SECTION 4 –
SPECIALIST REPORTS

60 Dutton Street, Coolangatta

Engineering Services Report
Statement of Landscape Intent
Stormwater Management Plan
Swept Path Assessment

ENGINEERING SERVICES REPORT

enhance
URBAN PLANNING

60 Dutton Street, Coolangatta

MICHAEL BALE & ASSOCIATES

Structural and Civil Engineering Consultancy

RESIDENTIAL DEVELOPMENT

60 DUTTON STREET, COOLANGATTA, QLD

ENGINEERING SERVICES REPORT

FOR: SOUTHERN CROSS PROPERTY HOLDINGS

REPORT NUMBER: R002-G24095







INNOVATIVE ENGINEERING WITH PERSONAL SERVICE

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Document Control

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03	01/06/26	SC	JT	Revised Architectural Plans
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1. Introduction

This report has been prepared to support the lodgement of a development application involving the construction of a new residential development, comprising of five (5) townhouse type units with four (4) stories. The development is proposed to take place over the following parcel of land:

Property Address:	60 Dutton St, Coolangatta QLD 4225
Property Description:	Lot 2 on RP86756
Council:	City of Gold Coast
Site Area:	703m^2

The report describes the civil engineering issues associated with the development of the proposed land and includes discussion on the following engineering items;

- Earthworks;
- Erosion and Sediment Control;
- Flooding;
- Stormwater Drainage;
- Water Connection; and
- Sewer Connection.

This report demonstrates that the proposed development can be suitably serviced with all engineering services described and supports the type and scale of development that is proposed.

1.1 Related Reports

This report is intended to be read in conjunction with the associated development submission documents, current as of the date of this report.

A Stormwater Management Plan (Ref: R001-G24095, REV 4) has been prepared for the proposed development and should be read in conjunction with this report.

2. Property Description

The proposed development is situated on the existing lot located at 60 Dutton Street, Coolangatta described as Lot 2 on RP86756. The property is located within the City of Gold Coast Local Government Area.

The site is located in the suburb of Coolangatta and is in close proximity to local commercial and retail centres.

The proposed development site is bounded by Dutton Street to the west, existing residential allotments to the north and south and Goodwin Park to the east. The registered area of the existing allotment for this proposal is 703m^2.

A general locality plan is presented in Figure 2.1 below:



Figure 2.1 - Site Locality (retrieved from QLD Globe)

2.1 Land Usage

The development site is currently occupied by a residential dwelling. The existing development contains impervious land uses, including roof, driveway, and other hardstand areas. The existing impervious areas have been estimated from the survey to cover approximately 57% of the site area, as displayed on the pre-developed catchment plan attached within Appendix A of this report.

The existing development is currently assessable via an existing VXO from Dutton Street.

2.2 Topography and Drainage

The detailed survey obtained for the project site indicates that majority of the surface grades towards the eastern boundary of the site towards Goodwin Park. A stormwater culvert traverses the proposed development site, running in parallel alignment with the northern boundary of the development site. Approximate levels on the site vary from 4.19m (AHD) in the northwest corner of the site to 2.99m (AHD) located in the southeast corner of the site. The average grade of the site has been calculated to be approximately 1.5%.

The development site contains existing internal stormwater infrastructure capturing runoff generated from the roof area, and discharges flows towards Goodwin Park to the east.

A copy of the detailed survey by Usher and Company has been attached within Appendix A of this report.

2.3 Upstream Catchment

The site survey indicates that the development site contains existing stormwater infrastructure that conveys an upstream catchment through the site, it is proposed that this stormwater infrastructure will remain to convey the upstream catchment through the development site, and the proposed development will comply with MP1.4. As a result, this development is expected not to be impacted by an upstream catchment and no allowance for upstream catchment flows have been considered in this report.

3. Proposed Development

3.1 Development Description

The proposed development consists of:

- The demolition of existing structures; and
- The construction of 5 (five) units, four (4) storey residential townhouses; and
- The construction of access driveways and other hardstand surfaces associated with the proposed development.

A copy of the proposed architectural layout plans has been included in Appendix A of this report.

Additional works on site shall include the construction of water reticulation, sewer reticulation, electrical and telecommunications services and stormwater management works.

External works for the development will consist of verge works with Dutton Street to facilitate the construction of the vehicle crossover and service connections. No further external civil works are proposed as part of this development.

4. Earthworks

The earthworks associated with the proposed development will predominantly involve minor earthworks and general lot shaping

The development is shown as being within a potential Acid Sulfate Soils problem area in City of Gold Coast's Interactive Mapping, shown in Figure 4.1 below.

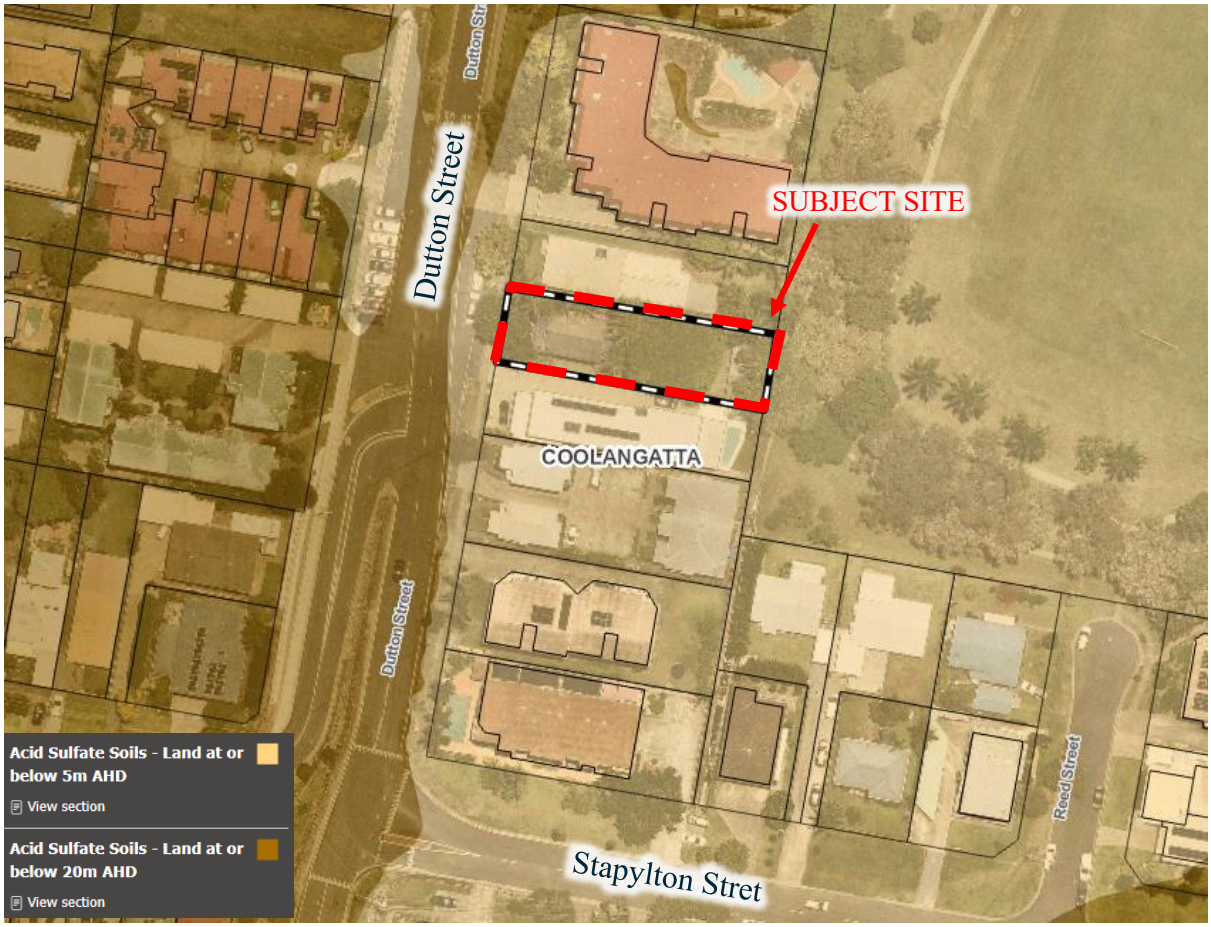


Figure 4.1: Acid Sulfate Soils Overlay Map (retrieved from Gold Coast City Plan interactive mapping)

A site-specific Acid Sulfate Soils assessment may therefore be required for the site. This is to be prepared by a suitably qualified geotechnical engineer. It is expected that the preparation of this report is to be included in the development application conditions, to be completed prior to construction of the development site.

5. Erosion and Sediment Control

The development has the potential to cause erosion and sedimentation runoff. The information presented in this section is relevant to the City of Gold Coast's Erosion Hazard Assessment table.

The average slope across the development site is estimated to be approximately 5%. Geoscience Australia Portal (GAP) data surrounding the subject site suggests that the soil type is a clay. The estimated duration of soil disturbance will likely be more than six months, considering the development type and average construction times.

The average rainfall for the Gold Coast area was taken from the bureau of meteorology for a three-month period from January to the end of March. This resulted in an expected mean rainfall of 186mm per month. There are currently no off-site sediment control measures serving the development site and analysis of the site survey and surrounding properties shows it is unlikely that stormwater from upstream catchments will discharge into the development area.

The results of the Erosion Hazard Assessment presented in City Plan / Part 9 Development codes / 9.4 Other development codes / 9.4.5 Healthy waters code / Table 9.4.5-3 of the City of Gold Coast City Plan are shown in table 5.1 below. If the development scores more than 11 points or greater, or five in any factor, a detailed erosion and sedimentation control plan will be required.

Table 5.1: Erosion Hazard Assessment

Controlling Factor	Result	Points
Average Slope	Slope less than 2%	0
Soil Type	Clay	3
Duration of Disturbance	More than 6 months	5
Rainfall Risk	High (101-225mm)	2
Off-Site Sediment Control	No	1
Run-off Entering the Site	No	0
Extent of Site Disturbance	Yes	2
	Total	**12**

As the total score for the proposed development is above 11 points and has scored 5 in a controlling factor, erosion and sediment control measures shall be undertaken in accordance with the Best Practice Erosion and Sediment Control: International Erosion Control Association. Detailed erosion and sediment control plans are to be prepared and lodged to Council during Operational Works phase of the development.

6. Flooding

The site has been identified on City of Gold Coast's mapping system as being unaffected by flooding levels, as shown in Figure 6.1 below.



Figure 6.1: Potential Flooding Inundation Overlay Map (retrieved from Gold Coast Flood Planning interactive mapping)

The development site is shown to not be flood affected by the flood overlay of the City of Gold Coast Flood Planning Map. Therefore, no further assessment of flood management is required for the proposed development site.

7. Water and Sewer Connection and Capacity

7.1 Sewer Connection

An existing Ø225 mm sewer main is located within the development site, located near the southern boundary. The precise location of the existing sewer property connection is currently unknown and will need to be identified and inspected as part of the development.

Subject to the findings of the inspection, it may be necessary to upgrade the existing sewer property connection. If required, the property connection will be upgraded to a new Ø150 mm sewer connection, which will directly tie into the existing Ø225 mm sewer main located within the development site.

Location of the proposed sewer property connection is detailed in the Engineering Drawings attached as Appendix B.

7.2 Water Connection

The development site is currently serviced via an existing Ø100 water main located within the Dutton Street western verge. It is proposed the existing Ø20 water property connection is to be decommissioned and removed and the existing water meter is to be returned to council.

It is proposed that the development site is to be serviced via a Ø40mm below ground water meter and property connection connecting directly into the existing Ø100 water main located within the western verge of Dutton Street. The final size of the connection is to be confirmed by the hydraulic engineer at the detailed design stage. Location of the proposed water property connection is detailed in the Engineering Drawings attached as Appendix B.

7.3 Capacity Assessment

The proposed development has been assessed under the requirements of the Gold Coast City Plan and the South-East Queensland Code (SEQ Code), providing a comparison between the planned intent for the subject site and the proposed development with regards to sewer and water demand rates.

An estimation of the Equivalent Persons (EP) to be used for the water demand and effluent discharge calculations for the proposed development site are presented in Table 7.1.

The impact of the proposed development has been compared to the planned demand in the City of Gold Coast City Plan.

The resulting impact on the existing water and sewer infrastructure has been calculated using the CoGC Water and Sewerage Demand Table and is presented in Table 7.2.

Table 7.1: Proposed Developments Equivalent Persons (EP)

Development Schedule	Dwellings	EP/Dwelling	Equivalent Persons (EP)
Apartments/Attached Dwellings - 3+ Bedrooms	5	2.51	12.55
		Total EP	**12.55**

Table 7.2: Water and Sewer Capacity Summary

	Current City Plan (RD5)	Proposed Development
Demand Conversion	206.00 EP/Ha	See above EP calc
Demand EP	*14.48* EP	*12.55* EP
Water Demand		
Average Day Demand (240L/EP/d)	3475.63 L/d	*3,012.00* L/d
Peak Conversion	PH = 2.97AD M.Residential	PH = 2.97AD M.Residential
Peak Hour Demand	*10,322.63* L/d - or	*8,945.64* L/d - or
	***0.120* L/s**	***0.104* L/s**
Sewer Demand		
Average Dry Weather Flow (210L/EP/d)	*3,186.00* L/d	*2,635.50* L/d
Peak Wet Weather Flow (5xADWF)	*15929.98* L/d - or	*13,177.50* L/d - or
	***0.180* L/s**	***0.153* L/s**

7.4 Summary

Results from Table 7.2 indicate that the proposed development does increase the water and sewer demand flows beyond what has been allowed for within the City of Gold Coast City Plan.

Therefore, a detailed W&S capacity assessment may be required for the proposed development site. It is requested that Council confirm the requirement of this assessment.

8. Stormwater Drainage

In the existing case, the majority of the stormwater runoff generated from the development site discharges towards the eastern boundary via overland sheet flow, towards Goodwin Park. Flows will enter council stormwater network via a stormwater headwall located within Goodwin Park. The captured stormwater runoff, discharges from the site without any on-site detention or water quality treatment. There is an existing 1200mm wide and 900mm high stormwater culvert traversing the northern side of the subject property as shown in Figure 8.1 below.

In the developed case, it is proposed that the development site is to connect into the existing stormwater infrastructure located within Goodwin Park. The flows generated from the site are to be detained and treated within a combined belowground stormwater treatment and detention tank, and discharge to an existing council headwall located within Goodwin Park via a proposed Ø300 stormwater pipe. This arrangement is outlined in the Engineering Drawings attached within Appendix B.

A separate report has been prepared for submission with this application to address stormwater drainage in specific detail.

The report prepared by Michael Bale & Associates (Ref: R001-G24095) describes the process of managing stormwater quality and quantity.

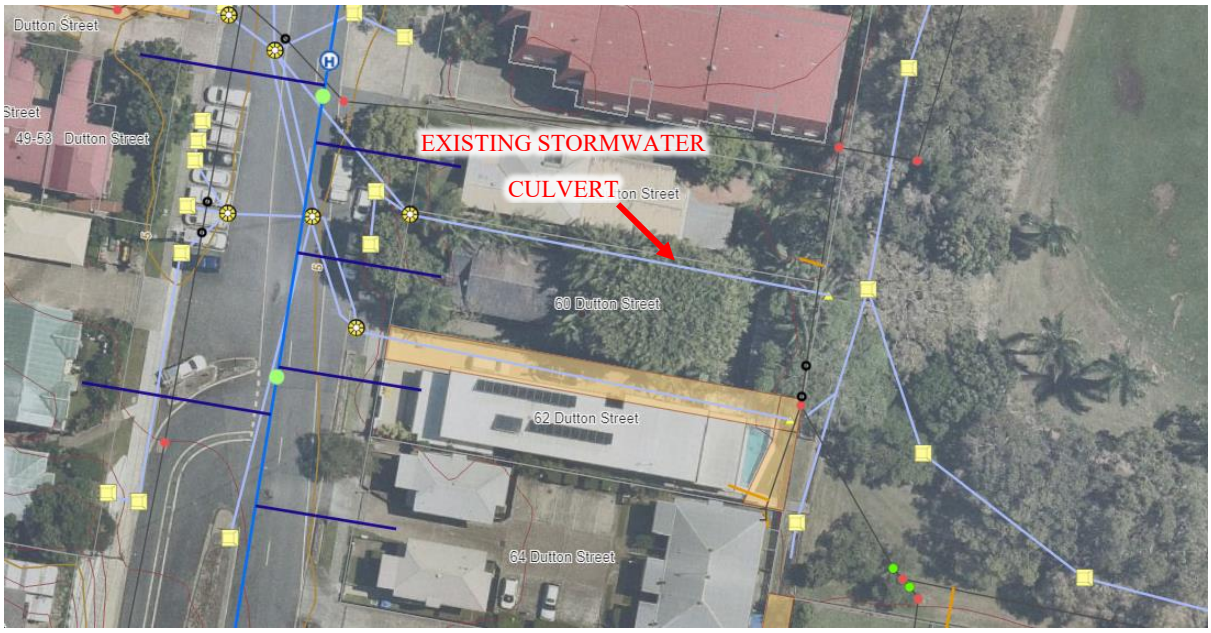


Figure 8.1: Existing Stormwater Infrastructure (retrieved from Gold Coast Infrastructure Asset ArcGIS online mapping)

9. Conclusion

This report has been prepared to support the lodgement of a development application involving the construction of a new residential development, comprising of five (5) townhouse type units with four (4) stories. The development is proposed to take place over the following parcel of land:

Property Address:	60 Dutton St, Coolangatta QLD 4225
Property Description:	Lot 2 on RP86756
Council:	City of Gold Coast
Site Area:	703m^2

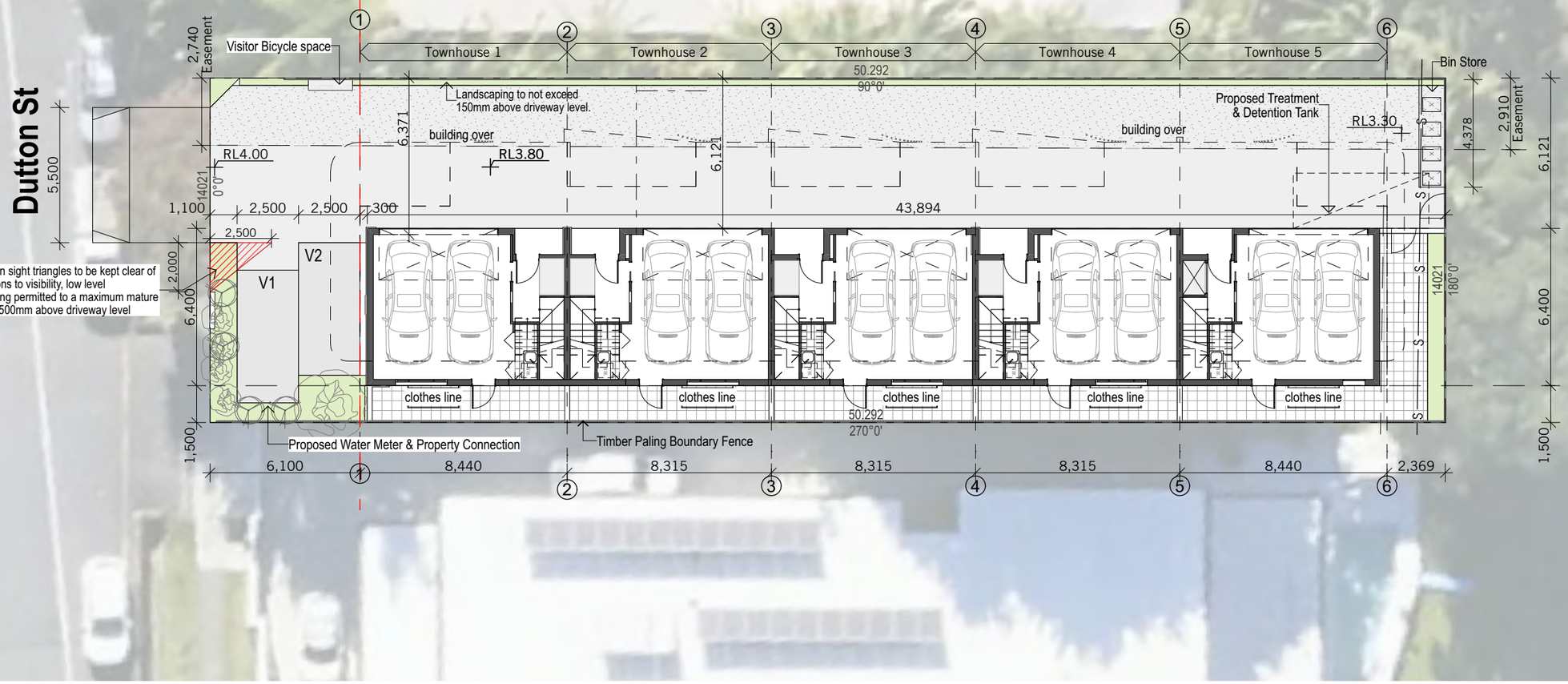
There are no apparent significant constraints on the execution of earthworks, sediment and erosion control, provision of vehicular access, or the drainage of stormwater from the site.

A summary of the proposed water and sewer connection strategy has been presented for Council's consideration. It has been assumed that surrounding infrastructure has sufficient capacity to service the proposed development.

This report demonstrates that the proposed development can be suitably serviced with all engineering services described and supports the type and scale and development that is proposed.

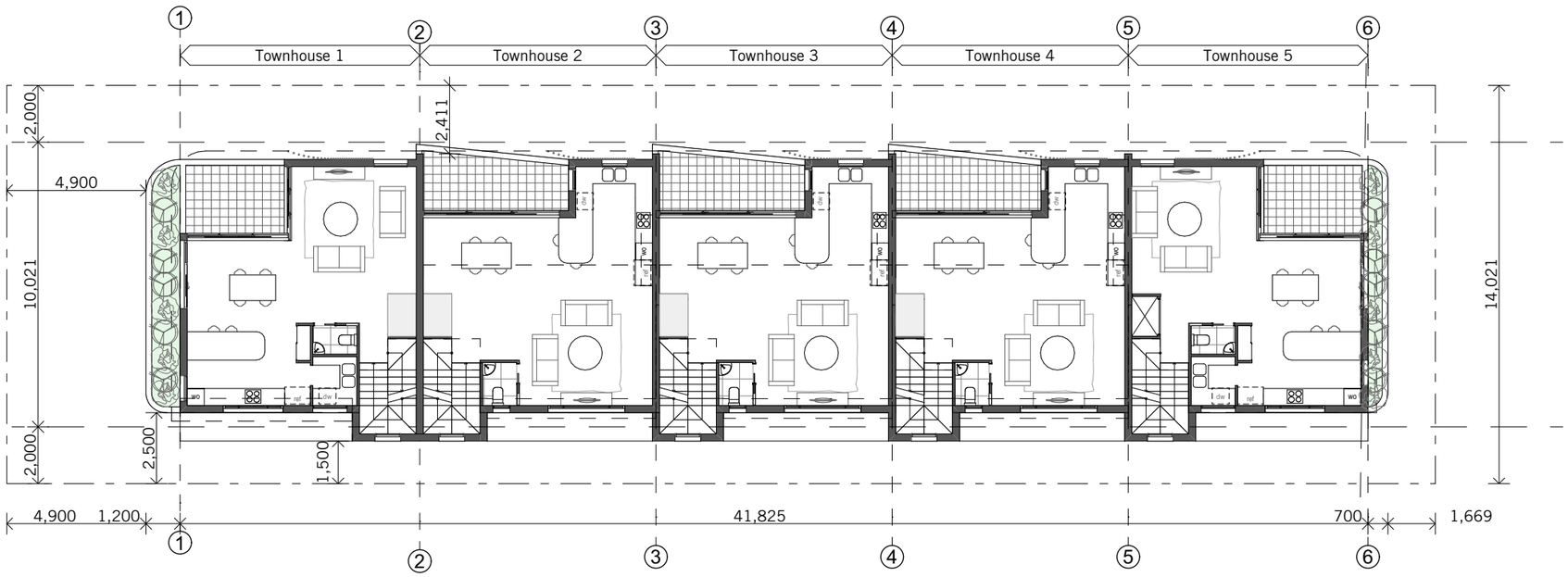
MICHAEL BALE & ASSOCIATES
Structural and Civil Engineering Consultancy

Appendix A
Site Survey & Architectural Plans



N

Site Plan
1:200, 1:1 @ A3



N

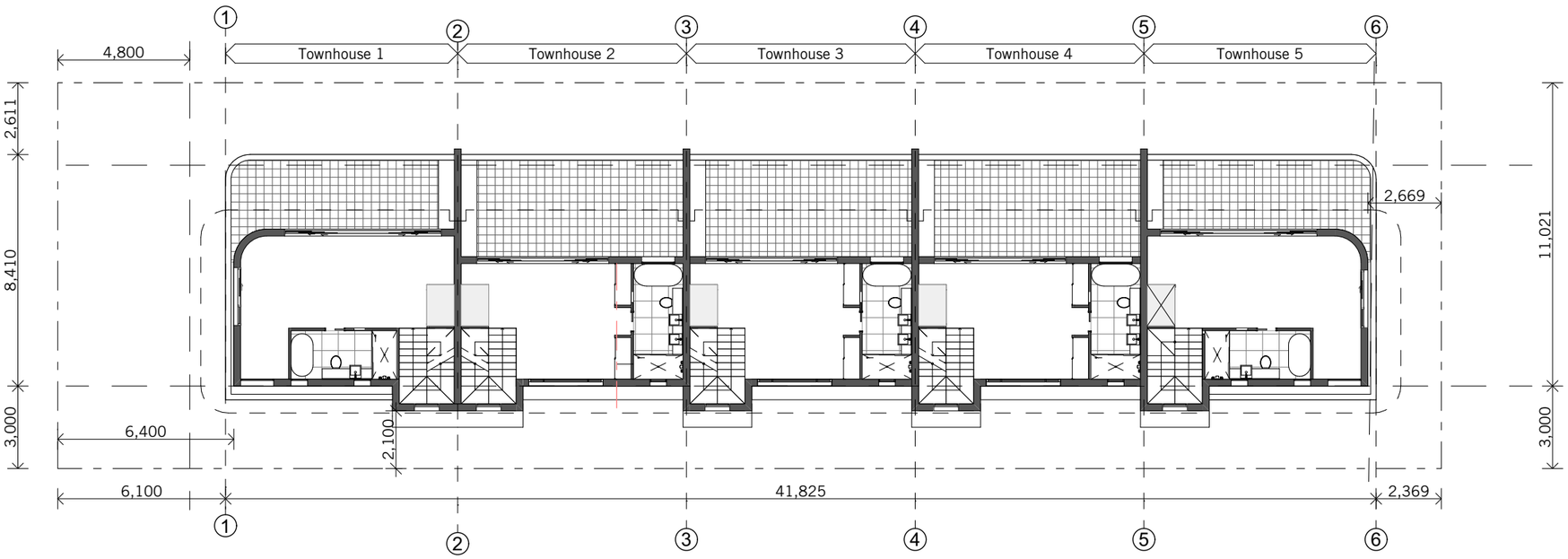
Level 2 Site Plan
1:200 @ A3



N

Levels 3 Site Plan

1:200 @ A3



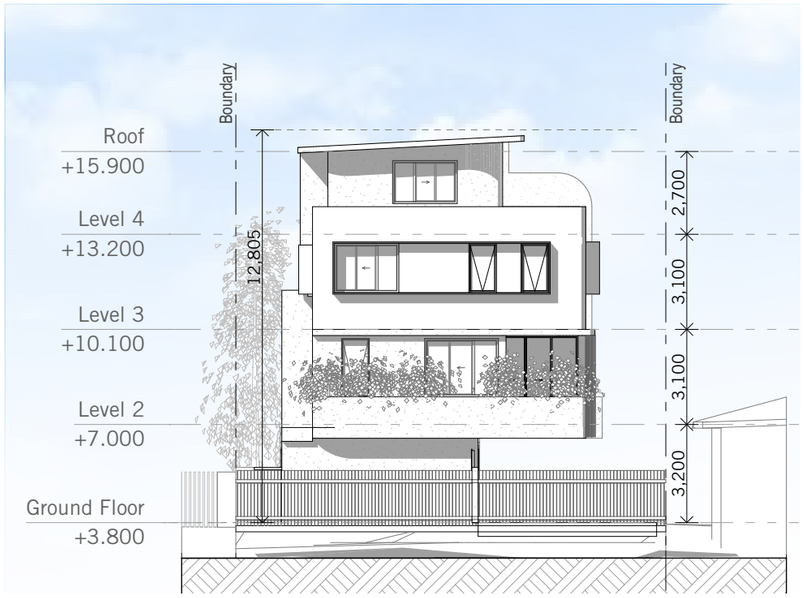
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Level 4 Site Plan

1:200 @ A3

Legend	
R-1	Rendered Finish (Vivid White)
R-2	Rendered Finish (Natural White)
R-3	Textured Rendered Finish with Ashlar Cut @600mm ctr (Vivid White)
CT-2	Crazy Paver (Sandblasted Finish)
Refer DA 20.05 Colour Pallet	





East Elevation

East Elevation
1:200, 1:100 @ A3



North Elevation

Legend	
R-1	Rendered Finish (Vivid White)
R-2	Rendered Finish (Natural White)
R-3	Textured Rendered Finish with Ashlar Cut @600mm ctr (Vivid White)
CT-2	Crazy Paver (Sandblasted Finish)
Refer DA 20.05 Colour Pallet	



North Elevation
1:200, 1:100 @ A3

MICHAEL BALE & ASSOCIATES
Structural and Civil Engineering Consultancy

Appendix B
Engineering Drawings

LEGEND

SITE BOUNDARY

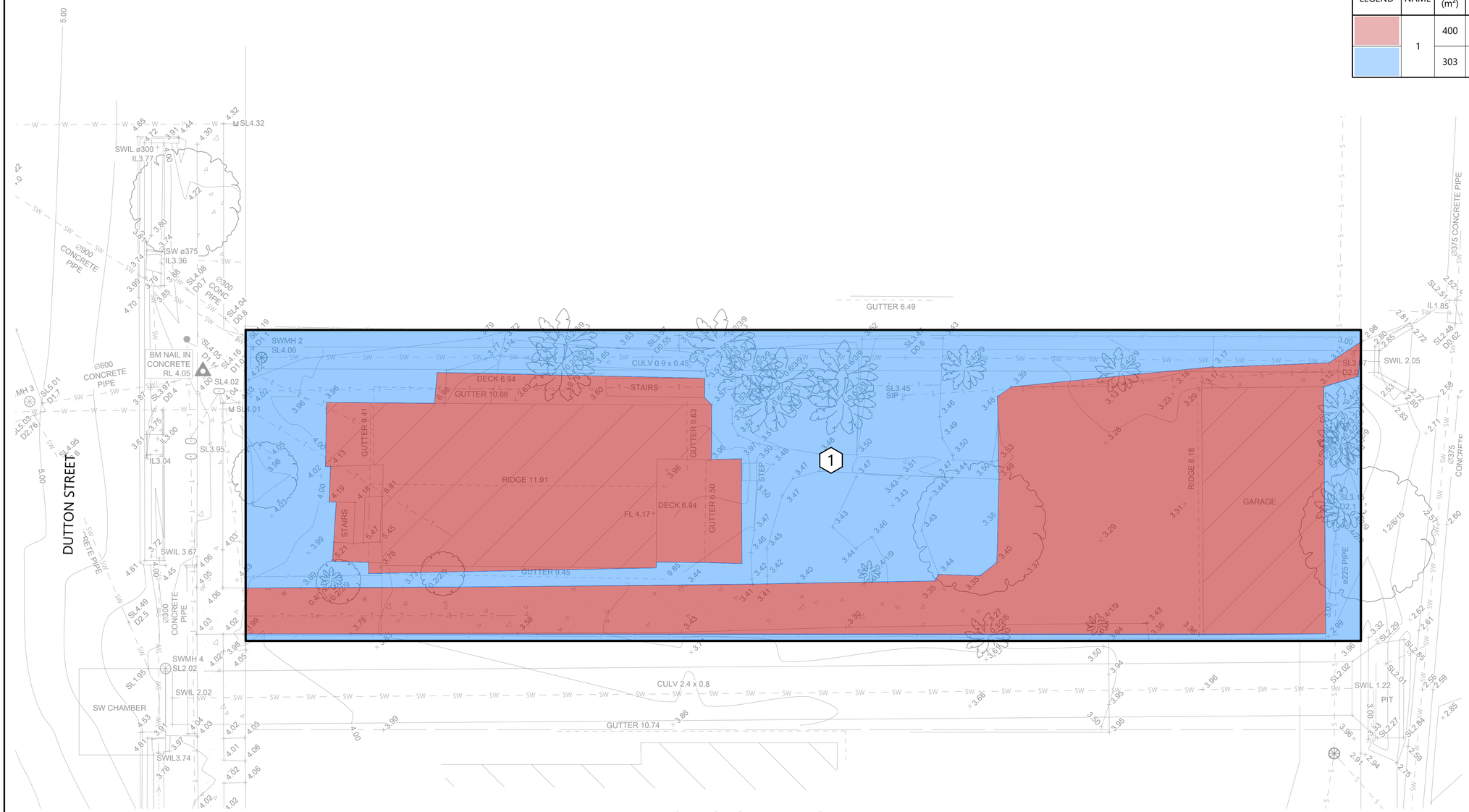
1 CATCHMENT LABELS

NOTES / WARNINGS

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PREDEVELOPED CATCHMENT AREAS

LEGEND	NAME	AREA (m^2)	DESCRIPTION	TOTAL AREA (m^2)	PERCENT IMPERVIOUS
	1	400	CATCHMENT 1 - IMPERVIOUS	703	57%
		303	CATCHMENT 1 - PERVIOUS		



PRE-DEVELOPED CATCHMENT LAYOUT

SCALE 1:100

ISSUE	DESCRIPTION	AUTHOR	DATE
01	ORIGINAL ISSUE	MTB	30.04.25

STATUS: FOR DA APPROVAL
NOT FOR CONSTRUCTION

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HEIGHT DATUM	AHD	DESIGNER	MTB
GRID	LOCAL	CHECKER	SC
ORIGINAL SIZE	A1	APPROVER	MB

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SCALE
SCALE 1:100 (1 0 1 2 3 4 5)
1:100 (A1) - 1:200 (A3)

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PROJECT TITLE:
60 DUTTON STREET
COOLANGATTA

DRAWING TITLE:
PRE-DEVELOPED CATCHMENT LAYOUT PLAN

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DA01	G24095	01

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POST-DEVELOPED CATCHMENT AREAS

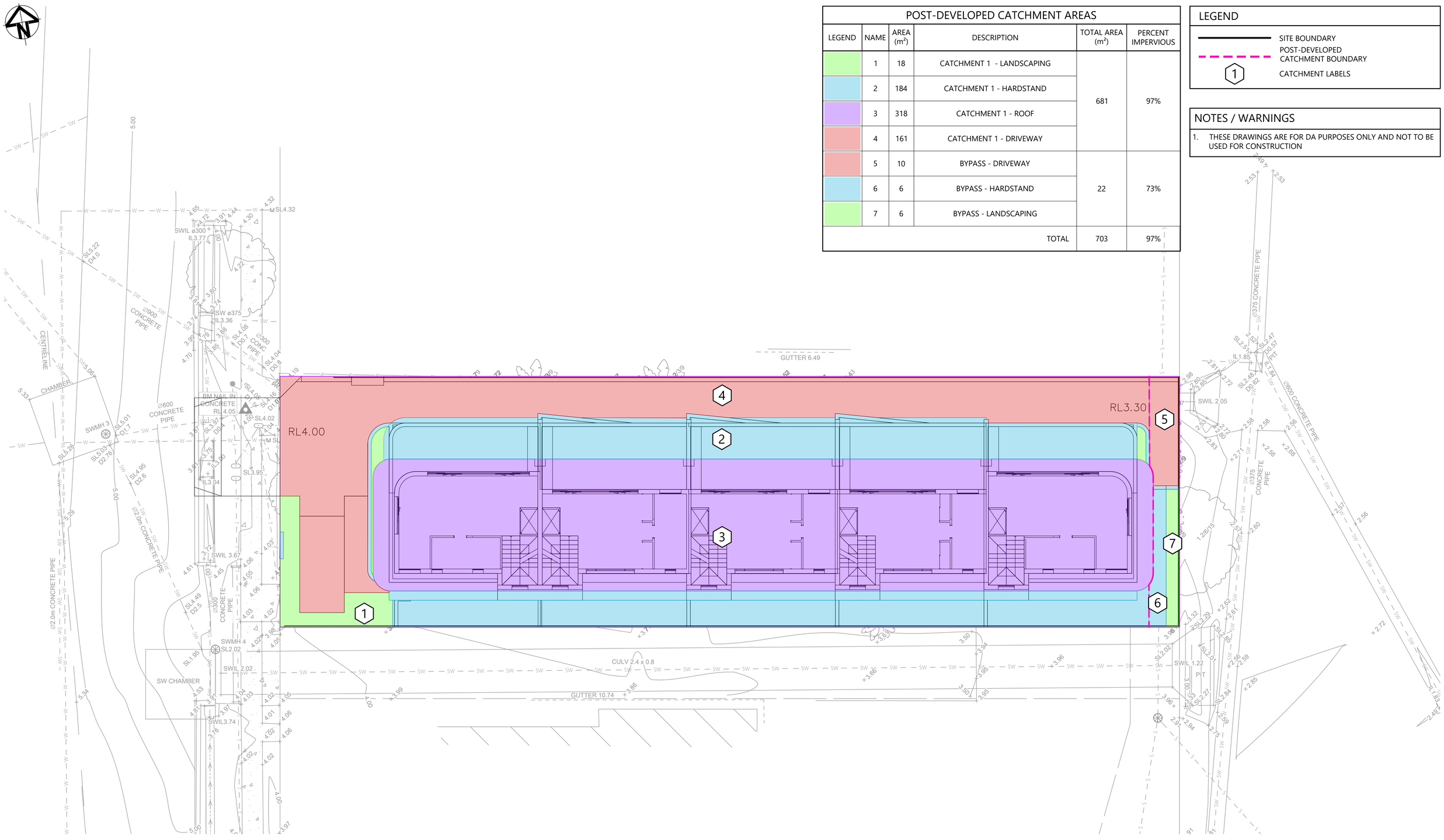
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	1	18	CATCHMENT 1 - LANDSCAPING	681	97%
	2	184	CATCHMENT 1 - HARDSTAND		
	3	318	CATCHMENT 1 - ROOF		
	4	161	CATCHMENT 1 - DRIVEWAY		
	5	10	BYPASS - DRIVEWAY	22	73%
	6	6	BYPASS - HARDSTAND		
	7	6	BYPASS - LANDSCAPING		
			TOTAL	703	97%

LEGEND

- SITE BOUNDARY
- POST-DEVELOPED CATCHMENT BOUNDARY
- (1) CATCHMENT LABELS

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POST-DEVELOPED CATCHMENT LAYOUT

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ISSUE	DESCRIPTION	AUTHOR	DATE
03	REVISED ARCHITECTURAL PLANS	TD	09.09.26
02	REVISED ARCHITECTURAL SCHEME	BM	01.06.26
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NOT FOR CONSTRUCTION

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ORIGINAL SIZE	A1	APPROVER	MB

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SCALE
SCALE 1:100 (1 0 1 2 3 4 5)
1:100 (A1) - 1:200 (A3)

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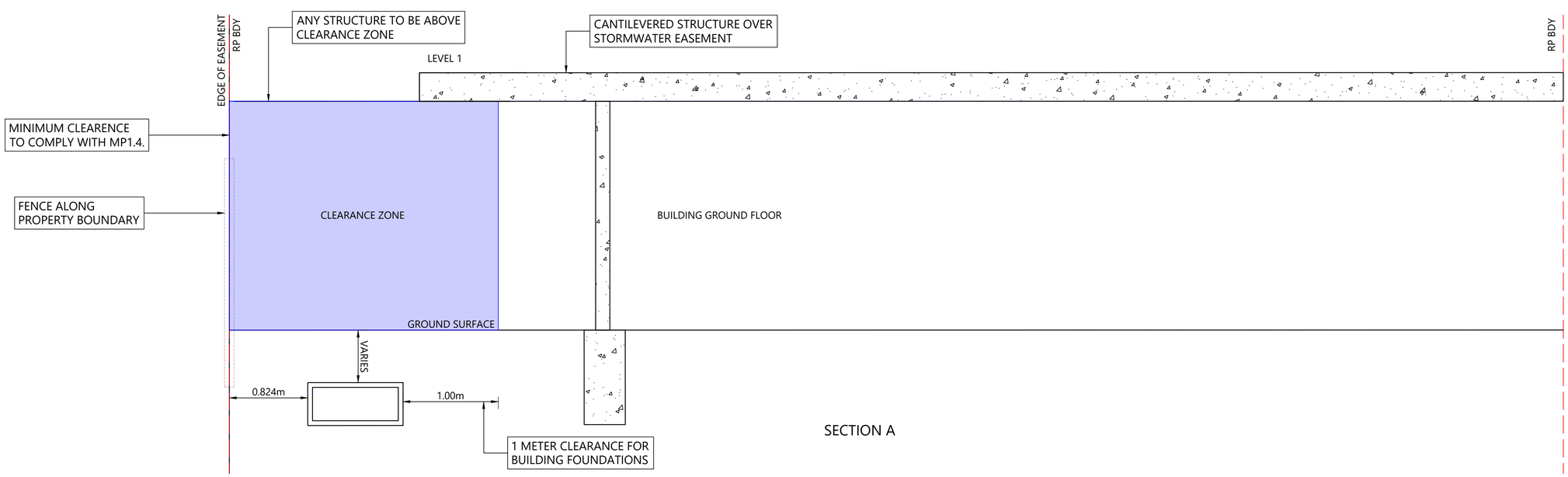
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60 DUTTON STREET
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POSTDEVELOPED CATCHMENT LAYOUT PLAN

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DA02	G24095	03

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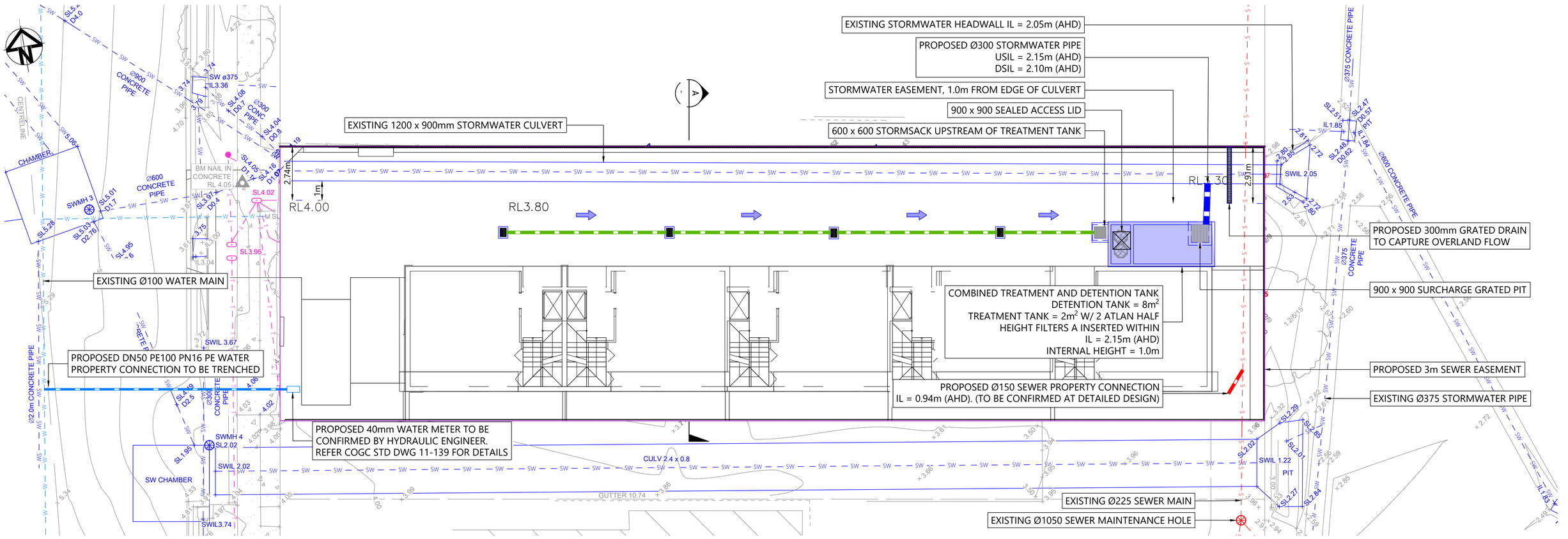
SECTION A

LEGEND

- SITE BOUNDARY
- PROPOSED STORMWATER LINE
- PROPOSED STORMWATER EASEMENT
- PROPOSED SEWER LINE
- PROPOSED SEWER EASEMENT
- EXISTING SEWER
- EXISTING WATER
- EXISTING STORMWATER
- EXISTING UNDERGROUND ELECTRICAL
- EXISTING OVERHEAD ELECTRICAL
- EXISTING TELSTRA
- EXISTING GAS

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SERVICES LAYOUT PLAN
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02	UPDATED ARCHITECTURAL LAYOUT	TD	09.09.26
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SCALE
SCALE 1:100
1:100 (A1) - 1:200 (A3)

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60 DUTTON STREET
COOLANGATTA

DRAWING TITLE:
SERVICES LAYOUT PLAN

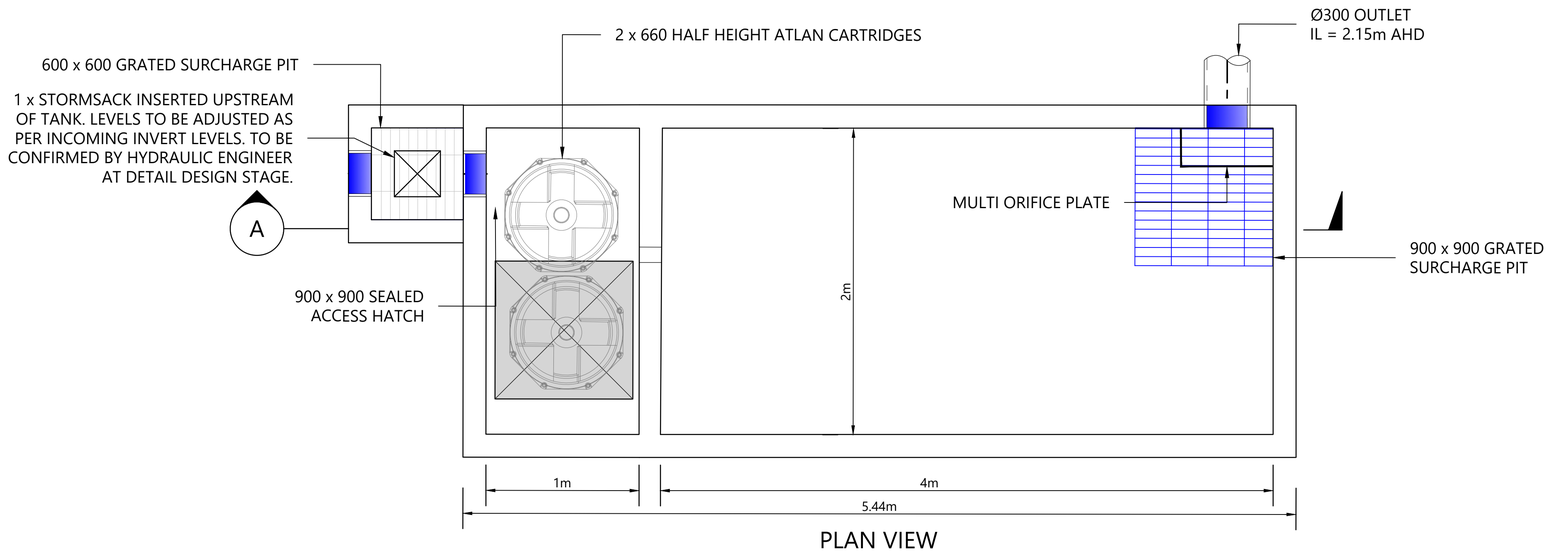
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DA03	G24095	02

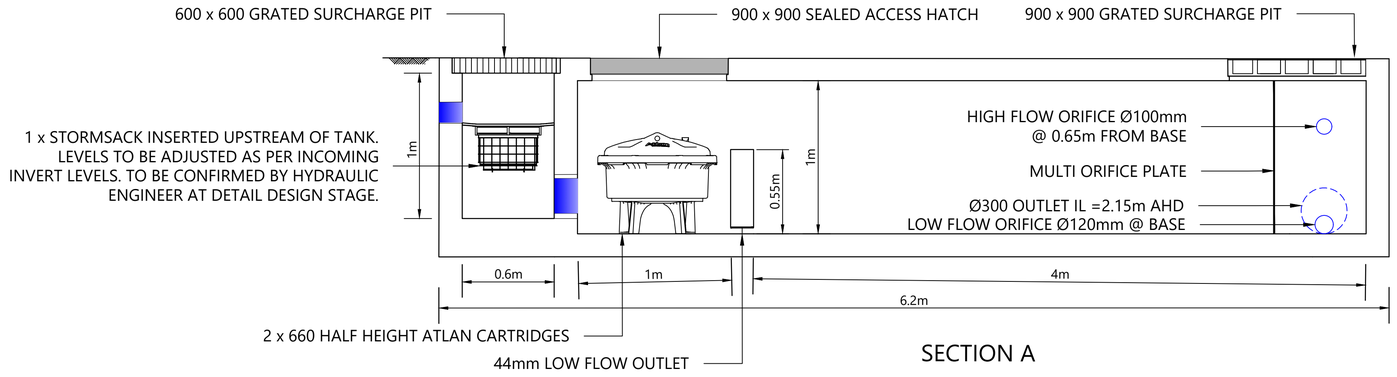
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PLAN VIEW



SECTION A

STORMWATER TANK PLAN

SCALE 1:20

ISSUE	DESCRIPTION	AUTHOR	DATE
02	REVISED ARCHITECTURAL SCHEME	BM	01.06.26
01	ORIGINAL ISSUE	MTB	09.05.25

22/01/2026 11:20 AM

STATUS: FOR DA APPROVAL
NOT FOR CONSTRUCTION

R.P.E.Q No :		CERTIFIED	
HEIGHT DATUM	AHD	DESIGNER	MTB
GRID	LOCAL	CHECKER	SC
ORIGINAL SIZE	A1	APPROVER	MB

SURVEYOR
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SCALE
SCALE 1:20 — 0.2 0 0.2 0.4 0.6 0.8 1.0
1:20 (A1) - 1:40 (A3)

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SOUTHERN CROSS PROPERTY HOLDINGS

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PROJECT TITLE:
60 DUTTON STREET
COOLANGATTA

DRAWING TITLE:
STORMWATER TANK PLAN

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DRAWING No.	PROJECT No.	REVISION
DA04 –	G24095	– 02

STATEMENT OF LANDSCAPE INTENT

enhance
URBAN PLANNING

60 Dutton Street, Coolangatta

60 Dutton Street

Coolangatta

Statement of Landscape Intent - Revised MCU IR Response

August 2026

Meaningful- Grounded- Playful

shepherd

Urban Landscape Architecture

Project Details & Contents

Project Details

Project Name:
Dutton Street

Client Name:
Lattimore

Architect Name:
Lightwave Architectural

Planner Name:
Enhance Urban Planning

Project Address:
60 Dutton Street Coolangatta QLD 4225

Project No.
2450

Revision:
A- 2025-04-29- Draft for Review
B- 2025-05-06- For Approval
C- 2025-05-07- For Approval
D- 2025-07-30- IR Response
E- 2026-05-19- Revised MCU
F- 2026-05-26- Revised MCU
G- 2026-08-31- Revised MCU IR Response

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1 Design Summary

2 Location & Context Plan

3 Key Design Principles

4 Landscape Concept Plan- Ground Level

5 Landscape Concept Plan- Level 2

6 Planting Palette

Design Summary

The subject site located at 60 Dutton Street (Lot 2 on RP86756) in Coolangatta on the Gold Coast, comprising 703m2 approximate of medium density land within Division 14 of the City of Gold Coast.

The Landscape concept for the proposed residential development is based on the surrounding context, response to the proposed architectural layout and expression including the desired outcomes of the City of Gold Coast Council City Plan.

The design intent is to contribute positively to the image and overall quality of the proposed residential development by providing a contemporary, sensitive and appropriate landscape environment.

The key landscape design principles applied to the landscape concept comprise:

- Enhancing (Maximising planting opportunities and responding to local context)
- Connected (multiple access points and lines of movement)
- Diverse (a planting palette that provides variation of habit, form, colour, texture, mix of natives and exotics)
- Enduring (sustainable and resilient material selection)
- Comfortable (humanised scale. A space where you can be yourself)
- Vibrant (providing spaces for interaction and socialisation)
- Safe (open sight lines)

Location & Context Plan



North

Project Name:	Client Name:	Project No.	Revision:	Date:	DWG No.
Dutton Street	**Lattimore**	**2450**	**G**	**2026-08-31**	**L002**

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Urban Landscape Architecture

Key Design Principles



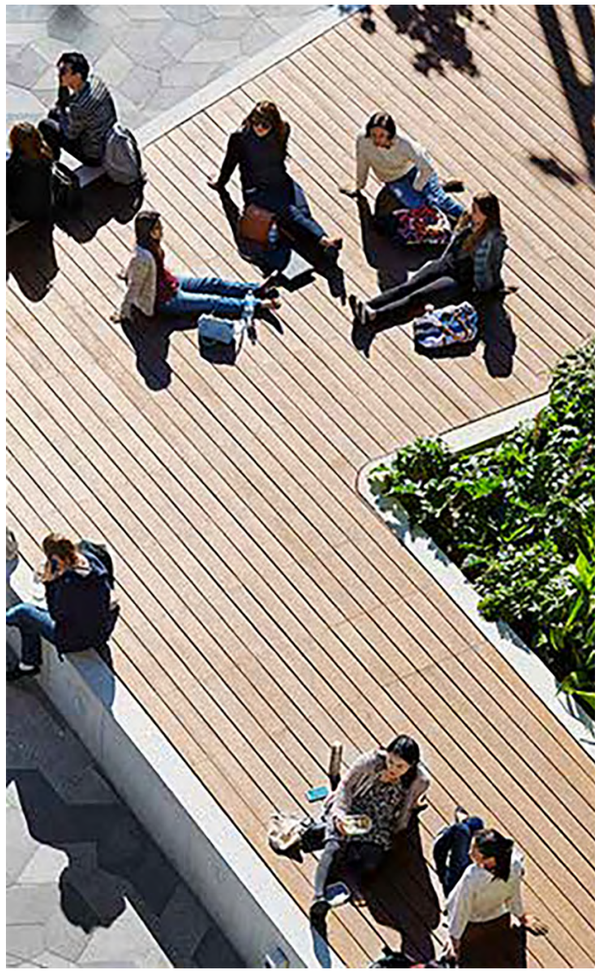
Make it Local

+ Reflect local context, story and people
+ Reflect local planting communities
+ Provide a sense of place and locality
+ Promote local connectivity



Make it Human

+ Provide a human scale of design
+ Experience to be comfortable



Make it Social

+ Provide social amenities for the community
+ Provide options to gather and meet
+ Provide flexible spaces for socialisation



Make it Green

+ Create active zones for residents and visitors
+ Create interest for kids such as sensory planting and safe water interaction
+ Promote active connections to surrounding open space

Overview

The Landscape Principles are based on best practice design, understanding the human needs, making it safe and enjoyable while designing spaces that encourage social outcomes, community spirit and a strong sense of place.

Landscape Concept Plan - Ground Floor

Legend

1. Deep soil planting zone with screen shrub planting and accent palm / shrub / groundcover planting
   Frontage: deep soil = 15m2
   Rear deep soil = 6m2
2. Feature paving to private open space (to Architects details)
3. Visitor parking
4. Easement
5. Existing underground sewer line
6. Site Boundary / Fencing (to Architects details)
7. Columnar tree planting within deep soil planting zone
8. 300mm wide garden bed comprising climber to fence



0 2 4 6 8 10m

Scale 1:200 @ A3

North

Project Name:	Client Name:	Project No.	Revision:	Date:	DWG No.
Dutton Street	**Lattimore**	**2450**	**G**	**2026-08-31**	**L004**

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Urban Landscape Architecture

Landscape Concept Plan - Level 2

Legend

1. Raised planter 1m high with accent shrub, groundcover and cascade planting
2. BBQ / dining / gathering terrace
   To Architects details
3. Ground level landscape



0 2 4 6 8 10m

Scale 1:200 @ A3

North

Project Name:	Client Name:	Project No.	Revision:	Date:	DWG No.
Dutton Street	**Lattimore**	**2450**	**G**	**2026-08-31**	**L005**

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Urban Landscape Architecture

Planting Palette - Trees & Palms



Tuckeroo **Tree**
Cupaniopsis anacardiodes 8 x 4m



Eumundi Quandong **Tree**
Elaeocarpus eumundi 8 x 3m



Water Gum **Native Tree**
Tristaniopsis ‘Luscious’ 8 x 5m



Weeping Lilly Pilly **Native Tree**
Waterhousea floribunda 8 x 5m



Kentia Palm **Palm**
Howea forsteriana 8 x 6m



Foxtail Palm **Palm**
Wodyetia bifurcata 10 x 5m



Cabbage Tree Palm **Palm**
Livistona australis 8 x 6m



Screw Pine **Tree**
Pandanus utilis 8 x 4m

Project Name:	Client Name:	Project No.	Revision:	Date:	DWG No.
Dutton Street	**Lattimore**	**2450**	**G**	**2026-08-31**	**L006**

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Urban Landscape Architecture

Planting Palette - Shrubs



Miss Muffet **Shrub**
Pittosporum tobira 1 x 1m



Giant Bird of Paradise **Shrub**
Strelitzia nicolai 5 x 3m



Agave attenuata **AGA att**
Century Plant



Big Red **Shrub**
Syzygium australe 3 x 3m



Resilience **Shrub**
Syzygium australe 3 x 2m



Dense Fence **Shrub**
Viburnum odoratissimum 3 x 3m



Pink Diamond **Shrub**
Cordyline fruticosa 2 x 1m



Cardboard Plant **Shrub**
Zamia furfuracea 2 x 1m



Desert Star **Shrub**
Carissa grandiflora 2 x 2m



Gymea Lily **Shrub**
Doryanthes excelsa 2 x 2m



Silver Lady **Shrub**
Blechnumsp 1 x 1m



Rojo Congo **Shrub**
Philodendron sp 1 x 1m

Project Name:	Client Name:	Project No.	Revision:	Date:	DWG No.
Dutton Street	**Lattimore**	**2450**	**G**	**2026-08-31**	**L007**

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Urban Landscape Architecture

Planting Palette - Groundcovers



Yareena **Groundcover**
Myoporoum parvifolium 0.3 x 3m



Silver Leaf Gazania **Groundcover**
Gazania tomentosa 0.3 x 2m



Blue Chalksticks **Groundcover**
Senecio serpens 0.3 x 2m



Xanadu **Groundcover**
Philodendron selloum 1 x 1m



Just Right **Groundcover**
Liriope muscari 0.3 x 0.3m



Evergreen Giant **Groundcover**
Liriope muscari 0.5 x 0.5m



Lime Tuff **Groundcover**
Lomandra 0.5 x 0.5m



Matt Rush **Groundcover**
Lomandra Hystrix 1.5 x 1.5m

Planting Palette - Cascading & Climbers



Cousin It **Cascading**
Casuarina glauca 0.3 x 2m



Silver Falls **Cascading**
Dichondra repens 0.3 x 2m



Golden Pothos **Cascading**
Epipermnum aureum 0.3 x 2m



Waterfall Plant **Cascading**
Phyllanthus multiflorus 0.3 x 2m



Climbing Fig **Climber**
Ficus pumila 8 x 3m



Pink Mandevilla **Climber**
Dipladenias 8 x 5m



Trachelospermum jasminoides
Star Jasmine **Climber**
8 x 5m



Funky Bells **Climber**
Pandorea jasminoides 8 x 5m

Project Name:	Client Name:	Project No.	Revision:	Date:	DWG No.
Dutton Street	**Lattimore**	**2450**	**G**	**2026-08-31**	**L009**

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STORMWATER MANAGEMENT PLAN

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URBAN PLANNING

60 Dutton Street, Coolangatta

MICHAEL BALE & ASSOCIATES

Structural and Civil Engineering Consultancy

RESIDENTIAL DEVELOPMENT

60 DUTTON STREET, COOLANGATTA, QLD

STORMWATER MANAGEMENT PLAN

FOR: SOUTHERN CROSS PROPERTY HOLDINGS

REPORT NUMBER: R001-G24095







INNOVATIVE ENGINEERING WITH PERSONAL SERVICE

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The information contained in this report has been prepared based on the information made available to Michael Bale and Associates at the time of preparation. This document, design parameters, and conclusions rely on external data sources, and the accuracy of this document is correct to the extent of the information provided to us.

This report has been prepared solely for the benefit of our client. We do not accept any liability for damage or loss resulting from reliance on this report, or any part of it, by any party other than the client (named on the front page of this report).

Document Control

Author:	Trent Dalton		
Reviewer	Salvatore Cautela		
Approver **RPEQ**	Jasmin Trgo 19378		
Report Title	R001 – G24063 - Stormwater Management Plan		
Revision	05	**Date**	09/09/26

Revision History

Revision	Date	Author	Approver	Description
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02	20/05/25	MTB	MB	Original Issue
03	04/08/25	MTB	MB	Updated as per council RFI
04	01/06/26	BM	JT	Revised Architectural Plans
05	09/09/26	TD	JT	Updated Architectural Plans

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Client Contact Details

- Client: Southern Cross Property Holdings

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1. Introduction

This report has been prepared to support the lodgement of a development application involving the construction of a new residential development, comprising of five (5) townhouse type units with four (4) stories. The development is proposed to take place over the following parcel of land:

Property Address:	60 Dutton St, Coolangatta QLD 4225
Property Description:	Lot 2 on RP86756
Council:	City of Gold Coast
Site Area:	703m^2

The purpose of this report is to address the management of stormwater quantity and quality to ensure that the proposed development complies with all necessary state and local government policies.

This report intends to assess the likely impact of the proposed development in relation to stormwater quantity, and the adequacy of the existing stormwater infrastructure to accommodate the proposed development.

1.1 Related Reporting

This report is intended to be read in conjunction with the associated development submission documents, current as of the date of this report.

An Engineering Service Report (Ref: R002-G24095, REV 3) has been prepared for the proposed development and should be read in conjunction with this report.

2. Property Description

The proposed development is situated on the existing lot located at 60 Dutton Street, Coolangatta described as Lot 2 on RP86756. The property is located within the City of Gold Coast Local Government Area.

The site is located in the suburb of Coolangatta and is in close proximity to local commercial and retail centres.

The proposed development site is bounded by Dutton Street to the west, existing residential allotments to the north and south and Goodwin Park to the east. The registered area of the existing allotment for this proposal is 703m^2.

A general locality plan is presented in Figure 2.1 below:



Figure 2.1 - Site Locality (retrieved from QLD Globe)

2.1 Land Usage

The development site is currently occupied by a residential dwelling. The existing development contains impervious land uses, including roof, driveway, and other hardstand areas. The existing impervious areas have been estimated from the survey to cover approximately 57% of the site area, as displayed on the pre-developed catchment plan attached within Appendix A of this report.

The existing development is currently assessable via an existing VXO from Dutton Street.

2.2 Topography and Drainage

The detailed survey obtained for the project site indicates that majority of the surface grades towards the eastern boundary of the site towards Goodwin Park. A stormwater culvert traverses the proposed development site, running in parallel alignment with the northern boundary of the development site. Approximate levels on the site vary from 4.19m (AHD) in the northwest corner of the site to 2.99m (AHD) located in the southeast corner of the site. The average grade of the site has been calculated to be approximately 1.5%.

The development site contains existing internal stormwater infrastructure capturing runoff generated from the roof area, and discharges flows towards Goodwin Park to the east.

A copy of the detailed survey by Usher and Company has been attached within Appendix A of this report.

2.3 Upstream Catchment

The site survey indicates that the development site contains existing stormwater infrastructure that conveys an upstream catchment through the site. An assessment of this external catchment is detailed in Section 7.

3. Proposed Development

The proposed development consists of:

- The demolition of existing structures; and
- The construction of 5 (five) units, four (4) storey residential townhouses; and
- The construction of access driveways and other hardstand surfaces associated with the proposed development.

A copy of the proposed architectural layout plans has been included in Appendix A of this report.

Additional works on site shall include the construction of water reticulation, sewer reticulation, electrical and telecommunications services and stormwater management works.

External works for the development will consist of verge works with Dutton Street to facilitate the construction of the vehicle crossover and service connections. No further external civil works are proposed as part of this development.

4. Lawful Point of Discharge

In the existing case, the majority of the stormwater runoff generated from the development site discharges towards the eastern boundary via overland sheet flow, towards Goodwin Park. Flows will enter council stormwater network via a stormwater headwall located within Goodwin Park. The captured stormwater runoff, discharges from the site without any on-site detention or water quality treatment.

In the developed case, it is proposed that the development site is to connect into the existing stormwater infrastructure located within Goodwin Park. The flows generated from the site are to be detained and treated within a combined belowground stormwater treatment and detention tank, and discharge to an existing council 1200x900 reinforced concrete box culvert via a proposed Ø300 stormwater pipe. Ultimately, flows discharge towards Goodwin Park via a council headwall. This arrangement is outlined in the Engineering Drawings attached within Appendix B.

The proposed discharge arrangement is considered to comply with the requirements of a lawful point of discharge and will be maintained following the development of the site. It is not anticipated that any stormwater will be directed towards any adjacent properties.

QUDM (2017) provides a three-part framework for the identification of a lawful point of discharge for a development site. The first assessment item is to consider if the proposed development will alter the site's stormwater discharge characteristics in a manner that may substantially damage a third-party property. As the proposed development is not considered likely to worsen the flows received by the stormwater infrastructure within Goodwin Park, the proposed point of discharge is considered to satisfy the requirements set out in Section 3.9.1 – Lawful Point of Discharge Test.

This compliance is further demonstrated in the following pages where it is shown that the proposed development will result in no worsening of peak flows from the development site.

5. Site Specific Hydrology

5.1 Introduction

The proposed development will involve the construction of a new residential apartment building, access driveway and other associated hardstand surfaces. These changes in site layout have the potential to change the coefficient of discharge for the site and thereby may affect the peak stormwater discharge rates of the development site.

This section of the report presents an assessment of the peak stormwater discharge resulting from the site and identifies whether attenuation measures are necessary to ensure "no-worsening" of the peak flows from the site.

5.2 Methodology

The methodology of the hydrologic analysis involves the use of both the Rational Method and DRAINS runoff-routing software. The Rational Method, as described by the Queensland Urban Drainage Manual (QUDM 2017), provides a simple means for the assessment of the peak discharge rate for design storms. The rational method does not provide a reliable basis for the determination of runoff volume or hydrograph shape.

DRAINS software (by Watercom) is a computer-based model that incorporates time-area routing processes to more accurately determine the volume and shape of the hydrograph during a storm event. DRAINS also includes storage-routing processes that can simulate the effect of stormwater detention systems.

The Rational Method is used in the hydrologic analysis to calibrate and verify the results of the DRAINS software modelling, in lieu of the availability of gauged information.

Once calibrated and verified, the DRAINS software modelling is used to calculate all the pre and post development hydrographs that are used in the assessment, and for the design of the proposed stormwater detention system.

5.3 Catchment Definition

In the existing case, the site has been modelled as singular catchment, with the Fraction Imperviousness measured from the site survey. In the developed case, the development site is represented by two (2) catchments, a highly developed catchment and a small bypass catchment with the fraction imperviousness measured from the current architectural plans. Table 5.1 below summarises the catchment properties used for the stormwater modelling.

Table 5.1: Catchment Definition

Catchment	Catchment Size	Fraction Impervious (f_i)
Pre-Developed Site	703m^2	0.57
Post-Developed Site	669m^2	0.97
Post-Developed (Bypass)	34m^2	0.73

Hydrologic Parameters

Time of Concentration

The time of concentration for the pre- and post-development catchments have been calculated in accordance with QUDM. The Friends sheet flow equation has been used to determine the time of concentration (t_c) for the ground catchments. The time of concentration for the catchment have been estimated using standard inlet times in combination with expected length of piped flows. Refer to Table 5.2 for the calculated time of concentration for each catchment.

Table 5.2: Time of Concentration Summary

Catchment	Catchment Size	Time of Concentration
Pre-Developed Site	703m²	9.0 minutes
Post-Developed Site	681m²	5.0 minutes
Post-Developed (Bypass)	22m²	5.0 minutes

C10 Value

The C_{10} values for the existing and proposed site conditions have been calculated in accordance with the Queensland Urban Drainage Manual (QUDM), Table 4.5.3: Table of C_{10} values. A summary of the C_{10} values adopted for the site are presented in Table 5.3 below.

Table 5.3: C_{10} Values

	Area	Rainfall Intensity, $^1I_{10}$/ Fraction Impervious	C_{10}
Pre-development	703m²	70.50mm/hr /57%	0.814
Post-development	681m²	70.50mm/hr /97%	0.894
Post-Developed (Bypass)	22m²	70.50mm/hr /73%	0.846

Summary of Flow – Rational Method

The Rational Method was used to calculate runoff from the site in the pre-developed and post developed scenario. The anticipated peak discharge is detailed in Table 5.4 below.

Table 5.4: Rational Method Calculation Summary

AEP	39% (m³/s)	18% (m³/s)	10% (m³/s)	5% (m³/s)	2% (m³/s)	1% (m³/s)
Pre-Developed	0.016	0.024	0.029	0.035	0.045	0.052
Post-Developed	0.019	0.030	0.037	0.045	0.056	0.063
Bypass	0.001	0.001	0.001	0.001	0.002	0.002
Flow Increase	**+0.005**	**+0.007**	**+0.009**	**+0.011**	**+0.013**	**+0.013**

Table 5.4 above shows that the development will result in an increase is peak estimated flow rates for all AEPs. As it has been demonstrated that the proposed development will result in increased flows from the development site, the development **will** need to provide on-site detention to mitigate peak flows.

5.4 Detention Design Process

DRAINS hydrologic software has been utilised to undertake the assessment of pre-development and post-development stormwater discharge for the purposes of the on-site detention specification process.

DRAINS version 2025.01 has been utilised in this assessment.

DRAINS Parameters

Calibration

The total pre-development flow has been calculated using DRAINS software and compared to the Rational Method Calculations. The times of concentration and fractions impervious used in DRAINS are identical to the ones used in the Rational Method calculations. The pre-development flow calculated in the DRAINS Model is presented in Table 5.5 below.

Table 5.5: Pre-Development Runoff Calculations Comparison

	39% (m^3/s)	18% (m^3/s)	10% (m^3/s)	5% (m^3/s)	2% (m^3/s)	1% (m^3/s)
Pre-development Rational Method	0.016	0.024	0.029	0.035	0.045	0.052
Pre-development DRAINS	0.019	0.024	0.030	0.035	0.042	0.047

As shown in Table 5.5 above, the peak flows determined by DRAINS generally compare well against the peak flows calculated by the Rational Method, with conservative values. Therefore, the DRAINS model is considered appropriate for this site.

Rainfall (Temporal Patterns)

Rainfall data used in the DRAINS model has been sourced from the Bureau of Meteorology for the Coolangatta region. The model has assessed all temporal patterns between 5 minutes and 120 minutes (2 hours) for all standard design storms.

Modifiable Inputs

The DRAINS software package has several inputs that can be used to manipulate the hydraulic behaviour of the model. The values adopted in this model are all default values, and are presented in Table 5.6 below:

Table 5.6: DRAINS Modifiable Inputs

Input	Modelled Value
Antecedent Moisture Condition	3
Paved Depression Storage (mm)	1
Supplementary Depression Storage (mm)	1
Grassed (Pervious) Depression Storage (mm)	5
Soil Type	3

Depression Storage values of 1mm for paved/supplementary and 5mm for grassed (pervious) areas were adopted in this model as is recommended in the DRAINS user manual.

An Antecedent Moisture Condition (AMC) of 3.0 has been adopted for this site. This is a default value for DRAINS. A soil type classification type of 3 is representative of soil with slow infiltration rates (may have layers that impede downward movement of water). This value is the default (conservative) value adopted by DRAINS and is considered to represent the existing site conditions well.

Detention Design Parameters

It is proposed to provide detention for the development site within a singular detention tank that is underneath the ground floor slab. The detention system is proposed to mitigate peak flows from the proposed development. Details of the proposed detention systems are presented in Table 5.7 below.

Table 5.7– Detention System Design Parameters

Detention Tank Parameters	
Detention Base	8.0m²
Detention Height	1.0m
Total Detention Volume	**8.0m³**
Low-Flow Orifice Size/Level	Ø120mm @ Base
High-Flow Orifice Size/Level	Ø100mm @ 0.65m above Base
Emergency Overflow Weir	900 x 900 Grate @ Top of Tank
Outlet Size/Level	Ø300mm @ Base

Figure 5.1 below shows a screenshot of the DRAINS model used to represent the subject site.

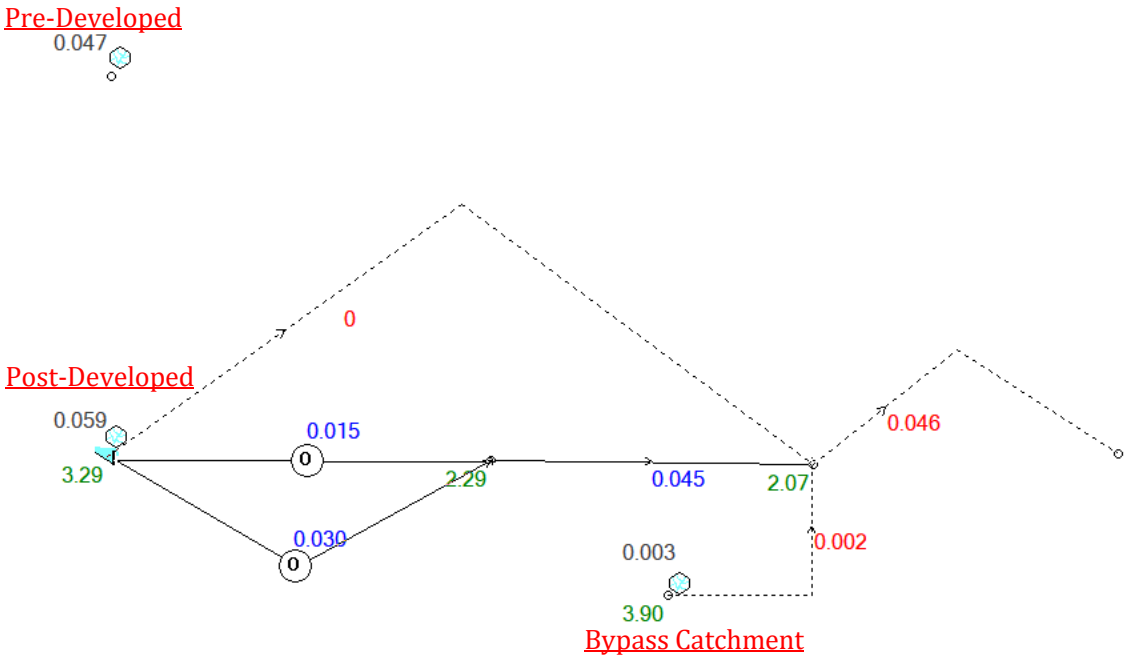


Figure 5.1 – DRAINS Model Screenshot 1% AEP

DRAINS Hydrologic Modelling Results

The on-site stormwater detention arrangement described in Table 5.7 has been designed to demonstrate that the proposed on-site detention strategy is effective in reducing developed peak stormwater discharge to a rate that is less than the existing, pre-development scenario.

The results of the assessment and confirmation of the achievement of the on-site detention objectives at all lawful points of discharge are provided in Table 5.8 below:

Table 5.8 – Development Runoff Calculations with Detention – DRAINS Model

	39% (m³/s)	18% (m³/s)	10% (m³/s)	5% (m³/s)	2% (m³/s)	1% (m³/s)
Q Pre-Developed (m³/s)	0.019	0.024	0.030	0.035	0.042	0.047
Q Detention (m³/s)	0.019	0.023	0.030	0.035	0.040	0.046
Peak Flow Reduction (m³/s)	0.000	-0.001	0.000	0.000	-0.002	-0.001

The comparison of pre-developed and attenuated post-developed with detention conditions shows that non-worsening of peak discharges in the 39%, 18%, 10%, 20%, 50% and 1% AEP storm events is achievable with the detention system described in previous sections.

6. Stormwater Quality

6.1 Introduction

This section of the report aims to identify the requirements for stormwater quality management resulting from the proposed development and identify suitable stormwater treatment devices to comply with relevant requirements of the State Planning Policy and the City of Gold Coast City Plan Policy – Land Development Guidelines.

6.2 State Planning Policy Assessment

An assessment has been undertaken to determine whether the development proposal necessitates compliance with the State Planning Policy (SPP) objectives. The following trigger questions are used to determine whether SPP compliance is required.

Table 6.1: State Planning Policy Trigger Questions

Trigger Question	Development Response
Material Change of Use for Urban Purposes with a land area greater than 2,500m^2 and:	No
a) Will result in an impervious area greater than 25% of the net developable area; or	N/A
b) Will result in 6 or more dwellings.	N/A
Reconfiguration of Lot for Urban Purposes that involves a land area greater than 2,500m^2, and will result in 6 or more lots	No

The above table indicates that the development does not trigger compliance with the SPP, and the proposed development will adopt local authority stormwater quality assessment.

6.3 Local Authority Assessment

As compliance with the SPP objectives has been shown not to be required, an assessment has been undertaken to determine whether the development proposal necessitates compliance with City of Gold Coast (CoGC) objectives. The following trigger questions are used to determine whether CoGC compliance is required.

Table 6.2: City of Gold Coast Trigger Questions

Trigger Question	Development Response
Greater than 850m^2 of land and results in an increased number of allotments	No
3 or more dwellings (attached or detached)	**Yes**
Includes newly constructed road (previously unformed road) exceeding 30m in total length	No
Includes 200m^2 or more uncovered new or refurbished car park area including parking bays and circulation driveway	No

As the above trigger questions are applicable to this development, the site **is** required to achieve the design objectives of the City of Gold Coast City Plan Policy.

6.4 Water Quality Objectives and Methodology

Table 6.2 indicates that the proposed development triggers the requirement for the development to achieve the Water Quality Objectives outlined in the State Planning Policy. As such, the development must demonstrate the following minimum reductions in mean annual pollutant loads from the unmitigated development:

Table 6.3-Water Quality Objectives

Pollutant	Minimum Reduction in Mean Load (%)
Total Suspended Solids (kg/yr)	80
Total Phosphorus (kg/yr)	60
Total Nitrogen (kg/yr)	45
Gross Pollutants (kg/yr)	90

To design and assess the achievement of these stormwater quality objectives the Model for Urban Stormwater Improvement Conceptualisation (MUSIC) Version 6.4.0 has been utilised to size suitable stormwater quality improvement devices as described in the following sections.

6.5 Catchment Areas & Source Nodes

The catchment areas used in the MUSIC model for the site are limited to the net developable area of the development site and are outlined in Table 6.4 below:

Table 6.4-Pollutant Export Parameters

Catchment	Area
Roof Area (100% Impervious)	318m^2
Landscape Area (100% Pervious)	18m^2
Hardstand Area (100% Impervious)	184m^2
Driveway Area (100% Impervious)	161m^2
Bypass Driveway Area (100% Impervious)	10m^2
Bypass Hardstand Area (100% Impervious)	6m^2
Bypass Landscape Area (100% pervious)	6m^2

The hardstand bypass area has been excluded from the modelling due to the size of the catchment area which would have minimal affected on the development.

6.6 Recorded Rainfall Data – Gold Coast South

Rainfall data for the site was taken from the City of Gold Coast (South) Elanora Treatment Plant (ID 40609) using the dates 1/1/1989 – 31/12/1998 in accordance with the Water By Design – MUSIC Modelling Guidelines (2010) using a 6-minute time step.

The mean average rainfall over the period is 1,436mm.

Rainfall over this time period was modelled using MUSIC to calculate the pollutant generation and treatment effectiveness of the proposed systems.

6.7 Rainfall-Runoff Parameters

Rainfall-runoff parameters were taken in accordance with the Water By Design – MUSIC Modelling Guidelines (2010) using *Urban Residential* land use, as tabulated in Table 6.5 below:

Table 6.5-MUSIC Modelling Parameters

Parameter	Value
Rainfall threshold (mm)	1.00
Soil storage capacity (mm)	500
Initial storage (%)	10
Field capacity (mm)	200
Infiltration capacity coefficient a	211
Infiltration capacity exponent b	5.0
Initial depth (mm)	50
Daily recharge rate (%)	28
Daily baseflow rate (%)	27
Daily deep seepage rate	0

6.8 Pollutant Export Parameters

Pollutant export parameters were taken in accordance with Water By Design – MUSIC Modelling Guidelines (2010) using *Urban Residential* land use.

The split catchment approach was utilised for each surface type, with the input parameters shown in Table 6.6 below:

Table 6.6-Pollutant Export Parameters

Flow Type	Surface Type	TSS log^{10} values		TP log^{10} values		TN log^{10} values	
Baseflow	Roof	N/A	N/A	N/A	N/A	N/A	N/A
	Roads	1.00	0.34	-0.97	0.31	0.20	0.20
	Ground	1.00	0.34	-0.97	0.31	0.20	0.20
Stormflow	Roof	1.30	0.39	-0.89	0.31	0.26	0.23
	Roads	2.43	0.39	-0.30	0.31	0.26	0.23
	Ground	2.18	0.39	-0.47	0.31	0.26	0.23

6.9 Proposed Treatment Device Details

The proposed stormwater quality treatment train includes an Atlan Environmental cartridge system to treat stormwater flows from the development site. This system is to provide primary treatment of stormwater flows. Flows from majority of the development site are to be directed towards the treatment tank. The proposed development will contain a singular treatment chamber located towards the north boundary of the site, as shown on the engineering drawing attached within Appendix B.

Proprietary Treatment Device (Atlan Environmental Products)

The Atlan treatment train is a compact implementation of multiple stormwater treatment elements. It is comprised of Altan Stormsack gully pit inserts which act as a pre-treatment device and AtlanFilter cartridge filters which provide primary treatment for the site. The Atlan treatment train is typically

designed to provide stormwater treatment in ultra-urban environment by meeting water quality standard whilst increasing yield and hence cost effectiveness for developers.

ATLAN StormSack filtration solutions are water quality devices that are installed within stormwater inlet pits to capture contaminants close to the surface for ease of maintenance. ATLAN StormSack filtration offers a decentralised approach to stormwater treatment which assists in achieving site water quality goals.

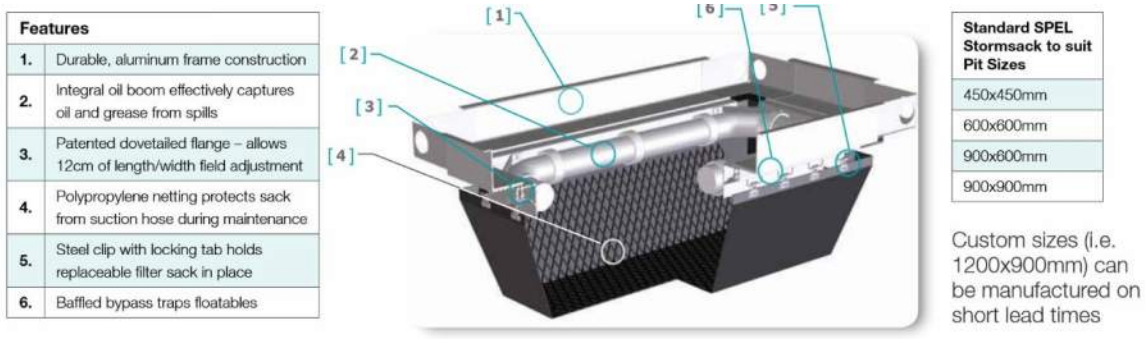


Figure 6.1: ATLAN Stormsack Gully Insert Pre-Treatment Filters

The AtlanFilter cartridge system provides a significantly greater surface contact area to footprint ratio than other filters. With a flow rate of 3.00L/s per cartridge and underground installation, the AtlanFilter provides excellent removal efficiency whilst maintaining site surface yield.

The high flow capacity and modular cartridge design means the AtlanFilter system can be effectively deployed in a variety of structures including manholes, precast vaults, or cast-in-place structures.



Figure 6.2: AtlanFilter Cartridge Filter

The Atlan Treatment Train system has proven compliance with the South-East Queensland Water by Design Music Modelling Guidelines requirements (2010) and has been accepted for use by the City of Gold Coast Council. The total requirement for treatment devices for the subject site is presented in Table 6.7 below:

Table 6.7 - Site Specific Atlan Treatment Train Requirements

Device Type	Treatment Tank
AtlanFilter Half Height Cartridges	2
Stormsack Inserts	1

The AtlanFilter cartridge is to be located within an underground tank that is to be constructed at the near the eastern boundary of the site alongside the Atlan Stormsack Insert which is to be constructed upstream of the treatment chamber.

6.1 MUSIC Model Diagrams

A diagrammatic layout of the MUSIC model interface used to model the proposed development with the proposed treatment devices incorporated for the development is presented in Figure 6.3 below:

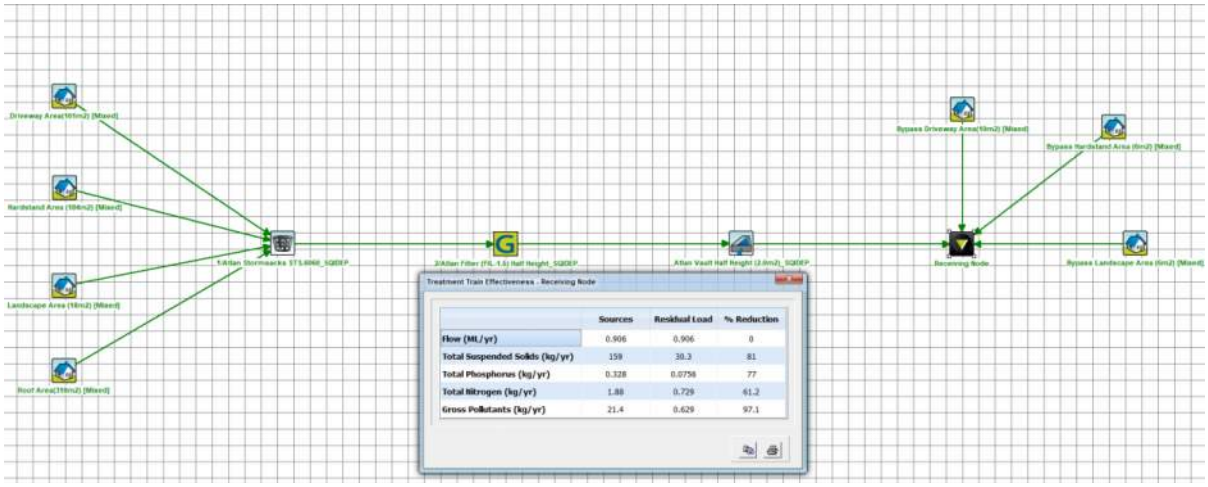


Figure 6-3: MUSIC Modelling Results

6.2 MUSIC Modelling Results

MUSIC was used to model the treatment train effectiveness in terms of the percentage of pollutants being removed from the system using the proposed treatment devices.

The results of the MUSIC modelling compared to the stated Water Quality Objectives (WQO's) are presented below:

Table 6.8: MUSIC Modelling Results

Potential Pollutant	Target WQO's	MUSIC Results
Total Suspended Solids (kg/yr)	80%	81.0%
Total Phosphorus (kg/yr)	60%	77.0%
Total Nitrogen (kg/yr)	45%	61.2%
Gross Pollutants (kg/yr)	90%	97.1%

The results indicate that the proposed treatment devices are efficient in achieving the water quality objectives and exceeds the minimum required pollutant reduction targets.

7. Overland Flow Assessment

7.1 Hydrologic

Hydrologic modelling of the external catchments was undertaken using WBNM with Storm injector (1.4.2). Sub-catchments were delineated from Council's stormwater network database and ALS (conducted 2018), as illustrated on Appendix C1. Current best practices were adopted to estimate design storm runoff, including the following:

- 65% impervious value (IPWEAQ, 2017), with the exception of C13, C29 & C30;
- 1.3 catchment lag factor;
- BoM 2016 design rainfall depths; and
- ARR (Ball, et al., 2019) temporal patterns and burst losses (initial loss – median pre-burst).

All 1% AEP, 5-180 minute durations and temporal ensembles were simulated, with box plots included in Appendix C.

7.2 Hydraulic

Hydraulic modelling was undertaken using Tuflow (2025.1.1), as summarised below.

- Model extent illustrated in Appendix C2, with boundaries set a suitable distance away from the site to eliminate undue boundary effects;
- Topography is based on ALS data (conducted 2018), and site ground survey (August 2024), with a 1 m model grid. Break lines and grid modifications were applied to critical areas for accuracy, consistency and stability;
- Manning's 'n' roughness, as illustrated in Figure C3:
    - Road reserve 0.025;
    - Open space 0.035;
    - Dense vegetation 0.18 (0.2 m) to 0.08 (3.5 m) (variable depth); and
    - Lots 0.1.
- Structure information was extracted from Council's digital stormwater database and site survey, with engineering judgement applied to missing or conflicting information.
- Constant tailwater boundary and initial water level set to 3.1m AHD (5% AEP storm tide +0.8 m predicted seal level rise);
- Local inflows applied to applicable pits; and
- Map cut-off depth of 0.1 m.

7.3 Results

Figure C5 presents the predicted 1% AEP overland flow map, illustrating extensive flooding of Goodwin Park as a result of the adopted tailwater boundary condition. This backwater inundation extends into the lower elevation western boundary site areas. However, fill of the lower site areas inundated by storm tide will not affect local catchment storage.

The upstream Dutton Street inundation is generally contained to the street kerb, with the underlying stormwater network providing sufficient conveyance. No changes are proposed to the relevant trunk drainage. Hence the site development is not predicted to adversely impact overland flows external to the site. Furthermore, in the case of upstream stormwater network blockages, the proposed layout facilitates conveyance of severe storm overland flows via the proposed driveway to Goodwin Park.

8. Conceptual Erosion and Sediment Control Plan

8.1 Introduction

During construction, it shall be the responsibility of the Principal Contractor to ensure that the development complies with the relevant erosion and sediment control objectives, as outlined in the State Planning Policy and the City of Gold Coast Planning Scheme.

This section of the report provides suggested inclusions in an erosion and sediment control plan for the proposed development site. This plan includes recommendations for monitoring & reporting responsibilities and the construction of site-specific sedimentation and erosion control measures. Detailed drawings specifying the proposed erosion and sediment control measures are to be provided at the Operational Works stage of the development.

8.2 General Erosion and Sediment Control Measures

It shall be the responsibility of the Principal Contractor to ensure the following erosion and sediment control measures are implemented on site:

- Clean stormwater runoff from upstream allotments is to be directed away from the development site using earth bunds or cut-off drains, as deemed appropriate by a suitable supervisor;
- The prevention of sediment runoff towards other allotments via the effective implementation of silt fences, sediment basins or other mitigation devices as deemed appropriate by a suitable supervisor;
- Sediment runoff shall also be prevented from entering the Council stormwater drainage system via the implementation of control measures such as gully pit sediment barriers;
- Erosion shakedown points shall be established at all vehicular access points, with shakedown areas regularly swept clean and sediment removed; and
- Erosion and sediment control measures are not to be removed from the development site until the site is completely rehabilitated and the surface is capable of resisting erosion.

8.3 Spoil and Stockpile Management Measures

It shall be the responsibility of the Principal Contractor to ensure the following spoil and stockpile management measures are implemented on site:

- Where the stockpiling of spoil and excess earthworks is necessary on the development site, stockpiles shall be established as far away as possible from stormwater inlets and pipelines to reduce the likelihood of sediment runoff; and
- Stockpiles are to be established within a designated zone of fill material and should be surrounded with appropriate erosion and sediment control measures.

8.4 Training Requirements

It shall be the responsibility of the Principal Contractor to ensure the following training protocols are implemented on the development site:

- Site induction courses shall include details of an environmental management reporting system, through which personnel will be able to report perceived erosion and sediment control issues on site.

9. Conclusion

This report has been prepared to support the lodgement of a development application involving the construction of a new residential development, comprising of five (5) townhouse type units with four (4) stories. The development is proposed to take place over the following parcel of land:

Property Address:	60 Dutton St, Coolangatta QLD 4225
Property Description:	Lot 2 on RP86756
Council:	City of Gold Coast
Site Area:	703m^2

This report has addressed the management of stormwater quantity and quality to ensure that the proposed development complies with all necessary state and local government policies.

This report describes the design process for specifications of the following key infrastructure elements that will ensure the management of stormwater to achieve necessary standards.

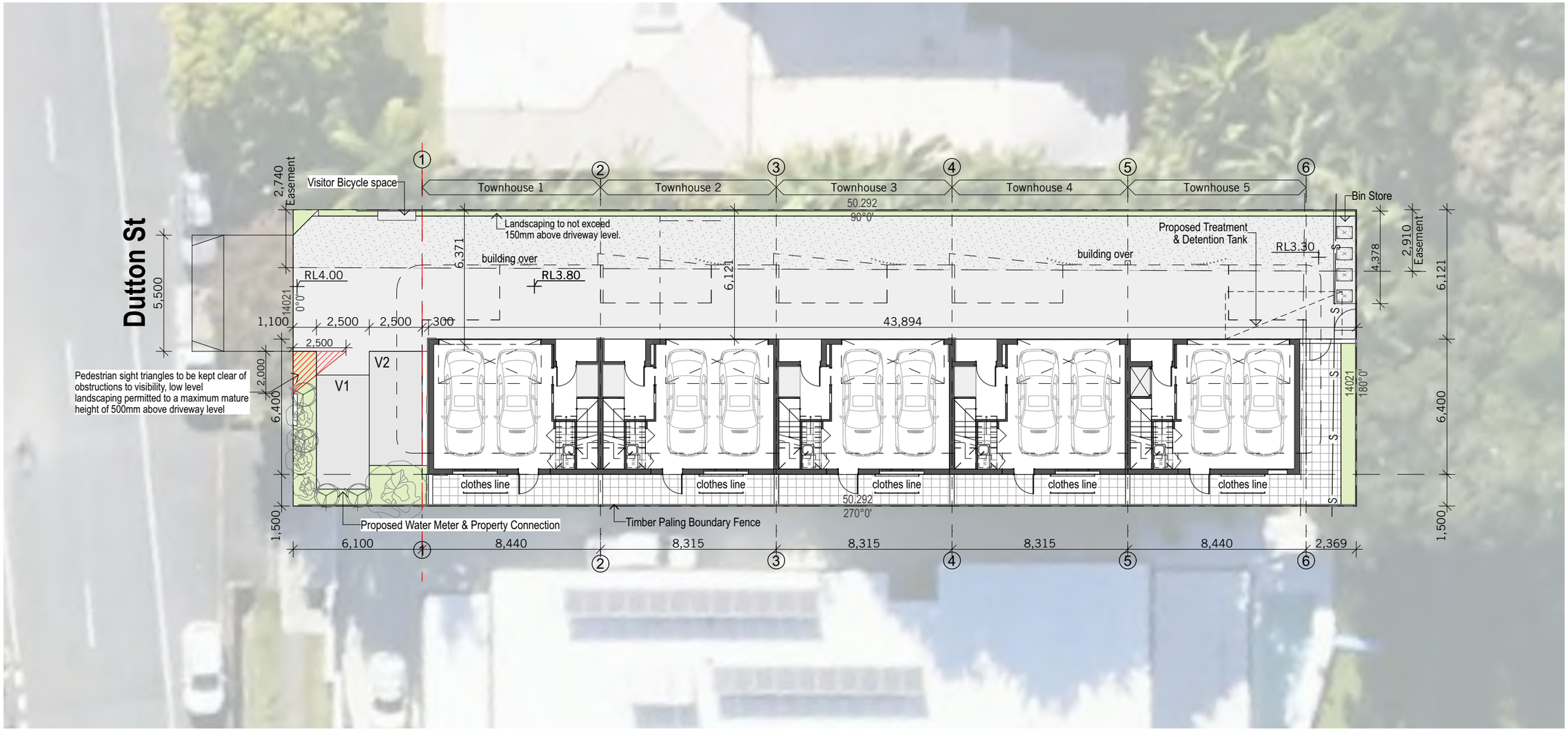
- Stormwater detention for the proposed development,
    - The construction of an 8.0m^2 stormwater detention tank (refer to Section 5 of this report for outlet arrangements).
- Stormwater quality treatment for the proposed development,
    - The installation of a two (2) half height Atlan filters to be located within a 2.0m^2 treatment chamber to treat flows generated from the proposed development site.
    - The installation of one (1) Atlan Stormsack pit insert to be located within a pit upstream of the treatment tank to treat flows generated from the proposed development site.

This report has addressed the management of stormwater quantity and demonstrated that no additional works are required to ensure that the proposed development complies with all necessary state and local government policies.

It is the opinion of this report that the proposed stormwater quantity management systems are suitable for a development of this scale and potential impacts.

MICHAEL BALE & ASSOCIATES
Structural and Civil Engineering Consultancy

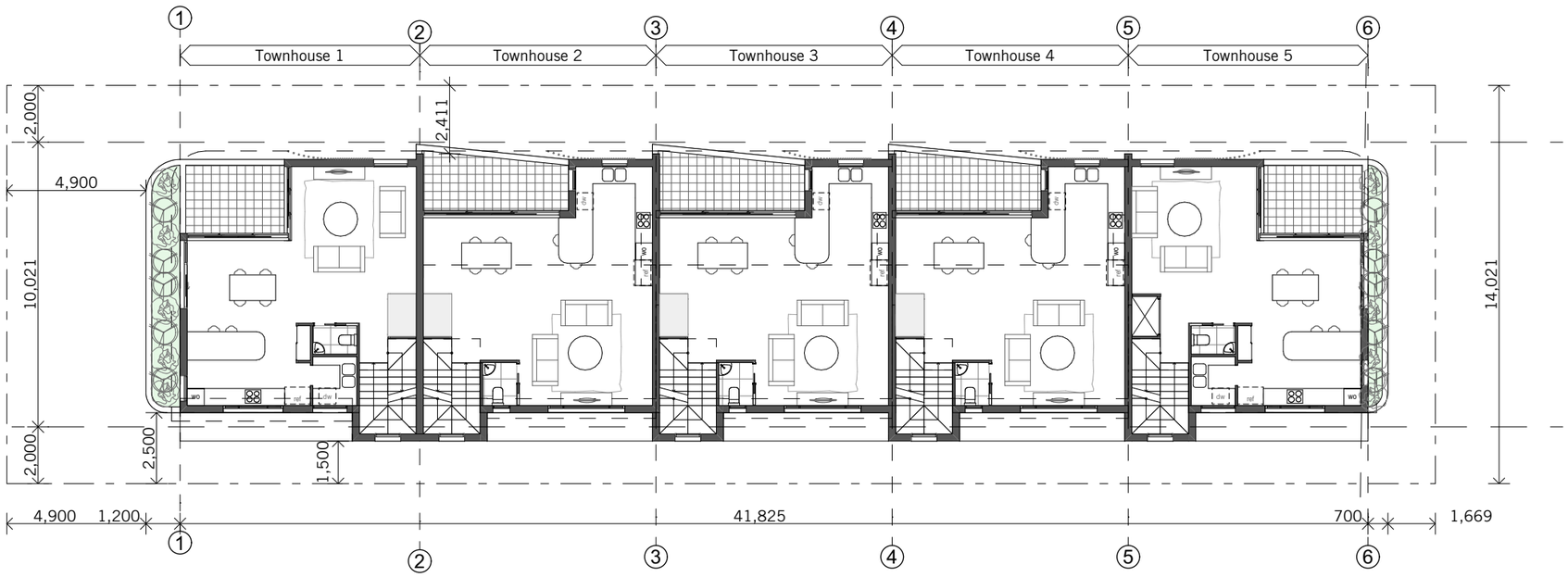
Appendix A
Site Survey & Architectural Layout



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Site Plan

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Level 2 Site Plan

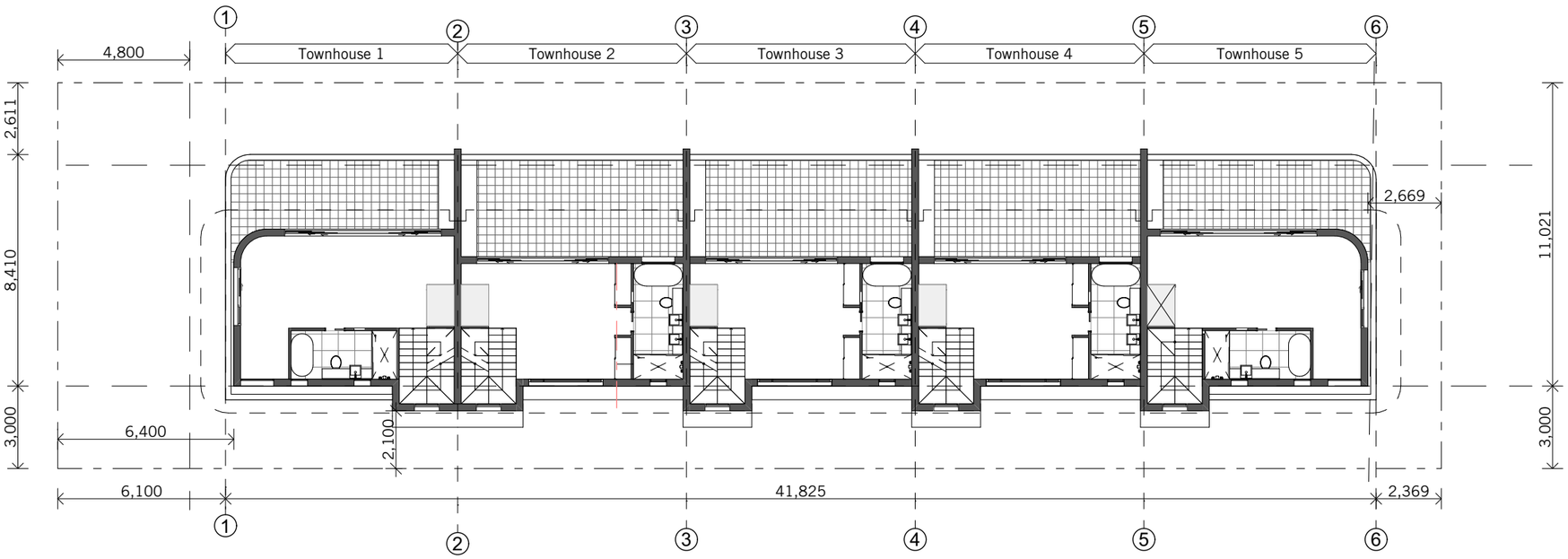
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Levels 3 Site Plan

1:200 @ A3

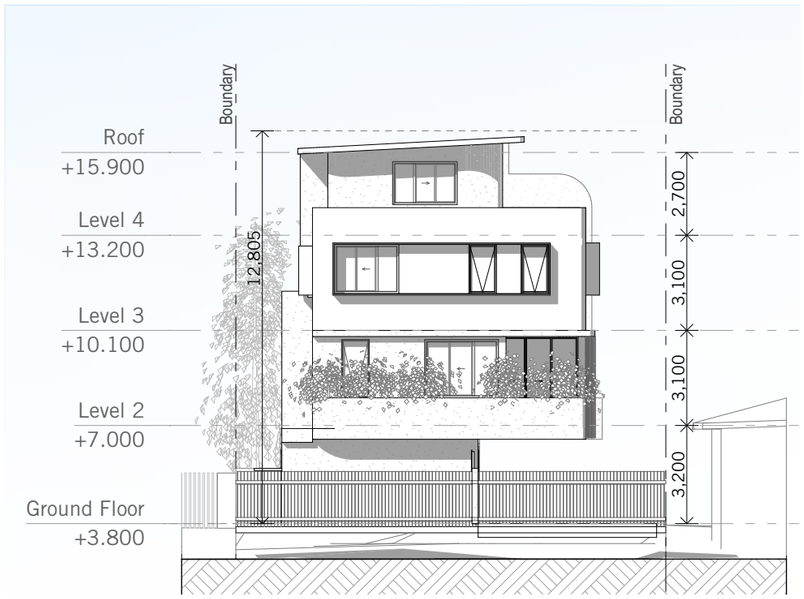


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Level 4 Site Plan
1:200 @ A3

Legend	
R-1	Rendered Finish (Vivid White)
R-2	Rendered Finish (Natural White)
R-3	Textured Rendered Finish
	with Ashlar Cut @600mm ctr (Vivid White)
CT-2	Crazy Paver (Sandblasted Finish)
Refer DA 20.05 Colour Pallet	





East Elevation

East Elevation
1:200, 1:100 @ A3



North Elevation

Legend	
R-1	Rendered Finish (Vivid White)
R-2	Rendered Finish (Natural White)
R-3	Textured Rendered Finish with Ashlar Cut @600mm ctr (Vivid White)
CT-2	Crazy Paver (Sandblasted Finish)
Refer DA 20.05 Colour Pallet	



North Elevation
1:200, 1:100 @ A3

MICHAEL BALE & ASSOCIATES
Structural and Civil Engineering Consultancy

Appendix B
Engineering Drawings

LEGEND

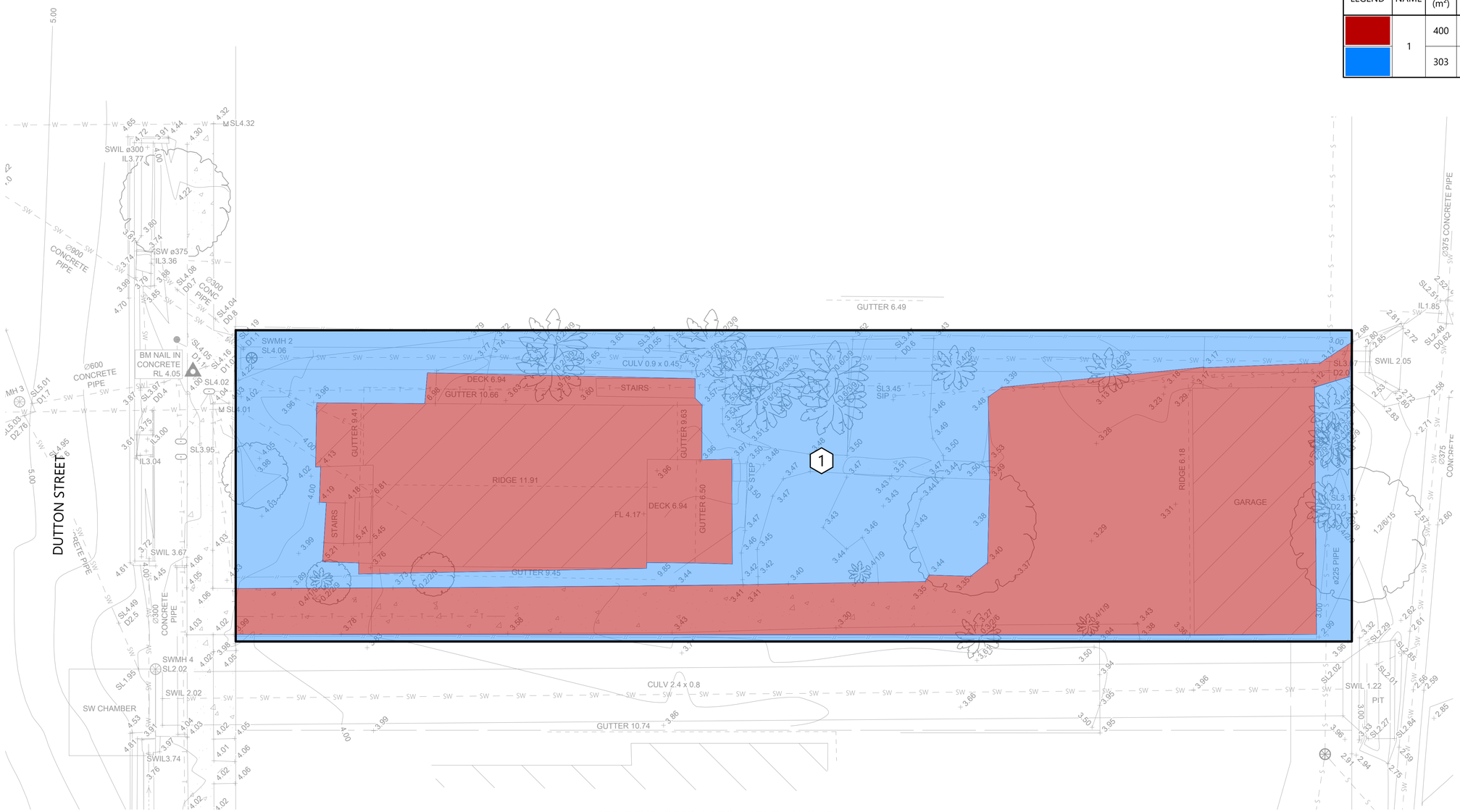
———	SITE BOUNDARY
⬡ 1	CATCHMENT LABELS

NOTES / WARNINGS

1. THESE DRAWINGS ARE FOR DA PURPOSES ONLY AND NOT TO BE USED FOR CONSTRUCTION

PREDEVELOPED CATCHMENT AREAS

LEGEND	NAME	AREA (m^2)	DESCRIPTION	TOTAL AREA (m^2)	PERCENT IMPERVIOUS
	1	400	CATCHMENT 1 - IMPERVIOUS	703	57%
		303	CATCHMENT 1 - PERVIOUS		



PRE-DEVELOPED CATCHMENT LAYOUT

SCALE 1:100

ISSUE	DESCRIPTION	AUTHOR	DATE
01	ORIGINAL ISSUE	MTB	30.04.25

STATUS: FOR DA APPROVAL
NOT FOR CONSTRUCTION

R.P.E.Q No :		CERTIFIED	
HEIGHT DATUM	AHD	DESIGNER	MTB
GRID	LOCAL	CHECKER	SC
ORIGINAL SIZE	A1	APPROVER	MB

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SCALE
SCALE 1:100 (1 0 1 2 3 4 5)
1:100 (A1) - 1:200 (A3)

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PO BOX 1715, Surfers Paradise 4217
Ph: **07 5538 0431**
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PROJECT TITLE:
60 DUTTON STREET
COOLANGATTA

DRAWING TITLE:
PRE-DEVELOPED CATCHMENT LAYOUT PLAN

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DA01	G24095	01

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POST-DEVELOPED CATCHMENT AREAS

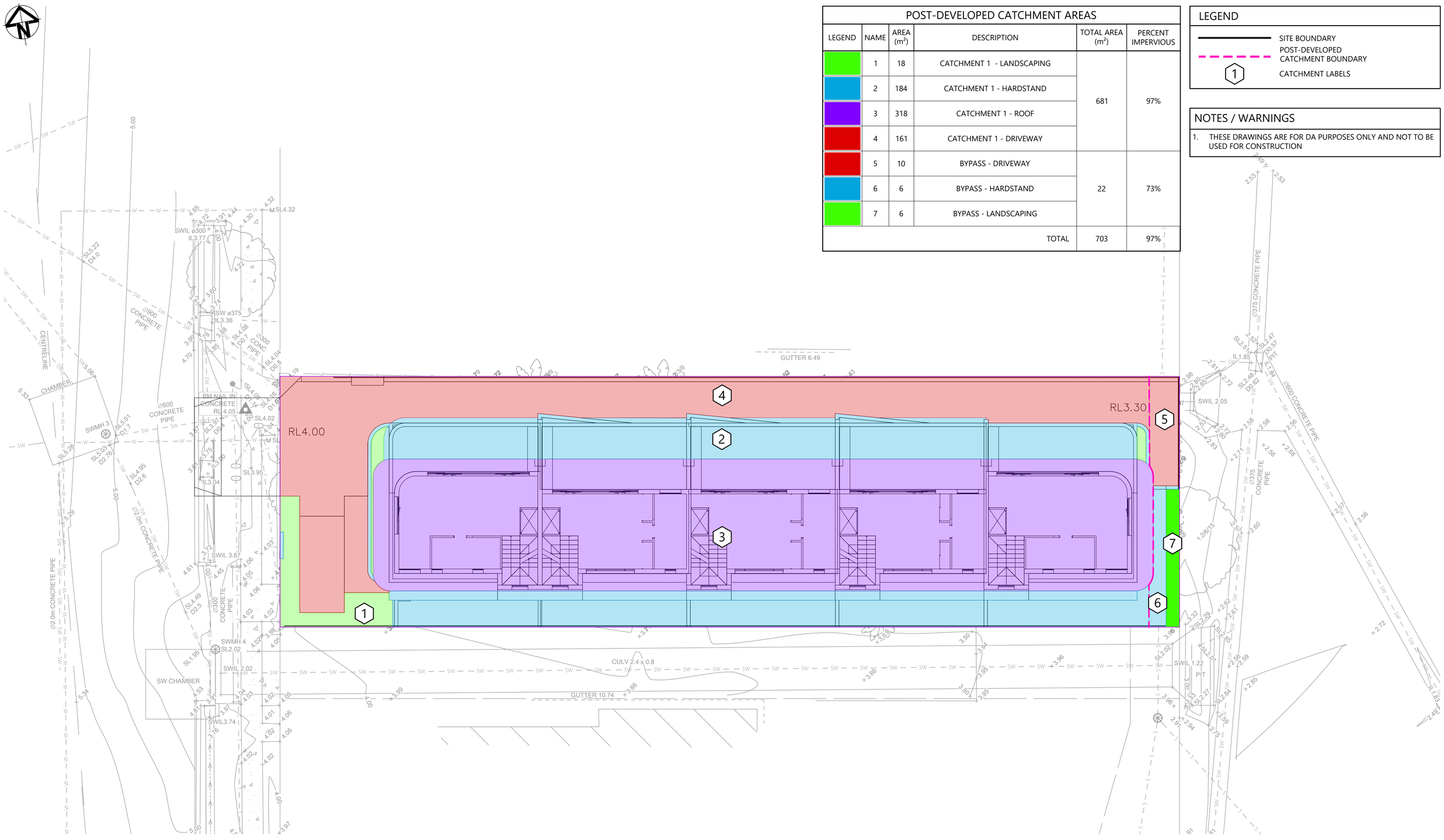
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	1	18	CATCHMENT 1 - LANDSCAPING	681	97%
	2	184	CATCHMENT 1 - HARDSTAND		
	3	318	CATCHMENT 1 - ROOF		
	4	161	CATCHMENT 1 - DRIVEWAY		
	5	10	BYPASS - DRIVEWAY	22	73%
	6	6	BYPASS - HARDSTAND		
	7	6	BYPASS - LANDSCAPING		
			TOTAL	703	97%

LEGEND

- SITE BOUNDARY
- POST-DEVELOPED CATCHMENT BOUNDARY
- (1) CATCHMENT LABELS

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POST-DEVELOPED CATCHMENT LAYOUT

SCALE 1:100

ISSUE	DESCRIPTION	AUTHOR	DATE
03	REVISED ARCHITECTURAL PLANS	TD	09.09.26
02	REVISED ARCHITECTURAL SCHEME	BM	01.06.26
01	ORIGINAL ISSUE	MTB	09.05.25

STATUS: FOR DA APPROVAL
NOT FOR CONSTRUCTION

R.P.E.Q No :		CERTIFIED	
HEIGHT DATUM	AHD	DESIGNER	MTB
GRID	LOCAL	CHECKER	SC
ORIGINAL SIZE	A1	APPROVER	MB

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SCALE
SCALE 1:100
1 0 1 2 3 4 5
1:100 (A1) - 1:200 (A3)

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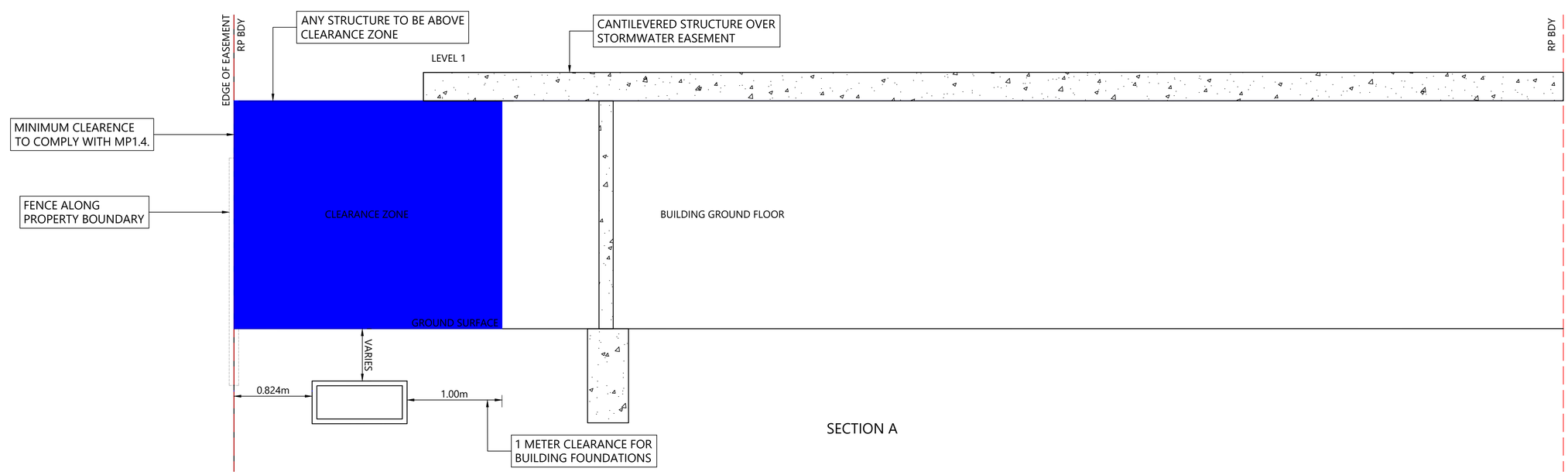
PROJECT TITLE:
60 DUTTON STREET
COOLANGATTA

DRAWING TITLE:
POSTDEVELOPED CATCHMENT LAYOUT PLAN

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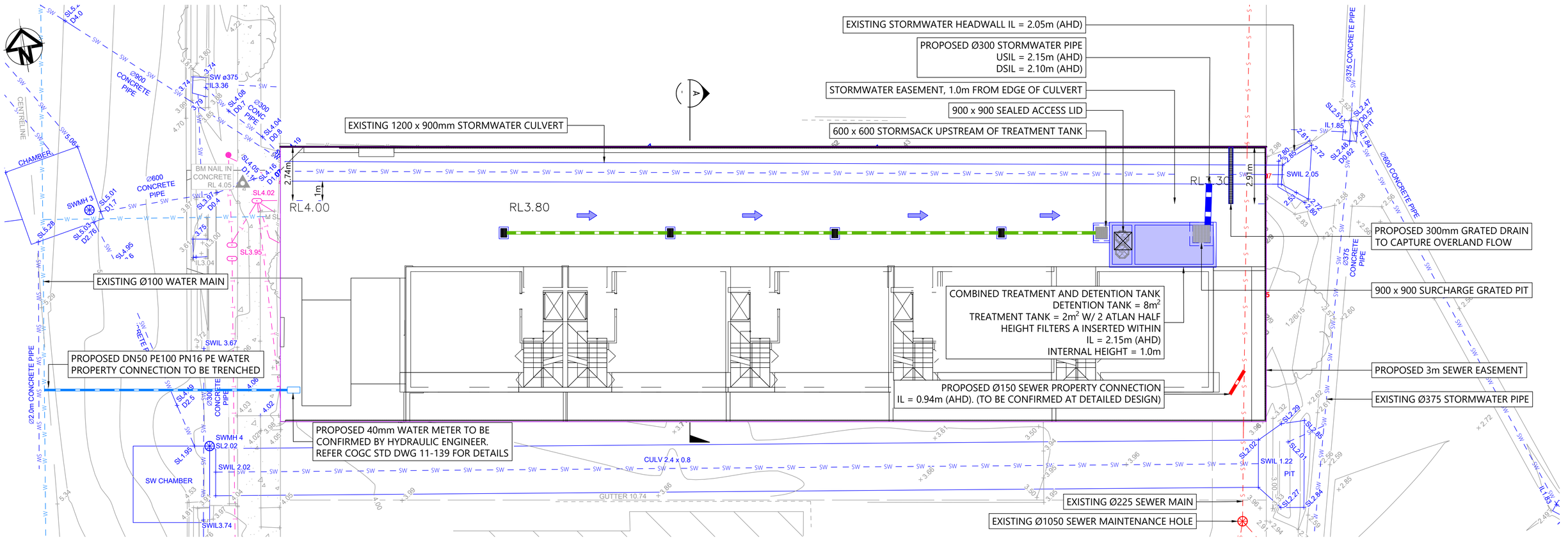
SECTION A

LEGEND

- SITE BOUNDARY
- PROPOSED STORMWATER LINE
- PROPOSED STORMWATER EASEMENT
- PROPOSED SEWER LINE
- PROPOSED SEWER EASEMENT
- EXISTING SEWER
- EXISTING WATER
- EXISTING STORMWATER
- EXISTING UNDERGROUND ELECTRICAL
- EXISTING OVERHEAD ELECTRICAL
- EXISTING TELSTRA
- EXISTING GAS

NOTES / WARNINGS

1. THESE DRAWINGS ARE FOR DA PURPOSES ONLY AND NOT TO BE USED FOR CONSTRUCTION



SERVICES LAYOUT PLAN

SCALE 1:100

ISSUE	DESCRIPTION	AUTHOR	DATE
02	UPDATED ARCHITECTURAL LAYOUT	TD	09.09.26
02	REVISED ARCHITECTURAL SCHEME	BM	01.06.26
01	ORIGINAL ISSUE	MTB	02.05.25

STATUS: FOR DA APPROVAL
NOT FOR CONSTRUCTION

R.P.E.Q No :		CERTIFIED	
HEIGHT DATUM	AHD	DESIGNER	MTB
GRID	LOCAL	CHECKER	SC
ORIGINAL SIZE	A1	APPROVER	MB

SURVEYOR: USHER & COMPANY Surveying & Land Development Consultants
25 Tallebudgera Creek Road
Burleigh Heads, QLD, 4220
07 5535 8346

SCALE: 1:100 (1 0 1 2 3 4 5) 1:100 (A1) - 1:200 (A3)

CLIENT: SOUTHERN CROSS PROPERTY HOLDINGS

ARCHITECT: LIGHTWAVE ARCHITECTURAL
1 Sands Street
Tweed Heads, NSW,2485
admin@lightwave.com.au

MICHAEL BALE & ASSOCIATES
Structural and Civil Engineering Consultancy
Level 3, 18 Orchid Avenue,
Surfers Paradise
PO BOX 1715, Surfers Paradise 4217
Ph: **07 5538 0431**
mail@michaelbale.com.au

PROJECT TITLE: 60 DUTTON STREET COOLANGATTA

DRAWING TITLE: SERVICES LAYOUT PLAN

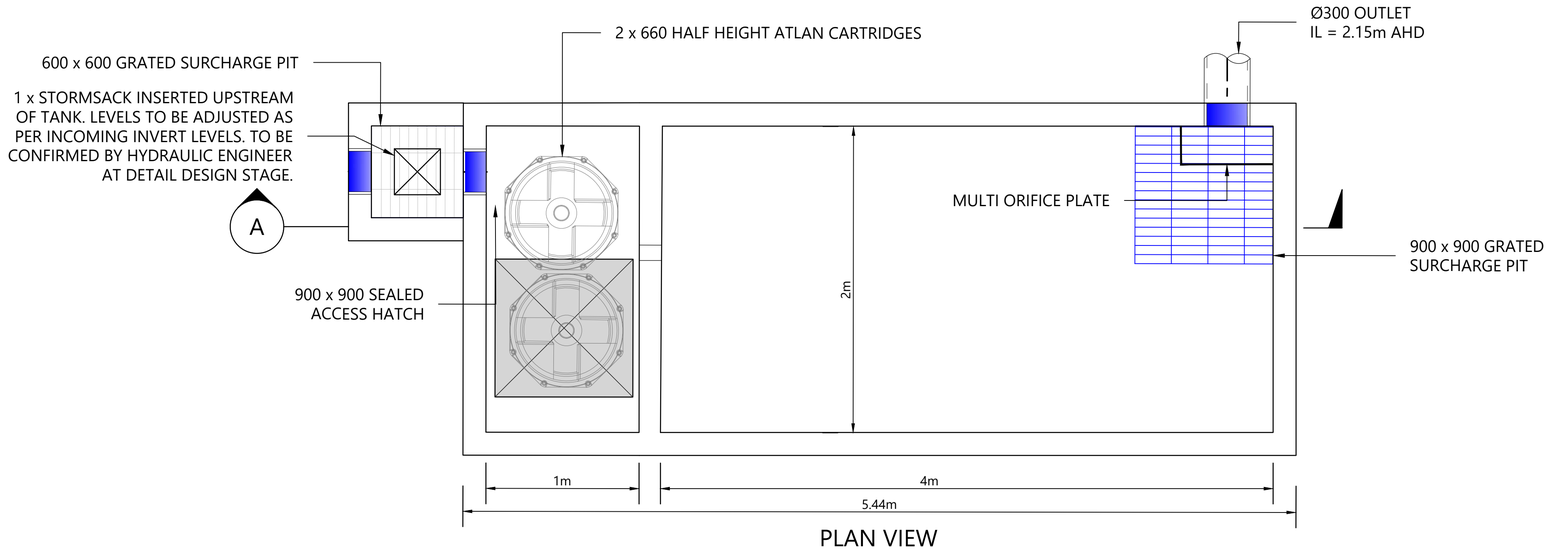
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DRAWING No.	PROJECT No.	REVISION
DA03	G24095	02

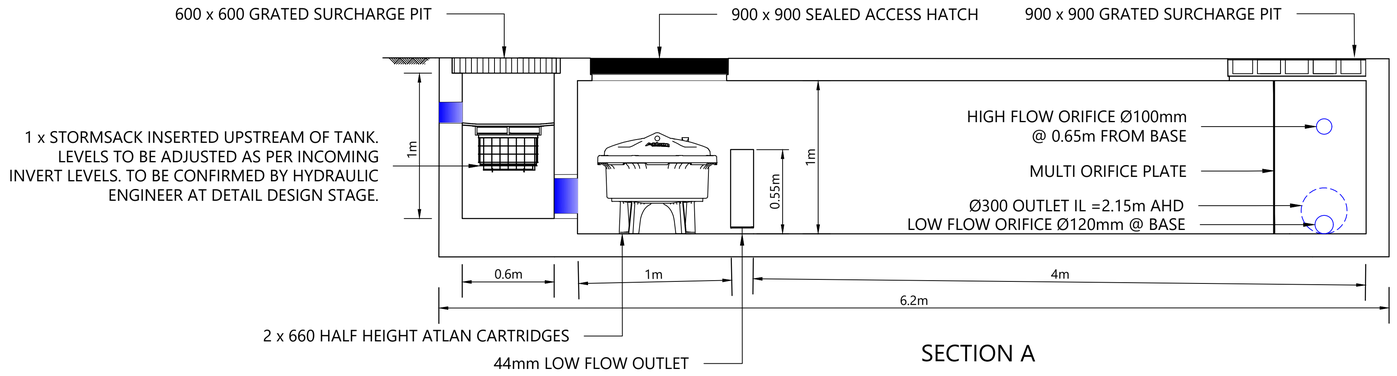
9/Sep/2026 11:38 AM

NOTES / WARNINGS
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NOTE - PROVIDE MAXIMESH RH3030 FOR ORIFICES WITH A DIAMETER OF 100mm OR LESS, WITH A MINIMUM AREA OF 50 TIMES THE ORIFICE AREA AND WELDLOK F40/203 FOR ORIFICE WITH A 150mm DIAMETER OR MORE, WITH A MINIMUM AREA OF 20 TIMES THE ORIFICE AREA



PLAN VIEW



SECTION A

STORMWATER TANK PLAN

SCALE 1:20

ISSUE	DESCRIPTION	AUTHOR	DATE
02	REVISED ARCHITECTURAL SCHEME	BM	01.06.26
01	ORIGINAL ISSUE	MTB	09.05.25

22/01/2026 11:20 AM

STATUS: FOR DA APPROVAL
NOT FOR CONSTRUCTION

R.P.E.Q No :		CERTIFIED	
HEIGHT DATUM	AHD	DESIGNER	MTB
GRID	LOCAL	CHECKER	SC
ORIGINAL SIZE	A1	APPROVER	MB

SURVEYOR
USHER & COMPANY
Surveying & Land Development Consultants
25 Tallebudgera Creek Road
Burleigh Heads, QLD, 4220
07 5535 8346

SCALE
SCALE 1:20 0.2 0 0.2 0.4 0.6 0.8 1.0
1:20 (A1) - 1:40 (A3)

CLIENT
SOUTHERN CROSS PROPERTY HOLDINGS

ARCHITECT
LIGHTWAVE ARCHITECTURAL
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Surfers Paradise
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Ph: **07 5538 0431**
mail@michaelbale.com.au

PROJECT TITLE:
60 DUTTON STREET
COOLANGATTA

DRAWING TITLE:
STORMWATER TANK PLAN

NOTES:
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DRAWING No.	PROJECT No.	REVISION
DA04 -	G24095	- 02

MICHAEL BALE & ASSOCIATES
Structural and Civil Engineering Consultancy

Appendix C
Overland Flow Assessment

552000E 552300E 552600E 552900E

6883500N

6883200N

Tweed Street
Coolangatta State School
Rutledge Street
Jarvis Lane
TAFE Queensland - Coolangatta
Scott Street
Goodwin Park Access
Goodwin Park
Dixon Street
Mclean Street
Stapylton Street
Reed Street
Miles Street
Upper Ballow Street
Miles Street Reserve
Garrick Street
Dutton Street
Ballow Street
Kent Street
Tooloon Street

C01 1.372 ha
C02 1.255 ha
C03 1.051 ha
C04 0.934 ha
C05 1.241 ha
C06 1.175 ha
C07 0.377 ha
C08 1.871 ha
C09 1.598 ha
C10 1.297 ha
C11 0.66 ha
C12 0.071 ha
C13 2.203 ha
C14 2.366 ha
C15 2.004 ha
C16 1.176 ha
C17 1.193 ha
C18 0.986 ha
C19 0.571 ha
C20 0.527 ha
C21 1.388 ha
C22 0.864 ha
C23 1.299 ha
C24 1.666 ha
C25 0.674 ha
C26 0.494 ha
C27 0.986 ha
C28 1.331 ha
C29 0.646 ha
C30 1.42 ha

LEGEND

- Site
- State Border
- Cadastre
- Sub Catchment
- Stormwater Culvert

Elevation (mAHD)

30
2

Contour

- 5 m
- 1 m

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Structural and Civil Engineering Consultancy

DATE 02 August 2025
SIZE A3
REFERENCE J25030
SCALE 1:3,000

0 40 80 120 160 200 m

FIGURE C1
HYDROLOGIC MODEL LAYOUT

60 Dutton St, Coolangatta
Overland Flow Assessment
Southern Cross Property Holdings

D:\Work\AD\J25030\QGIS\S01.qgs 2025-08-02T18:31:38.749

552500E 552600E 552700E 552800E

6883700N 6883600N 6883500N

Tweed Street
Jarvis Lane
Goodwin Park Access
Dutton Street
Mclean Street
Stapylton Street
Reed Street
Dixon Street
Goodwin Park

TW
C30L
C08T
C05T
C09L
C11L
C10L
C12L
C25L
C27T
C29T
C24T

LEGEND

Site
State Border
Cadastre

Model Features

Extent
Pit Inflow
TW 2D
TW 1D
Inlet
Manhole
Culvert
Connector
Grid Modification
Invert Forcing

Elevation (mAHD)

30
2

Contour

5 m
1 m

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Structural and Civil Engineering Consultancy

DATE 02 August 2025
SIZE A3
REFERENCE J25030
SCALE 1:1,200
0 10 20 30 40 50 m

FIGURE C2
HYDRAULIC MODEL LAYOUT
60 Dutton St, Coolangatta
Overland Flow Assessment
Southern Cross Property Holdings

C:\Work\AD\J25030\GIS\SG01.qgs 2025-08-02T18:31:52.898

552500E
552600E
552700E
552800E
6883700N
6883600N
6883500N
Tweed Street
Jarvis Lane
Goodwin Park Access
Goodwin Park
Dutton Street
Mclean Street
Stapylton Street
Reed Street
Dixon Street

LEGEND
Site
State Border
Cadastre
Model Features
Extent
Roughness Class
Road Reserve
Open Space
Dense Vegetation
Lots

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DATE 02 August 2025
SIZE A3
REFERENCE J25030
SCALE 1:1,200
0 10 20 30 40 50 m

FIGURE C3
HYDRAULIC MODEL ROUGHNESS
60 Dutton St, Coolangatta
Overland Flow Assessment
Southern Cross Property Holdings

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552600E

552640E

552680E

6883600N

6883560N

1/1.5 RCP
2.565
1/0.9 RCP
3.431
1/1.5 RCP
1/0.9 RCP
2.524
Dutton Street
1/0.3 RCP
1/0.9 RCP
2/1.35 RCP
2.704
2.314
1/0.6 RCP
2.5
1/1.2x0.9 RCBC
2/1.35 RCP
1/0.3 RCP
2.02
1/2.4x0.9 RCBC
Staplyton Street
1/0.525 RCP
1.744
1/0.525 RCP
Goodwin Park
1.784
1/0.45 RCP
1/0.525 RCP
1.8
1.8
1.849
1/0.525 RCP
1.829
1/0.45 RCP
1.893
1/0.45 RCP

LEGEND

Site
Cadastre

Model Features

Inlet
Manhole
Culvert
Connector
Grid Modification
Invert Forcing

Elevation (mAHD)

7.5
2.5

Contour

1 m
0.25 m

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DATE
02 August 2025

SIZE
A3

REFERENCE
J25030

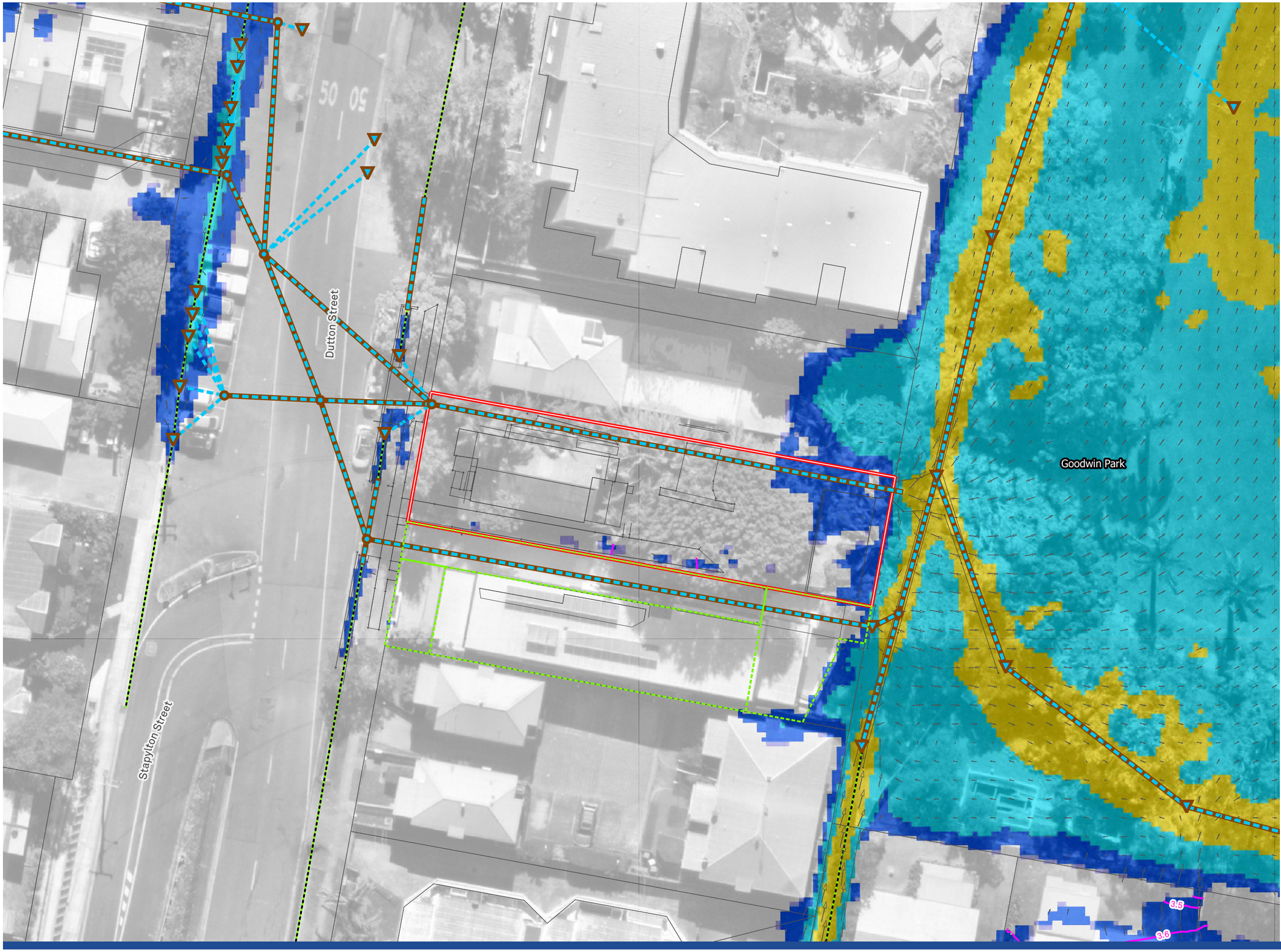
SCALE
1:400

0 6 12 18 24 30 m

FIGURE C4
EXISTING SITE LAYOUT

60 Dutton St, Coolangatta
Overland Flow Assessment
Southern Cross Property Holdings

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N

LEGEND

- Site
- Cadastre

Model Features

- Culvert
- Inlet
- Manhole
- Connector
- Invert Forcing
- Grid Modification

Flow Depth (m)

- 0.1 - 0.3
- 0.3 - 0.6
- 0.6 - 1.2
- 1.2 - 2.0
- Above 2.0
- Flow Level Contour (mAHD)

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Structural and Civil Engineering Consultancy

DATE 02 August 2025

SIZE A3

REFERENCE J25030

SCALE 1:400

0 6 12 18 24 30 m

FIGURE C5

1% AEP PREDICTED CLIMATE OVERLAND FLOW MAP - EXISTING (S01)

60 Dutton St, Coolangatta
Overland Flow Assessment
Southern Cross Property Holdings

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Peak Flow (m3/s) Duration Analysis (1% AEP - C12)

All Values | Mean Values | Adopted Temporal Pattern

Peak Flow (m3/s)

6.6
6.4
6.2
6
5.8
5.6
5.4
5.2
5
4.8
4.6
4.4
4.2
4
3.8
3.6
3.4
3.2
3
2.8
2.6
2.4
2.2
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0

5 (TP1) - 2.77
5093 (TP2) - 4.04
5102 (TP1) - 4.62
5091 (TP1) - 4.76
5122 (TP4) - 4.96
5095 (TP1) - 4.96
5144 (TP2) - 4.85
5294 (TP9) - 4.64
5326 (TP6) - 4.64
5363 (TP9) - 4.27
5325 (TP2) - 4.10

5 min | 10 min | 15 min | 20 min | 25 min | 30 min | 45 min | 1 hour | 1.50 hour | 2 hours | 3 hours

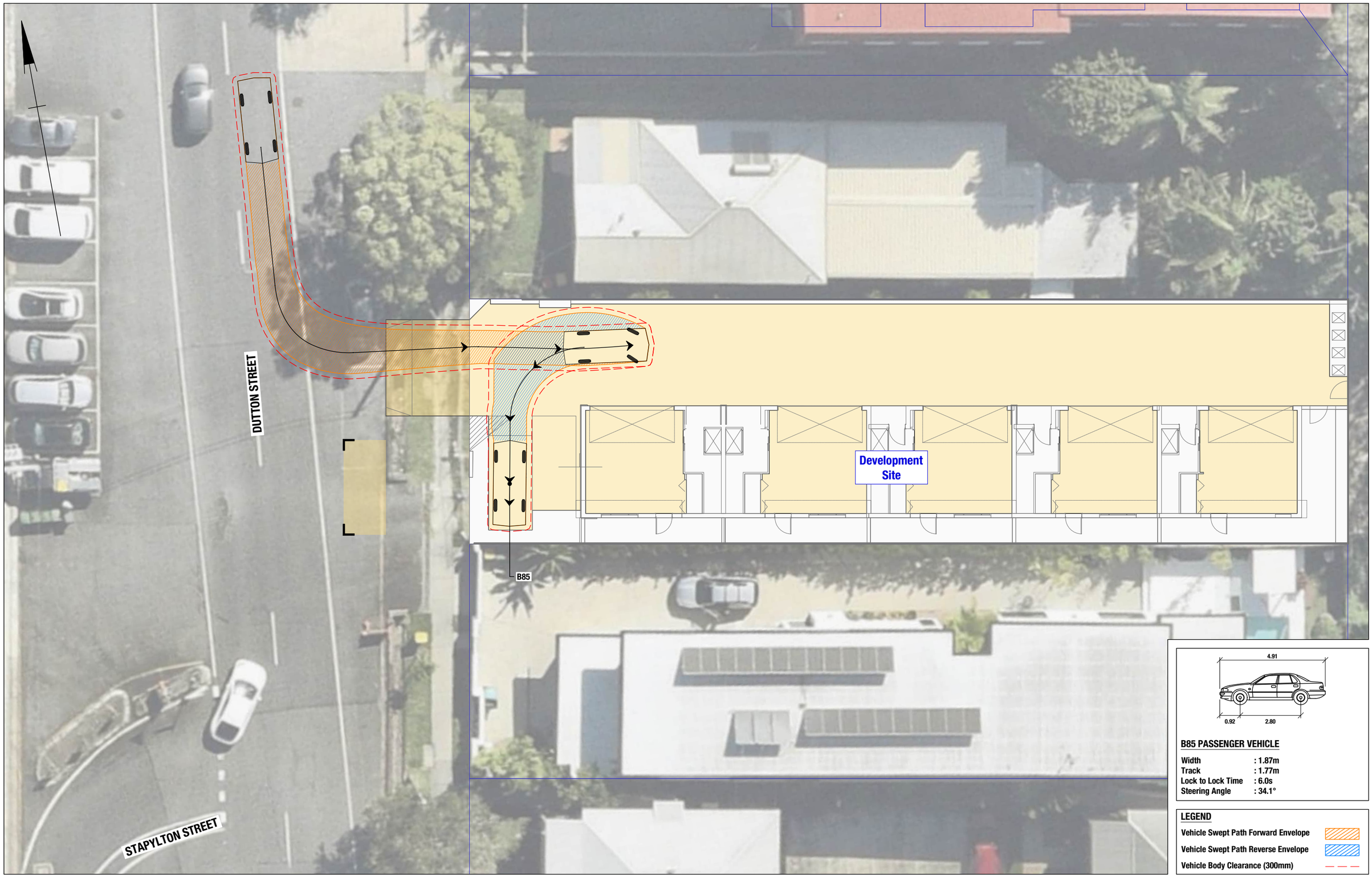
Duration

SWEPT PATH ASSESSMENT

enhance
URBAN PLANNING

60 Dutton Street, Coolangatta

F-7330 A (05.01.2015



B85 PASSENGER VEHICLE

Width	: 1.87m
Track	: 1.77m
Lock to Lock Time	: 6.0s
Steering Angle	: 34.1°

LEGEND

- Vehicle Swept Path Forward Envelope
- Vehicle Swept Path Reverse Envelope
- Vehicle Body Clearance (300mm)

GELEON
ABN 53 143 670 071
Suite 12, Level 1, 3029 The Boulevard
Emerald Lakes, Carrara
PO Box 454 Nerang Qld 4211
tel +61 7 5594 4473

0 1 2 3 4m

Engineering Certification

RPEQ Name James Goodman
RPEQ No. 29448
Date 31/08/2026

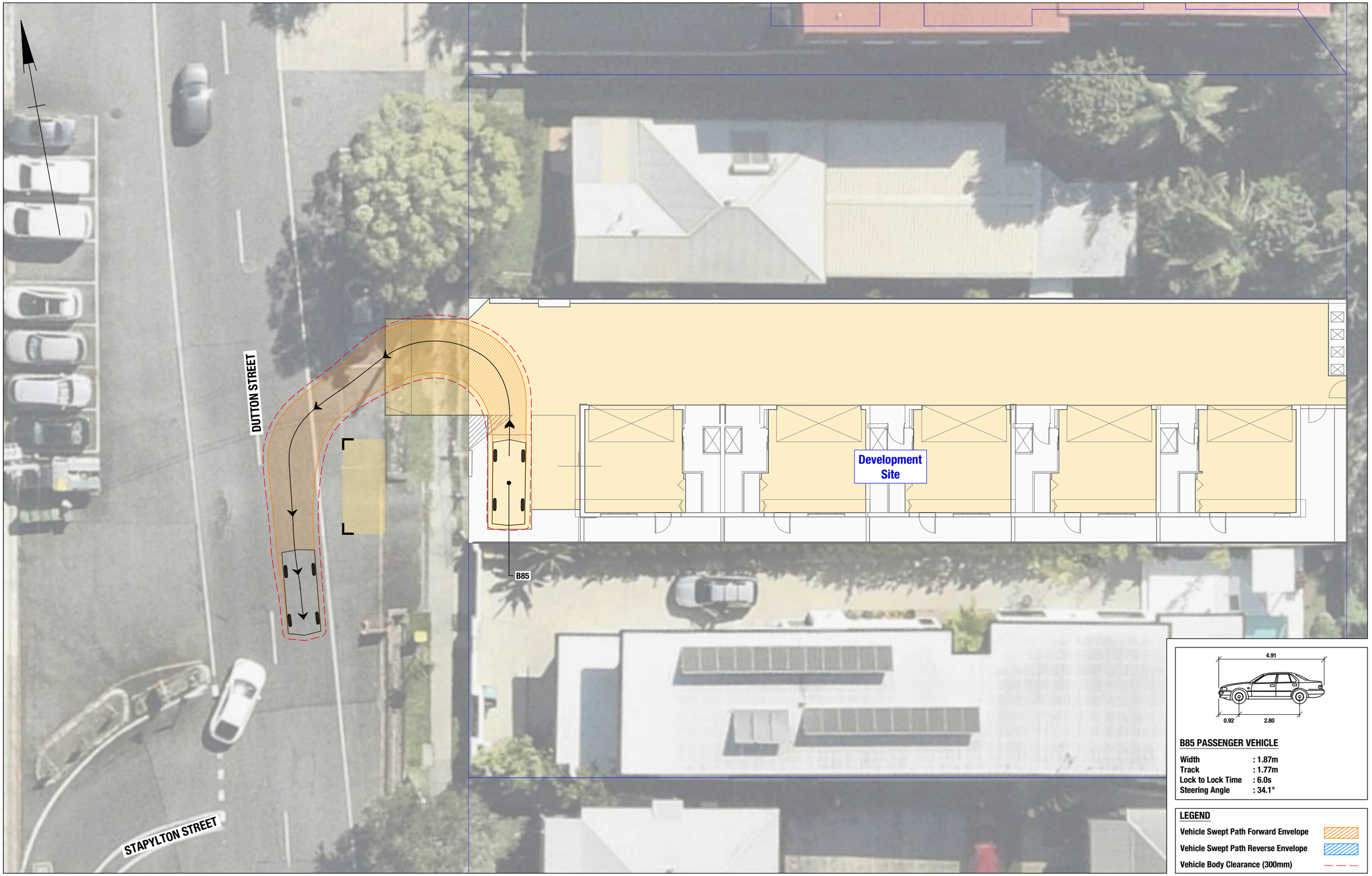
60 DUTTON STREET, COOLANGATTA
PROPOSED MULTIPLE DWELLING DEVELOPMENT

SWEPT PATH ASSESSMENT
B85 PASSENGER VEHICLE
ENTRY MANOEUVRE INTO VISITOR PARKING BAY

Project No. 51080
Issue Date 31/08/26
Drawing No. 51080-SP005-A
Series No. 1 of 4

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F-7330 A (05.01.2015



B85 PASSENGER VEHICLE

Width	: 1.87m
Track	: 1.77m
Lock to Lock Time	: 6.0s
Steering Angle	: 34.1°

LEGEND

- Vehicle Swept Path Forward Envelope
- Vehicle Swept Path Reverse Envelope
- Vehicle Body Clearance (300mm)

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9:59:00 AM 31 August 2026

GELEON
ABN 53 143 670 071
Suite 12, Level 1, 3029 The Boulevard
Emerald Lakes, Carrara
PO Box 454 Nerang Qld 4211
tel +61 7 5594 4473

0 1 2 3 4m

Engineering Certification

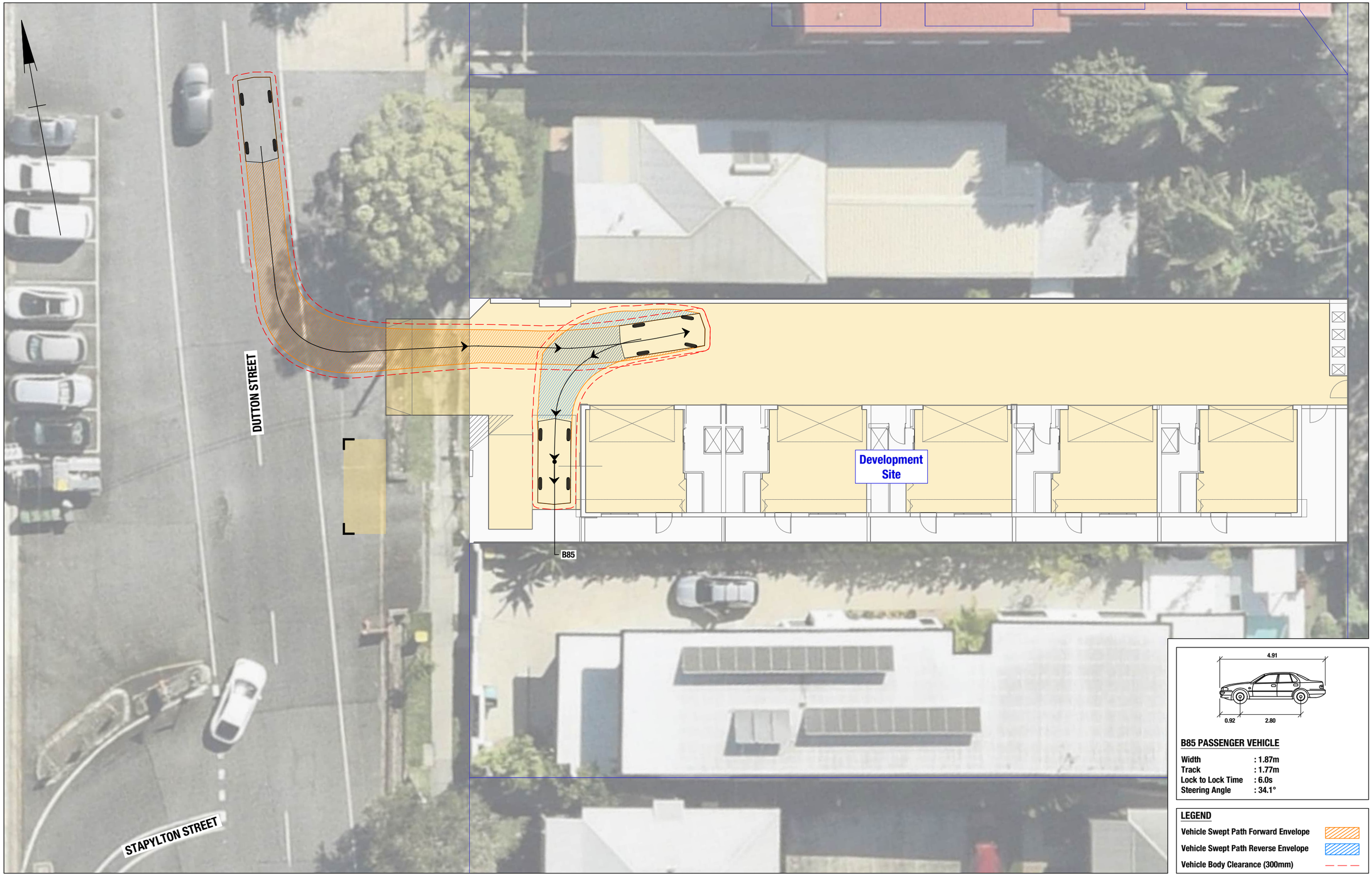
RPEQ Name James Goodman
RPEQ No. 29448
Date 31/08/2026

60 DUTTON STREET, COOLANGATTA
PROPOSED MULTIPLE DWELLING DEVELOPMENT

SWEPT PATH ASSESSMENT
B85 PASSENGER VEHICLE
EXIT FROM DEVELOPMENT SITE

Project No. 51080
Issue Date 31/08/26
Drawing No. 51080-SP006-A
Series No. 2 of 4

F-7330 A (05.01.2015



B85 PASSENGER VEHICLE

Width	: 1.87m
Track	: 1.77m
Lock to Lock Time	: 6.0s
Steering Angle	: 34.1°

LEGEND

- Vehicle Swept Path Forward Envelope
- Vehicle Swept Path Reverse Envelope
- Vehicle Body Clearance (300mm)

GELEON
ABN 53 143 670 071
Suite 12, Level 1, 3029 The Boulevard
Emerald Lakes, Carrara
PO Box 454 Nerang Qld 4211
tel +61 7 5594 4473

0 1 2 3 4m

Engineering Certification

RPEQ Name James Goodman
RPEQ No. 29448
Date 31/08/2026

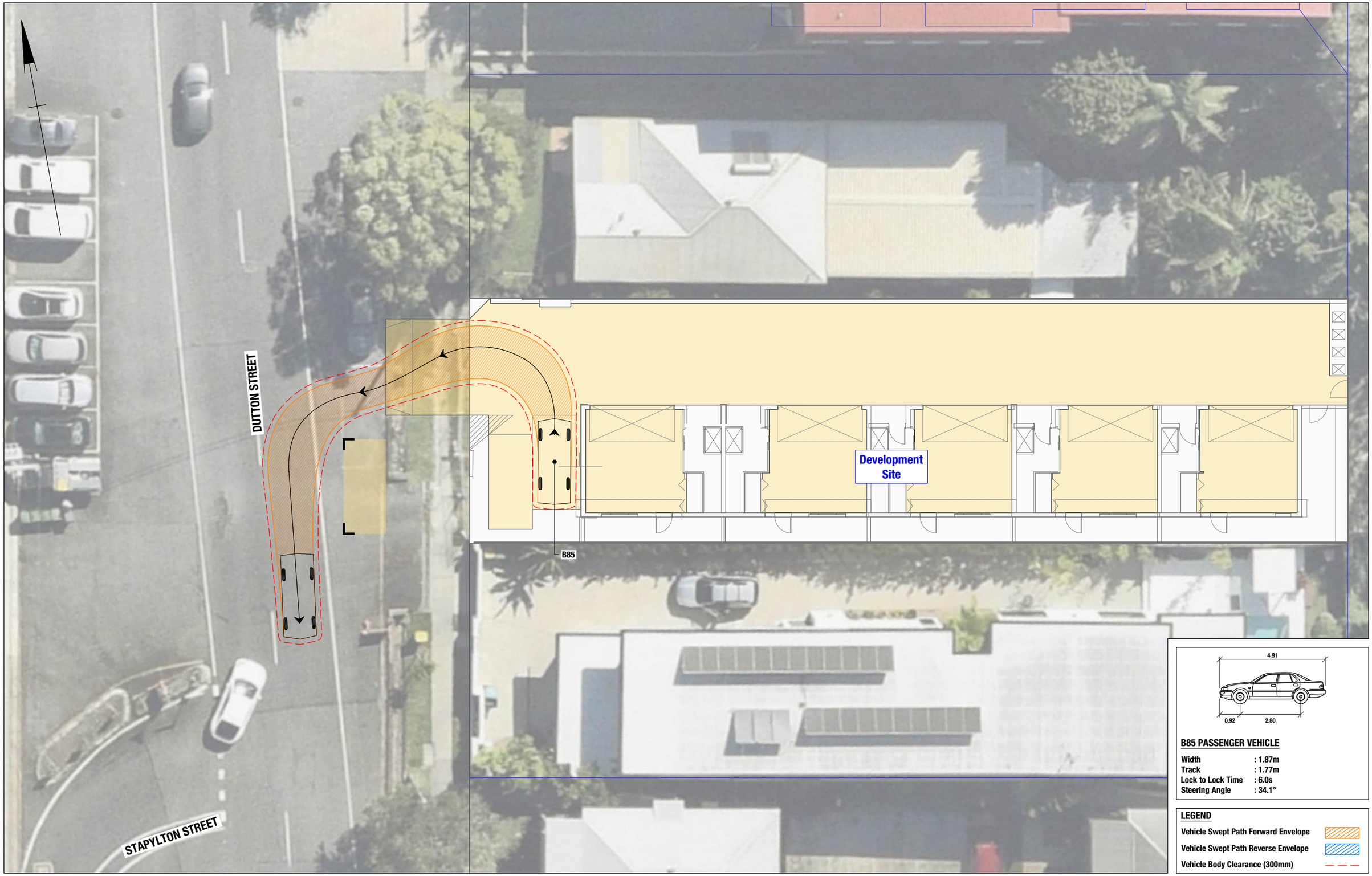
60 DUTTON STREET, COOLANGATTA
PROPOSED MULTIPLE DWELLING DEVELOPMENT

SWEPT PATH ASSESSMENT
B85 PASSENGER VEHICLE
ENTRY MANOEUVRE INTO VISITOR PARKING BAY

Project No. 51080
Issue Date 31/08/26
Drawing No. 51080-SP007-A
Series No. 3 of 4

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F-7330 A (05.01.2015



B85 PASSENGER VEHICLE

Width	: 1.87m
Track	: 1.77m
Lock to Lock Time	: 6.0s
Steering Angle	: 34.1°

LEGEND

- Vehicle Swept Path Forward Envelope
- Vehicle Swept Path Reverse Envelope
- Vehicle Body Clearance (300mm)

GELEON
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Emerald Lakes, Carrara
PO Box 454 Nerang Qld 4211
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0 1 2 3 4m

Engineering Certification

RPEQ Name James Goodman
RPEQ No. 29448
Date 31/08/2026

60 DUTTON STREET, COOLANGATTA
PROPOSED MULTIPLE DWELLING DEVELOPMENT

SWEPT PATH ASSESSMENT
B85 PASSENGER VEHICLE
EXIT FROM DEVELOPMENT SITE

Project No. 51080
Issue Date 31/08/26
Drawing No. 51080-SP008-A
Series No. 4 of 4

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