



May 2026

MNCE Ref: C6527

Flood Investigation Report

189-195 Teviot Road, Greenbank

Commissioned By
Chin-Yuan Chang

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REPORT CONTROL SHEET

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TABLE OF CONTENTS

1 INTRODUCTION	4
1.1 Overview and Background	4
1.2 Objectives and Scope.....	7
2 DATA	8
2.1 Modelling Parameters	8
2.2 Rainfall and Temporal Data.....	8
2.3 Level Data.....	8
3 EXISTING SITE ANALYSIS.....	9
3.1 Existing Model Overview	9
3.2 Existing Hydrologic Model	9
3.2.1 Existing Catchment Definition.....	9
3.2.2 Existing Rainfall Parameters and Losses	11
3.2.3 Existing Hydrological Results.....	12
3.3 Model Comparison	12
3.4 Existing Hydraulic Model	13
3.4.1 Existing Model Topography and Boundaries	13
3.4.2 Existing Hydraulic Infrastructure	13
3.5 Model Results.....	15
4 DEVELOPED SITE ANALYSIS.....	19
4.1 Developed Model Overview.....	19
4.2 Developed Hydrologic Model.....	19
4.3 Developed Hydraulic Model.....	19
4.4 Developed Model Results	20
5 PLANNING SCHEME REQUIREMENTS	25
5.1 Flood Planning Levels.....	25
6 INTERPRETATION AND CONCLUSIONS	26
Appendix A: Proposed Development Layout.....	27
Appendix B: Survey Plan.....	28
Appendix C: Logan Property Flood Report	29
Appendix D: Rational Method Calculation	30
Appendix E: Hydraulic Model Setup	31

1 INTRODUCTION

1.1 Overview and Background

This report has been prepared to support a combined Reconfiguration of a Lot (ROL) and Material Change of Use (MCU) application over Lot 11 on RP210430 at 189–195 Teviot Road, Greenbank. The site is located within the Logan City Council local government area and has a total area of approximately 2ha. Figure 1.1 below provides an aerial locality of the site and adjacent areas.



Figure 1.1: Subject Site bound by Teviot Road to the east (QLD Globe)

The proposed development is intended to be undertaken in stages comprising an initial 1 into 5 lot residential subdivision including road reserve and park dedication (Stage 1), a subsequent subdivision of three of those lots into 15 lots together with a Material Change of Use for 15 dwelling units (Stage 2), and a Material Change of Use over proposed Lot 16 for a townhouse development comprising 71 units (Stage 3). Refer Appendix A for ultimate development layout adopted as part of this assessment.

The existing site comprises a single residential dwelling and predominantly vegetated land, falling generally towards the rear of the property at an average grade of approximately 4%, based on the Detail and Level Survey prepared by JW Surveys dated January 2026 (refer Appendix B).

No municipal infrastructure is located within the subject site. However, municipal stormwater and sewer infrastructure are located within a registered services easement within the adjoining property to the rear at 29 Leanne Court, Greenbank (Lot 15 on RP217719). This infrastructure was established as part of recent subdivision works undertaken within the adjoining property to the north at 169–187 Teviot Road, Greenbank (Lot 18 on RP184970).

These subdivision works include the construction of a road reserve extending to the common boundary with the subject site. A municipal water main is also shown within this road reserve on the JW Surveys Detail and Level Survey (refer Appendix B), while available Council mapping identifies municipal stormwater infrastructure within the vicinity of the site. Refer Figure 1.2 below.

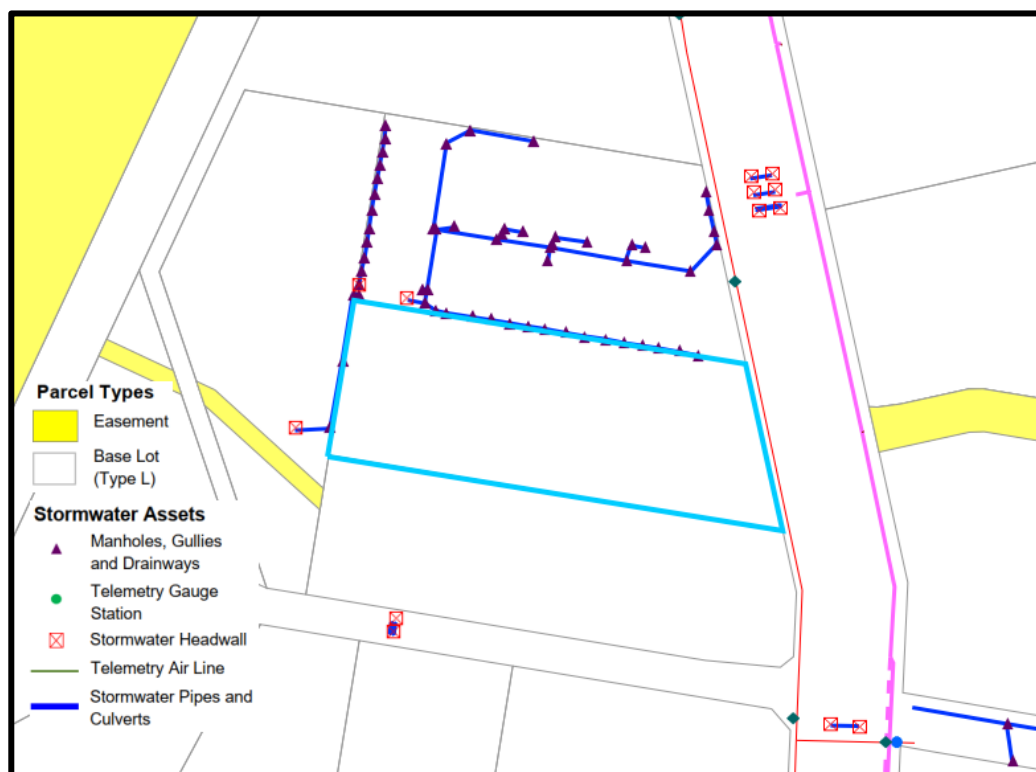


Figure 2.2: Municipal Stormwater Infrastructure Mapping (LCC)

The Logan Property Flood Report for the site (Appendix C) indicates that the subject land is affected by both regional flooding associated with Upper Oxley Creek and localised overland flow flooding. The Council mapping identifies high, medium and low flood risk areas towards the south-western corner of the site, which relate to the regional floodplain associated with Upper Oxley Creek. Refer Table 1.1 below for a summary of the regional flood levels applicable to the site and Figure 1.3 for the relevant Council flood overlay mapping.

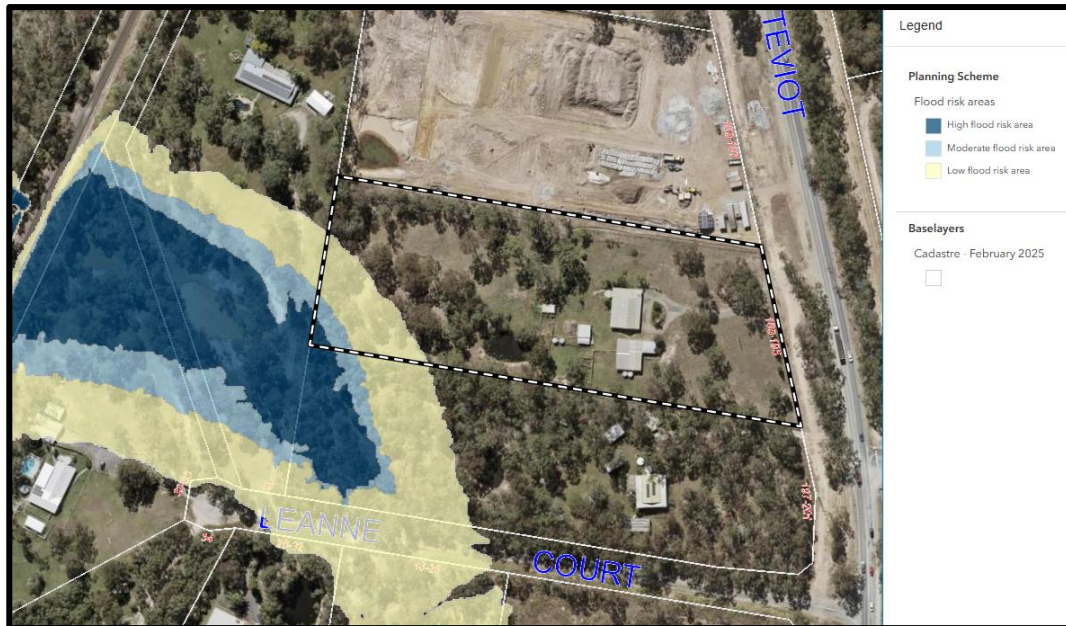


Figure 3.3: Council Flood Overlay Mapping (LCC PSP 2015)

Table 1.1: Site Peak Flood Levels (LCC PFR)

Storm Event	Level (m AHD)	Source
20%	60.3	Upper Oxley Creek
10%	60.3	Upper Oxley Creek
5%	60.3	Upper Oxley Creek
2%	60.3	Upper Oxley Creek
1%	60.5	Upper Oxley Creek

Given the proposed development involves a reconfiguration of a lot and townhouse development, a flood investigation has been undertaken to confirm that the proposed works do not adversely impact flooding behaviour external to the site. To facilitate this assessment, hydrologic and hydraulic modelling has been undertaken to quantify flooding conditions under both existing and developed scenarios.

1.2 Objectives and Scope

Milanovic Neale Consulting Engineers have been commissioned by Chin-Yuan Chang to undertake an assessment of site flooding conditions.

This report seeks to establish the site-specific flooding conditions for the site in relation to existing and developed conditions. It will estimate the width, depth and depth-velocity products of site floodwaters and outline requirements for the proposed development in accordance with the Logan Planning Scheme 2015.

The scope of works undertaken for this project are summarised below:

1. Prepare an integrated hydrologic and hydraulic model incorporating 1D and 2D elements to quantify the existing flooding conditions on site during the 1% AEP storm event.
2. Update the model to reflect the development proposal to quantify developed site flooding conditions during the 1% AEP storm event.
3. Advise on compliance with Logan City Council's Flood Hazard Overlay Code with respect to flood planning levels and flow conveyance.

2 DATA

2.1 Modelling Parameters

Logan City Council's Flood Hazard Overlay Code, Logan City Council's Flood Planning Scheme Policy and the *Queensland Urban Drainage Manual (QUDM)* have been used as a guide to establish the required modelling parameters for the site.

2.2 Rainfall and Temporal Data

Rainfall data for the catchment was sourced from the Australian Rainfall & Runoff (ARR) Data Hub on 14th January 2026 based on grid cell 27.742 (S), 152.985 (E).

Enveloped LIMB 2020 Intensity Frequency Durations (IFDs) were referenced as this data is said to result in a reduction in local biases across all AEPs, durations and areas, compared to the 2016 IFDs. The Enveloped Dataset represents the maximum of the 2016 and 2020 IFDs.

Temporal patterns were sourced from the Australian Rainfall & Runoff (ARR) Data Hub website based on the East Coast (North) region.

A climate change factor of 9.5% has also been applied to design rainfall intensities to represent a future climate scenario (2100), in accordance with recommendations outlined in Logan City Council's Upper Oxley Creek Flood Study dated 27th September 2023.

This factor has been applied within the hydraulic modelling scenarios only. Base rainfall intensities (excluding climate change) have been adopted for the hydrologic modelling and Rational Method comparison.

2.3 Level Data

Surface levels external and internal to the site are based on 2023 LiDAR information from the Foundation Spatial Data Framework provided by the State of Queensland (Department of Natural Resources and Mines). Supplied publication data includes 2023 Logan City Council (LGA) 1 kilometre tiles in 1 metre Digital Elevation Models (DEM) in ASCII xyz format.

3 EXISTING SITE ANALYSIS

3.1 Existing Model Overview

This section of the report will analyse and comment on existing site flooding conditions. The modelling software InfoWorks ICM, utilising the RAFTS routing model, was used to generate the hydrographs and peak flows from the catchments affecting the site under the 1% AEP storm event. This software will also be utilised to prepare an integrated 1D-2D hydraulic model to quantify site flooding conditions.

3.2 Existing Hydrologic Model

3.2.1 Existing Catchment Definition

The total impervious area attributed to the catchment was adopted based on assumed ultimate development conditions, rather than existing land use. Impervious fractions have been selected with reference to Table 4.5.1 of QUDM, assuming the upstream catchment will ultimately be developed as low to medium density residential development.

As per *Book 5 of Australian Rainfall and Runoff* (2019 Guidelines), use of the total impervious area (TIA) can lead to an overestimation of urban catchment flows and an effective Impervious area (EIA) equating to 60% of the TIA has therefore been assumed. The EIA accounts for flows generated from impervious surfaces which are directly connected to a drainage system and is otherwise known as a directly connected impervious area (DCIA).

The remaining 40% of the overall TIA for each catchment has been reclassified as an indirectly connected impervious area (ICIA) which considers impervious areas that interact with pervious areas before discharging to drainage infrastructure such as paved patio areas which exist upstream of a grassed garden area.

The catchment slope has been defined by reviewing the contours generated from the underlying DTM data. Refer Figure 3.1 for catchment delineation and Table 3.1 and Table 3.2 for associated properties.

The catchment roughness has been defined using a manning's 'n' value of 0.015 for impervious areas and 0.05 for pervious areas which is considered reasonable.

Figure 3.1: Catchment Plan

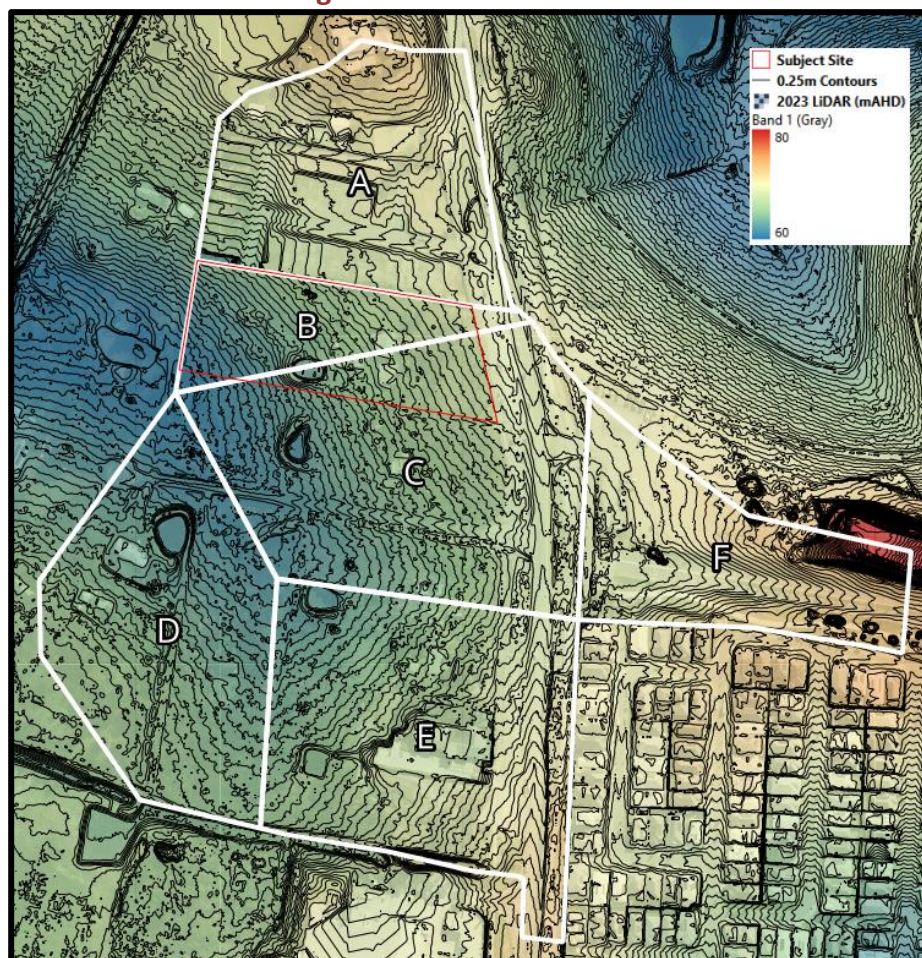


Table 3.1: Catchment Parameters

Catchment	Total Catchment Area (ha)	Fraction Impervious (%)	Total Impervious Area (ha)	Total Pervious Area (ha)	Slope (%)
A	3.675	50	1.838	1.838	3
B	1.437	50	0.719	0.719	3
C	5.265	50	2.633	2.633	3
D	4.050	50	2.025	2.025	2
E	4.907	50	2.454	2.454	3
F	2.705	70	1.894	0.811	2

Table 3.2: Total Impervious Area Breakdown

Catchment	Directly Connected Impervious Area (ha)	Indirectly Connected Impervious Area (ha)
A	1.103	0.735
B	0.431	0.288
C	1.580	1.053
D	1.215	0.810
E	1.472	0.982
F	1.136	0.758

3.2.2 Existing Rainfall Parameters and Losses

As indicated in Section 2.1 above, Rainfall data within the vicinity of the site was extracted from the Australian Rainfall & Runoff (ARR) Data Hub.

The uniform loss method was adopted and an initial loss coefficient of 25mm attributed to pervious areas as per ARR 2016 Data Hub rural loss values. This initial loss value is considered appropriate given the inclusion of pre-burst rainfalls within the proposed hydrology.

An initial loss coefficient equal to 70% of the rural loss value assumed for pervious areas was applied to indirectly connected impervious areas (ICIA) as per *Book 5 of Australian Rainfall and Runoff* (2019 Guidelines).

An initial and continuing loss coefficients adopted for directly connected impervious (DCIA), indirectly connected impervious (ICIA) and pervious sub catchment areas are tabulated below.

Table 3.3: Initial and Continuing Loss Parameters

Parameter	DCIA Catchment Values (mm)	ICIA Catchment Values (mm)	Pervious Catchment Values (mm)
Initial Loss	1.0	17.5	25
Continuing Loss	0.0	1.1	1.1

Temporal patterns applicable to East Coast North have been adopted in accordance with AR&R 2016.

3.2.3 Existing Hydrological Results

Using the parameters outlined in Sections 3.2.1 and 3.2.2 above, the storm ensemble which produced the median flow for each storm duration up to and including the 270 minute was identified. The storm duration and ensemble which yielded the maximum 1% AEP peak flow for the overall catchment in the hydrological model is summarised in Table 3.4 below.

Table 3.4: Critical Storm Properties

Storm Event	Duration (min)	Ensemble	Peak Flow (m ³ /s)
1% AEP	30	7	7.99

3.3 Model Comparison

QUDM Section 4.2.3 recommends hydrologic models are calibrated with actual flow data rather than to an alternate runoff routing model. In the absence of such data, Section 4.2.3 continues to state that as alternative, model results may be compared with the results to a Rational Method peak discharge for catchments less than 500ha.

Based on the methods outlined in QUDM, the following parameters were used to estimate the peak runoff at the model outlet. Refer Appendix A for Rational Method calculation.

Table 3.5: Rational Method Parameters

Catchment Area (ha)	Runoff Coefficient (C10)	Time of Concentration (mins)
22.039	0.86	30

A comparison between Rational Method and ICM model peak discharge estimations for the 1% AEP storm event is provided in the table below.

Table 3.6: Peak Discharge Comparison

Storm Event	Peak Discharge (m ³ /s)		Difference (%)
	Rational Method	ICM	
1% AEP	8.51	7.99	6

As these peak discharges are within 6% of one another, the hydrology and hydraulics represented within the model area is considered reasonable. Refer Appendix A for a Rational Method Calculation.

3.4 Existing Hydraulic Model

3.4.1 Existing Model Topography and Boundaries

The two-dimensional model domain for the analysis covers an area of approximately 15.1ha. As outlined in Section 2 above, surface levels external to and including the site are based on LiDAR information.

The model utilises a minimum and maximum mesh size of 5m² and 10m² to provide the appropriate level of detail required to represent the study area with a 1 second time step. Refer Appendix D for model setup.

Manning 'n' roughness coefficients were used throughout the 2D domain to represent the surface roughness. These coefficients have been derived in accordance with the *Australian Rainfall and Runoff, A Guide to Flood Estimation* and are summarised in Table 3.7 below.

Table 3.7: Manning's Roughness Values

Land Use	Manning's 'n' Value
Road	0.02
Verge	0.03
Urban Residential	0.10

The model domain was allocated a normal boundary condition and extended approximately 150m downstream of the subject site in line with an existing railway embankment. Flows which reached the extents of the domain were therefore allowed to freely exit the model as per local topography and is considered to have no effect on the flooding conditions over and adjacent to the site.

A downstream tailwater condition has been applied to the model domain, corresponding to the 5% AEP regional flood level associated with Upper Oxley Creek. This event was adopted as the coincident regional flood condition following review of Logan City Council's Upper Oxley Creek Flood Study dated 27th September 2023.

The adopted modelling approach also incorporates a 9.5% climate change factor applied to design rainfall intensities to represent a future (2090) scenario.

Existing dams located within the model domain, together with the detention basin located within the adjoining development to the north, have been conservatively represented as full. This approach represents a worst-case hydraulic scenario for assessment of downstream flooding conditions.

3.4.2 Existing Hydraulic Infrastructure

Key hydraulic controls within the broader model domain have been incorporated as 1D elements within the hydraulic model. This includes the reinforced concrete box

culvert (RCBC) conveying flow beneath the railway embankment, which represents the primary flow relief mechanism for the model domain.

The configuration and hydraulic properties of this structure were adopted with reference to Logan City Council's Upper Oxley Creek Flood Study dated 27th September 2023, specifically Table B.1 – Hydraulic Structure Details (Structure ID 28).

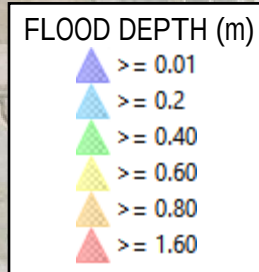
3.5 Model Results

Flood depth, elevation and depth–velocity product estimates for existing conditions in the 1% AEP event are presented in the following figures. Results are based on the 2-hour storm duration (6th ensemble), which was identified as representing the peak median flooding conditions for the site.

The hydraulic model indicates that, under existing conditions, the site is subject to localised flooding, with peak flood elevations ranging from approximately 63.50 m AHD along the north-western extent of the site to 61.43 m AHD towards the south-western extent. A maximum flood depth of approximately 1.4 m and depth–velocity product of approximately 0.3 m²/s occur during the 1% AEP event.

Flooding is primarily concentrated towards the western end of the site. This behaviour is influenced by the presence of the railway embankment and associated culvert crossing, which acts as a key hydraulic control and limits downstream discharge capacity. Flooding conditions are further influenced by regional tailwater effects associated with Upper Oxley Creek, contributing to increased depths within the site.

Based on the predicted flood depth and depth–velocity product and adopted hazard vulnerability criteria, a maximum hydraulic hazard classification of H4 is identified. Flooding across the site is therefore generally classified as moderate to high risk during the defined flood event, in accordance with Figure 1.8.2 of Logan City Council's Planning Scheme Policy 10 – Flood.



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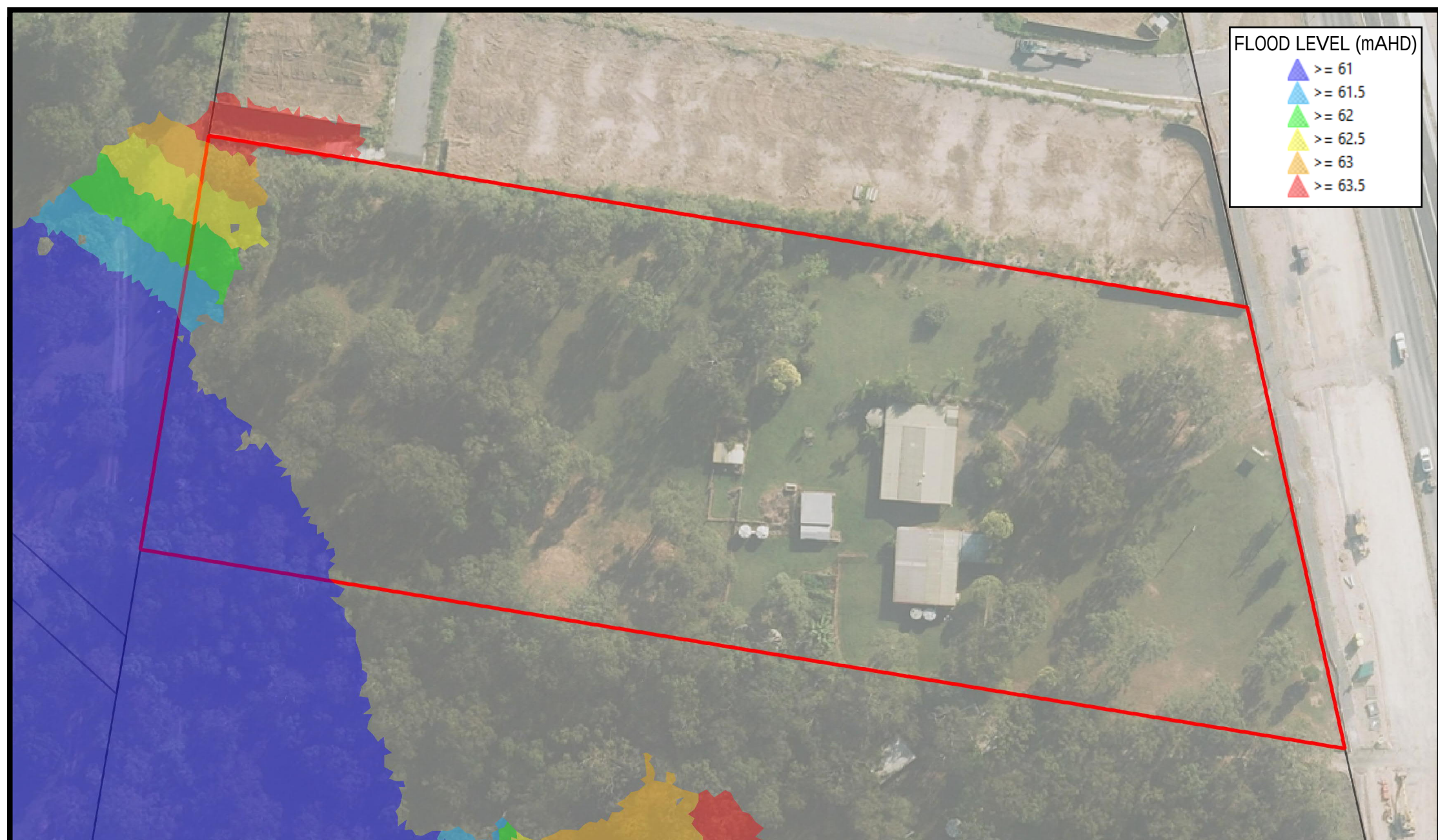
1% AEP(2100) FLOOD DEPTH - EXISTING CONDITIONS



PROJECT: C6572
DATE:
25/05/2026
SCALE: 1:1000

FLOOD LEVEL (mAHD)

-  ≥ 61
-  ≥ 61.5
-  ≥ 62
-  ≥ 62.5
-  ≥ 63
-  ≥ 63.5



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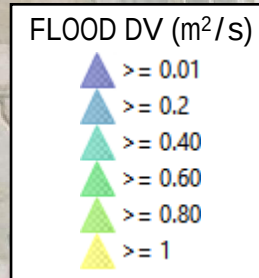
189-195 TEVIOT ROAD, GREENBANK

1% AEP(2100) FLOOD LEVEL - EXISTING CONDITIONS



PROJECT: C6572
DATE:
25/05/2026
SCALE: 1:1000





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189-195 TEVIOT ROAD, GREENBANK

1% AEP(2100) FLOOD DEPTH-VELOCITY PRODUCT - EXISTING CONDITIONS



PROJECT: C6572
DATE:
25/05/2026
SCALE: 1:1000

4 DEVELOPED SITE ANALYSIS

4.1 Developed Model Overview

This section of the report assesses flooding conditions for the ultimate developed site layout. The modelling software InfoWorks ICM, utilising the RAFTS routing model, has been used to generate hydrographs and peak flows from the catchments affecting the site for the 1% AEP storm event. The software has also been used to prepare an integrated 1D–2D hydraulic model to quantify the extent of flooding affecting the site under developed conditions.

4.2 Developed Hydrologic Model

The hydrologic model has been maintained consistent with existing conditions for the purpose of flood impact assessment. Changes in site imperviousness associated with the proposed development have not been incorporated into the flood model, with increased runoff managed separately as part of the stormwater management design for the development.

4.3 Developed Hydraulic Model

The hydraulic model has been updated to incorporate proposed development works associated with the ultimate development layout, including the extension of the road network, based on the conceptual earthworks design prepared by MNCE.

Hydraulic parameters external to the site have been maintained consistent with existing conditions.

4.4 Developed Model Results

Flood depth, elevation and depth–velocity product estimates for the ultimate developed condition in the 1% AEP event are presented in the following figures. Results are based on the critical storm duration and ensemble identified in Section 3.2.3.

The hydraulic model indicates that flood extents within the site are reduced under developed conditions. Flood levels and flow behaviour external to the site remain generally consistent with existing conditions, with no adverse impacts on external flooding conditions identified.

FLOOD DEPTH (m)

- ≥ 0.01
- ≥ 0.2
- ≥ 0.40
- ≥ 0.60
- ≥ 0.80
- ≥ 1.60



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1% AEP(2100) FLOOD LEVEL - ULTIMATE DEVELOPED CONDITIONS



PROJECT: C6572

DATE:

25/05/2026

SCALE: 1:1000

FLOOD LEVEL (mAHD)

- ▲ ≥ 61
- ▲ ≥ 61.5
- ▲ ≥ 62
- ▲ ≥ 62.5
- ▲ ≥ 63
- ▲ ≥ 63.5



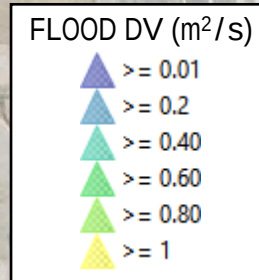
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1% AEP(2100) FLOOD LEVEL - ULTIMATE DEVELOPED CONDITIONS



PROJECT: C6572
DATE:
25/05/2026
SCALE: 1:1000



FLOOD DEPTH IMPACT (m)

- ▲ ≥ 0.01
- ▲ ≥ 0.02
- ▲ ≥ 0.03
- ▲ ≥ 0.04
- ▲ ≥ 0.05
- ▲ ≥ 0.06
- ▲ ≥ WAS DRY / NOW WET
- ▲ ≥ WAS WET / NOW DRY



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1% AEP(2100) FLOOD DEPTH IMPACT - ULTIMATE DEVELOPED CONDITIONS



PROJECT: C6572
DATE:
25/05/2026
SCALE: 1:1000



5 PLANNING SCHEME REQUIREMENTS

This section will outline minimum flood planning levels for the proposed development based on the flow parameters outlined above.

5.1 Flood Planning Levels

In accordance with Logan City Council's Flood Hazard Overlay Code, flood affected portions of the proposed development are required to achieve minimum lot and non-habitable floor levels above the adopted 1% AEP flood level including climate change (2100). Future habitable floor levels are required to achieve a minimum 500 mm freeboard above the adopted flood level.

The minimum flood planning levels for flood affected lots are summarised within Table 5.1.

Table 5.1: Flood Planning Level Requirements

Lot	Adopted 1% AEP + CC Flood Level (AHD)	Minimum Required Lot and Non-Habitable Floor Level (AHD)	Proposed Minimum Lot Level (AHD)
1	63.65	63.65	64.40
2	63.00	63.00	64.40
3	62.50	62.50	63.80
4	62.00	62.00	63.80
5	61.60	61.60	63.20
6	61.20	61.20	63.20

The conceptual earthworks design prepared by MNCE demonstrates that the proposed development can achieve the required flood planning levels. The adopted lot levels also satisfy minimum habitable floor level requirements. Refer attached civil engineering plans for further detail.

6 INTERPRETATION AND CONCLUSIONS

An integrated hydrologic and hydraulic assessment has been undertaken to quantify flooding behaviour affecting the site under existing and ultimate developed conditions.

The modelling indicates that, under existing conditions, the site is subject to localised flooding, with flooding primarily concentrated towards the western end of the site due to the influence of the railway embankment and downstream hydraulic controls, in combination with regional tailwater effects associated with Upper Oxley Creek.

Under developed conditions, the proposed earthworks and development layout are shown to result in a reduction in flood extents within the site, while flood levels and flow behaviour external to the site remain generally consistent with existing conditions, with no adverse impacts identified.

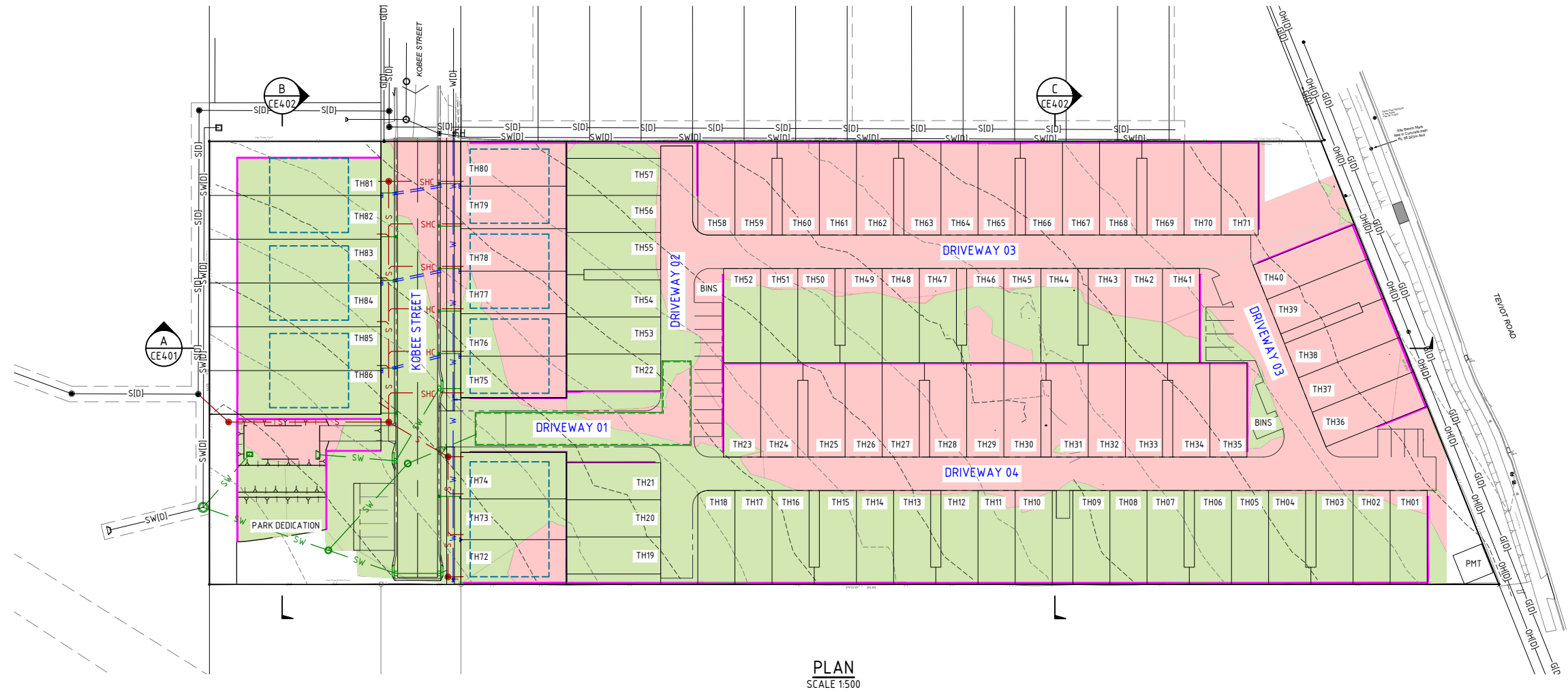
The assessment adopts a 5% AEP regional tailwater condition and assumes upstream storage elements are full at the commencement of the design event, representing a conservative assessment of flood behaviour. A 9.5% climate change factor has been applied to design rainfall intensities in accordance with Logan City Council's *Upper Oxley Creek Flood Study (27 September 2023)* to establish the applicable flood planning levels.

Minimum lot levels have been established in accordance with Logan City Council's Flood Hazard Overlay Code, with the conceptual earthworks design demonstrating that the required flood planning levels can be achieved. The adopted lot levels also satisfy the minimum habitable floor level requirements.

Based on the above, the proposed development is considered to satisfy the relevant flood planning requirements and is not expected to result in adverse flooding impacts to surrounding properties.

Appendix A: Proposed Development Layout

NOT FOR CONSTRUCTION



LEGEND

—G[D]—	EXISTING GAS	9.999 - - - - -	EXISTING CONTOURS		
—UE[D]—	EXISTING ELECTRICAL UNDERGROUND	—SW—	PROPOSED STORMWATER DRAINAGE		
—OH—	EXISTING ELECTRICAL OVERHEAD	—RW—	PROPOSED ROOFWATER DRAINAGE/KERB ADAPTER		
—T[D]—	EXISTING TELECOMMUNICATION	—S—	PROPOSED SEWERAGE MAIN		
—SW[D]—	EXISTING STORMWATER DRAINAGE	—W—	PROPOSED WATER MAIN		
—S[D]—	EXISTING SEWERAGE MAIN	—	PROPOSED RETAINING WALL		
—W[D]—	EXISTING WATER MAIN	—	PROPOSED BLE EXTENTS		
	PROPOSED TOP OF BATTER	□ W/M	PROPOSED WATER METER		
---	PROPOSED TOE OF BATTER				

NOTE:
EXISTING SEWER & STORMWATER INFRASTRUCTURE DETAILS WITHIN
NEIGHBOURING SERVICE EASEMENT UNKNOWN. ADDITIONAL
INVESTIGATIONS/SURVEY REQUIRED TO BE UNDERTAKEN BY OTHERS TO VERIFY
DESIGN CONCEPT.

- NOTES:
- THIS DRAWING TO BE USED FOR DESIGN REVIEW AND ACCESS PERMISSION ONLY. NOT TO BE USED FOR CONSTRUCTION.
 - LEVELS ON SITE TO BE CONFIRMED BY DETAILED SURVEY AND DESIGN REVISED PRIOR TO CONSTRUCTION.
 - APPROPRIATE APPROVALS FROM THE LOCAL AUTHORITIES ARE REQUIRED PRIOR TO CONSTRUCTION.

EXISTING SERVICES NOTE:
THIS DESIGN HAS BEEN PREPARED BASED ON SERVICE AUTHORITY AS
CONSTRUCTED INFORMATION OR FIELD SURVEY, IF MADE AVAILABLE TO MNCE AT
THE TIME OF DESIGN. THE LOCATION OF UNDERGROUND SERVICES ARE NOTED WITH
THEIR RESPECTIVE CLASS IN ACCORDANCE WITH ASS488:2022, THE AUSTRALIAN
STANDARDS FOR CLASSIFICATION OF SUBSURFACE UTILITY INFORMATION (SUI).
NO POT HOLING HAS BEEN UNDERTAKEN TO VERIFY EXISTING SERVICE LOCATIONS
AND DEPTHS. IT IS THE CONTRACTORS RESPONSIBILITY TO UNDERTAKE FURTHER
SURVEY AND POT HOLING AS REQUIRED, TO CONFIRM THE NATURE AND LOCATION
OF THESE SERVICES AND VERIFY THE DESIGN.

SCALE 1:500 (A1)
0 10 20 30m
(SCALE BEFORE REDUCTION)

REAL PROPERTY DESCRIPTION
LOT 17 ON RP210430

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**CIVIL
STRUCTURAL
TRAFFIC
PROJECT MANAGEMENT**

CHIN-YUAN CHANG

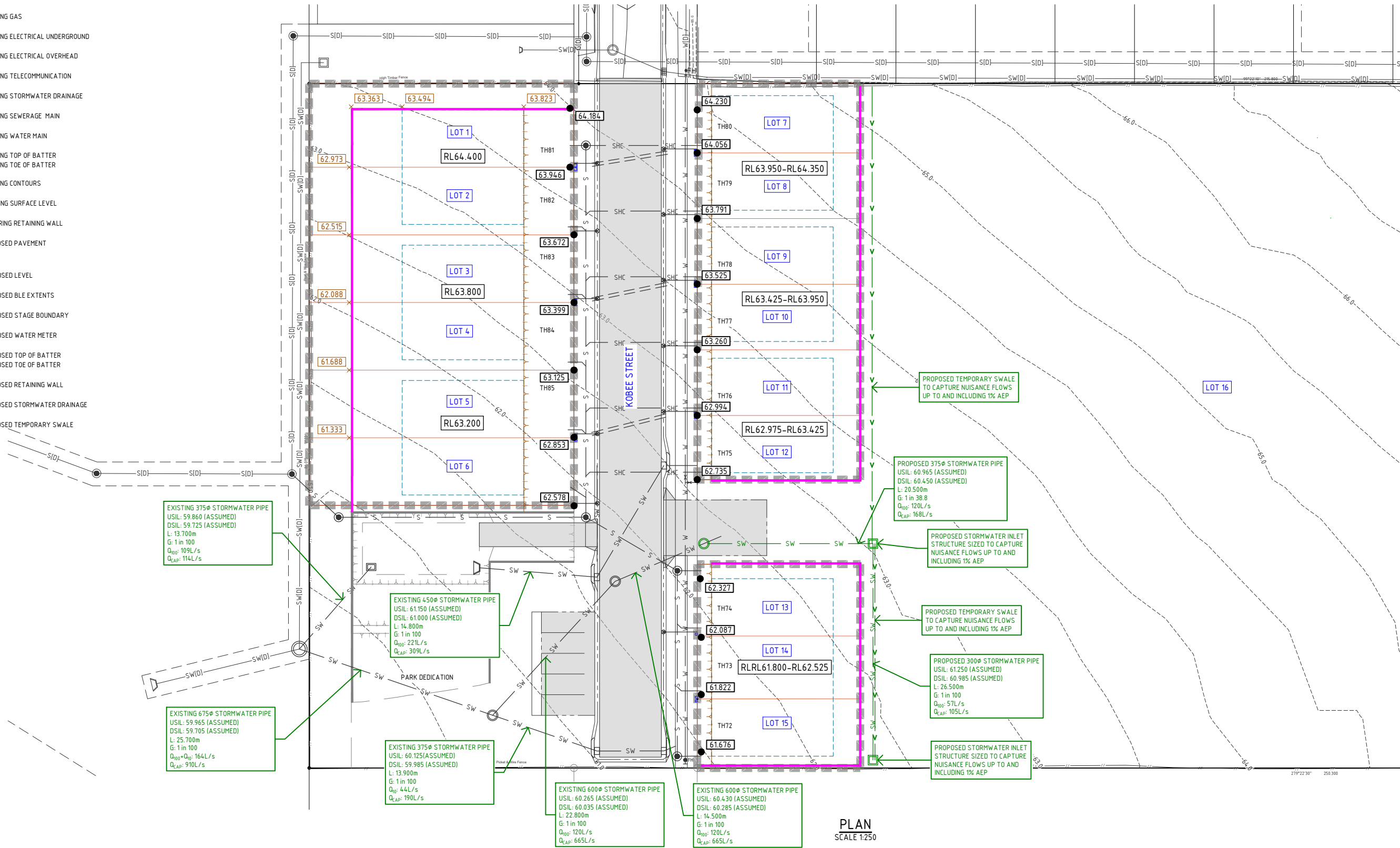
189-195 TEVIOT ROAD, GREENBANK

**PRELIMINARY OVERALL CIVIL
WORKS LAYOUT PLAN**

DRAWN SM	DESIGNED SM	DATE FEB 2026
CHECKED CFR	APPROVED	
DRAWING No. C6527 - CE100	REV. A	

LEGEND

- G(D)— EXISTING GAS
—UE(D)— EXISTING ELECTRICAL UNDERGROUND
—OH— EXISTING ELECTRICAL OVERHEAD
—T(D)— EXISTING TELECOMMUNICATION
—SW(D)— EXISTING STORMWATER DRAINAGE
—S(D)— EXISTING SEWERAGE MAIN
—W(D)— EXISTING WATER MAIN
--- EXISTING TOP OF BATTER
--- EXISTING TOE OF BATTER
9.999 --- EXISTING CONTOURS
X ### EXISTING SURFACE LEVEL
--- EXISTING RETAINING WALL
--- PROPOSED PAVEMENT
● ### PROPOSED LEVEL
--- PROPOSED BLE EXTENTS
--- PROPOSED STAGE BOUNDARY
--- PROPOSED WATER METER
--- PROPOSED TOP OF BATTER
--- PROPOSED TOE OF BATTER
--- PROPOSED RETAINING WALL
--- SW --- PROPOSED STORMWATER DRAINAGE
--- PROPOSED TEMPORARY SWALE

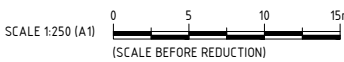


NOTE:
EXISTING SEWER & STORMWATER INFRASTRUCTURE DETAILS WITHIN
NEIGHBOURING SERVICE EASEMENT UNKNOWN. ADDITIONAL
INVESTIGATIONS/SURVEY REQUIRED TO BE UNDERTAKEN BY OTHERS TO VERIFY
DESIGN CONCEPT.

- NOTES:
- THIS DRAWING TO BE USED FOR DESIGN REVIEW AND ACCESS PERMISSION ONLY. NOT TO BE USED FOR CONSTRUCTION.
 - LEVELS ON SITE TO BE CONFIRMED BY DETAILED SURVEY AND DESIGN REVISED PRIOR TO CONSTRUCTION.
 - APPROPRIATE APPROVALS FROM THE LOCAL AUTHORITIES ARE REQUIRED PRIOR TO CONSTRUCTION.

EXISTING SERVICES NOTE:
THIS DESIGN HAS BEEN PREPARED BASED ON SERVICE AUTHORITY AS
CONSTRUCTED INFORMATION OR FIELD SURVEY, IF MADE AVAILABLE TO MNCE AT
THE TIME OF DESIGN. THE LOCATION OF UNDERGROUND SERVICES ARE NOTED WITH
THEIR RESPECTIVE CLASS IN ACCORDANCE WITH ASS488:2022, THE AUSTRALIAN
STANDARDS FOR CLASSIFICATION OF SUBSURFACE UTILITY INFORMATION (SUI).
NO POT HOLE HAS BEEN UNDERTAKEN TO VERIFY EXISTING SERVICE LOCATIONS
AND DEPTHS. IT IS THE CONTRACTORS RESPONSIBILITY TO UNDERTAKE FURTHER
SURVEY AND POT HOLE AS REQUIRED, TO CONFIRM THE NATURE AND LOCATION
OF THESE SERVICES AND VERIFY THE DESIGN.

NOT FOR CONSTRUCTION



REAL PROPERTY DESCRIPTION
LOT 17 ON RP210430

REV.	DESCRIPTION	DATE	DRAWN	REVIEWED	VERIFIED
A	PRELIMINARY ISSUE	22.05.26	SM	CFR	

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CHIN-YUAN CHANG

189-195 TEVIOT ROAD, GREENBANK

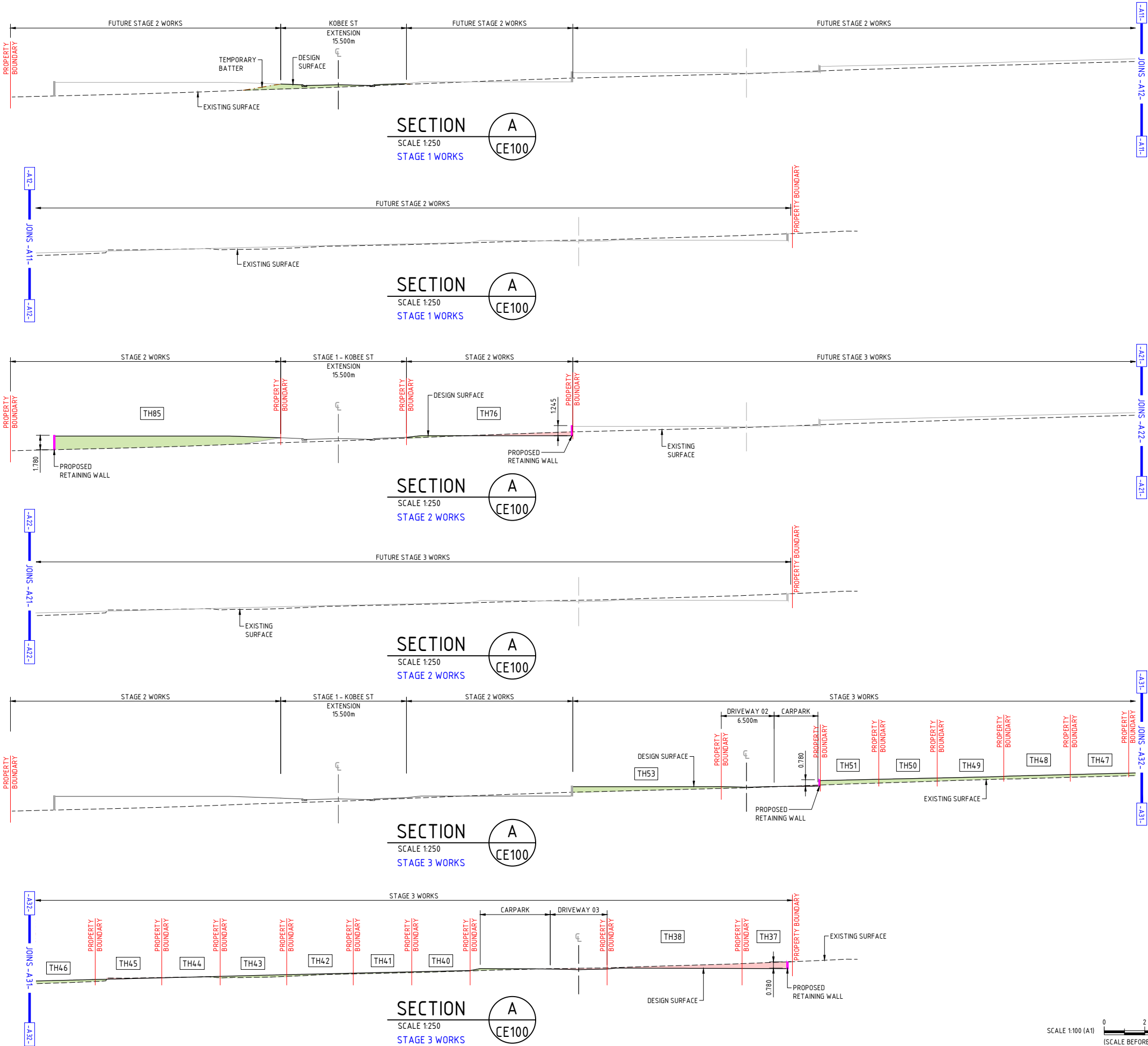
PRELIMINARY CIVIL WORKS
LAYOUT PLAN - STAGE 2

DRAWN SM	DESIGNED SM	DATE FEB 2026
CHECKED CFR	APPROVED	
DRAWING No. C6527 - CE201	REV. A	

NOT FOR CONSTRUCTION

LEGEND

- EXISTING SURFACE LEVEL
----- PROPOSED SURFACE LEVEL
- . - . - TEMPORARY EARTHWORKS BATTER
PROPOSED FILL
PROPOSED CUT



- NOTES:
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SCALE 1:100 (A1)
0 2 4 6m
(SCALE BEFORE REDUCTION)

REAL PROPERTY DESCRIPTION
LOT 17 ON RP210430

REV.	DESCRIPTION	DATE	DRAWN	REVIEWED	VERIFIED
A	PRELIMINARY ISSUE	22.05.26	SM	CFR	

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CHIN-YUAN CHANG

189-195 TEVIOT ROAD, GREENBANK

PRELIMINARY BULK EARTHWORKS
SECTIONS SHEET 1 OF 2

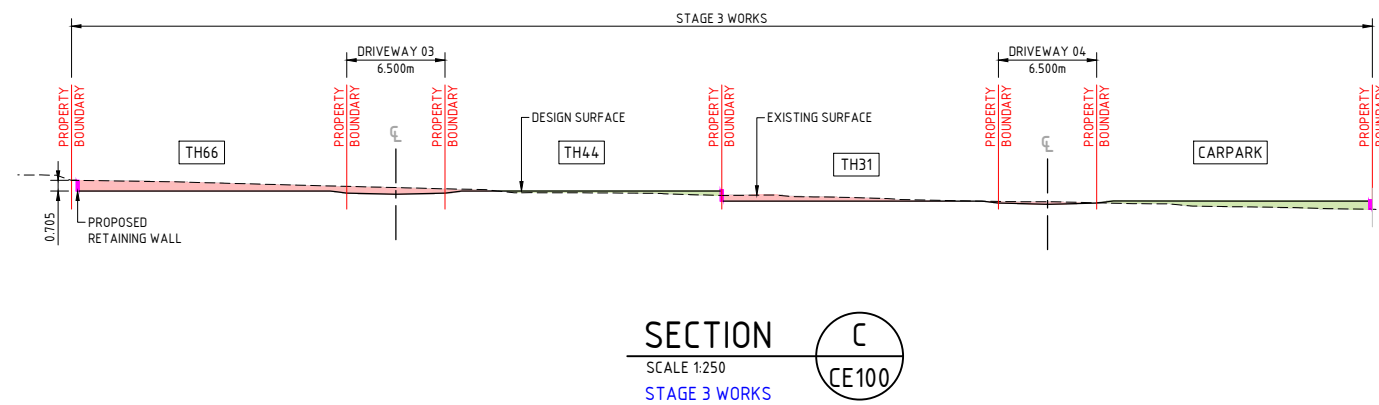
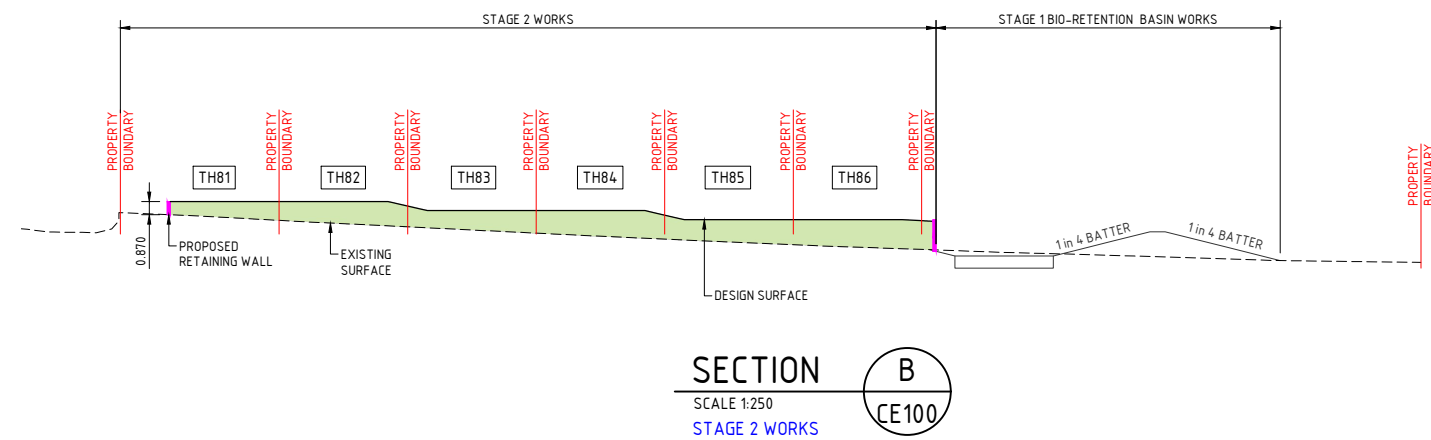
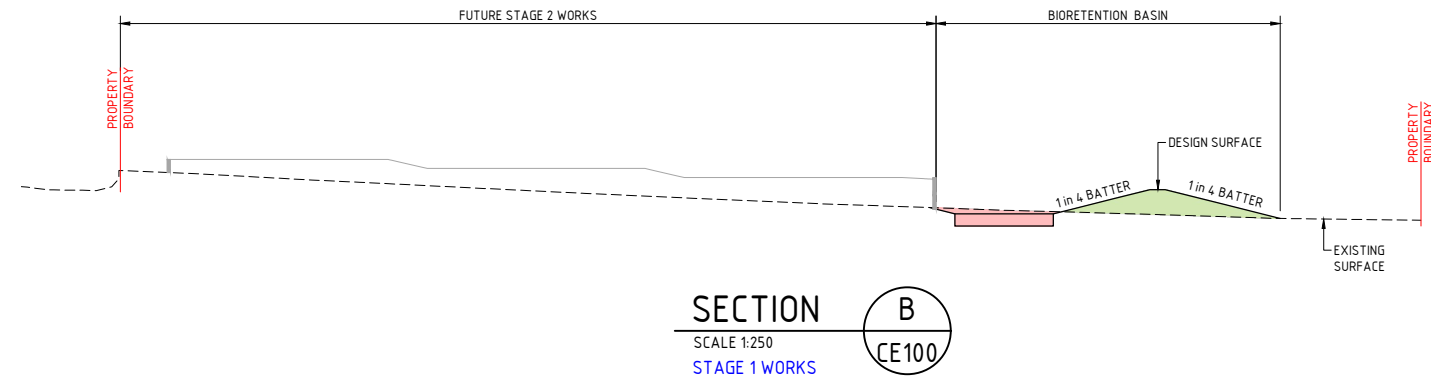
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DRAWING No. C6527 - CE401	REV. A	

DO NOT SCALE FROM DRAWING
ALL SCALES ARE AS SHOWN (A1)

NOT FOR CONSTRUCTION

LEGEND

- | | |
|---|-----------------------------|
|  | EXISTING SURFACE LEVEL |
|  | PROPOSED SURFACE LEVEL |
|  | TEMPORARY EARTHWORKS BATTER |
|  | PROPOSED FILL |
|  | PROPOSED CUT |



- NOTES:
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SCALE 1:100 (A1)



(SCALE BEFORE REDUCTION)

REAL PROPERTY DESCRIPTION
LOT 17 ON RP210430

[illegible]

**CIVIL
STRUCTURAL
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PROJECT MANAGEMENT**

	CLIENT
--	--------

CHIN-YUAN CHANG

PROJECT

189-195 TEVIOT ROAD, GREENBANK

	TITLE
--	-------

PRELIMINARY BULK EARTHWORKS
SECTIONS SHEET 2 OF 2

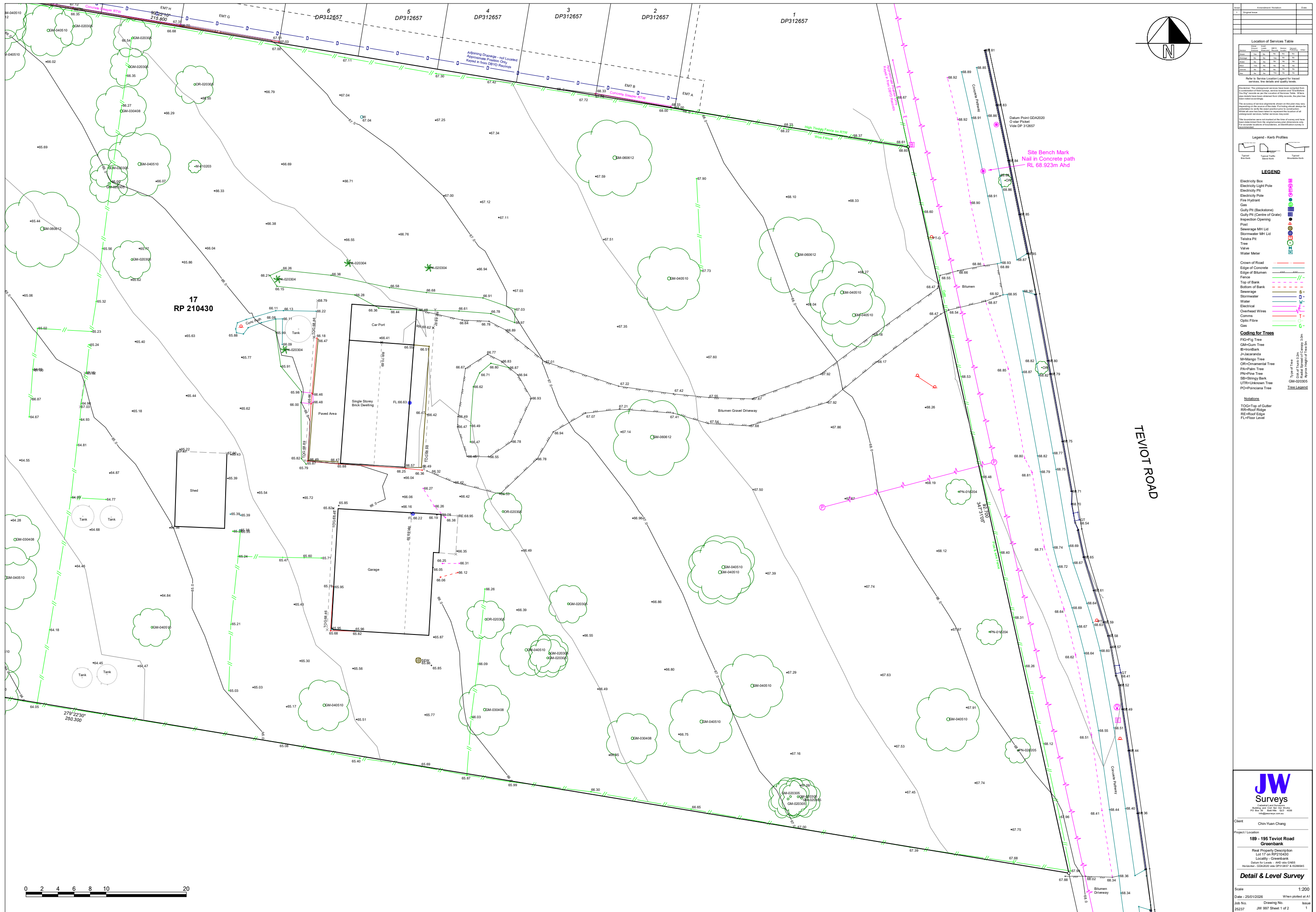
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CHECKED CFR	APPROVED	
DRAWING No. C6527 - CE402		REV. A

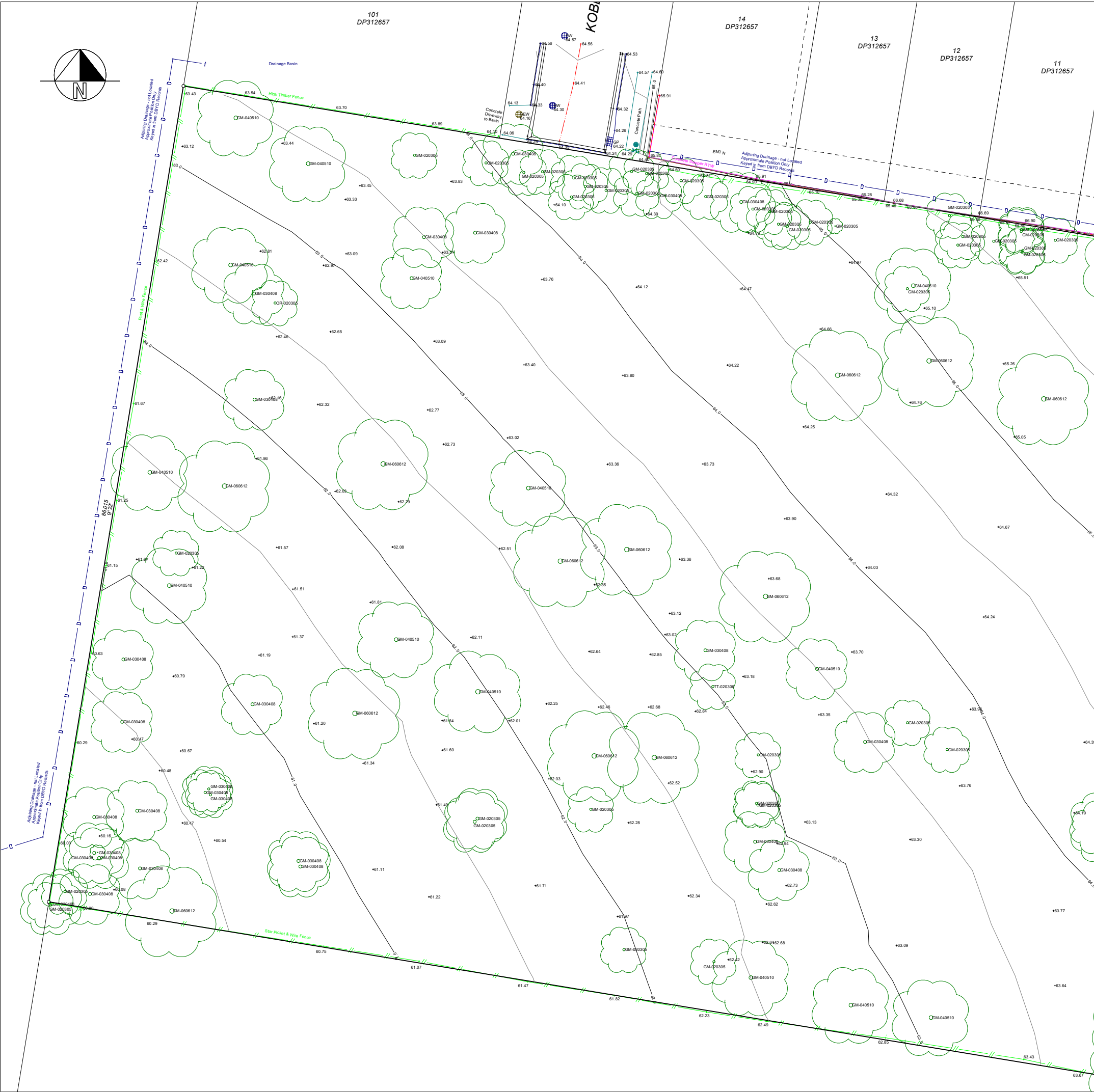
DO NOT SCALE FROM DRAWING
ALL SCALES ARE AS SHOWN (A1)

DOCUMENT PRODUCED UNDER AN ISO 9001:2015 CERTIFIED QUALITY MANAGEMENT SYSTEM

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Appendix B: Survey Plan





Appendix C: Logan Property Flood Report

PROPERTY FLOOD REPORT

 PRINT

Property Details

Address: 189-195 Teviot Road GREENBANK QLD 4124

Lot/Plan: Lot 17 RP 210430

Size/Area: 20,030 m²

Property Key: 279967

Catchment(s): Brisbane River, Oxley Creek

View Logan's [catchments and waterways map](#) (PDF)



Summary Flood Assessment

The table below presents the flood risks applicable to the selected property. There may be multiple studies and flood scenarios affecting the property, particularly for larger sites.

Assessment	Details
Other information	GREATER FLAGSTONE - This property is in the Greater Flagstone Priority Development Area (PDA). Please contact Economic Development Queensland Development for advice about development. This report is for flood risk awareness only. EDQ PDA - Greater Flagstone
Risk area(s)	High, Moderate, Low
Investigation area	Not applicable
Isolation risk	Not applicable
River flooding	Not applicable
Creek flooding	20% chance of a flood this size or larger happening in any given year
Overland flow	Applies. It is possible that flooding from a local waterway which has not yet been studied may also impact the property. Please contact Council for further advice. Overland flow is water (stormwater run-off) that travels over land during heavy rainfall events. It generally occurs quickly and for short durations.

Latest Flood Risk

The extract below comes from the flood risk map based on the latest (most recent) flood studies accepted by Council applicable for this property.



LEGEND

	High	Floodwaters may be deep or fast flowing, or have a relatively high chance of occurrence (e.g. 80% chance in 30 years). Conditions may pose a risk to life and cause damage to buildings, possibly severe. Limited development may be considered if not increasing the flood risk exposure for people or property. These areas are generally better suited to environmental, recreational and some agricultural uses.
	Moderate	Less frequently affected by flooding or if more frequent, with shallow or slower moving floodwater. Conditions may pose an unacceptable risk to people or property if not mitigated. Development may be tolerable if measures are taken to address flood impacts, protect people and limit damage.
	Low	Extremely unlikely chance of flooding (1% chance or less over a 30 year period) and/or relatively shallow or benign flooding conditions. Development is generally acceptable except for essential community infrastructure (e.g. emergency services). Vulnerable uses (e.g. childcare, aged care) may be ok subject to building, site access and safe shelter mitigation measures. Shows the full floodplain under the largest flood that could conceivably occur.
	Investigation area	Locations where a current flood study has not been delivered and information to determine flood risk is not available. The approximation of the floodplain in these areas is based on a citywide overland flow study. Development should avoid these areas until further investigation (updated flood study or localised risk assessment) is completed.



The flood studies this map is based on consider the impacts of climate change, as required by Queensland's planning legislation and policies. The map considers the whole floodplain for Logan and reflects a risk-based approach that takes into account:

- How likely a flood of a given size is in any given year, and
- What the impact or level of danger of that flood is.

Flood Levels

The table below displays flood levels from the most recently accepted flood studies affecting this property. To view the flood study documents please see the [Flood page](#) on Council's website. The levels are measured in Australian Height Datum (AHD), where sea level is approximately zero (0) metres. The level displayed in the table below is the maximum flood level on the property for that event (likelihood). For some properties, particularly large properties or those on a significant slope, flood levels can vary significantly.

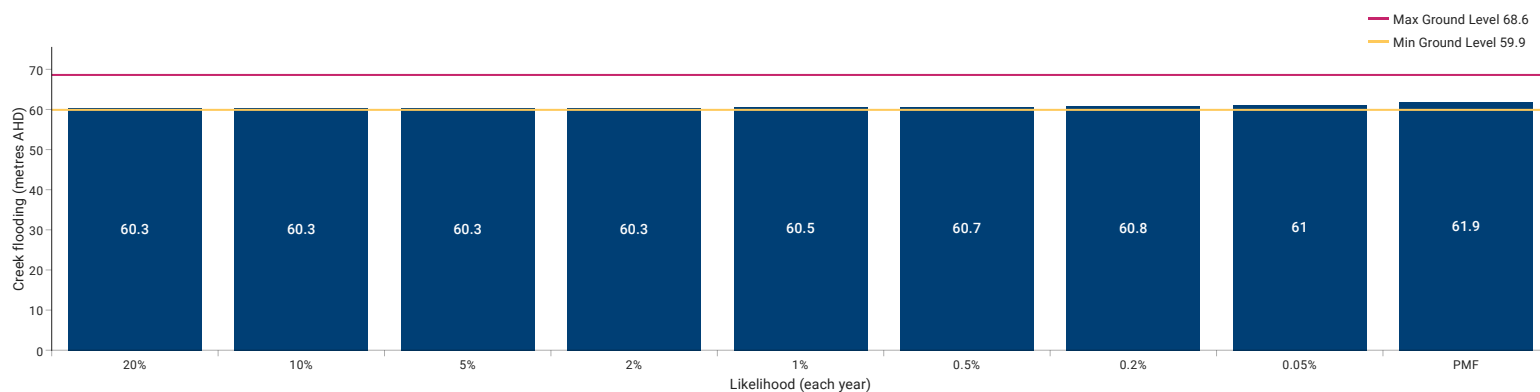
The most likely flood scenarios is shown at the top of the table, with the Probable Maximum Flood (PMF) at the bottom, being the least likely but most serious flood scenario.

Some properties may be impacted by only river flooding or only creek flooding, and some may be impacted by both. There may also be other sources of inundation that may impact the property and affect flood levels, based on overland flow or local creeks where studies have not yet been completed.

Study: Upper Oxley Creek Flood Study 2024

Likelihood (each year)	Creek flooding
20% chance	60.3 metres AHD
10% chance	60.3 metres AHD
5% chance	60.3 metres AHD
2% chance	60.3 metres AHD
1% chance	60.5 metres AHD
0.5% chance	60.7 metres AHD
0.2% chance	60.8 metres AHD
0.05% chance	61.0 metres AHD
PMF	61.9 metres AHD

Flood and Ground Levels in metres AHD



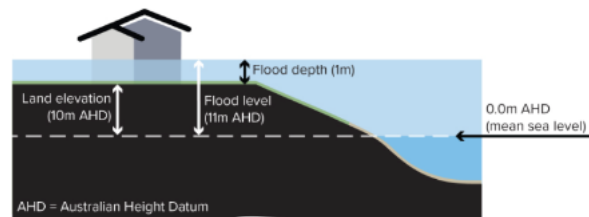
Ground Levels

Ground levels are based on an aerial LiDAR (Light Detection and Ranging) survey, which uses millions of laser point measurements to build a model of the ground surface. The source of the data is displayed in the table below so that you know when the survey was conducted.

Ground level	Details
Minimum ground level	59.9 metres AHD
Maximum ground level	68.6 metres AHD

Source: 2021 Digital elevation model (1 metre grid)

The projected flood depth (how deep the water may be above ground, in metres) is the difference between the flood levels in the section above and the ground levels in this table. The diagram below provides an example (land elevation is ground level).



Overland Flow

Overland flow is water (stormwater/rainfall run-off) that exceeds the capacity of drains, pipes and channels during heavy rainfall events and travels over land towards waterways. It generally occurs quickly and for shorter periods of time. The impact of overland flow is dependent on local conditions, so the mapping is a guide only. It is possible that flooding from a local waterway which has not yet been studied may also impact the property. Please contact Council for further advice.

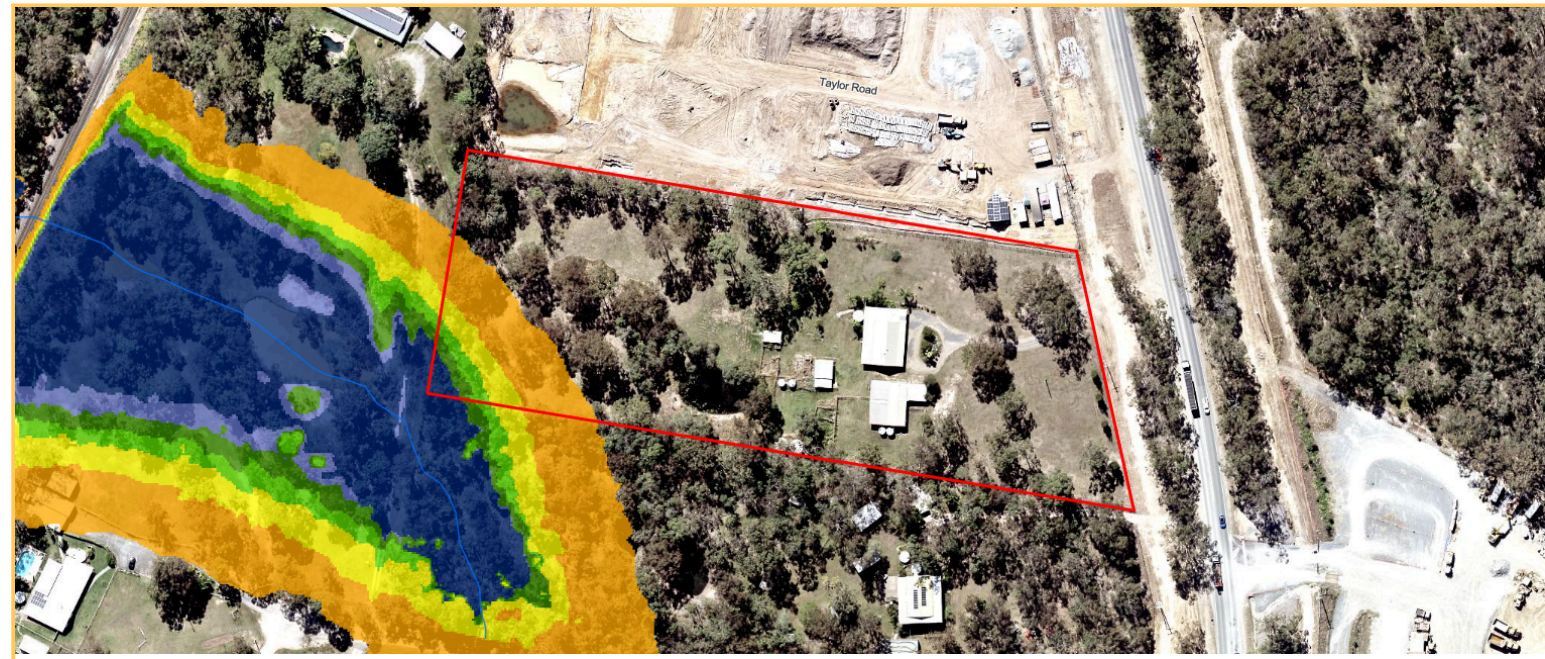


LEGEND

 Overland flow extent (areas possibly impacted)

Future Climate Scenarios

This extract comes from the map showing the projected extent of flooding (affected areas) for multiple flood scenarios for all relevant flood studies, **including the projected impacts of climate change**. This map corresponds with the flood levels provided in the table above for the 5%, 2%, 1%, 0.5%, 0.05% and Probable Maximum Flood (PMF) scenarios.

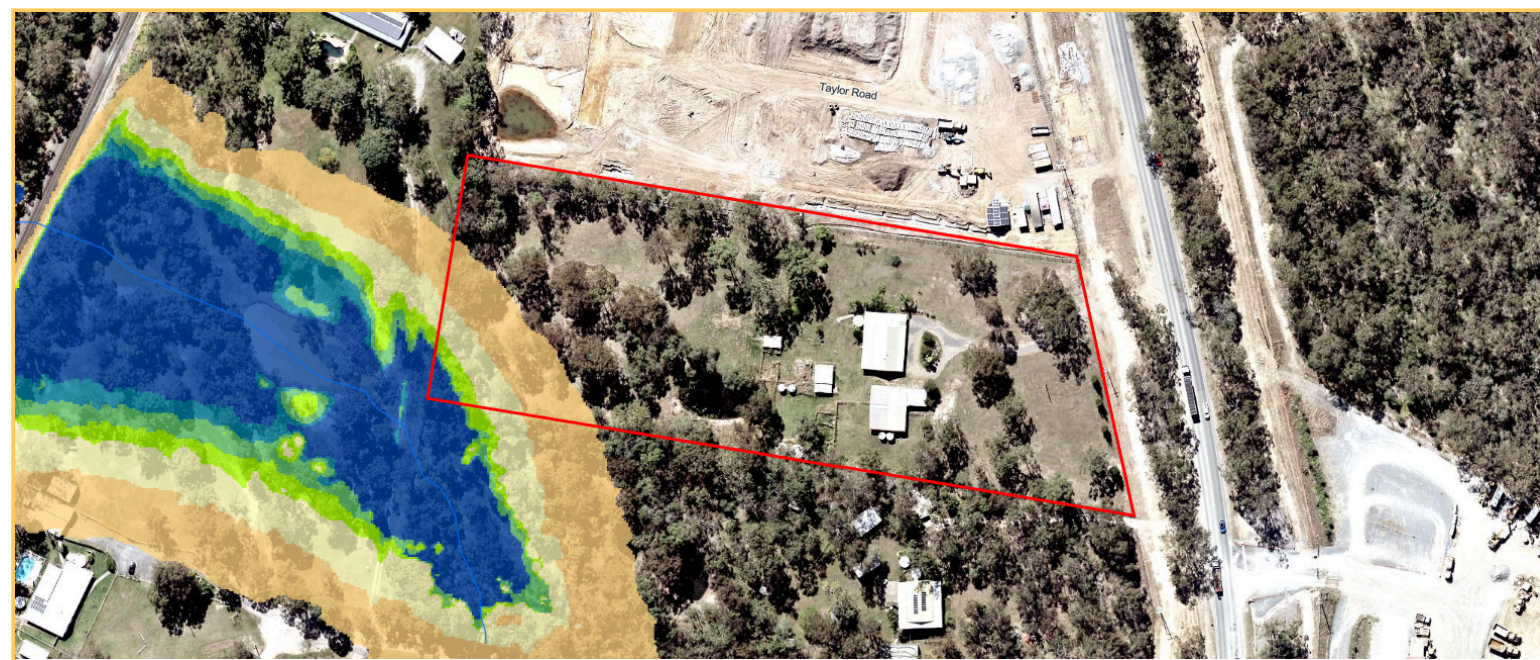


LEGEND

	5% chance	The areas modelled to be impacted by a flood that has a 5% (or 1 in 20) chance of happening in any given year, or 80% chance over a 30 year period, which is the common term of a mortgage. This modelling includes the impacts of climate change and represents our understanding of future risk.
	2% chance	The areas modelled to be impacted by a flood that has a 2% (or 1 in 50) chance of happening in any given year, or 45% chance over a 30 year period, which is the common term of a mortgage. This modelling includes the impacts of climate change and represents our understanding of future risk.
	1% chance	The areas modelled to be impacted by a flood that has a 1% (or 1 in 100) chance of happening in any given year, or 25% chance over a 30 year period, which is the common term of a mortgage. This modelling includes the impacts of climate change and represents our understanding of future risk.
	0.5% chance	The areas modelled to be impacted by a flood that has a 0.5% (or 1 in 200) chance of happening in any given year, or 15% chance over a 30 year period, which is the common term of a mortgage. This modelling includes the impacts of climate change and represents our understanding of future risk.
	0.05% chance	The areas modelled to be impacted by a flood that has a 0.05% (or 1 in 2000) chance of happening in any given year. This is an extremely unlikely flood event with a 1% chance of happening over a 30 year period, not including the impacts of climate change.
	PMF	The PMF or probable maximum flood scenario represents the full extent of the floodplain, or the most serious flood that could be expected to occur. This is usually estimated based on the probable maximum rainfall, not including the impacts of climate change.
	Investigation area	Locations where a current flood study has not been delivered and information to determine flood risk is not available. The approximation of the floodplain in these areas is based on a citywide overland flow study. Further investigation is needed.

Current Climate Scenarios

This extract comes from the map showing flood affected areas **without** considering the impacts of climate change. This map represents modelled flooding under current conditions, and can be used for insurance purposes.



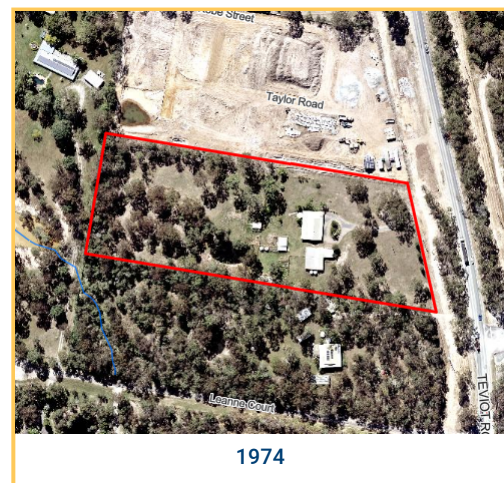
LEGEND

	5% chance	The areas modelled to be impacted by a flood that has a 5% (or 1 in 20) chance of happening in any given year, or 80% chance over a 30 year period, which is the common term of a mortgage. This modelling is based on current (present day) conditions and does not take into account the impacts of climate change.
	2% chance	The areas modelled to be impacted by a flood that has a 2% (or 1 in 50) chance of happening in any given year, or 45% chance over a 30 year period, which is the common term of a mortgage. This modelling is based on current (present day) conditions and does not take into account the impacts of climate change.
	1% chance	The areas modelled to be impacted by a flood that has a 1% (or 1 in 100) chance of happening in any given year, or 25% chance over a 30 year period, which is the common term of a mortgage. This modelling is based on current (present day) conditions and does not take into account the impacts of climate change.
	0.5% chance	The areas modelled to be impacted by a flood that has a 0.5% (or 1 in 200) chance of happening in any given year, or 15% chance over a 30 year period, which is the common term of a mortgage. This modelling is based on current (present day) conditions and does not take into account the impacts of climate change.
	0.05% chance	The areas modelled to be impacted by a flood that has a 0.05% (or 1 in 2000) chance of happening in any given year. This is an extremely unlikely flood event with a 1% chance of happening over a 30 year period, not including the impacts of climate change.
	PMF	The PMF or probable maximum flood scenario represents the full extent of the floodplain, or the most serious flood that could be expected to occur. This is usually estimated based on the probable maximum rainfall, not including the impacts of climate change
	Investigation area	Locations where a current flood study has not been delivered and information to determine flood risk is not available. The approximation of the floodplain in these areas is based on a citywide overland flow study. Further investigation is needed.

Historic Flood Events

Based on the best information available to Council, the table below indicates whether or not the selected property may have been impacted by significant historic flood events. It is possible that other creek flooding or overland flow, which is not included in Council's mapping of these events, may have impacted the property.

Flood event	Property impacted
1974	No
2017 (after ex Tropical Cyclone Debbie)	Yes
2022 (late February / early March)	Yes



Planning Scheme Maps

The selected property is shown below on an extract of the Flood Overlay Maps from the Logan Planning Scheme 2015 V9.2 with TLPI No. 1/2024. Various provisions of the planning scheme which refer to properties affected by the Flood Overlay Maps will apply to the flood affected areas for the purposes of planning and development. This may include, for example, raised building floor levels and achieving safe vehicle access to the road network.

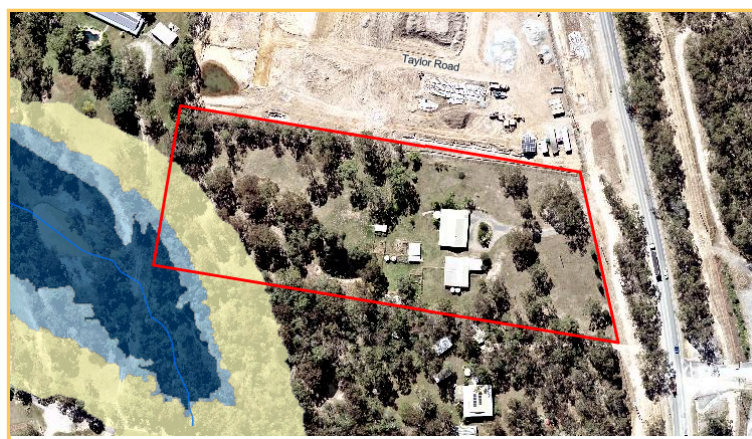
OM-05.01 Isolated islands



OM-05.02 High flow area



OM-05.04 Flood risk areas



MAP LEGEND

	High	Floodwaters may be deep or fast flowing, or have a relatively high chance of occurrence (e.g. 80% chance in 30 years). Conditions may pose a risk to life and cause damage to buildings, possibly severe. Limited development may be considered if not increasing the flood risk exposure for people or property. These areas are generally better suited to environmental, recreational and some agricultural uses.
	Moderate	Less frequently affected by flooding or if more frequent, with shallow or slower moving floodwater. Conditions may pose an unacceptable risk to people or property if not mitigated. Development may be tolerable if measures are taken to address flood impacts, protect people and limit damage.
	Low	Extremely unlikely chance of flooding (1% chance or less over a 30 year period) and/or relatively shallow or benign flooding conditions. Development is generally acceptable except for essential community infrastructure (e.g. emergency services). Vulnerable uses (e.g. childcare, aged care) may be ok subject to building, site access and safe shelter mitigation measures. Shows the full floodplain under the largest flood that could conceivably occur.
	Investigation area	Locations where a current flood study has not been delivered and information to determine flood risk is not available. The approximation of the floodplain in these areas is based on a citywide overland flow study. Development should avoid these areas until further investigation (updated flood study or localised risk assessment) is completed.

MAP LEGEND

	High flow area	High hazard areas of flooding where significant (deeper, faster) flow of water occurs and in which a building is vulnerable to structural damage or failure from floodwater. Classified as H5 or H6 in the Australian Institute of Disaster Resilience (AIDR) Guideline 7-3 'Flood Hazard'.
	High flood island	Areas which are isolated from flood-free land (surrounded by floodwater) but retain a portion of the area as flood free in a probable maximum flood (PMF).
	Low flood island	Areas which are surrounded by floodwater and at first isolated from flood-free land, then completely inundated by floodwater (submerged) as the flood continues to rise.
	Meadowbrook flood assessment area	Area where the function of important community infrastructure needs to be maintained. Flood mitigation measures and comprehensive emergency management planning is required to adequately manage the risk for flood events.



If more recent flood studies have been completed and accepted by Council, the Latest Flood Risk Map shown at the top of this report may be different from the planning scheme map. The latest flood information should be used to inform development decisions and will be incorporated into the planning scheme in a future amendment.

Further Information

1. Floods are highly unpredictable and variable, and properties may be affected by other sources of potential flooding. Each flood and its impact is different. Areas that were not flooded previously may be affected by future events. Areas that have been previously flooded may be impacted in different ways. This online report cannot take all of this into account.
2. The flood mapping and levels in this report are based on data from flood studies undertaken at a particular time and are subject to change. For example, if the method for calculating flood levels is updated, industry guidelines are updated or more recent information becomes available, this may result in changes to the information in this report. In areas where development is ongoing, the flood mapping and levels may not reflect developed conditions.
3. Flood studies do not create risk. They help us to understand the risk, based on relevant legislation and Queensland Government policies and guidelines. Flood studies also consider a range of other factors such as rainfall and river level information from recent events, climate change and trends, the impacts of development, changes to catchment conditions, new technologies and industry best practice (which help to improve accuracy).
4. Flood studies and models are developed from the best information available at the time. They do not tell you how the flood waters might behave, how quickly they may rise, or how dangerous the flooding will be. The models also cannot represent changes that have occurred since they were developed which may impact flood behaviour, such as earthworks, new developments or road infrastructure.
5. This report is not a substitute for independent professional advice. You should engage the services of a Registered Professional Engineer of Queensland (RPEQ) to get site specific information regarding the flood risk to your property, and how that might affect any proposed building or development work.
6. While Logan City Council takes reasonable care in producing this report, it does not guarantee that the information is accurate, complete or current. Logan City Council does not accept any responsibility for any loss or damage (however it was caused) in connection with the use of or reliance on the information in this report.

Contact Information

Where to go for further information depends on the type of information you need. Please refer to the [Flood Risk Fact Sheet](#) or contact Council using the details below.

Topic	Contact Details
Flood studies and modelling information, and the flood risk on your property	Contact Council on 07 3412 3412 or email council@logan.qld.gov.au . Further information about flooding and flood studies is available on the Flood page on Council's website.
Planning and development enquiries or proposals	Contact Council on 07 3412 3412 or email development@logan.qld.gov.au . Before lodging a development application, pre-lodgement advice is recommended.
Building information	Contact Council on 07 3412 3412 or email council@logan.qld.gov.au . You can also contact a private building certifier .
Properties in Priority Development Areas	Contact Economic Development Queensland . Council is not the planning authority for these properties.
Independent advice about flooding on your property	Contact a registered engineer through the Board of Professional Engineers of Queensland: Phone: 07 3210 3100 Email: admin@bpeg.qld.gov.au Web: Home - Board of Professional Engineers Queensland (bpeg.qld.gov.au)

Appendix D: Rational Method Calculation

RATIONAL METHOD CALCULATIONS - EXISTING SITE

Job Reference	C6527
Site Address	189-195 Teviot Road, Greenbank
Council	LIMB 2020 Enveloped IFD

Number of Sub-Catchments	6
Minor Storm Event	10% AEP (As per QUDM Table 7.02.1)
Major Storm Event	1% AEP (As per QUDM Table 7.02.1)

Subcatchment Summary Table				
Number	Catchment Name	Catchment Description	C ₁₀	tc
1	A	Low density residential area (including roads)Average lot ≥ 450m ² < 600m ²	0.86	30
2	B	Low density residential area (including roads)Average lot ≥ 450m ² < 600m ²	0.86	30
3	C	Low density residential area (including roads)Average lot ≥ 450m ² < 600m ²	0.86	30
4	D	Low density residential area (including roads)Average lot ≥ 450m ² < 600m ²	0.86	30
5	E	Low density residential area (including roads)Average lot ≥ 450m ² < 600m ²	0.86	30
6	F	Low-medium to high density residential areas	0.87	30

Site C₁₀ 0.86

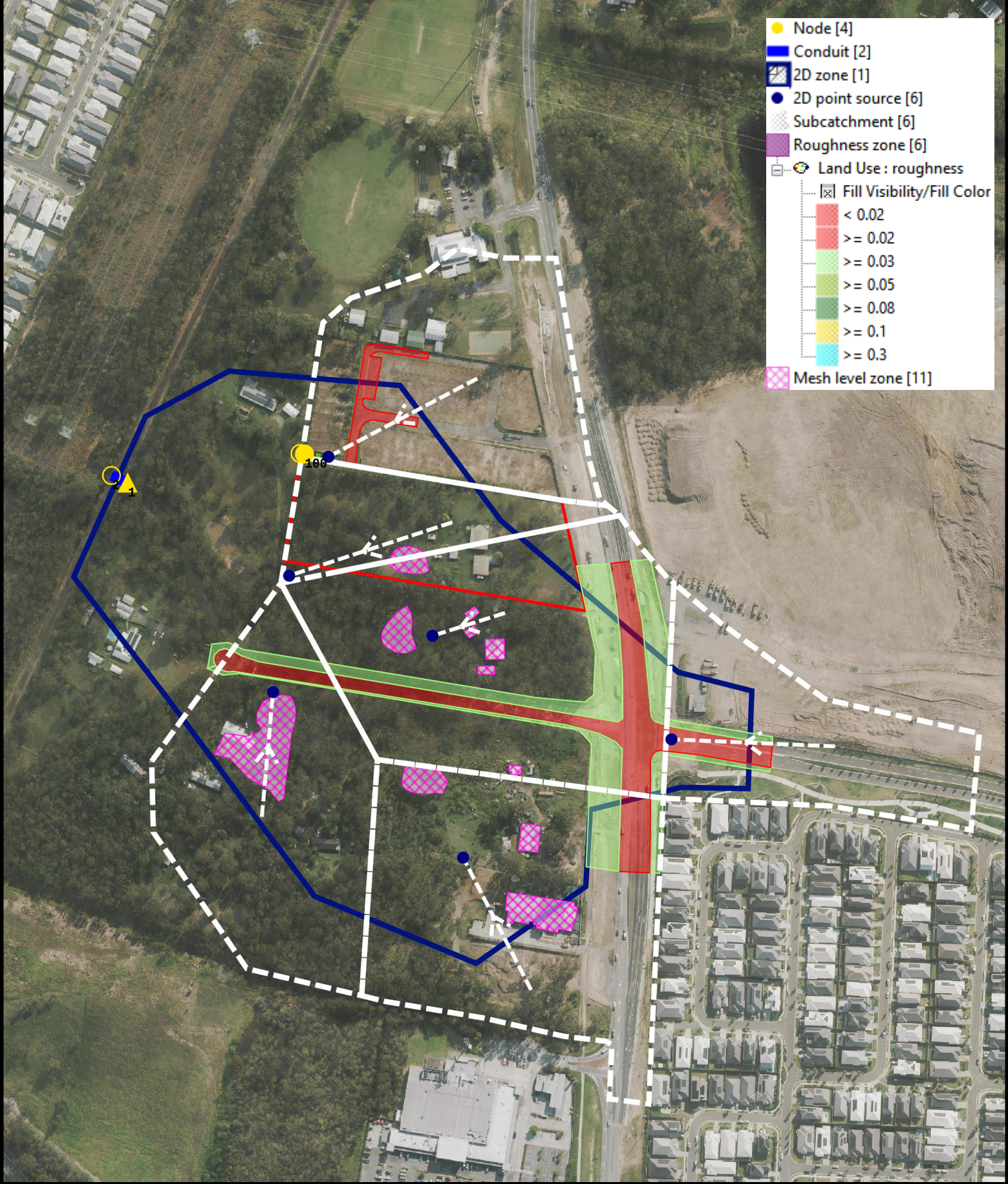
Catchment Calculations (Major and Minor Storm ARI's)							
Number	Area	C10	I10	10% AEP	C100	I100	1% AEP
	ha		mm/hr	m ³ /s		mm/hr	m ³ /s
1	3.675	0.86	97	0.852	1.00	139	1.417
2	1.437	0.86	97	0.333	1.00	139	0.554
3	5.265	0.86	97	1.220	1.00	139	2.030
4	4.050	0.86	97	0.938	1.00	139	1.562
5	4.907	0.86	97	1.137	1.00	139	1.892
6	2.705	0.87	97	0.634	1.00	139	1.043

Total Runoff	Minor	5.114 m ³ /s
	Major	8.497 m ³ /s
Total Area		22.039 ha

Overland Flow Calculations	
Trunk SW Infrastructure	
Pipe Diameter	N/A m
Number of Pipes	
Grade	m/m
mannings	
Pipe Capacity	m ³ /s
Pipe Velocity	m/s
Capacity @ 3m/s	m ³ /s
Overland Flow	m ³ /s

Runoff Summary		
Freq.	Peak Discharge	
4 EY	1.202	m ³ /s
63% AEP	2.404	m ³ /s
39% AEP	3.164	m ³ /s
15% AEP	4.378	m ³ /s
10% AEP	5.114	m ³ /s
5% AEP	5.935	m ³ /s
2% AEP	7.554	m ³ /s
1% AEP	8.497	m ³ /s

Appendix E: Hydraulic Model Setup



- Node [4]
- Conduit [2]
- 2D zone [1]
- 2D point source [6]
- Subcatchment [6]
- Roughness zone [6]
- Land Use : roughness
- Fill Visibility/Fill Color
 - < 0.02
 - >= 0.02
 - >= 0.03
 - >= 0.05
 - >= 0.08
 - >= 0.1
 - >= 0.3
- Mesh level zone [11]



MILANOVIC NEALE
CONSULTING ENGINEERS

189-195 TEVIOT ROAD, GREENBANK

HYDRAULIC MODEL SETUP

PROJECT: C6572
DATE:
25/05/2026
SCALE: 1:4000

