



PLANS AND DOCUMENTS
referred to in the PDA
DEVELOPMENT APPROVAL

Approval no: DEV2025/1651

Date: 19 August 2025



CIVIL ENGINEERING REPORT: ENGINEERING SERVICES
REPORT

Lot 103 Flagstone Estate

4499-4651 Mount Lindesay Highway North Maclean

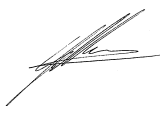
PREPARED FOR
CH Hydrangea Pty Ltd

Ref: BN250604
Rev: B
Date: 04.07.2025

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Document Control

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Glossary

Term	Definition
ADP	Area Development Plan
ADWF	Average Dry Weather Flow
ARI	Average Recurrence Interval
EDQ	Economic Development Queensland
EP	Equivalent Persons
ESCP	Erosions and Sediment Control Plan
ESR	Engineering Services Report
ET	Equivalent Tenants
FIA	Flood Impact Assessment
LCC	Logan City Council
PDWF	Peak Dry Weather Flow
PWWF	Peak Wet Weather Flow
QUDM	Queensland Urban Drainage Manual
ROL	Reconfiguration of Lot
SBSMP	Site Based Stormwater Management Plan
SQID	Stormwater Quality Improvement Device
UD	Ultimate Development

Executive Summary

This Engineering Services Report (ESR) has been prepared on behalf of CH Hydrangea Pty Ltd (Applicant) in support of a Development Application (DA) over land as part of 449904651 Mount Lindesay Highway, North Maclean QLD 4280 and described part of Lot 39 on SP 338781 (site). This Priority Development Area (PDA) DA seeks approval for a Development Permit for a Material Change of Use for a Warehouse, Low impact industry, and Medium impact industry.

The proposed development will be located approved Lot 103, approved by the Minister for Economic Development Queensland (MEDQ) as part of the PDA Development Approvals DEV2023/1466 and DEV2023/1446 issued on 11 October 2024 and 19 March 2025, respectively. The proposed development seeks to facilitate the establishment of a speculative warehouse and/or industrial facility that will operate 24 hours a day, 7 days a week.

This ESR provides advice on engineering services strategy for the proposed development's engineering planning issues associated with the application. This report demonstrates that the proposed development can connect to local stormwater, potable water, sewerage reticulation, electricity, telecommunications and transport infrastructure. The servicing strategy for the development is summarised below.

It is noted that the infrastructure referred to as existing in this report, is the estate infrastructure that is currently under construction. At the time of writing, Lot 103 is currently under construction.

- **Site Access** – One (1) heavy vehicle and one (1) light vehicle crossovers are proposed for the development via the private access driveway of the adjoining Lot 102
- **Stormwater Management** – The proposed development will introduce a new internal pit and pipe system and connect into the existing lawful point of discharge. Refer to the SBSMP for the lot 103 development that has been prepared by Northrop (BN250604_SBSMP001_A_Lot 103 Flagstone Estate), and the overarching precinct SBSMP prepared by Arcadis (EAG001-30109334-AAR Revision 12).
- **Water Supply** – The development's internal water reticulation network will be serviced by combined DN150mm fire service and DN80mm domestic services located within the private access driveway of the adjoining Lot 102. Suitability is to be confirmed by the hydraulics consultant in detailed design. The proposed development loads are less than the projected loads for the site as outlined in Arcadis Water Network Assessment EAG005-30109334-AAR-WNA.
- **Sewer Reticulation** – The development's internal sewer reticulation network will be constructed to meet the reticulation main along the eastern boundary of the site, accessible by an easement. The proposed development loads are less than the projected loads for the site as outlined in Arcadis Sewer Network Assessment EAG006-30109334-AAR-SNA.
- **Electrical Supply** – Connection to existing electrical infrastructure within the private access driveway of the adjoining Lot 102.
- **Gas Supply** – No Gas infrastructure was identified in the vicinity of the site. Should gas services be required for the development, connection and extension requirements shall be undertaken by a specialist consultant and will form part of the future building works applications to both APA and EDQ.
- **Telecommunications** – Connection to existing telecommunications infrastructure surrounding the site will be made via underground cables to the conduit network installed as part of the estate works in the private access driveway of the adjoining Lot 102.

1. Introduction

This Engineering Services Report (ESR) has been prepared on behalf of CH Hdrangea Pty Ltd (Applicant) in support of a Development Application (DA) over land as part of 449904651 Mount Lindesay Highway, North Maclean QLD 4280 and described part of Lot 39 on SP 338781 (site). This Priority Development Area (PDA) DA seeks approval for a Development Permit for a Material Change of Use for a Warehouse, Low impact industry, and Medium impact industry.

The proposed development will be located approved Lot 103, approved by the Minister for Economic Development Queensland (MEDQ) as part of the PDA Development Approvals DEV2023/1466 and DEV2023/1446 issued on 11 October 2024 and 19 March 2025, respectively. The proposed development seeks to facilitate the establishment of a speculative warehouse and/or industrial facility that will operate 24 hours a day, 7 days a week.

The purpose of this ESR is to provide advice on the engineering servicing strategy for the proposed development regarding earthworks, roadworks, stormwater management (quality, quantity and flooding), sewerage, water supply, electricity, communications and gas. The required infrastructure will be subject to the conditions attached to the Development Approval to be provided by Economic Development Queensland (EDQ).

Table 1-1 - Property Details

Category	Description
Site Address	Part of 4499 – 4651 Mount Lindesay Highway North Maclean
Lot Title	Approved Lot 103 Flagstone Estate, Part of Lot 39 on SP338781
Total Site Area	21,695 m ²
Proposed Land Use	Warehouse

1.1. Related Reports and Documents

This report is to be read in conjunction with the following supporting and reference documents:

- Site Based Stormwater Management Plan Report by Northrop. Report No: BN250604_SBSMP001_B_Lot 103 Flagstone Estate
- Arcadis SBSMP EAG001-30109334-AAR Revision 12
- PDA Development Approval DEV2018/961/18
- Civil Design Drawings by Northrop. Appendix A
- Arcadis Water Network Assessment EAG005-30109334-AAR-WNA
- Arcadis Sewer Network Assessment EAG006-30109334-AAR-SNA
- ACOR Consultants hydraulic drawings water connection 'NA240765_SK01-SK_241107'

2. Site Context and Existing Characteristics

The site, approved Lot 103, was approved by the MEDQ as part of the PDA Development Approvals DEV2023/1466 and DEV2023/1446 issued on 11 October 2024 and 19 March 2025, respectively. The site is currently cleared and undeveloped, comprising primarily of exposed soils. The site generally falls east towards the existing drainage channel (Lot 901) at approximately 0.5% grade. The subject site is located within stage 1 of the overarching PDA Development Approval for the Flagstone Logistics Estate (DEV2018/961/18) and is located within the Industrial Warehouse, Business, Research and Technology Precinct of the endorsed greater Flagstone context plan.

The site is currently bound by:

- Lot 101 to the north
- Lot 102 to the west
- Existing drainage to the east (Lot 901)
- Powerlink easement to the south

A site locality is shown Figure 2-1.

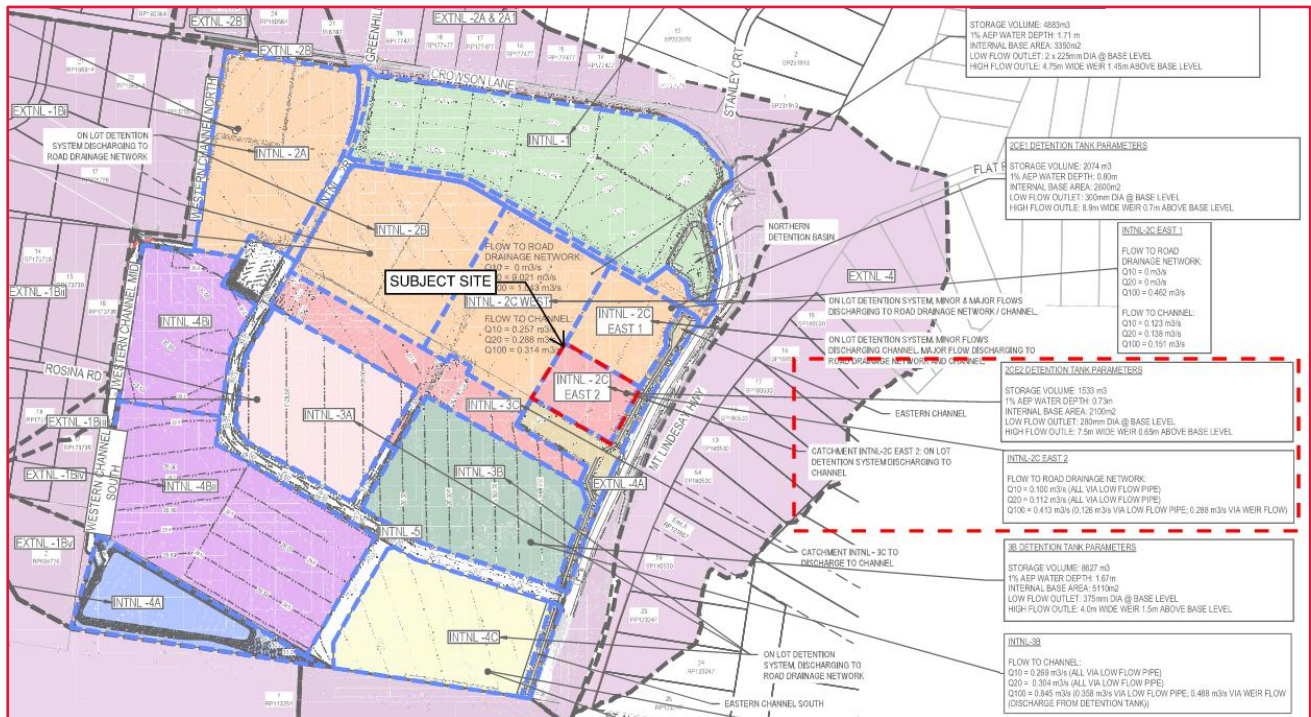


Figure 2-1 - Site Locality (Extract from Arcadis SBSMP EAG001-30109334-AAR)

3. Proposed Development / Lot Configuration

The subject site is located within stage 1 of the overarching PDA Development Approval for the Flagstone Logistics Estate (DEV2018/961/18) and is located within the Industrial Warehouse and Business, Research and Technology Precinct of the endorsed greater Flagstone context plan.

The proposed development seeks to facilitate the establishment of a speculative warehouse and/or industrial facility that will operate 24 hours a day, 7 days a week. The proposed architectural layout of the development prepared by Watson Young is shown below in Figure 3-1. Architectural drawings are included in Appendix C.

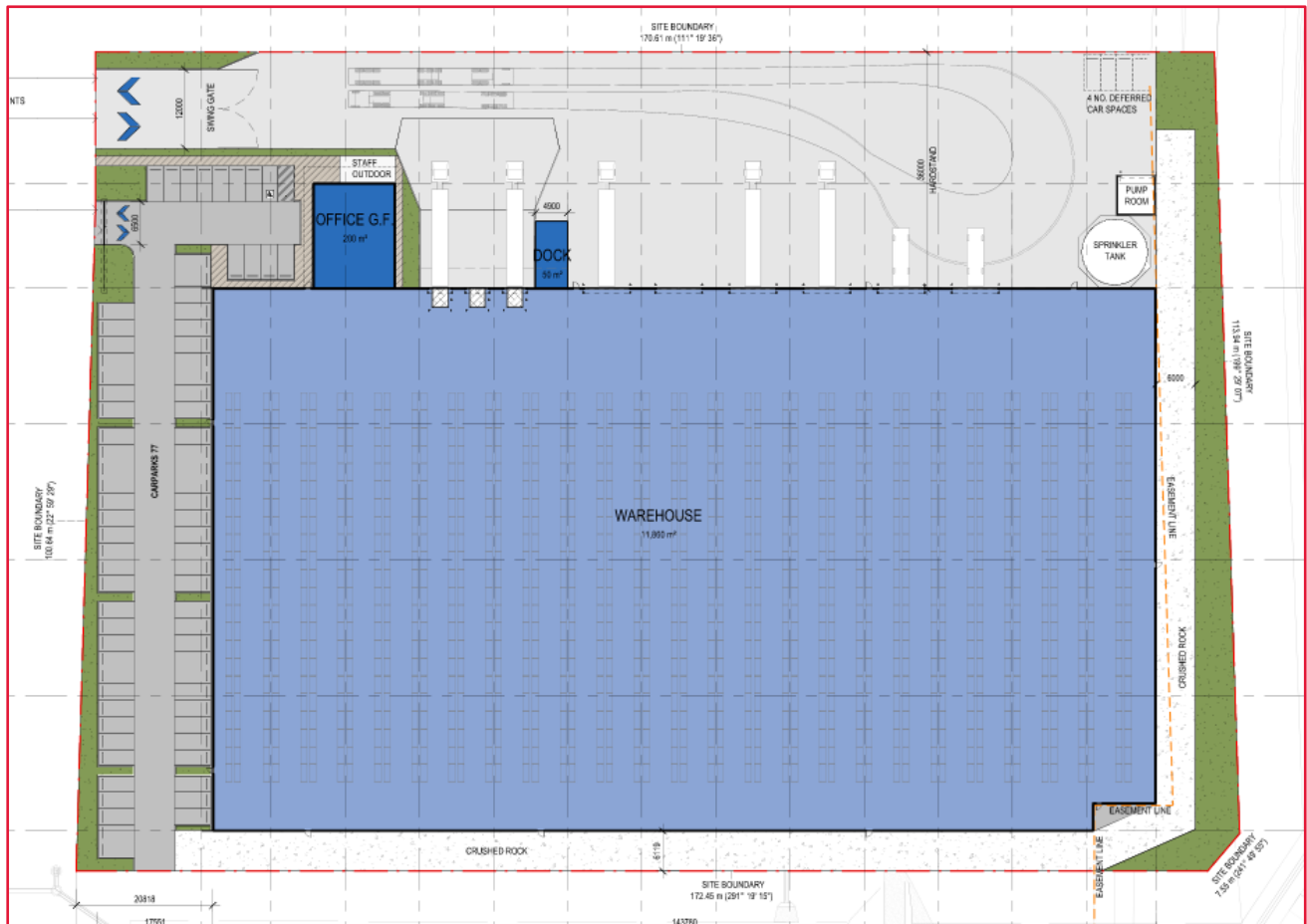


Figure 3-1 - Proposed Development (Watson Young 2025)

4. Earthworks

4.1. Bulk Earthworks

Bulk earthworks operations for the greater development have been undertaken as part of PDA Development Approval DEV2018/961/18. The proposed lot 103 development will require additional bulk earthworks operations to achieve the desired surface levels to accommodate the development.

4.2. Acid Sulfate Soil Assessment

Figure 4-1 below illustrates the Acid Sulfate Soil (A.S.S) overlay accessed from Logan Interactive Map. Figure 4-1 indicates that the site is not located within an area subject to risks associated with A.S.S. if acid sulfate soils are encountered on site, management of soils is to be in accordance with EDQ's requirements.



Figure 4-1 - Acid Sulfate Soils Overlay (Logan Interactive Map, 2025)

5. Roads and Access

Two (2) vehicular access points are proposed for the development. The development proposes to construct new vehicle crossovers and associated access ramp from the private access driveway located on the adjoining Lot 102. Site access to the carpark for light vehicles, and heavy commercial vehicles is proposed at Enterprise Drive via the private access driveway located on the adjoining Lot 102. Crossover locations shown below in Figure 5-1.

Internal hardstand areas will be designed in accordance with Logan City Council Land Development Guidelines and can cater for the design vehicle access to the loading docks.

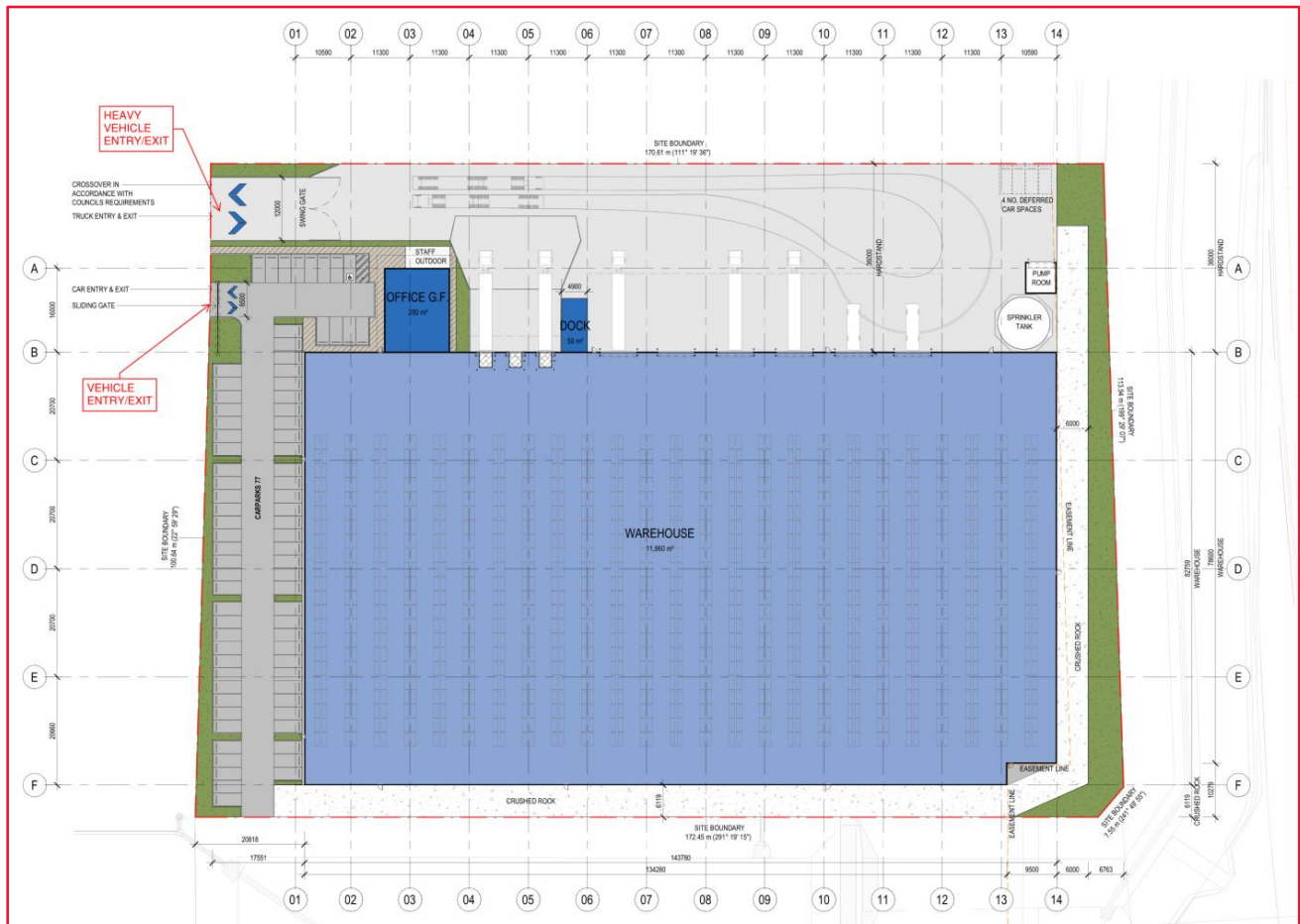


Figure 5-1 - Proposed Site Access

6. Flood Management

The estate Site Based Stormwater Management Plan (Quantity) by Arcadis (EAG001-30109334-AAR Revision 12) discusses the flood risk associated with the proposed estate for design storms up to and included the 1% AEP. The report demonstrates that the proposed Lot 103 development has immunity for all design storms.

Further to their SBSMP, Arcadis have prepared a technical memorandum (EAG001-30109334-AAR-02) which discusses the flood risk associated with the proposed estates for design storms exceeding the 1% AEP 2100, up to and including the 0.2% 2100 AEP. This memorandum was prepared in response to Logan City Council Planning Scheme 2015 Section 8.2.5 – Flood Overlay Code. In accordance with the memorandum and Council's requirements, the proposed lot 103 development is required to achieve immunity to the defined flood level (1% AEP at 2100). Based on the design site levels, the proposed lot 103 development will have immunity up to and including the 0.5% AEP design event.

Refer to Northrop SBSMP BN250604_SBSMP001_B_Lot 103 Flagstone Estate for further information.

7. Stormwater Drainage

A SBSMP (BN250604_SBSMP001_A_Lot 103 Flagstone Estate) has been prepared by Northrop Consulting Engineers. The report addresses the stormwater quality and quantity management scheme for the proposed development and should be referred to for full details of the stormwater management strategy. A summary of the proposed stormwater strategy is provided below.

7.1. Existing Stormwater Drainage Scheme

The subject site generally falls east towards the existing drainage channel (Lot 901) at 0.5%. The site has been levelled as part of earthworks operations and is currently cleared and undeveloped, comprising primarily of stabilised soils.

The following existing stormwater infrastructure has been identified in the vicinity of the site. The information has been sourced from the Arcadis Detailed Design documentation and the SBSMP EAG001-30109334-AAR Revision 12.

- Stormwater infrastructure is found within the private access driveway located within the adjoining Lot 102.

7.2. Proposed Stormwater Management Objectives

The stormwater management objectives that apply to the site have been defined in accordance with QUDM and The Logan Planning Scheme 2015 Version 9.1. The stormwater objectives are:

- Development should not result in water being diverted onto land that is not normally subject to overland flow
- Define a lawful point of discharge that will not cause an actionable nuisance in accordance with QUDM
- Ensure that the development does not create adverse flood impacts to upstream or adjacent properties
- No increase in post development flows for all rainfall events up to and including 100-year event
- Stormwater quality to achieve the minimum design requirements of the State Planning Policy (2017) and achieve water quality objectives in accordance with Environmental Protection (Water) Policy (2009), as follows in [Table 7-1](#) below.

Table 7-1 - Water Quality Objectives

Pollutant	Percent Reduction
Gross Pollutants (>5mm), GP	90%
Total Suspended Solids, TSS	80%
Total Phosphorous, TP	60%
Total Nitrogen, TN	45%

The achievement of these objectives is summarised in the following section of this report. Reference should also be made to the SBSMP prepared for the development.

7.3. Proposed Stormwater Drainage Infrastructure

The stormwater quantity objective was to demonstrate non-worsening in peak discharges from the subject site flows outlined in the Arcadis SBSMP EAG001-30109334-AAR Revision 12 and approved as part of the EDQ approval DEV2018/961/18.

To achieve non-worsening, the proposed lot 103 development requires a total detention volume of 1,624m³ which has been achieved via an underground detention tank, located in the hardstand to the northeastern corner of the site. Stormwater runoff from the proposed roof and hardstand areas shall be conveyed to the tank prior to discharge.

Stormwater quality infrastructure has been included in the design to achieve the water quality objectives for Southeast Queensland specified in the State Planning Policy 2017, namely, the removal of gross pollutants, suspended solids, nitrogen and phosphorus.

Refer to Northrop Consulting Engineers SBSMP (103BN250604_SBSMP001_A_Lot 103 Flagstone Estate) for more details.

8. Water Supply

8.1. Existing Water Supply Infrastructure

The following water mains have been identified near the site based on the Arcadis IFC Documentation (site survey) refer Appendix B:

- DN150mm PVC-M water reticulation main located on Enterprise Drive, along the northern boundary of adjoining Lot 102

8.2. Proposed Water Supply Infrastructure

Proposed water supply infrastructure for the industrial estate Lot 103 is to be constructed within the industrial road of the adjoining Lot 102. A combined DN80 Domestic Service and DN150 Fire services has been proposed for the development. It is expected the new meter will connect to the existing end of line arrangements located at the site boundary.

The proposed connection locations are detailed within the hydraulic drawings included in Appendix A.

8.2.1. Projected Development Loads

The projected loads have been assessed in accordance with SEQ Water Supply and Sewerage Design and Construction Code (SEQ WS&S D&C Code), and the Logan Water Technical Memorandum DD8001 North Maclean conversion rates. The calculated loading is presented in Table 8-1 Below.

Table 8-1 - Development Loading for Water Supply

Locality	IDM Development Type	GFA (Ha)	Development Density (EP/Ha)	EP
LCC	Lot 103 Development	1.21	55.90	68.81

Table 8-1 above demonstrates the development loading is calculated per net area for industrial developments. As part of the Water Network Analysis EAG005-30109334-AAR-WNA-03 Arcadis has considered the warehouse GFA for the site area as 1.518Ha (70% of site area) or 85 EP. Given this, it is expected that the existing water network adequately caters to the proposed development Lot 103 loads.

8.2.2. Internal Water Network

As part of the building works, internal water reticulation service will be provided throughout the site. This will require a full water network design to be prepared by a qualified hydraulic engineer, designed to service all internal firefighting flows and services demands.

8.2.3. Fire System

In accordance with the SEQ WS&S D&C Code, the site is permitted to draw the following fire flows.

- Commercial/ Industrial – 30L/sec for 4 hours

The water connection and internal water reticulation network for the development will be designed as part of future Operational Works applications for the site.

9. Sewerage Reticulation

9.1. Existing Sewer Reticulation

The following water mains have been identified near the site based on the Arcadis IFC Documentation (site survey) refer Appendix B:

- DN150mm PVC-U SN8 Sewer main located within the easement, along the eastern boundary of the site.

9.2. Proposed Sewer Reticulation

It is proposed to reuse the existing sewer property connection in the north-east corner of the site, located within the 10m wide sewer easement along the eastern boundary. If the proposed site is unserviceable by gravity sewer a private pump arrangement is to be provided. Details to be provided during detailed design by the hydraulic consultant.

The connection locations are detailed on the engineering drawings included in Appendix A. The internal wastewater network will form part of the design required for the Building Application approval.

9.2.1. Projected Development Loads

The projected loads have been assessed in accordance with SEQ Water Supply and Sewerage Design and Construction Code (SEQ WS&S D&C Code), and the Logan Water Technical Memorandum DD8001 North Maclean conversion rates. The calculated loading is presented in Table 9-1 Below.

Table 9-1 - Development Loading for Sewerage by Locality

Locality	IDM Development Type	GFA (Ha)	Development Density (EP/Ha)	EP
LCC	Lot 103 Development	1.21	50.30	61.92

Table 8-1 above demonstrates the development loading is calculated per net area for industrial developments. As part of the Sewer Network Analysis EAG006-30109334-AAR-SNA-04 Arcadis has considered the warehouse GFA for the site area as 1.518Ha (70% of site area) or 77 EP. Given this, it is expected that the existing sewer network adequately caters to the proposed development loads for the site.

10. Electrical Supply

Bulk earthworks and infrastructure works are currently in progress across the flagstone estate. An existing Powerlink easement traverses the site from north-west to south-east, which accommodates High Voltage Electrical Power transmission lines and towers

Connections for the proposed development will require an extension of the electrical cables of voltage <33kV to be designed by a qualified electrical consultant. The proposed development will utilise existing electrical conduit infrastructure installed as part of the external roadworks, as required by EDQ and Energex.

The need for a pad mount transformer to be located within the development site is subject to further design discussion with Energex; however sufficient provisions have been made within the proposed plan of development to accommodate one if required.

11. Gas Supply

The site is not serviced by gas supply. Should gas services be required for the development, connection and extension requirements shall be undertaken by a specialist consultant and will form part of the future building works applications to APA and EDQ.

12. Telecommunications

Telecommunication services have been identified within all road reserves bounding the subject site. It is proposed to utilise this existing surrounding infrastructure to provide telecommunication services to the proposed development.

Connection from the proposed development to the above-mentioned services will be undertaken by a specialist consultant and will form part of the future building works applications to the appropriate Telecommunications entity.

13. Conclusion

This Engineering Services Report (ESR) has been prepared on behalf of CH Hydrangea Pty Ltd (Applicant) in support of a Development Application (DA) over land as part of 449904651 Mount Lindesay Highway, North Maclean QLD 4280 and described part of Lot 39 on SP 338781 (site). This Priority Development Area (PDA) DA seeks approval for a Development Permit for a Material Change of Use for a Warehouse, Low impact industry, and Medium impact industry.

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It is noted that the infrastructure referred to as existing in this report, is the estate infrastructure that is currently under construction. At the time of writing, Lot 103 is currently under construction.

- **Site Access** – One (1) heavy vehicle and one (1) light vehicle crossovers are proposed for the development via the private access driveway of the adjoining Lot 102
- **Stormwater Management** – The proposed development will introduce a new internal pit and pipe system and connect into the existing lawful point of discharge. Refer to the SBSMP for the lot 103 development that has been prepared by Northrop (BN250604_SBSMP001_A_Lot 103 Flagstone Estate), and the overarching precinct SBSMP prepared by Arcadis (EAG001-30109334-AAR Revision 12).
- **Water Supply** – The development's internal water reticulation network will be serviced by combined DN150mm fire service and DN80mm domestic services located within the private access driveway of the adjoining Lot 102. Suitability is to be confirmed by the hydraulics consultant in detailed design. The proposed development loads are less than the projected loads for the site as outlined in Arcadis Water Network Assessment EAG005-30109334-AAR-WNA.
- **Sewer Reticulation** – The development's internal sewer reticulation network will be constructed to meet the reticulation main along the eastern boundary of the site, accessible by an easement. The proposed development loads are less than the projected loads for the site as outlined in Arcadis Sewer Network Assessment EAG006-30109334-AAR-SNA.
- **Electrical Supply** – Connection to existing electrical infrastructure within the private access driveway of the adjoining Lot 102.
- **Gas Supply** – No Gas infrastructure was identified in the vicinity of the site. Should gas services be required for the development, connection and extension requirements shall be undertaken by a specialist consultant and will form part of the future building works applications to both APA and EDQ.
- **Telecommunications** – Connection to existing telecommunications infrastructure surrounding the site will be made via underground cables to the conduit network installed as part of the estate works in the private access driveway of the adjoining Lot 102.

Appendix A – Civil Engineering Plans

**LOT 103, 4499-4651 MT. LINDESAY HIGHWAY, NORTH MACLEAN QLD 4280
DEVELOPMENT APPLICATION**



SOURCE : NEARMAP.COM.AU (©2021)



DWG NUMBER	DWG TITLE
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DA-001	COVER SHEET, LOCALITY PLAN AND DRAWING SCHEDULE
DA-101	BULK EARTHWORKS LAYOUT PLAN
DA-111	BULK EARTHWORKS SECTIONS
DA-211	ROADWORKS & STORMWATER DRAINAGE LAYOUT PLAN
DA-311	STORMWATER DRAINAGE CATCHMENT LAYOUT PLAN
DA-321	STORMWATER DRAINAGE LONGITUDINAL SECTIONS - SHEET 1 OF 2
DA-322	STORMWATER DRAINAGE LONGITUDINAL SECTIONS - SHEET 2 OF 2
DA-381	STORMWATER DRAINAGE TANK LAYOUT PLAN
DA-382	STORMWATER DRAINAGE TANK SECTIONS

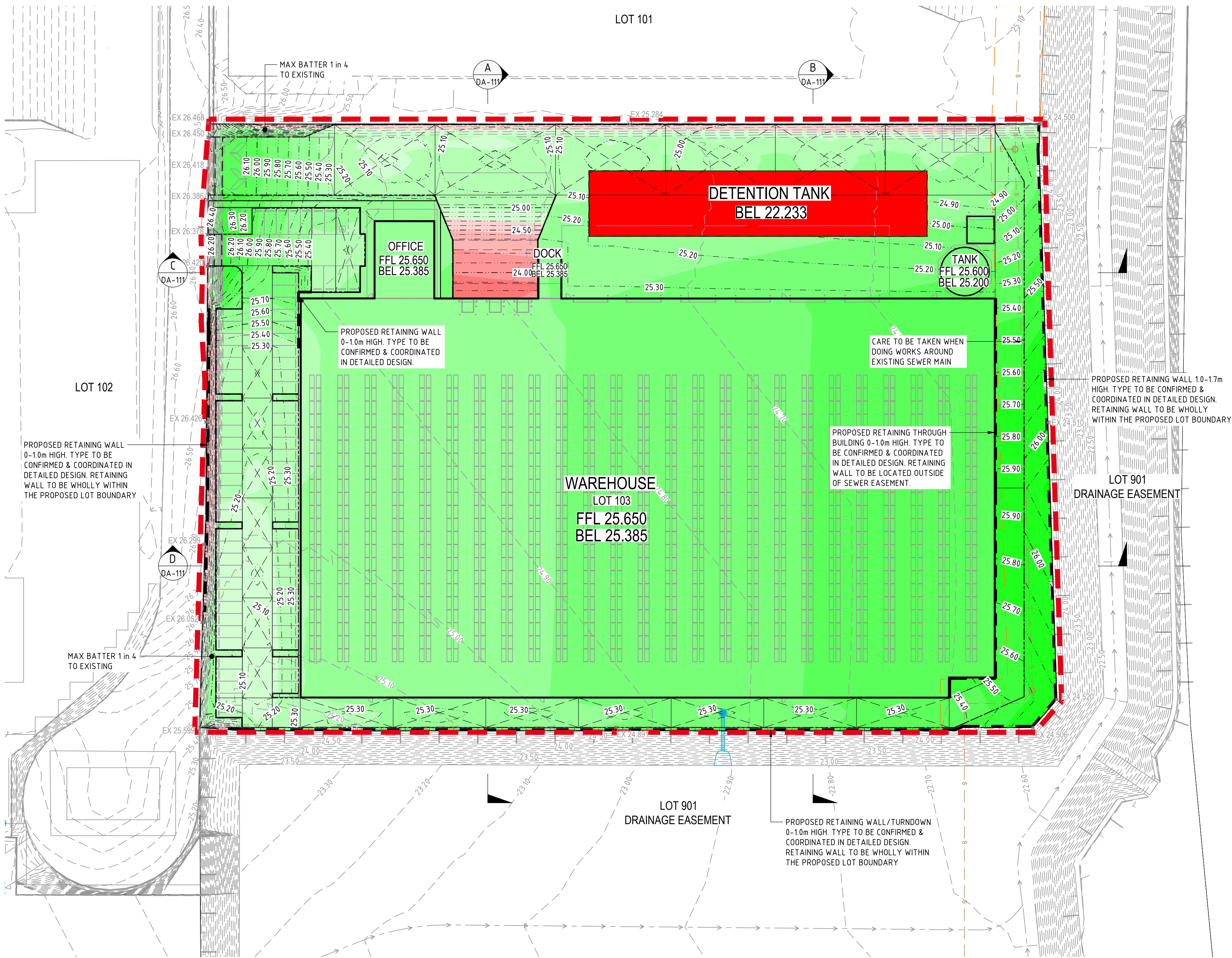
Approval no: DEV2025/1651
Date: 19 August 2025



NOT FOR CONSTRUCTION

REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE	CLIENT	ARCHITECT	 NORTHROP Brisbane Level 25, 12 Creek Street, Brisbane QLD 4000 GPO BOX 423 Brisbane QLD 4001 (07) 3365 0400 brisbane@northrop.com.au ABN 81 094 433 100	PROJECT	DRAWING TITLE	JOB NUMBER							
A	ISSUED FOR INFORMATION	JD	SK	ADA	15.05.25	 Charter Hall	 watson young		 NORTHROP Brisbane Level 25, 12 Creek Street, Brisbane QLD 4000 GPO BOX 423 Brisbane QLD 4001 (07) 3365 0400 brisbane@northrop.com.au ABN 81 094 433 100	PROPOSED INDUSTRIAL DEVELOPMENT LOT 103 4499-4651 MT.LINDESAY HIGHWAY NORTH MACLEAN QLD 4280	COVER SHEET, LOCALITY PLAN AND DRAWING SCHEDULE	250604						
B	ISSUED FOR INFORMATION	JD	SK	ADA	19.06.25							<table><tr><th>DRAWING NUMBER</th><th>REVISION</th></tr><tr><td>DA-001</td><td>B</td></tr><tr><td colspan="2">DRAWING SHEET SIZE = A1</td></tr></table>	DRAWING NUMBER	REVISION	DA-001	B	DRAWING SHEET SIZE = A1	
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DESIGNED: C. LOPEZ
JOB MANAGER: A.DE ANDRADE
VERIFIER: S.KILLORAN



NOTE
CRASH BARRIER TO BE INSTALLED WHERE
RETAINING HEIGHT EXCEEDS 600mm HIGH

PLANS AND DOCUMENTS
referred to in the PDA
DEVELOPMENT APPROVAL

Approval no: DEV2025/1651
Date: 19 August 2025

REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
A	ISSUED FOR INFORMATION	JD	SK	ADA	15.05.25
B	ISSUED FOR INFORMATION	JD	SK	ADA	19.06.25
C	ISSUED FOR INFORMATION	JM	SK	ADA	03.07.25

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PROJECT
**PROPOSED INDUSTRIAL
DEVELOPMENT
LOT 103
4499-4651 MT.LINDESAY HIGHWAY
NORTH MACLEAN QLD 4280**

DRAWING TITLE
**BULK EARTHWORKS
LAYOUT PLAN**

JOB NUMBER
250604

DRAWING NUMBER
DA-101

REVISION
C

DRAWING SHEET SIZE = A1

VOLUME NOTES

- VOLUMES ARE CALCULATED BETWEEN STRIPPED SURFACE AND BOXING (BULK) LEVELS.
- VOLUMES DO NOT CONSIDER BULKING / COMPACTION FACTORS, UNSUITABLE GROUND REMOVAL OR CONTAMINATED GROUND REMOVAL.
- IT HAS BEEN ASSUMED THAT THE SITE WILL REQUIRE 0mm TOPSOIL STRIP TO REMOVE ORGANIC MATERIAL. SHOULD THIS DEPTH VARY, PLEASE NOTIFY SUPERINTENDENT, GEOTECH & NORTHROP IMMEDIATELY.
- REFER TO CIVIL PAVEMENT & STRUCTURAL FOUNDATION / SLAB DRAWINGS FOR PAVEMENT DEPTHS, TO BE CONFIRMED & VALIDATED AGAINST BULK / BOXING LEVELS BY CONTRACTOR & SURVEYOR PRIOR TO COMMENCEMENT OF EARTHWORKS.
- ALL EARTHWORKS VOLUMES ARE PRELIMINARY ONLY, AND ARE TO BE USED AS A GUIDE ONLY. CONTRACTOR IS TO ALLOW ADEQUATE CONTINGENCY.

UNKNOWN GEOTECH PARAMETERS

THE CONTRACTORS IS TO ALLOW ADEQUATE PROVISIONAL AMOUNTS FOR CONTINGENCIES FOR THE FOLLOWING UNKNOWN EARTHWORKS/GEOTECH PARAMETERS:

- SWELLING/COMPACTION FACTORS - UNKNOWN
- SUBGRADE CBR - UNKNOWN
- SUBGRADE SUITABLE FOR FILLING/PAVEMENT - UNKNOWN
- IF CUT IS CONSIDERED SUITABLE FOR FILLING - UNKNOWN
- TOPSOIL DEPTH - 50mm
- ONSITE SOILS ARE DISPERSIVE/HIGHLY REACTIVE - UNKNOWN

LEVELS AND SETOUT NOTES

- EARTHWORKS LEVELS SHOWN ARE BULK SURFACE LEVELS (UNDERSIDE OF PAVEMENT AND TOPSOIL LAYERS)
- EARTHWORKS LEVELS ALLOW DRIVEWAY / CAR PARK SLAB THICKNESS AND BUILDING SLAB THICKNESS AS PER STRUCTURAL ENGINEERING DRAWINGS. REFER TO FINAL 'FOR CONSTRUCTION' STRUCTURAL DESIGN DRAWINGS FOR FINAL PAD THICKNESS AND CROSS-CHECK/VERIFY THE ASSOCIATED FINAL CIVIL BULK PAD LEVELS PRIOR TO CONSTRUCTION SETOUT.
- FLOOD IMMUNITY - 200 YR ARI RIVER FLOOD LEVEL = 25.5m AHD ('FLOOD TECHNICAL NOTE' PREPARED BY ARCADIS DATED 1/03/24). ENSURE THE MINIMUM FINISHED FLOOR LEVELS FOR HABITABLE BUILDINGS CAN BE CONSTRUCTED AT ABOVE THIS RL.
- ALL RETAINING WALL HEIGHT LABELS ARE CALCULATED TO FINISHED SURFACE LEVELS INCLUDING TOPSOIL (AND TO NEAREST 200mm HEIGHT). FINAL RETAINING WALL DESIGNS AND DETAILED STEPPING IS SUBJECT TO STRUCTURAL DESIGN BY OTHERS.
- REFER TO ARCHITECTURAL DRAWINGS FOR BUILDING SETOUT INFORMATION.
- CONTRACTOR TO CONFIRM SITE SURVEY STATION LOCATION AND BUILDING/PAD SETOUT LOCATIONS IN RELATION TO BOUNDARIES PRIOR TO CONSTRUCTION AND ADVISE SUPERINTENDENT IF ANY DISCREPANCIES/ANOMALIES FOUND.

PRELIMINARY BOXING DEPTHS

TRUCK MANEUVERING HARDSTAND, CONTAINER SET DOWN = 170mm THICK CONCRETE + 100mm CBR 15 SUBBASE = 270 TOTAL BOX

LIGHT DUTY PAVEMENT = 130mm THICK CONCRETE + 100mm CBR 15 SUBBASE = 230 TOTAL BOX

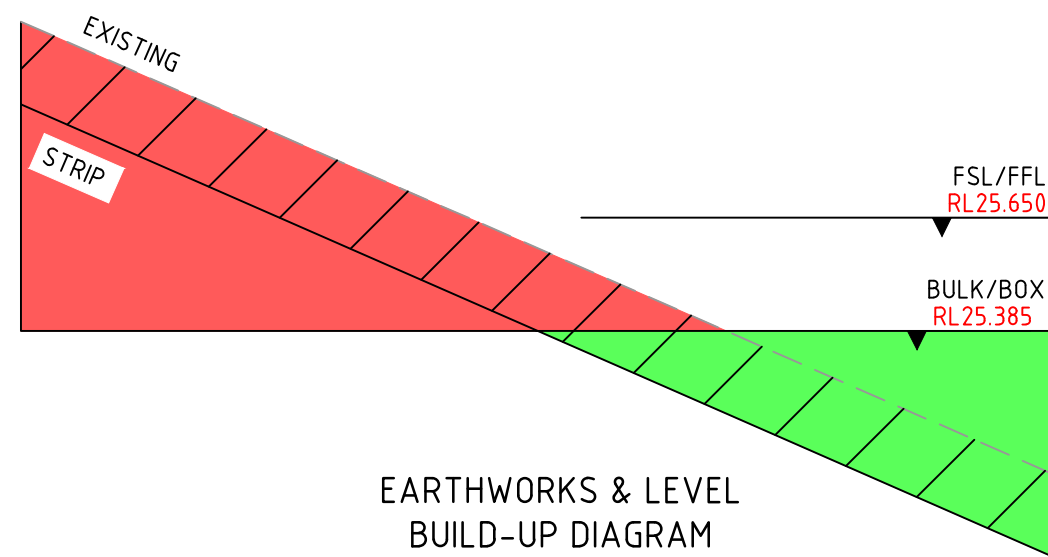
WAREHOUSE, OFFICE, PUMP ROOM = 165mm THICK CONCRETE + 100mm CBR 15 SUBBASE = 265 TOTAL BOX

TANK SLAB = 300mm THICK CONCRETE + 100mm CBR 15 SUBBASE = 400 TOTAL BOX

QFES = 230mm TOTAL BOX

FOOTPATH SLAB = 100mm THICK CONCRETE + 100mm CBR 15 SUBBASE = 200 TOTAL BOX

NOTE: FOR INTERNAL PAVEMENT DESIGN REFER TO STRUCTURAL DRAWINGS FOR DETAILS & SPECIFICATIONS



LEGEND

- PROPOSED BULK EARTHWORKS CONTOURS (0.10m INTERVAL)
- EXISTING SURFACE CONTOURS (0.10m INTERVAL)
- SPOT LEVEL (EXISTING)
- FFL XX.XX
BEL XX.XX
- FINISHED FLOOR LEVEL
- BULK EARTHWORKS LEVEL
- BUILDING PAD
- PROPOSED RETAINING WALL (TYPE TO BE CONFIRMED)
- SITE OF WORKS
- EXISTING STORMWATER
- EXISTING SEWER MAIN
- EXISTING WATER MAIN
- EXISTING 10m WIDE SEWER EASEMENT

DEPTH OF CUT

	- 999m TO - 2.0m
	- 2.0m TO - 1.5m
	- 1.5m TO - 1.25m
	- 1.25m TO - 1.0m
	- 1.0m TO - 0.75m
	- 0.75m TO - 0.5m
	- 0.5m TO - 0.25m
	- 0.25m TO - 0.0m

DEPTH OF FILL

	0.0m TO 0.25m
	0.25m TO 0.5m
	0.5m TO 0.75m
	0.75m TO 1.0m
	1.0m TO 1.25m
	1.25m TO 1.5m
	1.5m TO 2.0m
	2.0m TO 999m



FIRE ANT TREATMENT ZONE
MOVEMENT OF MATERIAL SHALL BE IN ACCORDANCE WITH THE DEPARTMENT OF AGRICULTURE AND FISHERIES ACTS AND REGULATIONS. FOR MORE INFORMATION CALL BIOSECURITIES QUEENSLAND ON 13 25 23 OR VISIT [WWW.DAF.QLD.GOV.AU](http://www.daf.qld.gov.au) FOR MORE INFORMATION.

WARNING

UNDERGROUND SERVICES
UNDERGROUND SERVICES EXIST IN THIS AREA. UNDERGROUND SERVICE LOCATIONS AND DEPTHS TO BE CONFIRMED PRIOR TO COMMENCEMENT OF CONSTRUCTION WORKS.

PRELIMINARY BULK EARTHWORKS VOLUMES

CUT	FILL	BALANCE
2,310 m ³	15,885 m ³	13,575 m ³ (FILL)

PRELIMINARY STRIP VOLUMES

AREA	DEPTH	VOLUME
22,357 m ²	50mm	1,118 m ³

NOT FOR CONSTRUCTION

DRAWN: J.DENG
DESIGNED: C.LOPEZ
JOB MANAGER: A.DE ANDRADE
VERIFIER: S.KILLORAN

REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
A	ISSUED FOR INFORMATION	JD	SK	ADA	15.05.25
B	ISSUED FOR INFORMATION	JD	SK	ADA	19.06.25
C	ISSUED FOR INFORMATION	JM	SK	ADA	03.07.25



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SCALE 1:500@ A1

SCALE 1:500@ A1

0 5 10 15 20 25m

0 5 10 15 20 25m



Brisbane
Level 25, 12 Creek Street, Brisbane QLD 4000
GPO BOX 423 Brisbane QLD 4001
(07) 3365 0400 brisbane@northrop.com.au
ABN 81 094 433 100

PROJECT

PROPOSED INDUSTRIAL DEVELOPMENT
LOT 103
4499-4651 MT.LINDESAY HIGHWAY
NORTH MACLEAN QLD 4280

DRAWING TITLE

BULK EARTHWORKS SECTIONS

JOB NUMBER

250604

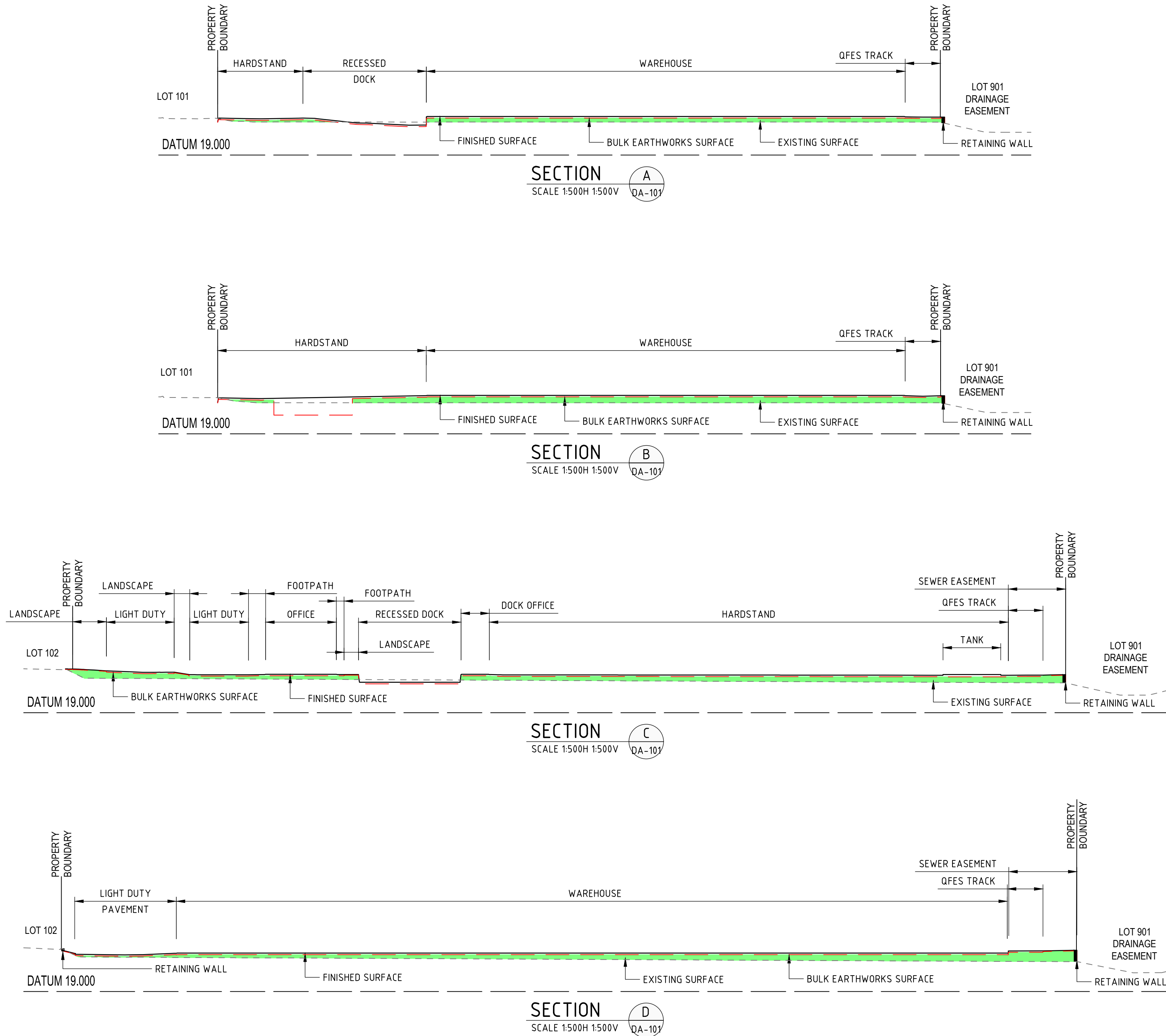
DRAWING NUMBER

DA-111

REVISION

C

DRAWING SHEET SIZE = A1



LEGEND - SECTIONS

FINISHED SURFACE

EXISTING SURFACE

BULK EARTHWORKS SURFACE

EARTHWORKS AREA OF CUT

EARTHWORKS AREA OF FILL

PROPOSED RETAINING WALL (TYPE TBC) - TO BE APPROVED AS PART OF THE DA

LAYOUT & NOTES REFERENCE

FOR EARTHWORKS LAYOUT PLAN & REFERENCE NOTES REFER DWG No DA-101

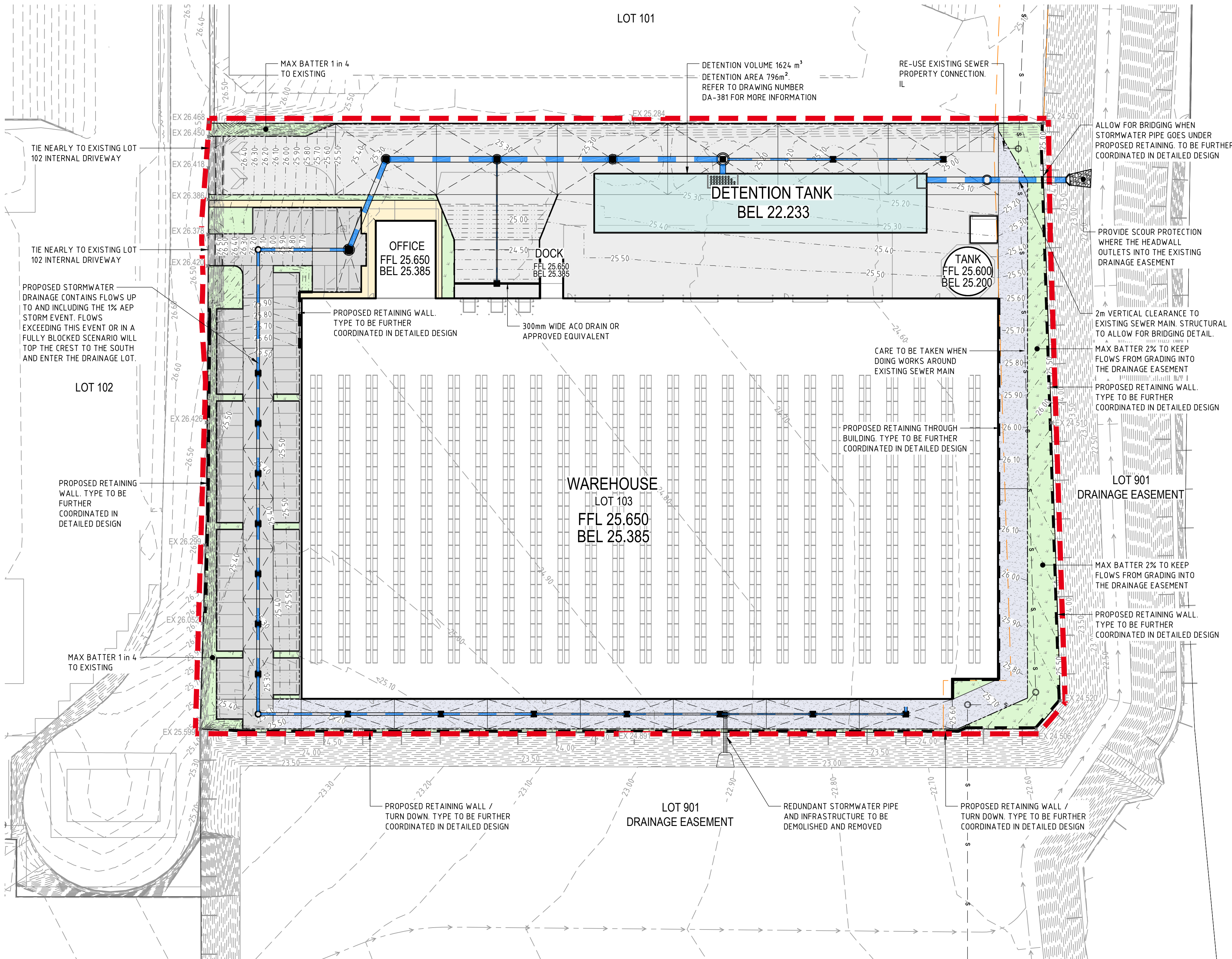
PLANS AND DOCUMENTS referred to in the PDA DEVELOPMENT APPROVAL

Approval no: DEV2025/1651
Date: 19 August 2025



NOT FOR CONSTRUCTION

DRAWN: J.DENG
DESIGNED: C.LOPEZ
JOB MANAGER: A.DE ANDRADE
VERIFIER: S.KILLORAN



NOTE

CRASH BARRIER TO BE INSTALLED WHERE RETAINING HEIGHT EXCEEDS 600mm HIGH

NOTES

ALL GRATED INLET PITS TO BE FITTED WITH OCEAN PROTECT OCEAN GUARDS (TRASH BASKETS) OR APPROVED EQUIVALENT

LEGEND

- XX.XX--- PROPOSED BULK EARTHWORKS CONTOURS (0.10m INTERVAL)
- XX.XX--- EXISTING SURFACE CONTOURS (0.10m INTERVAL)
- EXISTING INTEGRAL KERB
- EX XX.XX SPOT LEVEL (EXISTING)
- FFL XX.XX FINISHED FLOOR LEVEL
- BEL XX.XX BULK EARTHWORKS LEVEL
- PROPOSED STORMWATER DRAINAGE
- XXXØ PROPOSED STORMWATER SIZE
- PROPOSED STORMWATER FIELD INLET / GRATED DRAIN
- PROPOSED STORMWATER MANHOLE
- S --- PROPOSED SEWERAGE RETICULATION
- W --- PROPOSED WATER RETICULATION
- SWD --- EXISTING STORMWATER DRAINAGE
- S --- EXISTING SEWERAGE RETICULATION
- W --- EXISTING WATER RETICULATION
- EXISTING 10m WIDE SEWER EASEMENT
- PROPOSED RETAINING WALL (TYPE TO BE CONFIRMED)
- SITE OF WORKS
- PROPOSED CONCRETE LIGHT DUTY PAVEMENT
- PROPOSED HEAVY DUTY PAVEMENT
- PROPOSED CONCRETE FOOTPATH REFER TO LCC STD. DRG. 08-00399
- PROPOSED LANDSCAPE AREA
- PROPOSED QFES TRACK
- ⊗ PROPOSED STRUCTURE TAG
- ⊗ EXISTING STRUCTURE TAG

WARNING

UNDERGROUND SERVICES UNDERGROUND SERVICES EXIST IN THIS AREA. UNDERGROUND SERVICE LOCATIONS AND DEPTHS TO BE CONFIRMED PRIOR TO COMMENCEMENT OF CONSTRUCTION WORKS.

PLANS AND DOCUMENTS
referred to in the PDA
DEVELOPMENT APPROVAL

Approval no: DEV2025/1651
Date: 19 August 2025



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REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
A	ISSUED FOR INFORMATION	JD	SK	ADA	15.05.25
B	ISSUED FOR INFORMATION	JD	SK	ADA	19.06.25
C	ISSUED FOR INFORMATION	JM	SK	ADA	03.07.25

Charter Hall

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watson young

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Brisbane
Level 25, 12 Creek Street, Brisbane QLD 4000
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(07) 3365 0400 brisbane@northrop.com.au
ABN 81 084 433 100

PROJECT

PROPOSED INDUSTRIAL DEVELOPMENT LOT 103
4499-4651 MT.LINDSAY HIGHWAY NORTH MACLEAN QLD 4280

DRAWING TITLE

ROADWORKS & STORMWATER DRAINAGE LAYOUT PLAN

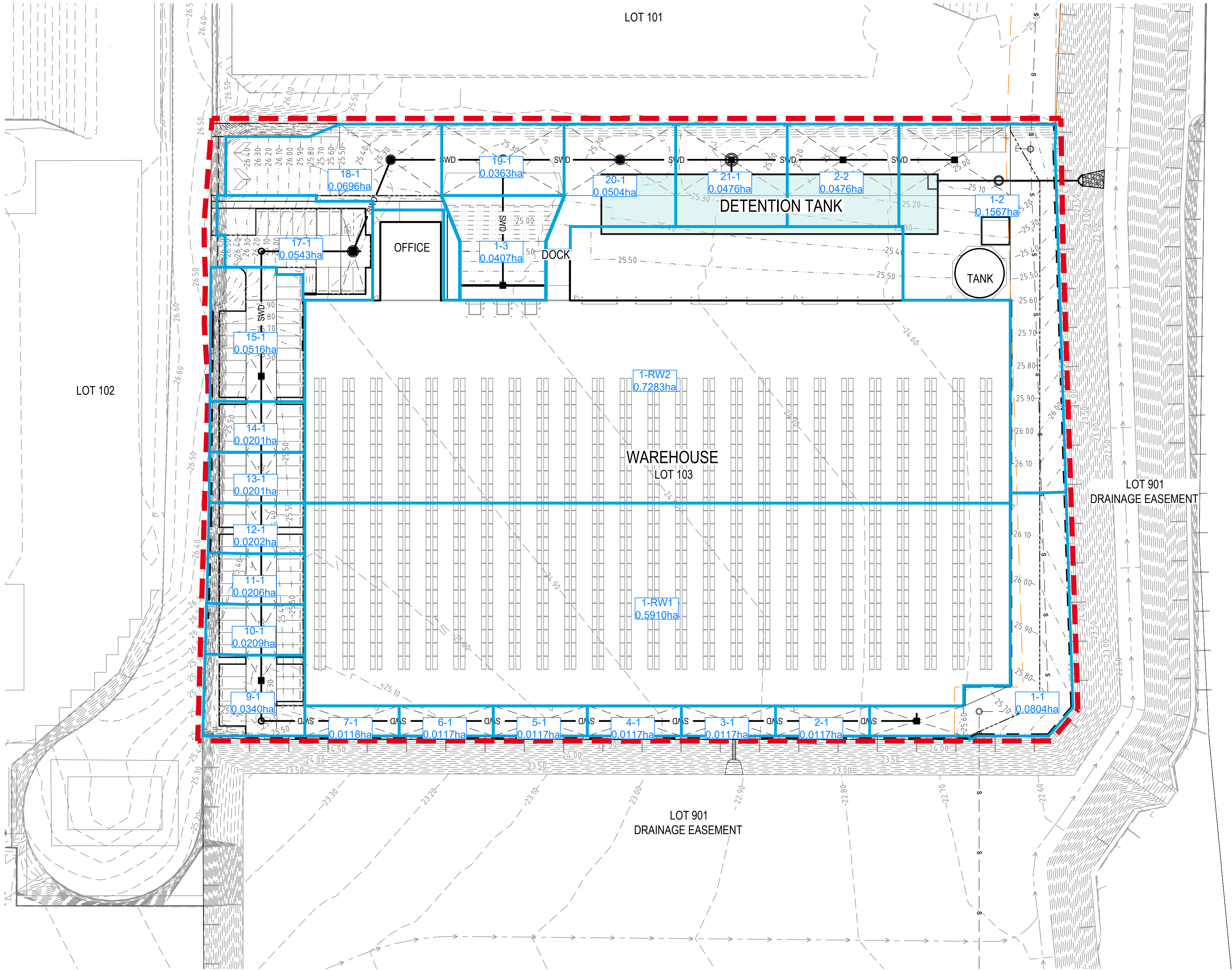
JOB NUMBER
250604

DRAWING NUMBER
DA-211

REVISION
C

DRAWING SHEET SIZE = A1

DRAWN: J.DENG
DESIGNED: C.LOPEZ
JOB MANAGER: A.DE ANDRADE
VERIFIER: S.KILLORAN



LEGEND	
	PROPOSED SURFACE CONTOURS
	EXISTING SURFACE CONTOURS
	PROPOSED STORMWATER DRAINAGE
	EXISTING STORMWATER DRAINAGE
	PROPOSED CATCHMENT BOUNDARY
	PROPOSED CATCHMENT IDENTIFIER AND AREA (ha)
	EXISTING CATCHMENT IDENTIFIER AND AREA (ha)

CATCHMENT	
CATCHMENT No.	SIZE
1-RW1	0.5910ha
1-RW2	0.7283ha
1-1	0.0804ha
2-1	0.0117ha
3-1	0.0117ha
4-1	0.0117ha
5-1	0.0117ha
6-1	0.0117ha
7-1	0.0118ha
9-1	0.0340ha
10-1	0.0209ha
11-1	0.0206ha
12-1	0.0202ha
13-1	0.0201ha
14-1	0.0201ha
15-1	0.0516ha
17-1	0.0543ha
18-1	0.0696ha
19-1	0.0363ha
20-1	0.0504ha
21-1	0.0476ha
1-2	0.1567ha
2-2	0.0476ha
1-3	0.0407ha

PLANS AND DOCUMENTS
referred to in the PDA
DEVELOPMENT APPROVAL

Approval no: DEV2025/1651
Date: 19 August 2025



NOT FOR CONSTRUCTION

REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
A	ISSUED FOR INFORMATION	JD	SK	ADA	15.05.25
B	ISSUED FOR INFORMATION	JD	SK	ADA	19.06.25

CLIENT

Charter Hall

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ARCHITECT

watson young

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SCALE 1:500@A1

0 5 10 15 20 25m

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Brisbane

Level 25, 12 Creek Street, Brisbane QLD 4000
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(07) 3365 0400 brisbane@northrop.com.au
ABN 81 094 433 100

PROJECT

**PROPOSED INDUSTRIAL
DEVELOPMENT
LOT 103
4499-4651 MT.LINESAY HIGHWAY
NORTH MACLEAN QLD 4280**

DRAWING TITLE

**STORMWATER DRAINAGE
CATCHMENT LAYOUT PLAN**

JOB NUMBER

250604

DRAWING NUMBER

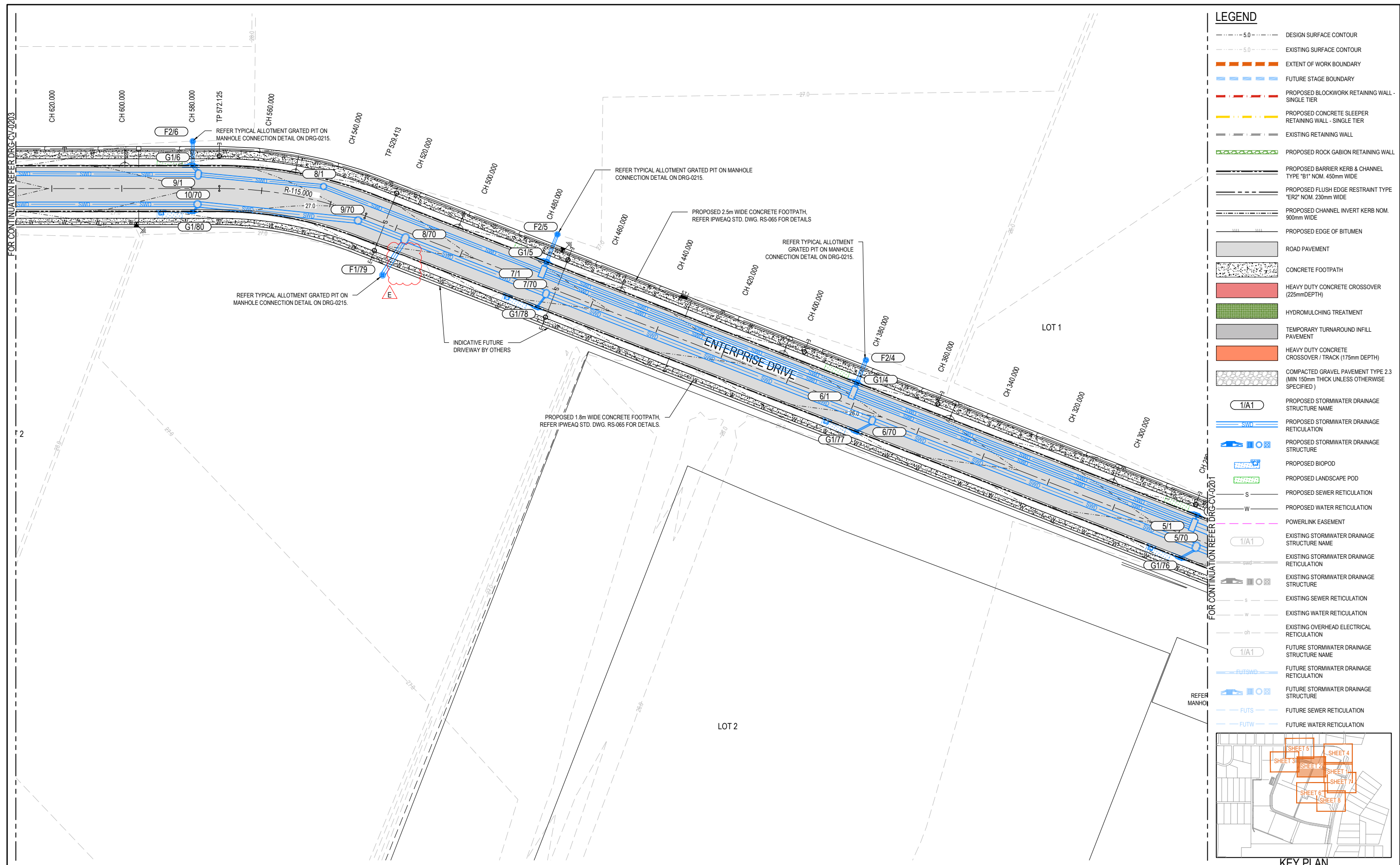
DA-311

REVISION

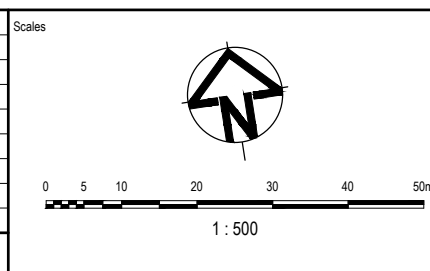
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DRAWING SHEET SIZE = A1

Appendix B – Arcadis IFC Documentation (Existing Estate Infrastructure)

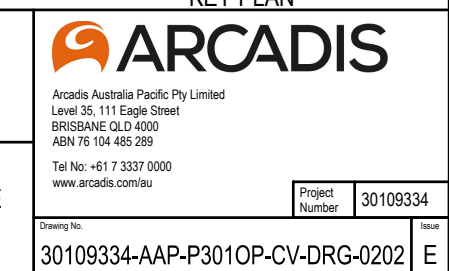


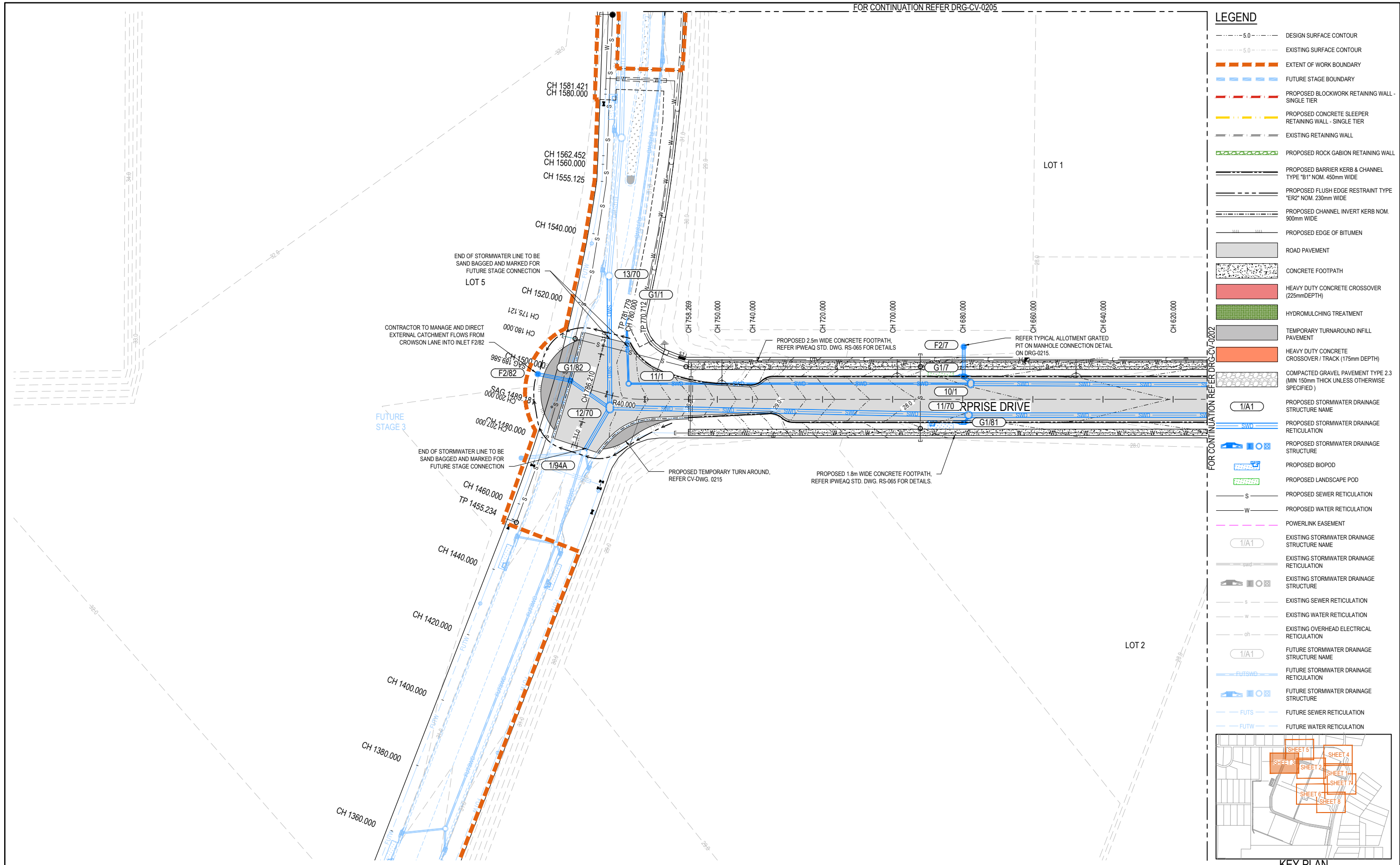
E	UPDATED LAYOUT, CROSSOVER REMOVED	A.O.	S.S.	B.K.	15.07.24
D	AMENDMENTS TO SWD DESIGN	A.O.	S.S.	G.E.	03.07.24
C	PCN17 AMENDMENTS TO SWD LINES 60, 65 & 79	G.P.	T.F.	G.E.	25.06.24
B	SEEDED TREATMENT AMENDED TO HYDROMULCH	J.B.	T.F.	G.E.	19.03.24
A	ISSUED FOR CONSTRUCTION	J.B.	T.F.	G.E.	16.02.24
Issue	Description	DR	CH	VE	Date



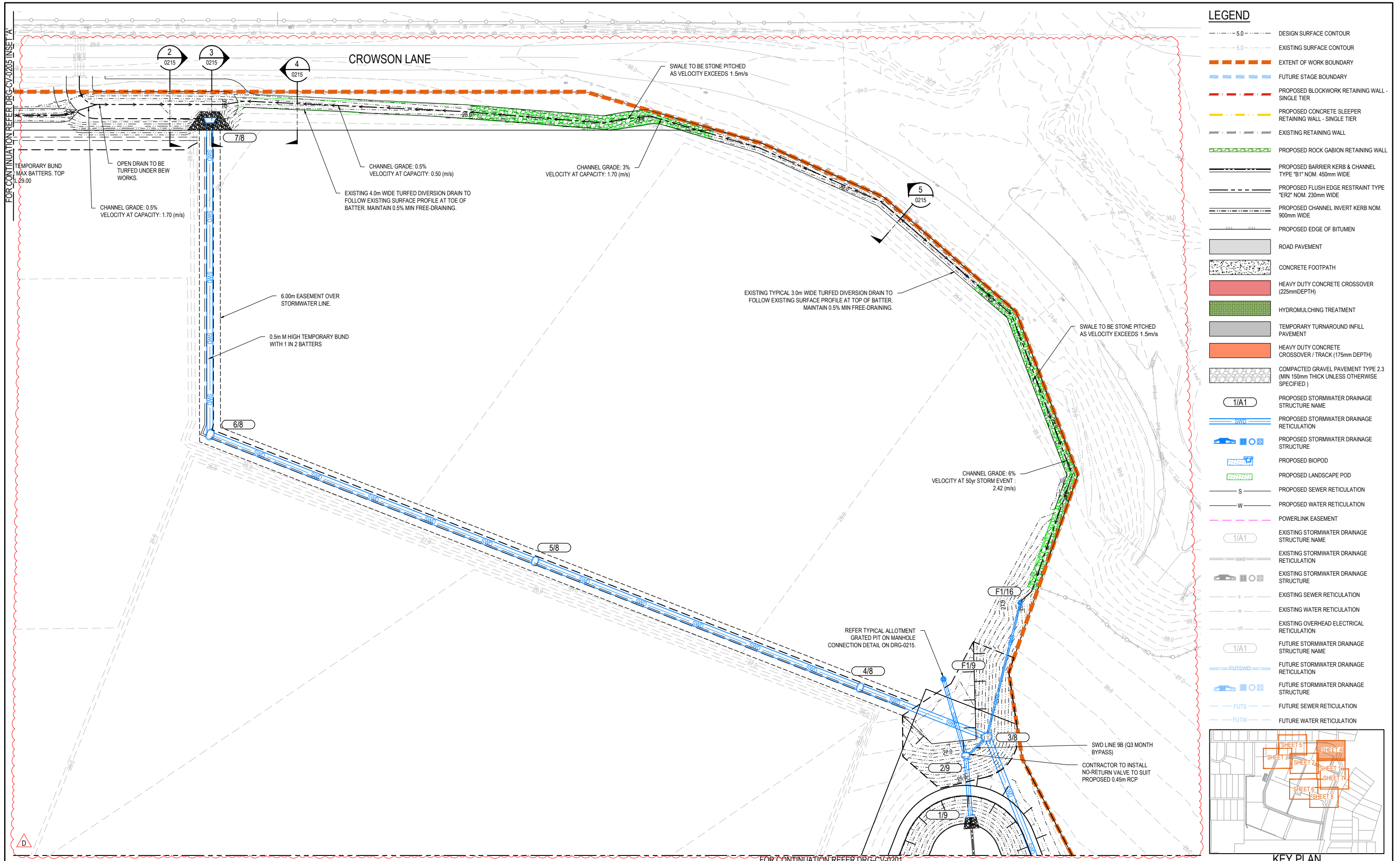
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© Copyright reserved			
Original Issue Signatures			
Drawn	P.LAGANAO	Original Size	A1
Designed	G.PUMNUT	Height Datum	AHD
Project Manager	T.FANNING	Grid	LOCAL
Verified	B.KITSON	R.P.E.Q. No: 07884 Date 01.08.24 	

Project	FLAGSTONE LOGISTICS ESTATE - STAGE 1
Title	ROADWORKS AND DRAINAGE LAYOUT PLAN SHEET 2

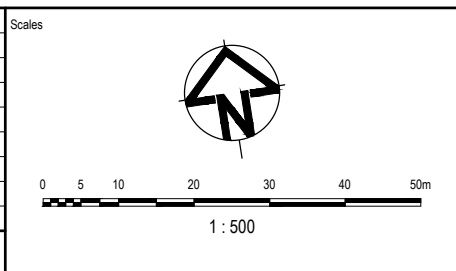




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											© Copyright reserved			
					1 : 500						Original Issue Signatures		Title	
											Drawn P.LAGANAO		Original Size A1	
											Designed G.PUMNUT		Height Datum AHD	
											Project Manager T.FANNING		Grid LOCAL	
											Verified B.KITSON		R.P.E.Q. No: 07884 Date 01.08.24	
													ROADWORKS AND DRAINAGE LAYOUT PLAN SHEET 3	
													Arcadis Australia Pacific Pty Limited Level 35, 111 Eagle Street BRISBANE QLD 4000 ABN 76 104 485 289 Tel No: +61 7 3337 0000 www.arcadis.com/au	
													Project Number 30109334	
													Issue 30109334-AAP-P3010P-CV-DRG-0203	
													B	



D	UPDATED LAYOUT	A.O.	S.S.	B.K.	01.08.24
C	UPDATED LAYOUT TEMPORARY ACCESS ROAD REMOVED	A.O.	S.S.	B.K.	15.07.24
B	SEEDED TREATMENT AMENDED TO HYDROMULCH	J.B.	T.F.	G.E.	19.03.24
A	ISSUED FOR CONSTRUCTION	J.B.	T.F.	G.E.	16.02.24
Issue	Description	DR	CH	VE	Date



FOR CONSTRUCTION			
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Original Issue Signatures		Original Size	
Drawn	P.LAGANAO	Height	A1
Designed	G.PUMNUT	Datum	AHD
Project Manager	T.FANNING	Grid	LOCAL
Verified	B.KITSON	R.P.E.Q. No: 07884	Date 01.08.24

Project	FLAGSTONE LOGISTICS ESTATE - STAGE 1
Title	ROADWORKS AND DRAINAGE LAYOUT PLAN SHEET 4

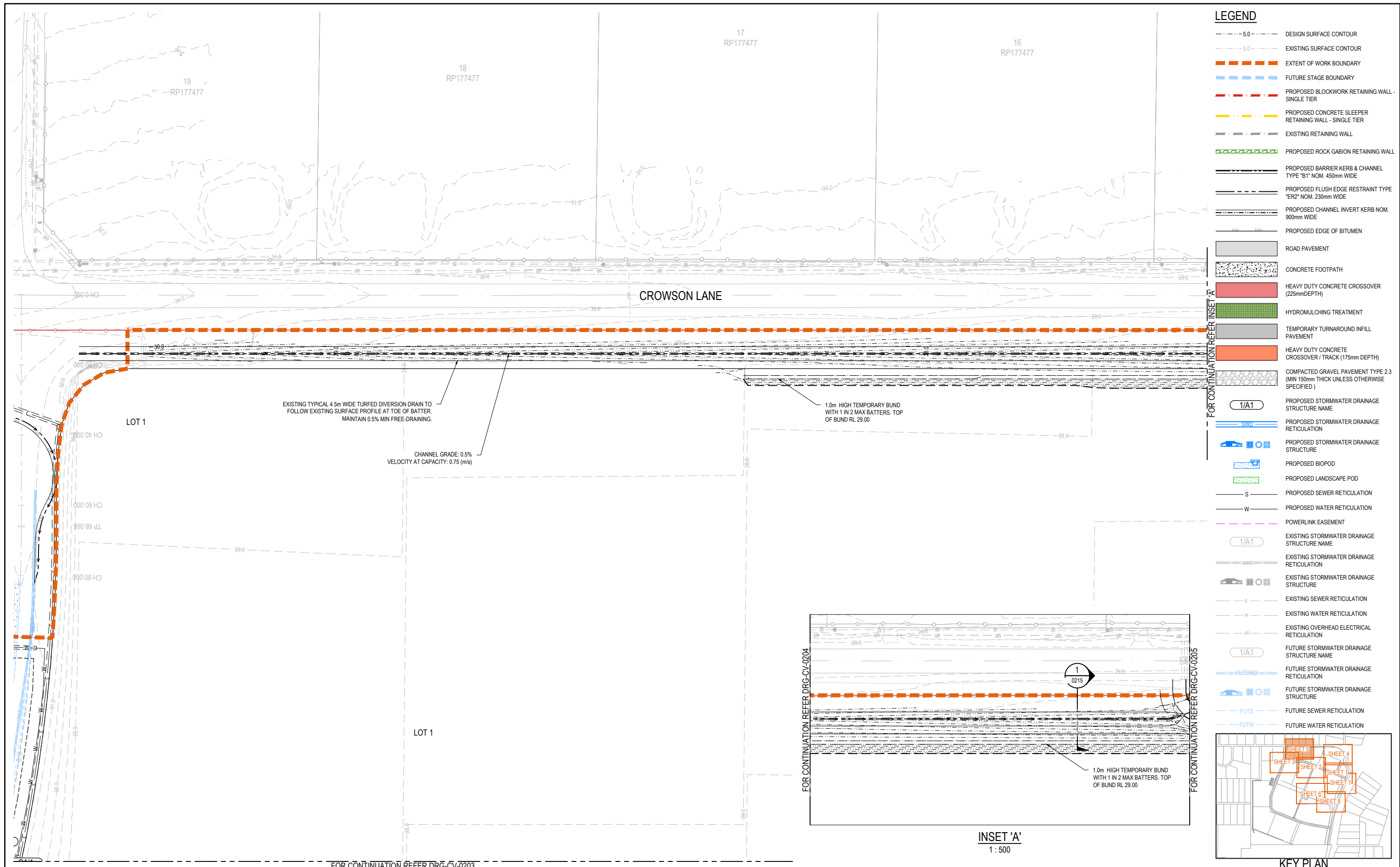
ARCADIS

Arcadis Australia Pacific Pty Limited
Level 35, 111 Eagle Street
BRISBANE QLD 4000
ABN 76 104 485 289
Tel No: +61 7 3337 0000
www.arcadis.com/au

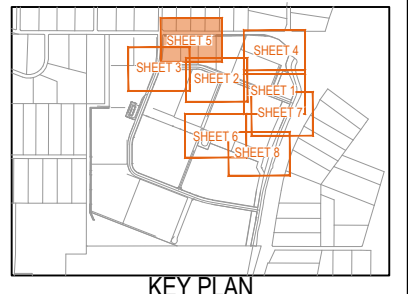
Project Number 30109334

Drawing No. 30109334-AAP-P3010P-CV-DRG-0204

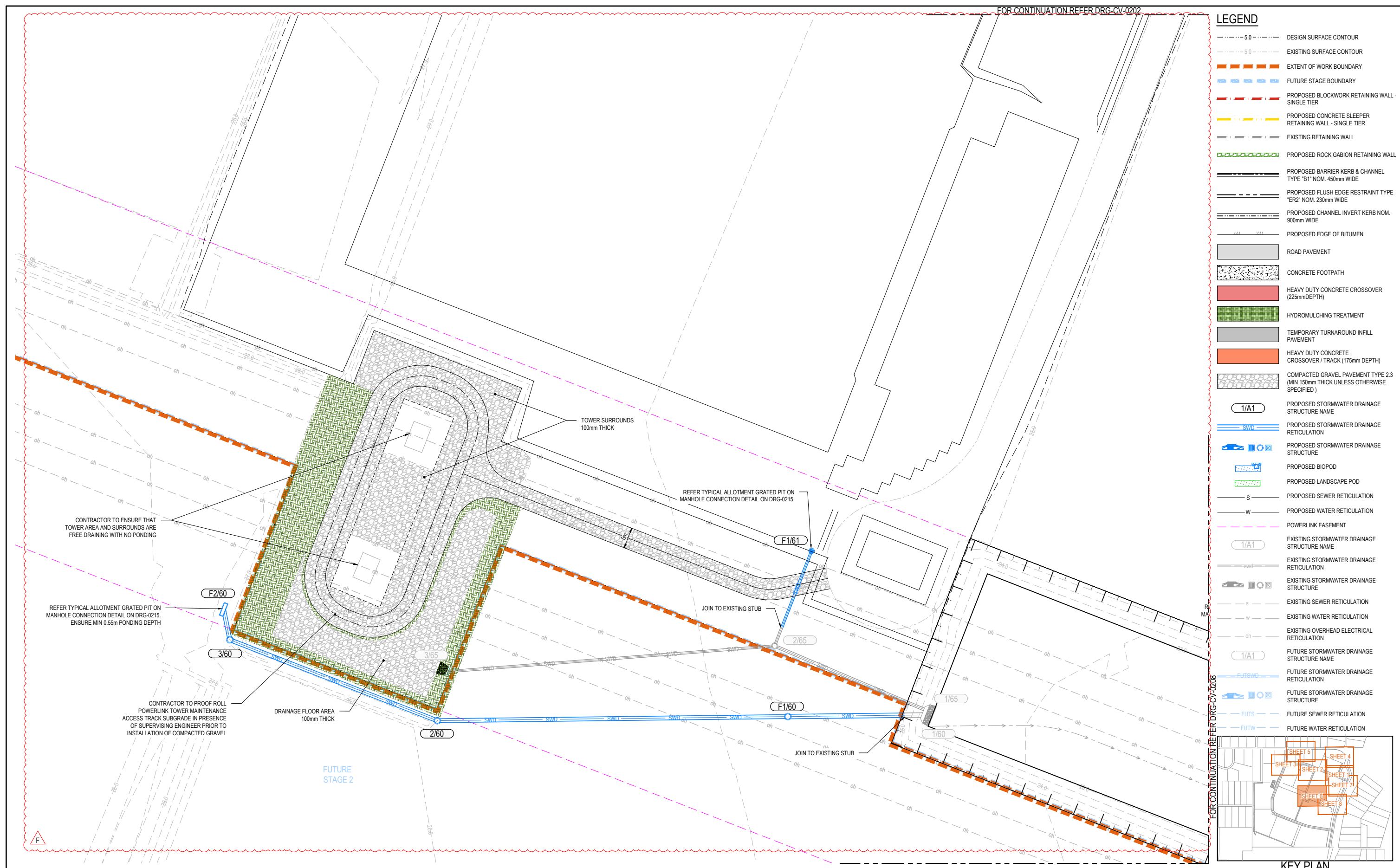
Issue D



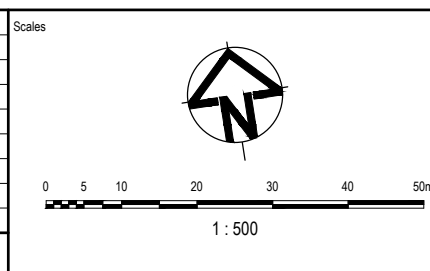
- LEGEND**
- 5.0 --- DESIGN SURFACE CONTOUR
 - 5.0 --- EXISTING SURFACE CONTOUR
 - EXTENT OF WORK BOUNDARY
 - FUTURE STAGE BOUNDARY
 - PROPOSED BLOCKWORK RETAINING WALL - SINGLE TIER
 - PROPOSED CONCRETE SLEEPER RETAINING WALL - SINGLE TIER
 - EXISTING RETAINING WALL
 - PROPOSED ROCK GABION RETAINING WALL
 - PROPOSED BARRIER KERB & CHANNEL TYPE "B1" NOM. 450mm WIDE
 - PROPOSED FLUSH EDGE RESTRAINT TYPE "ER2" NOM. 230mm WIDE
 - PROPOSED CHANNEL INVERT KERB NOM. 900mm WIDE
 - PROPOSED EDGE OF BITUMEN
 - ROAD PAVEMENT
 - CONCRETE FOOTPATH
 - HEAVY DUTY CONCRETE CROSSOVER (225mm DEPTH)
 - HYDROMULCHING TREATMENT
 - TEMPORARY TURNAROUND INFILL PAVEMENT
 - HEAVY DUTY CONCRETE CROSSOVER / TRACK (175mm DEPTH)
 - COMPACTED GRAVEL PAVEMENT TYPE 2.3 (MIN 150mm THICK UNLESS OTHERWISE SPECIFIED)
 - 1/A1 PROPOSED STORMWATER DRAINAGE STRUCTURE NAME
 - SWD PROPOSED STORMWATER DRAINAGE RETICULATION
 - PROPOSED STORMWATER DRAINAGE STRUCTURE
 - PROPOSED BIOPOD
 - PROPOSED LANDSCAPE POD
 - S PROPOSED SEWER RETICULATION
 - W PROPOSED WATER RETICULATION
 - POWERLINK EASEMENT
 - 1/A1 EXISTING STORMWATER DRAINAGE STRUCTURE NAME
 - SWD EXISTING STORMWATER DRAINAGE RETICULATION
 - EXISTING STORMWATER DRAINAGE STRUCTURE
 - S EXISTING SEWER RETICULATION
 - W EXISTING WATER RETICULATION
 - oh EXISTING OVERHEAD ELECTRICAL RETICULATION
 - 1/A1 FUTURE STORMWATER DRAINAGE STRUCTURE NAME
 - FUTSWD FUTURE STORMWATER DRAINAGE RETICULATION
 - FUTS FUTURE STORMWATER DRAINAGE STRUCTURE
 - FUTS FUTURE SEWER RETICULATION
 - FUTW FUTURE WATER RETICULATION



					Scales		Surveyor		Client		Status		Project	
											FOR CONSTRUCTION		FLAGSTONE LOGISTICS ESTATE - STAGE 1	
					0 5 10 20 30 40 50m		Planning Urban Design Landscape Environment Surveying				© Copyright reserved		Title	
					1 : 500						Original Issue Signatures		ROADWORKS AND DRAINAGE LAYOUT PLAN	
											Drawn P.LAGANAO		SHEET 5	
											Designed G.PUMNUT		1 : 500	
											Project Manager T.FANNING		PROJECT NUMBER	
											Verified B.KITSON		30109334	
											R.P.E.Q. No: 07884 Date: 01.08.24		ISSUE	
													30109334-AAP-P3010P-CV-DRG-0205	
													B	

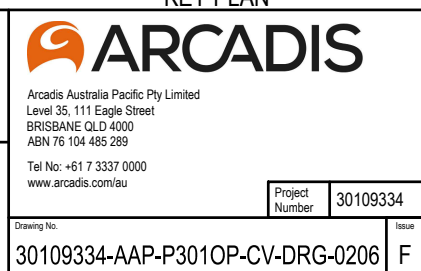


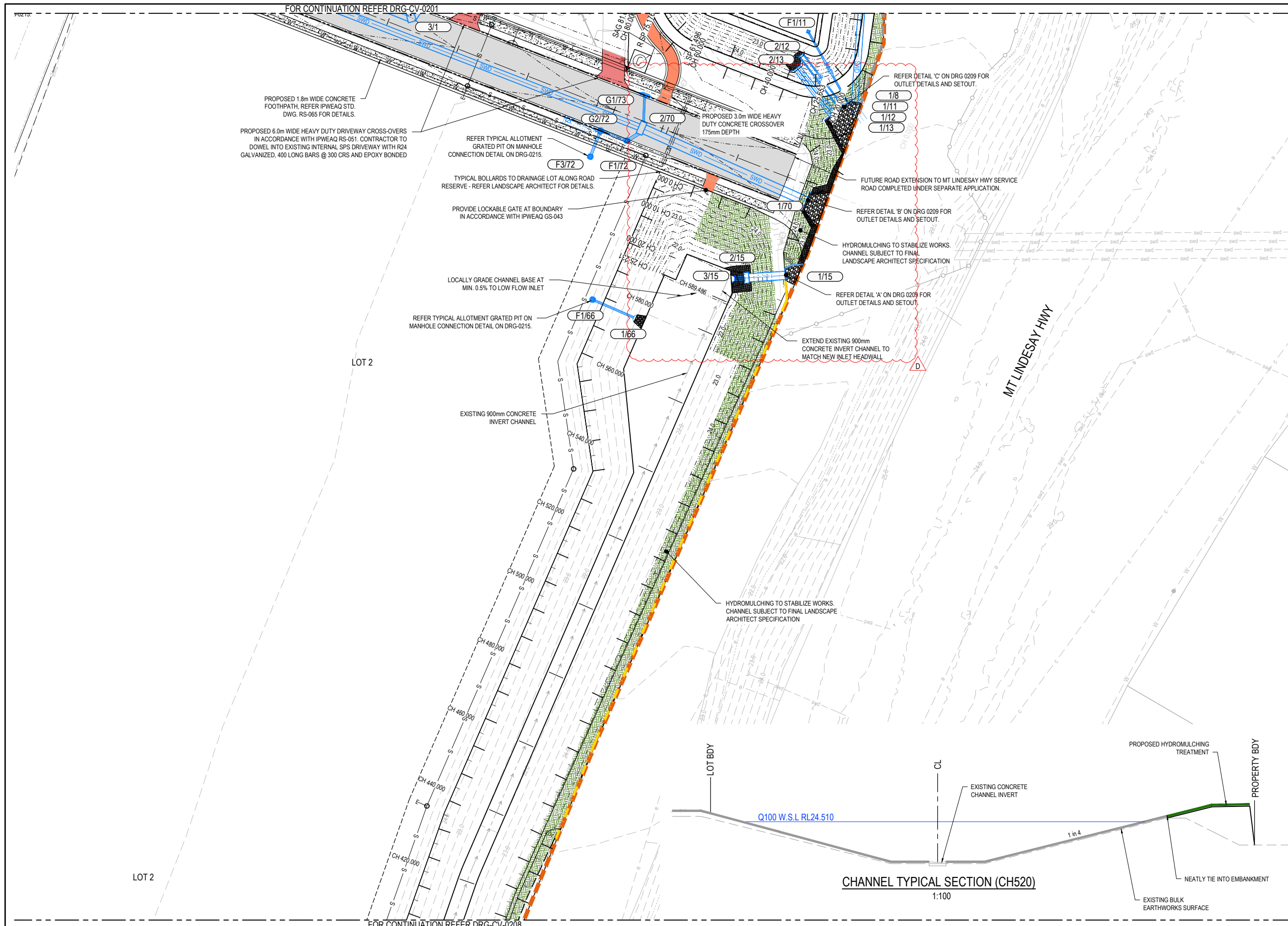
F	UPDATED LAYOUT	A.O.	S.S.	B.K.	01.08.24
E	UPDATED LAYOUT	A.O.	S.S.	B.K.	15.07.24
D	AMENDMENTS TO SWD DESIGN	A.O.	S.S.	G.E.	03.07.24
C	PCN17 AMENDMENTS TO SWD LINES 60, 65 & 79	J.B.	T.F.	G.E.	25.06.24
B	SEEDED TREATMENT AMENDED TO HYDROMULCH	G.P.	T.F.	G.E.	19.03.24
A	ISSUED FOR CONSTRUCTION	J.B.	T.F.	G.E.	16.02.24
Issue	Description	DR	CH	VE	Date



Status	FOR CONSTRUCTION		
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Drawn	P.LAGANAO	Original Size	A1
Designed	G.PUMNUT	Height Datum	AHD
Project Manager	T.FANNING	Grid	LOCAL
Verified	B.KITSON	R.P.E.Q. No: 07884 Date 01.08.24 	

Project	FLAGSTONE LOGISTICS ESTATE - STAGE 1
Title	ROADWORKS AND DRAINAGE LAYOUT PLAN SHEET 6



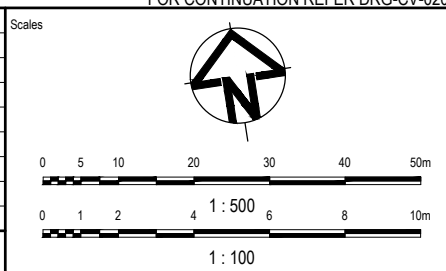


LEGEND

- DESIGN SURFACE CONTOUR
- EXISTING SURFACE CONTOUR
- EXTENT OF WORK BOUNDARY
- FUTURE STAGE BOUNDARY
- PROPOSED BLOCKWORK RETAINING WALL - SINGLE TIER
- PROPOSED CONCRETE SLEEPER RETAINING WALL - SINGLE TIER
- EXISTING RETAINING WALL
- PROPOSED ROCK GABION RETAINING WALL
- PROPOSED BARRIER KERB & CHANNEL TYPE "B1" NOM. 450mm WIDE
- PROPOSED FLUSH EDGE RESTRAINT TYPE "ER2" NOM. 230mm WIDE
- PROPOSED CHANNEL INVERT KERB NOM. 900mm WIDE
- PROPOSED EDGE OF BITUMEN
- ROAD PAVEMENT
- CONCRETE FOOTPATH
- HEAVY DUTY CONCRETE CROSSOVER (225mm DEPTH)
- HYDROMULCHING TREATMENT
- TEMPORARY TURNAROUND INFILL PAVEMENT
- HEAVY DUTY CONCRETE CROSSOVER / TRACK (175mm DEPTH)
- COMPACTED GRAVEL PAVEMENT TYPE 2.3 (MIN 150mm THICK UNLESS OTHERWISE SPECIFIED)
- PROPOSED STORMWATER DRAINAGE STRUCTURE NAME
- PROPOSED STORMWATER DRAINAGE RETICULATION
- PROPOSED STORMWATER DRAINAGE STRUCTURE
- PROPOSED BIOPOD
- PROPOSED LANDSCAPE POD
- PROPOSED SEWER RETICULATION
- PROPOSED WATER RETICULATION
- POWERLINK EASEMENT
- EXISTING STORMWATER DRAINAGE STRUCTURE NAME
- EXISTING STORMWATER DRAINAGE RETICULATION
- EXISTING STORMWATER DRAINAGE STRUCTURE
- EXISTING SEWER RETICULATION
- EXISTING WATER RETICULATION
- EXISTING OVERHEAD ELECTRICAL RETICULATION
- FUTURE STORMWATER DRAINAGE STRUCTURE NAME
- FUTURE STORMWATER DRAINAGE RETICULATION
- FUTURE STORMWATER DRAINAGE STRUCTURE
- FUTURE SEWER RETICULATION
- FUTURE WATER RETICULATION

KEY PLAN

Issue	Description	DR	CH	VE	Date
D	UPDATED LAYOUT, SWD LINE 15 UPDATED	A.O.	S.S.	B.K.	15.07.24
C	AMENDMENTS TO SWD DESIGN	A.O.	S.S.	G.E.	03.07.24
B	SEEDED TREATMENT AMENDED TO HYDROMULCH	J.B.	T.F.	G.E.	19.03.24
A	ISSUED FOR CONSTRUCTION	J.B.	T.F.	G.E.	16.02.24



WOLTER
consulting group

Planning Urban Design Landscape Environment Surveying

Charter Hall

Client

FOR CONSTRUCTION

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Original Issue Signatures

Drawn P.LAGANAO Original Size A1

Designed G.PUMNUT Height Datum AHD

Project Manager T.FANNING Grid LOCAL

Verified B.KITSON R.P.E.Q. No: 07884 Date 01.08.24

FLAGSTONE LOGISTICS ESTATE - STAGE 1

ROADWORKS AND DRAINAGE LAYOUT PLAN SHEET 7

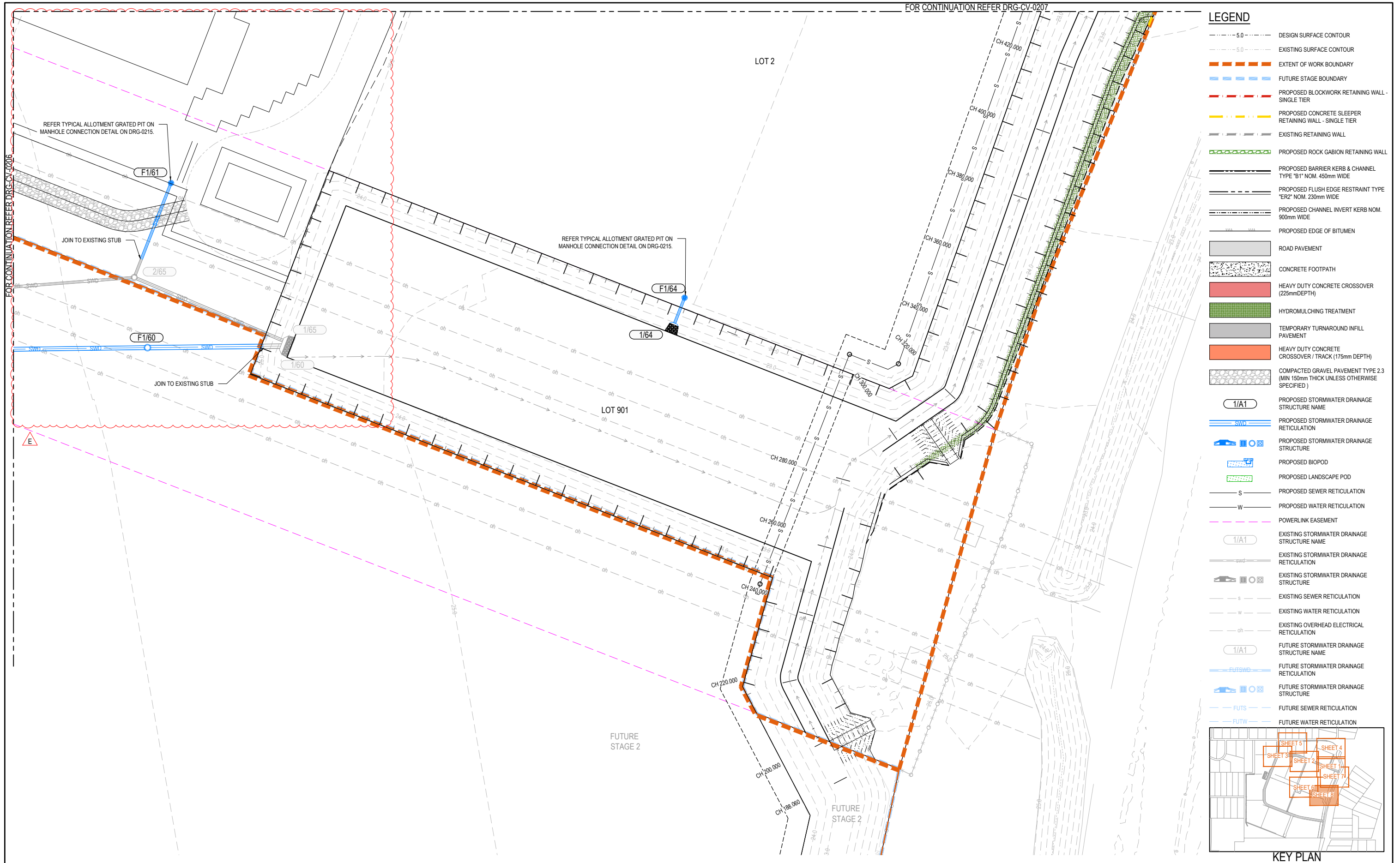
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Level 35, 111 Eagle Street
BRISBANE QLD 4000
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Tel No: +61 7 3337 0000
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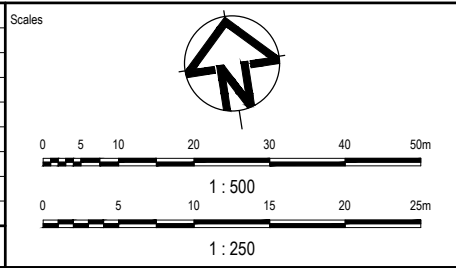
Project Number 30109334

Issue 30109334-AAP-P3010P-CV-DRG-0207

D



E	UPDATED LAYOUT	A.O.	S.S.	B.K.	15.07.24
D	AMENDMENTS TO SWD DESIGN	A.O.	S.S.	G.E.	03.07.24
C	PCN17 AMENDMENTS TO SWD LINES 60, 65 & 79	G.P.	T.F.	G.E.	25.06.24
B	SEEDING TREATMENT AMENDED TO HYDROMULCH	J.B.	T.F.	G.E.	19.03.24
A	ISSUED FOR CONSTRUCTION	J.B.	T.F.	G.E.	16.02.24
Issue	Description	DR	CH	VE	Date



Surveyor

Planning Urban Design Landscape Environment Surveying

Client

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Original Issue Signatures			
Drawn	P.LAGANAO	Original Size	A1
Designed	G.PUMNUT	Height Datum	AHD
Project Manager	T.FANNING	Grid	LOCAL
Verified	B.KITSON	R.P.E.Q. No: 07884 Date: 01.08.24	

Project

FLAGSTONE LOGISTICS ESTATE - STAGE 1

Title

ROADWORKS AND DRAINAGE LAYOUT PLAN SHEET 8

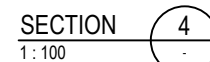
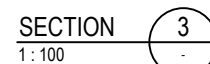
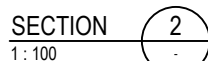
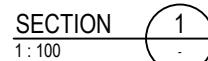
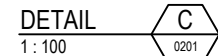
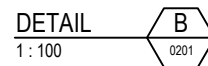
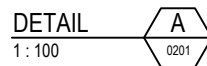
Arcadis Australia Pacific Pty Limited
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BRISBANE QLD 4000
ABN 76 104 485 289
Tel No: +61 7 3337 0000
www.arcadis.com/au

Project Number 30109334

Issue 1

30109334-AAP-P3010P-CV-DRG-0208

E





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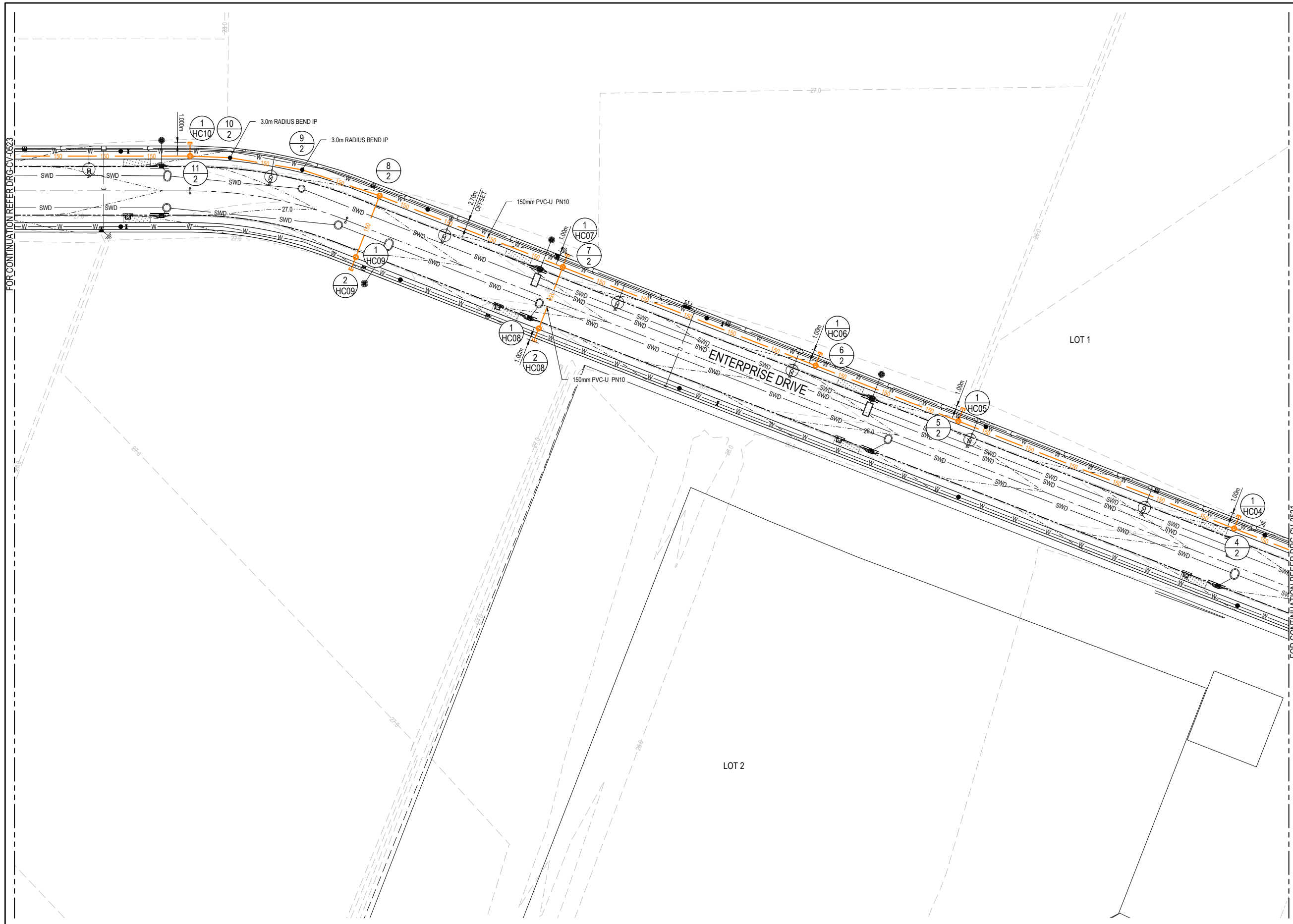
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 Level 35, 111 Eagle Street
 BRISBANE QLD 4000
 ABN 76 104 485 289

Tel No: +61 7 3337 0000
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Project Number	30109334
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Drawing No. 30109334-AAP-P301OP-CV-DRG-0209

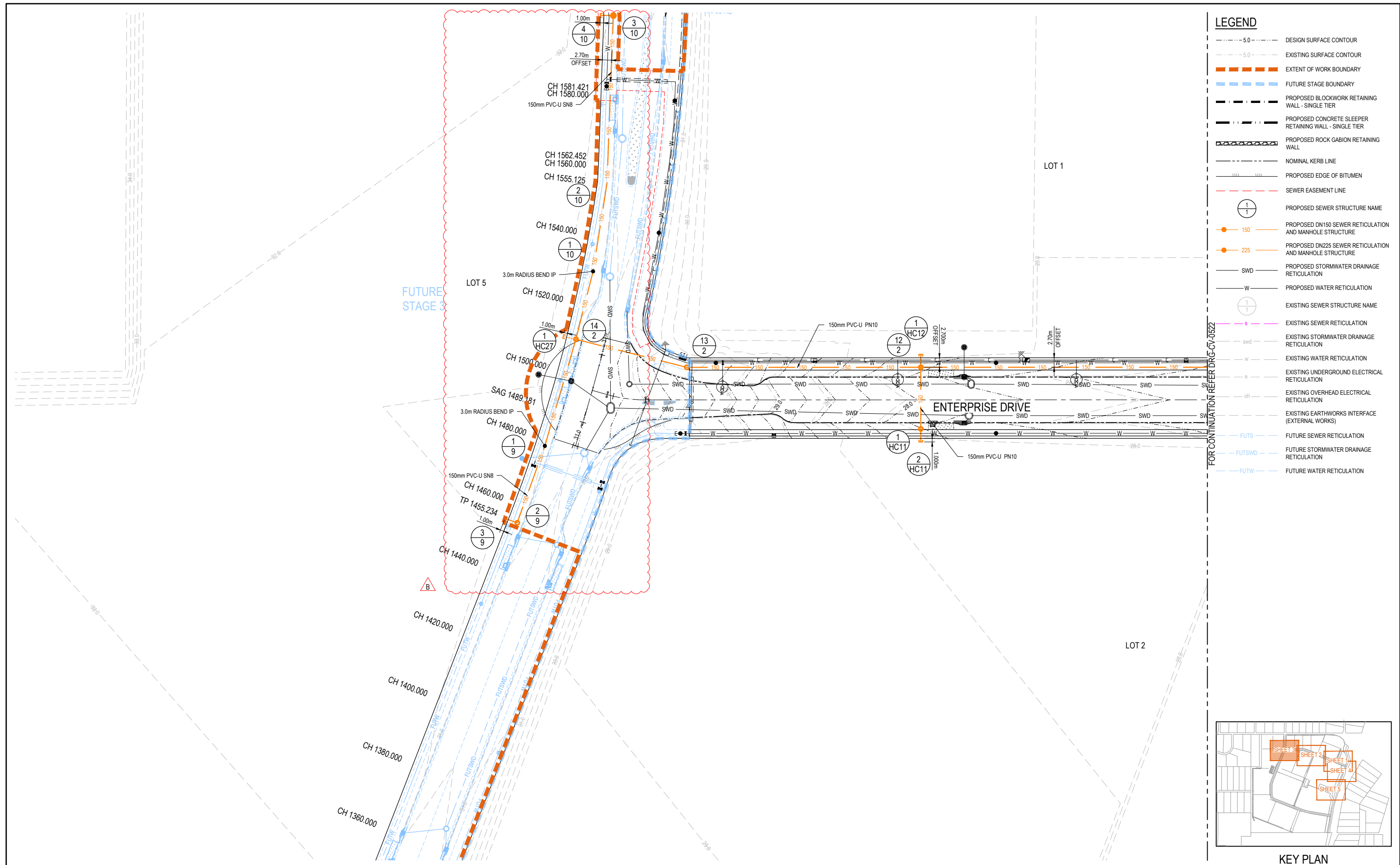
Issue	D
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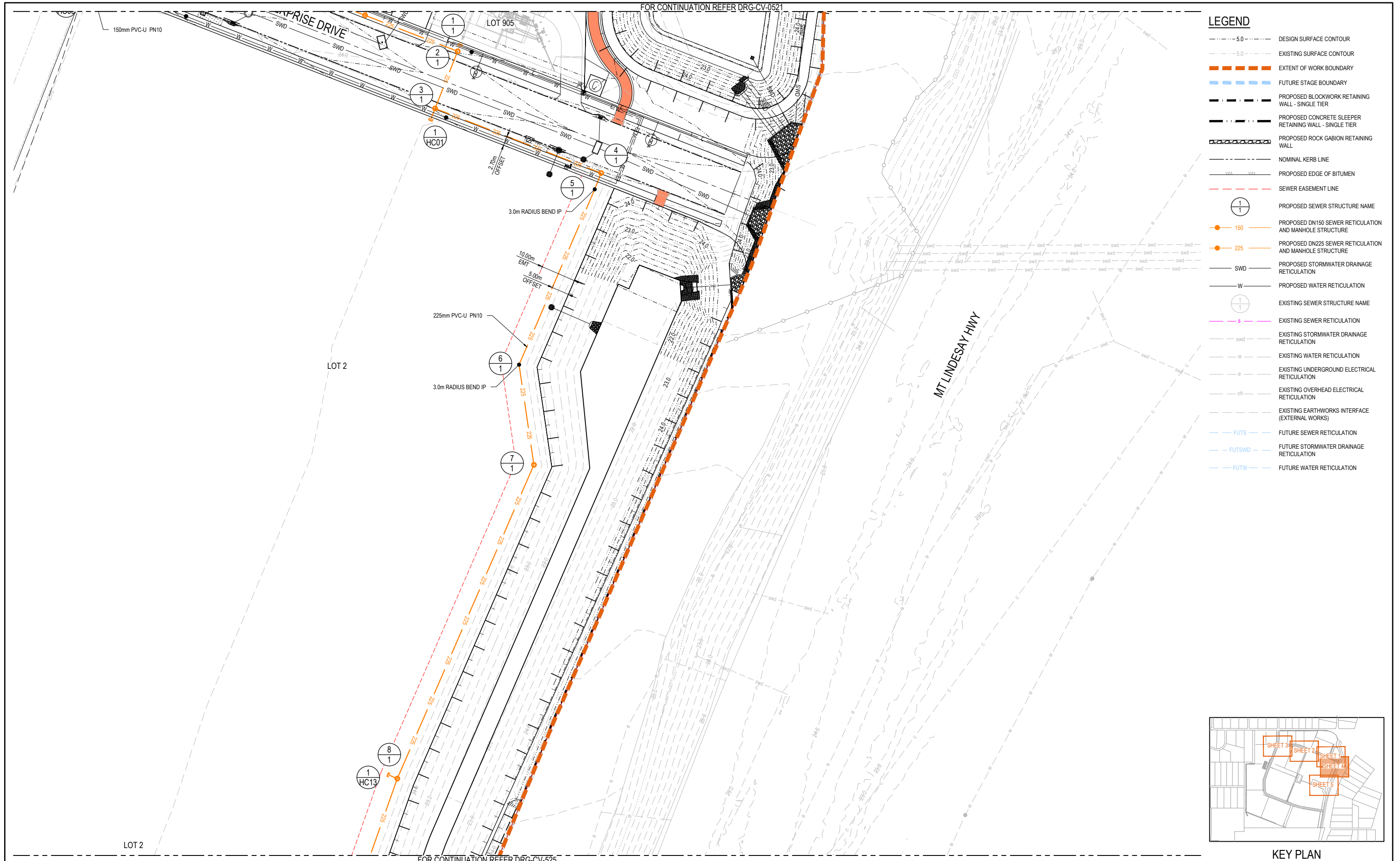
- LEGEND**
- 5.0--- DESIGN SURFACE CONTOUR
 - 5.0--- EXISTING SURFACE CONTOUR
 - EXTENT OF WORK BOUNDARY
 - FUTURE STAGE BOUNDARY
 - PROPOSED BLOCKWORK RETAINING WALL - SINGLE TIER
 - PROPOSED CONCRETE SLEEPER RETAINING WALL - SINGLE TIER
 - PROPOSED ROCK GABION RETAINING WALL
 - NOMINAL KERB LINE
 - PROPOSED EDGE OF BITUMEN
 - SEWER EASEMENT LINE
 - (1/1) PROPOSED SEWER STRUCTURE NAME
 - 150 PROPOSED DN150 SEWER RETICULATION AND MANHOLE STRUCTURE
 - 225 PROPOSED DN225 SEWER RETICULATION AND MANHOLE STRUCTURE
 - SWD PROPOSED STORMWATER DRAINAGE RETICULATION
 - W PROPOSED WATER RETICULATION
 - (1/1) EXISTING SEWER STRUCTURE NAME
 - s EXISTING SEWER RETICULATION
 - swd EXISTING STORMWATER DRAINAGE RETICULATION
 - w EXISTING WATER RETICULATION
 - e EXISTING UNDERGROUND ELECTRICAL RETICULATION
 - oh EXISTING OVERHEAD ELECTRICAL RETICULATION
 - EXISTING EARTHWORKS INTERFACE (EXTERNAL WORKS)
 - FUTURE SEWER RETICULATION
 - FUTURE STORMWATER DRAINAGE RETICULATION
 - FUTURE WATER RETICULATION



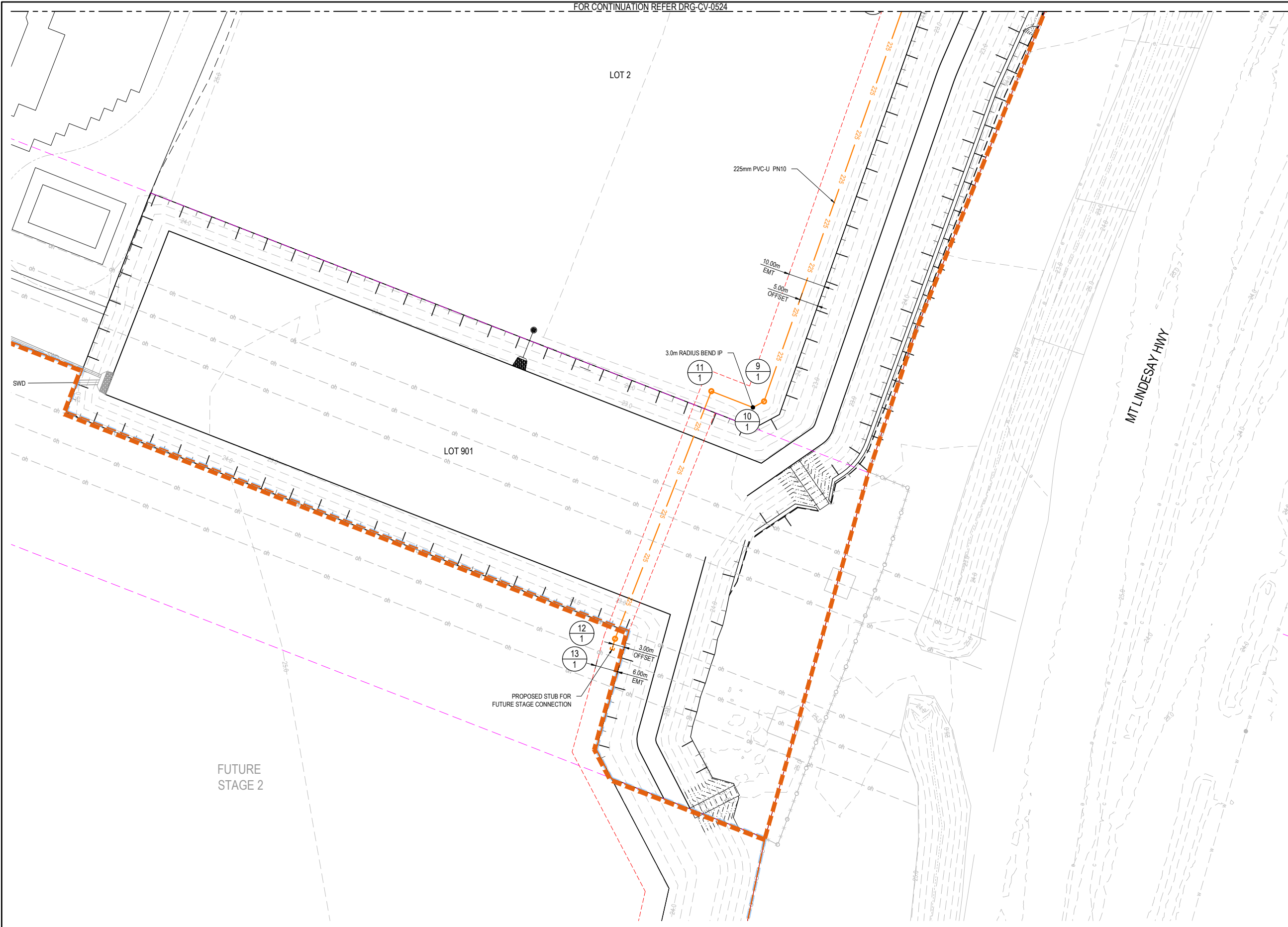
FOR CONSTRUCTION © Copyright reserved Original Issue Signatures Drawn P.LAGANAO Original Size A1 Designed G.PUMNUT Height Datum AHD Project Manager T.FANNING Grid LOCAL Verified B.KITSON R.P.E.Q. No: 07884 Date 01.08.24		Project FLAGSTONE LOGISTICS ESTATE - STAGE 1 Title SEWER RETICULATION LAYOUT PLAN SHEET 2		ARCADIS Arcadis Australia Pacific Pty Limited Level 35, 111 Eagle Street BRISBANE QLD 4000 ABN 76 104 485 289 Tel No: +61 7 3337 0000 www.arcadis.com/au Project Number 30109334 Issue A	
Surveyor WOLTER consulting group Planning Urban Design Landscape Environment Surveying		Client Charter Hall		Scale 0 5 10 20 30 40 50m 1 : 500	
Issue A ISSUED FOR CONSTRUCTION J.B. T.F. G.E. 16.02.24		DR CH VE Date		Date Plotted: 1 Aug 2024 - 04:42PM File Name: C:\Users\ao67297\Documents\Arcadis\AAU-30109334-4499-4651 Mount Lindesay Highway\Project Files\01_WIP\01_Stage-01_Internal Works\DRG\30109334-AAP-P3010P-CV-DRG-0521-Sewer.dwg	



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				Scales		Surveyor		Client		Status		Project	
										FOR CONSTRUCTION		FLAGSTONE LOGISTICS ESTATE - STAGE 1	
				1 : 500		Planning Urban Design Landscape Environment Surveying				© Copyright reserved		SEWER RETICULATION LAYOUT PLAN SHEET 4	
A ISSUED FOR CONSTRUCTION				J.B. T.F. G.E. 16.02.24						Original Issue Signatures		Title	
Issue Description				DR CH VE Date						Drawn P.LAGANAO		Original Size A1	
										Designed G.PUMNUT		Height Datum AHD	
										Project Manager T.FANNING		Grid LOCAL	
										Verified B.KITSON		R.P.E.Q. No: 07884 Date 01.08.24	
												Arcadis Australia Pacific Pty Limited Level 35, 111 Eagle Street BRISBANE QLD 4000 ABN 76 104 485 289 Tel No: +61 7 3337 0000 www.arcadis.com/au	
												Project Number 30109334	
												Issue A	

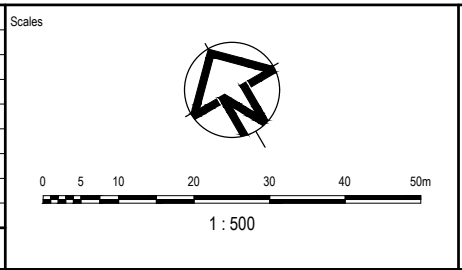


- LEGEND**
- 5.0 --- DESIGN SURFACE CONTOUR
 - 5.0 --- EXISTING SURFACE CONTOUR
 - EXTENT OF WORK BOUNDARY
 - FUTURE STAGE BOUNDARY
 - PROPOSED BLOCKWORK RETAINING WALL - SINGLE TIER
 - PROPOSED CONCRETE SLEEPER RETAINING WALL - SINGLE TIER
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 - W PROPOSED WATER RETICULATION
 - 1 1 EXISTING SEWER STRUCTURE NAME
 - s EXISTING SEWER RETICULATION
 - swd EXISTING STORMWATER DRAINAGE RETICULATION
 - w EXISTING WATER RETICULATION
 - e EXISTING UNDERGROUND ELECTRICAL RETICULATION
 - oh EXISTING OVERHEAD ELECTRICAL RETICULATION
 - EXISTING EARTHWORKS INTERFACE (EXTERNAL WORKS)
 - FUTS FUTURE SEWER RETICULATION
 - FUTSWD FUTURE STORMWATER DRAINAGE RETICULATION
 - FUTW FUTURE WATER RETICULATION



KEY PLAN

A	ISSUED FOR CONSTRUCTION	J.B.	T.F.	G.E.	16.02.24
Issue	Description	DR	CH	VE	Date



Surveyor

Planning Urban Design Landscape Environment Surveying

Client

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Drawn	P.LAGANAO	Original Size	A1
Designed	G.PUMNUT	Height Datum	AHD
Project Manager	T.FANNING	Grid	LOCAL
Verified	B.KITSON	R.P.E.Q. No: 07884 Date: 01.08.24	

Project

FLAGSTONE LOGISTICS ESTATE - STAGE 1

Title

SEWER RETICULATION LAYOUT PLAN SHEET 5

Arcadis Australia Pacific Pty Limited
Level 35, 111 Eagle Street
BRISBANE QLD 4000
ABN 76 104 485 289
Tel No: +61 7 3337 0000
www.arcadis.com/au

Project Number	30109334
Issue	A

Drawing No: 30109334-AAP-P3010P-CV-DRG-0525

STRUC/ BEND/ END NAME	1/1	2/1	3/1	4/1	5/1	6/1	7/1	8/1	9/1	10/1	11/1	12/1	13/1	2/1	1/2	2/2	3/2									
STRUCTURE TYPE	REFER SPS DESIGN	X PE LINED	P2 PE LINED	P2 PE LINED	HTP 3.0m RADIUS	HTP 3.0m RADIUS	X PE LINED	X PE LINED	P2 PE LINED	HTP 3.0m RADIUS	P2 PE LINED	P2 PE LINED	END	X PE LINED	P2 PE LINED	P2 PE LINED	P2 PE LINED									
STRUCTURE LID TYPE		B	B	B			B	B	B		B	B		B	D	B	B									
STRUCTURE DROP TYPE		V	V	V			V	V	V		V	V		V	V	V	V									
JUNCTION LINE		LINE 2						LINE HC13					LINE 4	LINE 2	LINE 3		LINE HC03									
DEPTH TO HC																										
HC INVERT LEVEL																										
HC TYPE																										
HC LOT No																										
CH. FROM D/S STRUC/ BEND																										
ALL PRECAST MANHOLES TO HAVE CONVERSION SLAB COVERINGS. REFER MANHOLE TYPE P2 SEQ-SEW-1300-1 FOR FURTHER DETAILS. ALL TYPE P2 MANHOLES TO BE 1050Ø, UNLESS NOTED OTHERWISE. ALL PROPOSED MANHOLES TO BE LINED AS PER SOUTH EAST QUEENSLAND SEWERAGE CODE. REFER SEQ-SPS-1407 FOR DETAILS. MANHOLES ARE ALSO REQUIRED TO HAVE COMPOSITE LIDS & FRAMES. FOR CUSTOM (X TYPE) MANHOLE STRUCTURE >6.0m DEEP. REFER TO DRG 0585-0586 FOR RPEQ CERTIFIED TYPICAL STRUCTURAL DETAILS. FOR SEWER EMBEDMENT SUPPORT TYPE 3 DETAILS REFER SEQ WATER DWG SEQ-SEW-1201-1. WHERE GROUND WATER IS DISCOVERED DURING EXCAVATIONS THE CONTRACTOR IS TO IMMEDIATELY CEASE ASSOCIATED WORKS AND NOTIFY SUPERINTENDENT WHO IS TO PROVIDE FURTHER ASSESSMENT AND INSTRUCTION ON THE EMBEDMENT SUPPORT TYPE TO BE CONSTRUCTED WITHIN THESE AREAS. UNLESS OTHERWISE DIRECTED ON SITE. INDICATIVE FINISH SURFACE WITHIN PRIVATE PROPERTY SUBJECT TO SEPARATE APPLICATION EXISTING SURFACE LIVE WORKS CONNECTION #1 150mm IL 23.644 CLR 4.840 1650mm IL 21.782 CLR 2.834 600mm IL 21.682 CLR 2.592 150mm IL 23.417 CLR 4.281 TEMPORARY END CAP FOR FUTURE STAGE CONNECTION FUTURE STAGE 2 SEWER																										
DATUM R.L.	11.0													12.0												
LAND USE	RD			FP					PP						FP											
DIAMETER	300Ø PVC-U SN8							225Ø PVC-U SN8							225Ø PVC-U SN8											
GRADE	1 in 286	1 in 286	1 in 286	1 in 286	1 in 286	1 in 286	1 in 286	1 in 286	1 in 286	1 in 286	1 in 286	1 in 286	1 in 286	1 in 179	1 in 179	1 in 179										
EMBEDMENT TYPE								TYPE 3 *							TYPE 3 *											
DEPTH TO INVERT	6.075	6.075	6.005	5.925	5.836	5.796	5.388	5.388	5.388	5.388	5.128	5.128	4.987	4.957	4.632	4.612	4.222	4.192	4.184	4.184	4.192	4.152	4.143	4.113	4.107	
JUNCTION INVERT LEVEL			18.588												21.510											
SEWER INVERT LEVEL	18.500	18.500	18.508	18.588	18.649	18.689	18.868	18.908	18.926	18.926	19.117	19.117	19.219	19.249	19.592	19.612	20.005	20.035	20.047	20.047	20.088	20.128	20.376	20.406	20.416	
DESIGN SURFACE LEVEL		24.575	24.513	24.485	24.266	24.294	24.266	24.245	24.206	24.225	24.227	24.230	24.280	24.518	24.513	24.684	24.780	24.513	24.684	24.780	24.513	24.518	24.518	24.518	24.518	
SETOUT	E501669.082	N6923375.976	E501667.971	N6923374.077	E501659.085	N6923358.885	E501903.289	N6923333.305	E501900.786	N6923328.980	E501871.667	N6923282.606	E501871.468	N6923253.568	E501819.018	N6923170.640	E501765.972	N6923071.787	E501762.787	N6923070.683	E501752.516	N6923076.607	E501717.114	N6923015.433	E501715.883	N6923012.697
RUNNING CHAINAGE	0.000	2.200	2.200	17.600	19.800	51.071	70.871	4.997	75.868	54.758	130.626	29.039	159.665	98.123	257.787	112.186	389.974	3.377	373.351	11.867	385.218	70.680	455.897	3.000	458.898	

19.319

25.168

STRUC/ BEND/ END NAME										14/2	1/9	2/9	3/9	14/2	1/10	2/10	3/10	4/10	3/1	1/HCO1	2/2	1/HCO2	3/2	1/HCO3	2/HCO3	4/2	1/HCO4	5/2	1/HCO5	6/2	1/HCO6	7/2	1/HCO7	7/2	1/HCO8	2/HCO8	8/2	1/HCO9				
STRUCTURE TYPE										P2	PE LINED	HTP	3.0m RADIUS	P2	PE LINED	END	P2	PE LINED	END	P2	PE LINED	END	P2	PE LINED	END	P2	PE LINED	END	P2	PE LINED	END	P2	PE LINED	END	P2	PE LINED	END	P2	PE LINED	END	P2	PE LINED
STRUCTURE LID TYPE										B				B			B		B		B		B		B		B		B		B		B		B		B		B		B	
STRUCTURE DROP TYPE										X		X	V				V	X																								
JUNCTION LINE										LINE 9				LINE 9						LINE HC01		LINE HC02		LINE HC03		W		LINE HC04		LINE HC05		LINE HC06		LINE HC07		LINE HC07		LINE HC09		V		
DEPTH TO HC																																										
HC INVERT LEVEL																																										
HC TYPE																																										
HC LOT No																																										
CH. FROM D/S STRUC/ BEND																																										
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LEGEND:																																										
OP - OPEN SPACE																																										
FP - FOOTPATH/VERGE																																										
PP - PRIVATE PROPERTY																																										
RD - ROAD																																										
DATUM R.L.										19.0																																
LAND USE																																										
DIAMETER																																										
GRADE																																										
EMBEDMENT TYPE																																										
DEPTH TO INVERT										3.557 3.307 3.007 3.007 2.873 2.763 3.000																																
JUNCTION INVERT LEVEL										27.477 27.727 28.044 28.044 28.277 28.387 28.424																																
SEWER INVERT LEVEL										27.477 27.727 28.044 28.044 28.277 28.387 28.424																																
DESIGN SURFACE LEVEL										31.034 31.051 31.150 31.150 31.424																																
SETOUT										E501250.399 N6929638.648 E501236.991 N6929609.933 E501225.827 N6929593.454 E501222.573 N6929591.215																																
RUNNING CHAINAGE										0.000 31.691 31.691 23.324 55.016 3.700 58.716																																
										9																																
										10																																
										HC01																																
										HC02																																
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										HC08																																
										HC09																																

</

STRUC/ BEND/ END NAME

STRUCTURE TYPE

STRUCTURE LID TYPE

STRUCTURE DROP TYPE

JUNCTION LINE

DEPTH TO HC

HC INVERT LEVEL

HC TYPE

HC LOT No

CH. FROM D/S STRUC/ BEND

ALL PRECAST MANHOLES TO HAVE CONVERSION SLAB COVERINGS. REFER MANHOLE TYPE P2 SEQ-SEW-1300-1 FOR FURTHER DETAILS. ALL TYPE P2 MANHOLES TO BE 1050Ø, UNLESS NOTED OTHERWISE.

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LEGEND:

OP - OPEN SPACE
FP - FOOTPATH/VERGE
PP - PRIVATE PROPERTY
RD - ROAD

DATUM R.L.

LAND USE
DIAMETER
GRADE
EMBEDMENT TYPE

DEPTH TO INVERT

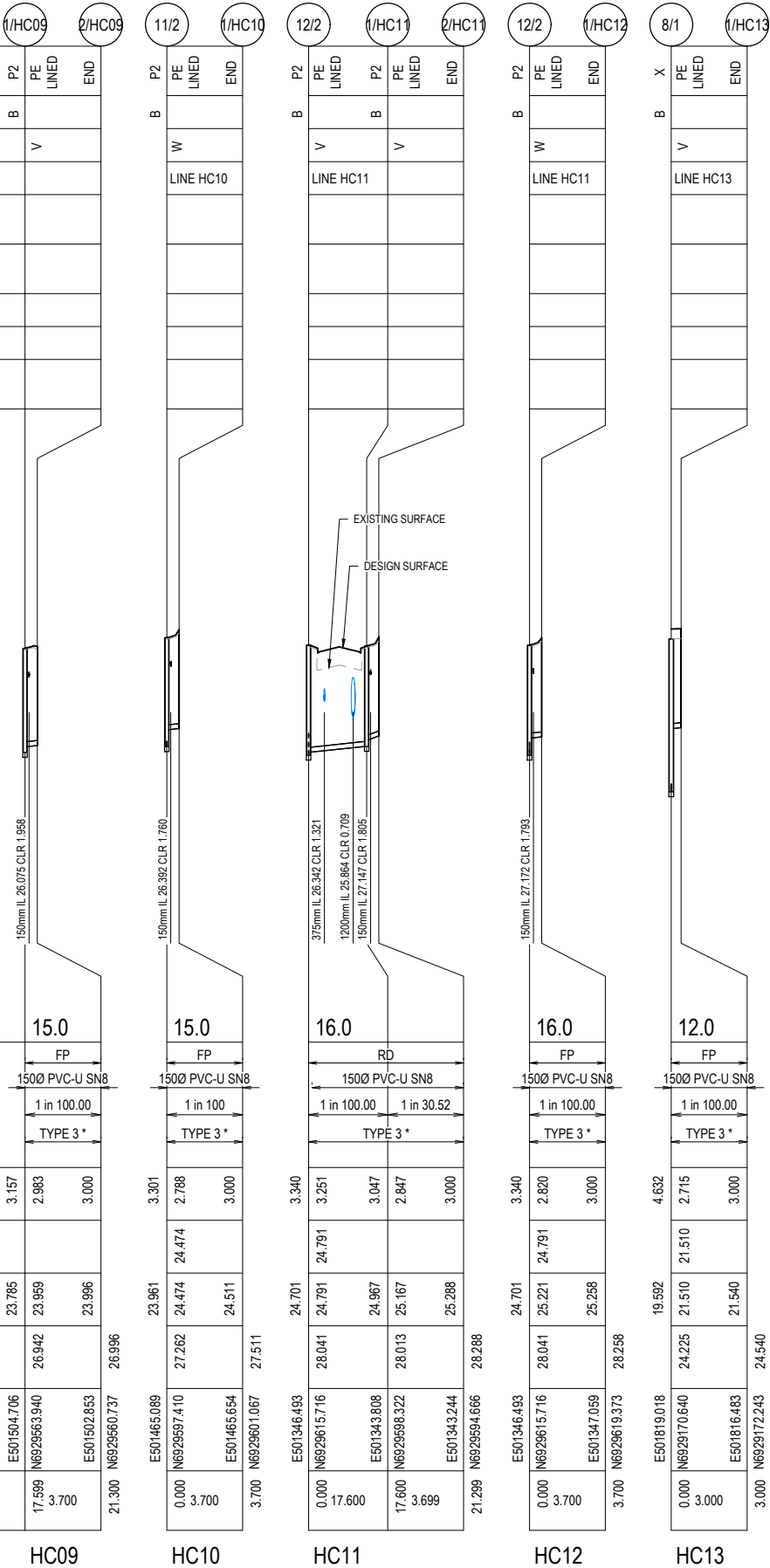
JUNCTION INVERT LEVEL

SEWER INVERT LEVEL

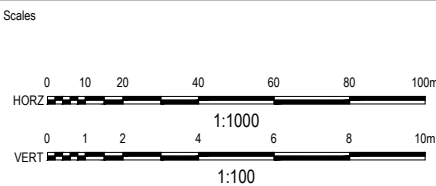
DESIGN SURFACE LEVEL

SETOUT

RUNNING CHAINAGE



A	ISSUED FOR CONSTRUCTION	J.B.	T.F.	G.E.	16.02.24
Issue	Description	DR	CH	VE	Date



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Original Issue Signatures			
Drawn	P.LAGANAO	Original Size	A1
Designed	G.PUMNUT	Height Datum	AHD
Project Manager	T.FANNING	Grid	LOCAL
Verified	B.KITSON	R.P.E.Q. No: 07884 Date: 01.08.24	

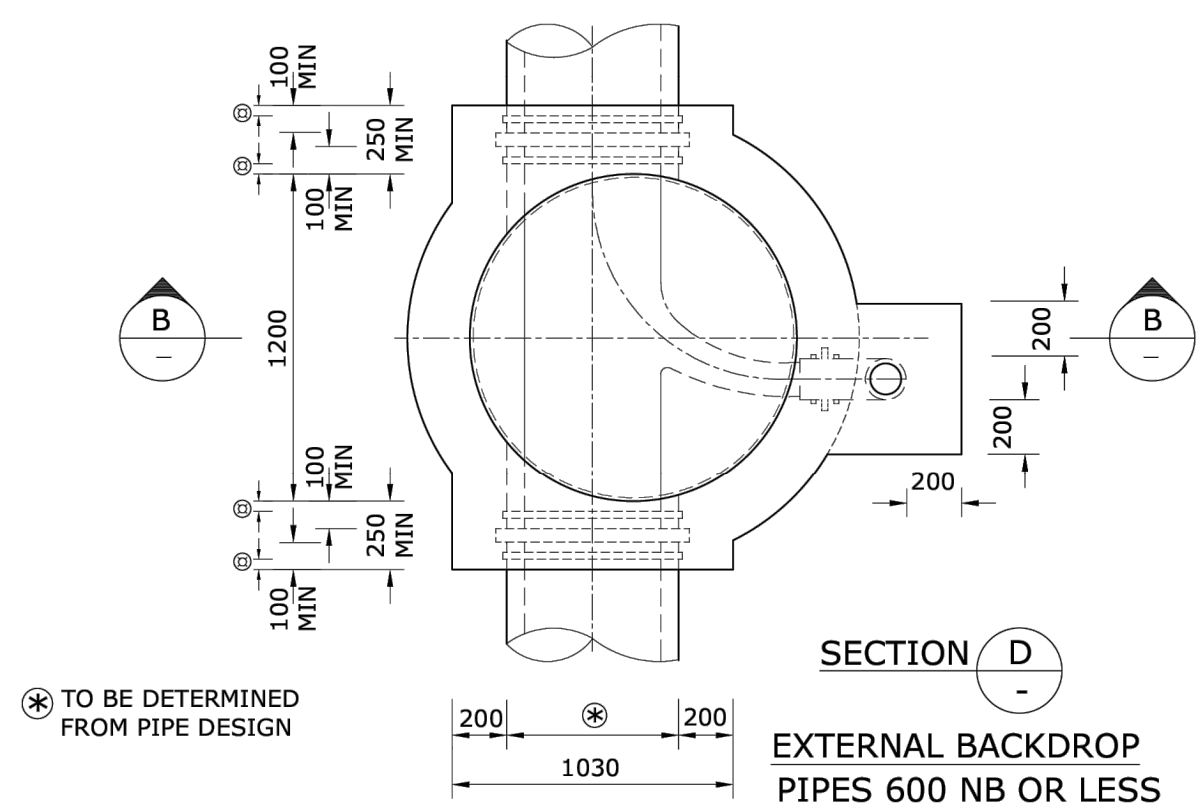
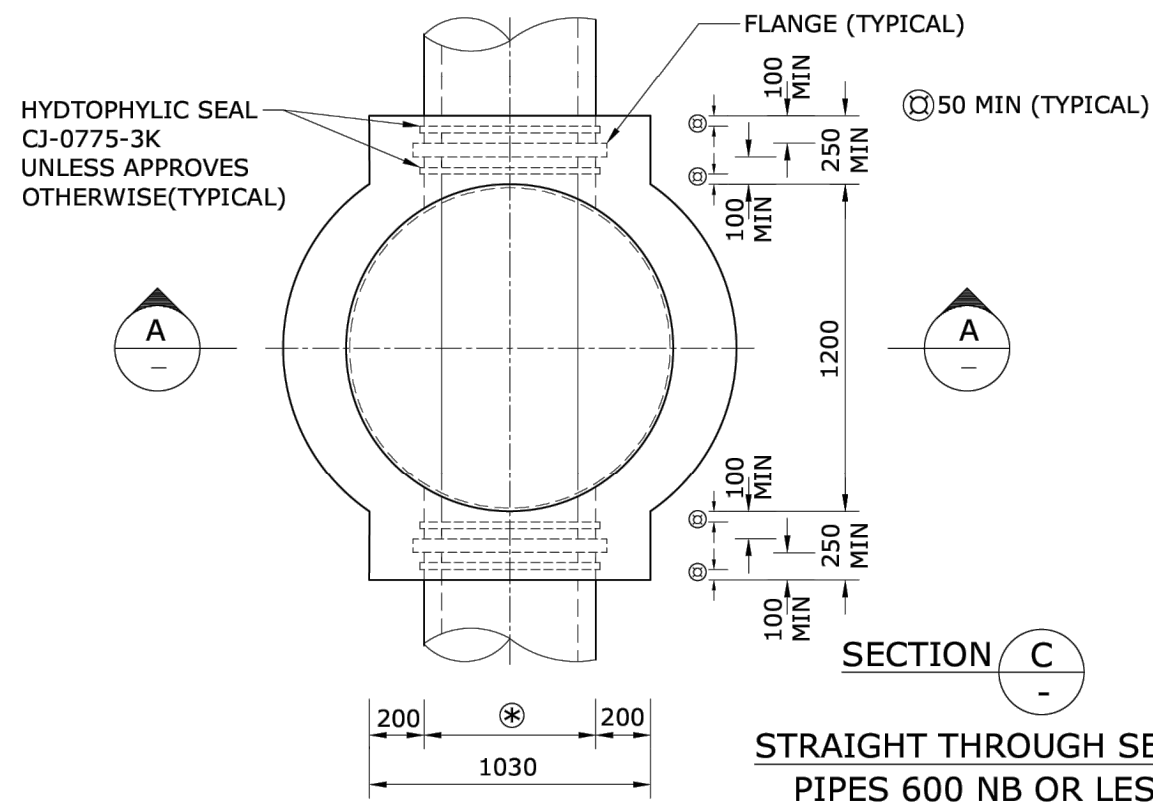
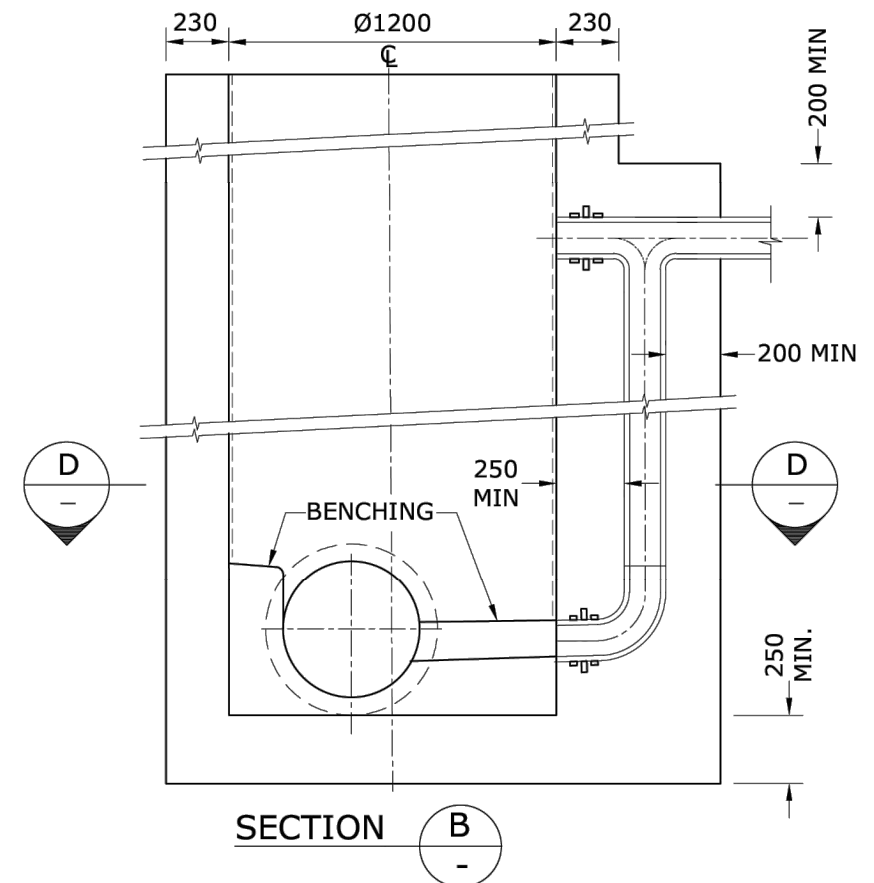
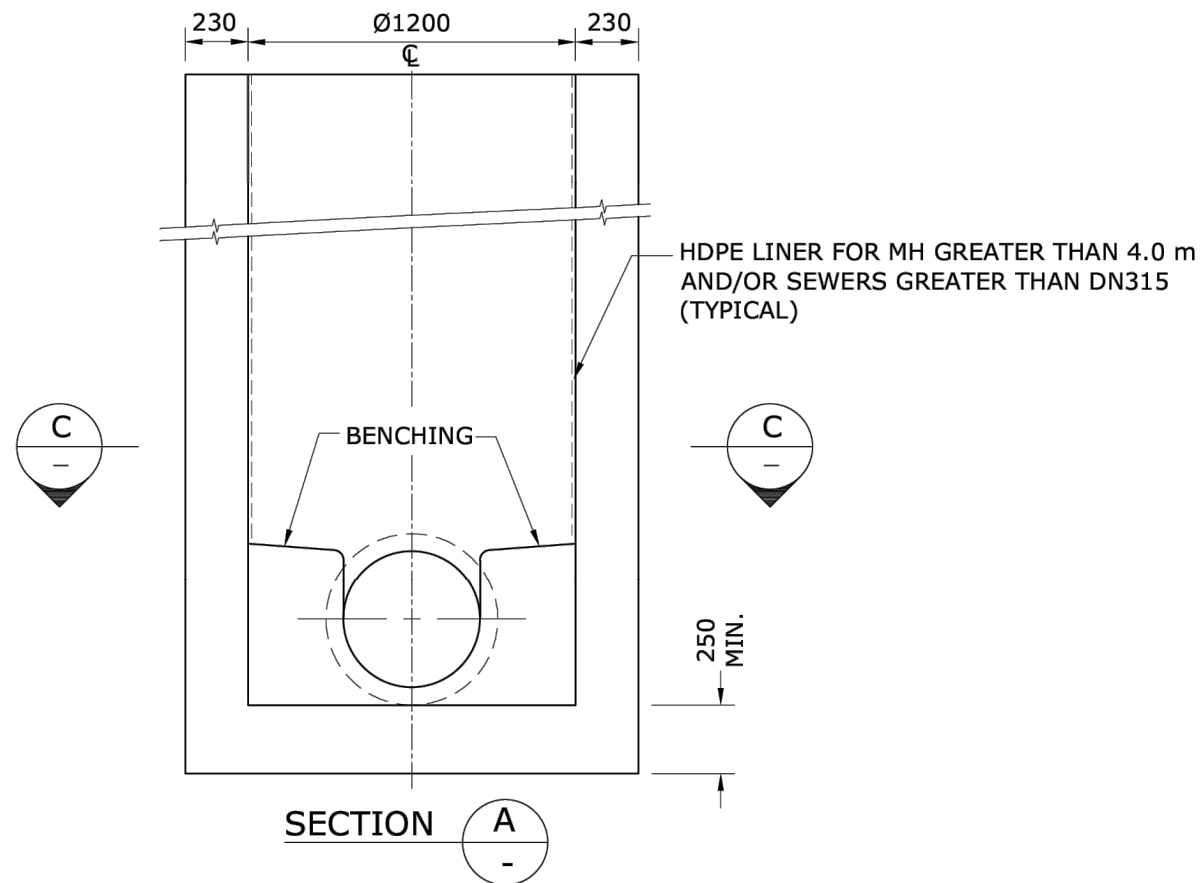
Project		FLAGSTONE LOGISTICS ESTATE - STAGE 1	
Title		SEWER LONGITUDINAL SECTION SHEET 4	



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Project Number	30109334	Issue	A
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Drawing No: 30109334-AAP-P301OP-CV-DRG-0584



STRAIGHT THROUGH SEWER
PIPES 600 NB OR LESS

EXTERNAL BACKDROP
PIPES 600 NB OR LESS

⊛ TO BE DETERMINED
FROM PIPE DESIGN

Issue	Description	DR	CH	VE	Date
A	ISSUED FOR CONSTRUCTION	J.B.	T.F.	G.E.	16.02.24

NOT TO SCALE

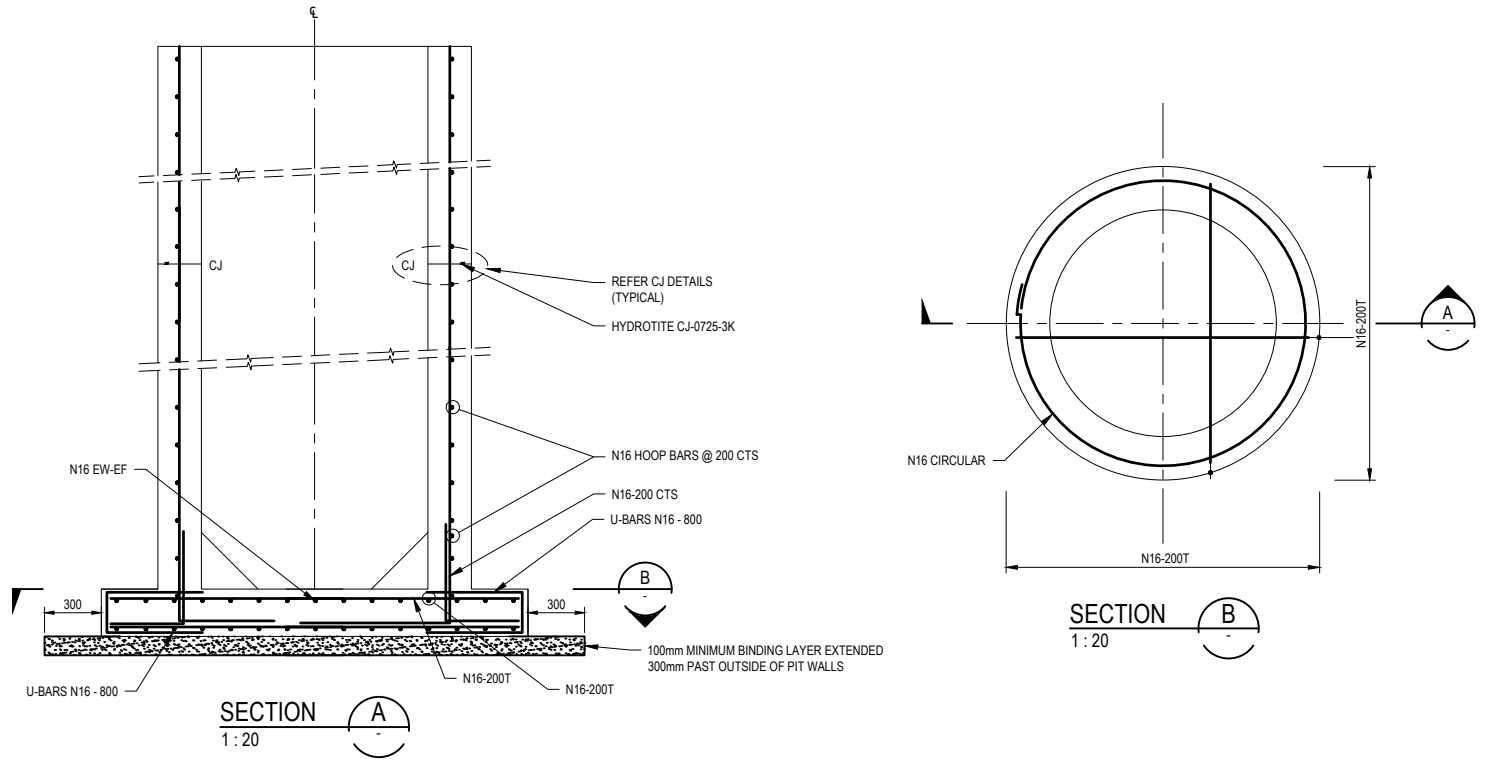
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Charter Hall

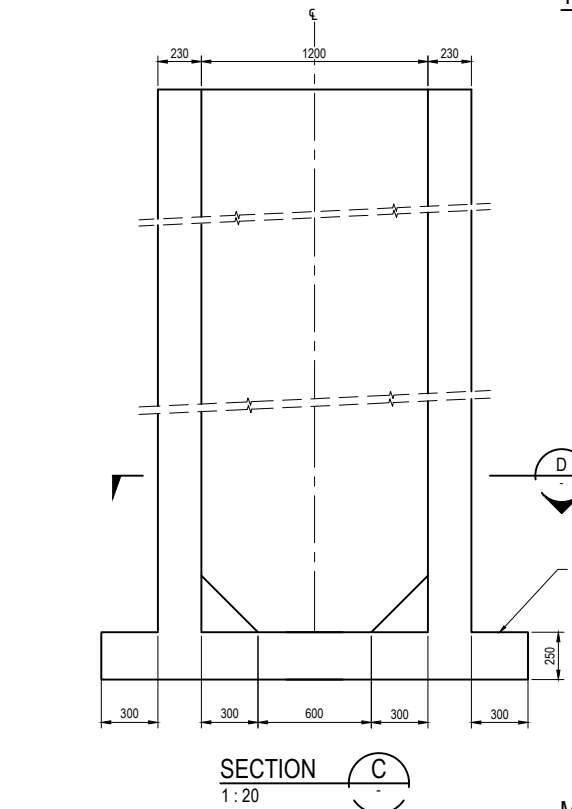
FOR CONSTRUCTION © Copyright reserved Original Issue Signatures Drawn P.LAGANAO Original Size A1 Designed G.PUMNUT Height Datum AHD Project Manager T.FANNING Grid LOCAL Verified B.KITSON R.P.E.Q. No: 07884 Date 01.08.24
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Project FLAGSTONE LOGISTICS ESTATE - STAGE 1 Title CUSTOM X TYPE MANHOLE STRUCTURE DETAILS SHEET 1
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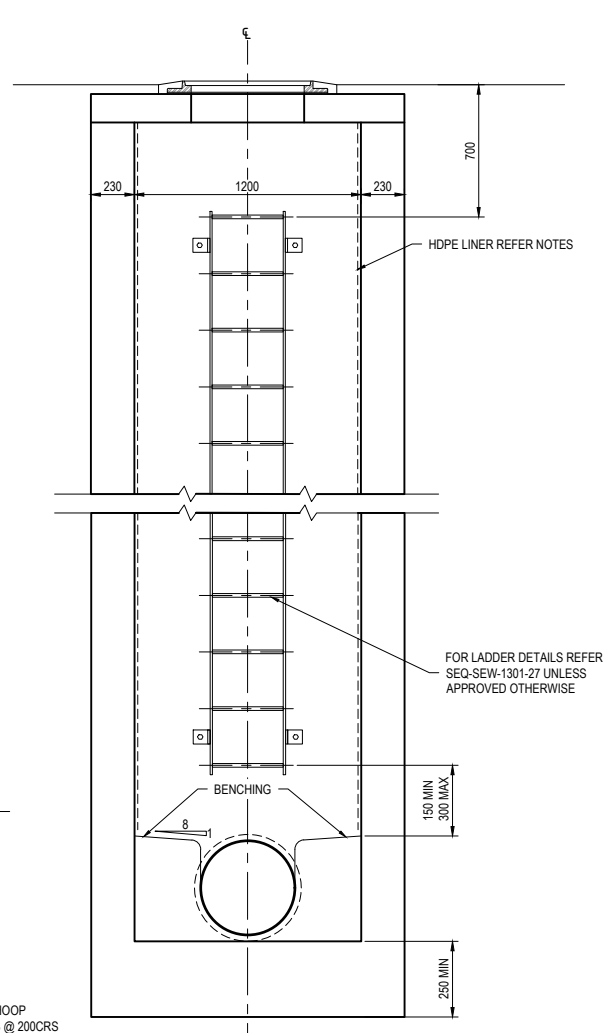
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TYPICAL SECTION X-TYPE
MAINTENANCE HOLE



X-TYPE
MAINTENANCE HOLE



SECTIONAL ELEVATION
SEWERS 600NB OR LESS

- NOTES:
- REFER SEQ-SEW-1101-4, SEQ-SEW-1101-5 AND SEQ-SEW-1101-6 FOR NOTES.
 - REFER SEQ-SEW-1301-26 FOR TOP SLAB REINFORCEMENT DETAILS.
 - HDPE INTERNAL LINER REQUIRED.
 - LADDERS TO STANDARD DRAWING SEQ-SEW-1301-27 SHALL BE PLACED OVER THE DOWNSTREAM OUTLET.

CONCRETE NOTES

- ALL MATERIALS AND WORKMANSHIP MUST BE IN ACCORDANCE WITH AS 3600.
- CONCRETE QUALITY:
 - ADMIXTURES MUST NOT BE USED WITHOUT THE WRITTEN APPROVAL OF THE DESIGN ENGINEER.
 - MAXIMUM SIZE OF COARSE AGGREGATE MUST BE 20 mm.

ELEMENT	CHARACTERISTIC CONCRETE STRENGTH (f _c) AT 28 DAYS	SPECIAL REQUIREMENTS
VARIOUS MH's	32	CALCAREOUS AGGREGATE
BLINDING CONCRETE	N20	NIL

- ELEMENT CHARACTERISTIC CONCRETE STRENGTH (f_c) AT 28 DAYS MUST BE VERIFIED BY PROJECT ASSESSMENT TESTING, WITH SITE CURED SAMPLES TAKEN TO VERIFY STRENGTH AT EARLY LOADING IF REQUIRED PRIOR TO 28 DAYS.
- COMPACTION OF CONCRETE MUST BE BY MEANS OF HIGH FREQUENCY VIBRATORS.
 - CONCRETE SIZES SHOWN ARE MINIMUM AND NO REDUCTIONS BY DUCTS, PIPES, ETC. MUST BE MADE WITHOUT THE APPROVAL OF THE DESIGN ENGINEER. SIZES DO NOT INCLUDE THICKNESS OF APPLIED FINISHES.
 - PIPES OR CONDUITS MUST NOT BE PLACED WITHIN THE CONCRETE COVER TO REINFORCEMENT WITHOUT THE APPROVAL OF THE DESIGN ENGINEER.
 - NO HOLES OR CHASES OTHER THAN THOSE SHOWN ON THE STRUCTURAL DRAWINGS MUST BE MADE IN CONCRETE MEMBERS WITHOUT THE PRIOR APPROVAL OF THE DESIGN ENGINEER.
 - CONSTRUCTION JOINTS, WHERE NOT SHOWN, MUST BE LOCATED TO THE APPROVAL OF THE DESIGN ENGINEER.
 - CURING OF ALL CONCRETE SURFACES MUST COMMENCE IMMEDIATELY AFTER SURFACES ARE FINISHED AS SPECIFIED AND MUST CONTINUE FOR A MINIMUM OF 7 DAYS. CLEAN FULLY WRAPPING ON PLASTIC SHEETING IS PREFERRED AND RECOMMENDED.

REINFORCEMENT NOTES

- REINFORCEMENT SYMBOLS:
 - "N" DENOTES GRADE 500N HOT ROLLED DEFORMED BAR TO AS/NZS 4671.
 - "RL" DENOTES GRADE 500L RECTANGULAR MESH TO AS/NZS 4671.
 - "SL" DENOTES GRADE 500L SQUARE MESH TO AS/NZS 4671.BAR NOTATION
THE NUMBER PRECEDING A BAR SYMBOL DENOTES THE NUMBER OF BARS IN THE GROUP AND THE NUMBER FOLLOWING THE BAR SYMBOL DENOTES THE BAR DIAMETER I.e. 4-N16. ALTERNATIVELY, THE NUMBER FOLLOWING THE BAR DIAMETER DENOTES THE MAXIMUM CENTRE TO CENTRE SPACING I.e. N16-200.
- SPLICES IN REINFORCEMENT MUST BE MADE ONLY IN THE POSITIONS SHOWN. THE WRITTEN APPROVAL OF THE DESIGN ENGINEER MUST BE OBTAINED FOR ANY OTHER SPLICES. WHERE THE LAP LENGTH IS NOT SHOWN, IT WILL BE SUFFICIENT TO DEVELOP THE FULL STRENGTH OF THE REINFORCEMENT TO AS3600 REQUIREMENTS OR IN ACCORDANCE WITH THE FOLLOWING LAP SCHEDULE :

BAR SIZE	LAP LENGTH
N16	800

- WELDING OF REINFORCEMENT WILL NOT BE PERMITTED UNLESS SHOWN ON THE STRUCTURAL DRAWINGS.
- CLEAR CONCRETE COVER TO REINFORCEMENT INCLUDING TIES MUST BE TO AS 3600 REQUIREMENTS OR AS STATED BELOW OR OTHERWISE NOTED ON STRUCTURAL DRAWINGS. COVER TO REINFORCEMENT MUST BE OBTAINED BY THE USE OF APPROVED METAL, CONCRETE OR PLASTIC BAR CHAIRS FOR REINFORCEMENT. CHAIRS TO BE SPACED AT 1500 MAXIMUM CENTRES FOR BARS, 1000 MAXIMUM CENTRES FOR FABRIC.

ELEMENT	COVER TO REINFORCEMENT (mm)	
	INSIDE FACE	OUTSIDE FACE
INSITU BASE	70	75
INSITU WALLS	70	75

- REINFORCEMENT IS REPRESENTED DIAGRAMMATICALLY AND IS NOT NECESSARILY SHOWN IN TRUE PROJECTION.
- INSTALL CIRCULAR TRIMMER BAR AND HORIZONTAL AND VERTICAL MAKE-UP EQUIVALENT STEEL.
- ALL PIPE PENETRATIONS AS PER TYPICAL PIPE PENETRATION TRIMMER BAR REINFORCEMENT DETAIL.
- EXTRA DIAGONAL TRIMMER BARS TO BE INSTALLED TO EACH SIDE FACE OF PIPE OPENING. BAR EXTENSION TO BE MIN. 300 PAST PIPE IN EACH DIRECTION

GENERAL NOTES

- APPLY HEAVY GREASE TO FRAME SEAT PRIOR TO INSTALLING COVER.
- DIMENSIONS IN MILLIMETERS UNLESS OTHERWISE NOTED.
- SEWER MANHOLE TO BE CAST IN-SITU
- MANHOLE TO BE PE LINED WITH COMPOSITE LID AS PER SEQ CODE REQUIREMENTS.

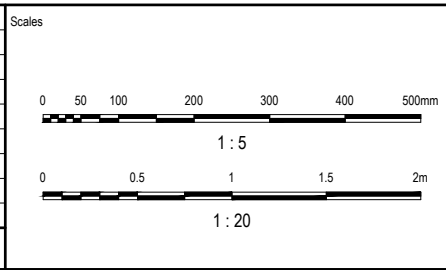
STRUCTURAL DESIGN CERTIFICATE

WE HEREBY CERTIFY THAT ARCADIS PTY LTD IS RESPONSIBLE FOR THE STRUCTURAL DESIGN AND THAT THE DESIGN HAS BEEN CARRIED OUT IN ACCORDANCE WITH ALL RELEVANT PROVISIONS OF THE AUSTRALIAN STANDARDS. WHEN ERRECTED IN ACCORDANCE WITH THIS DESIGN, THE STRUCTURE WILL BE ADEQUATE TO SUSTAIN THE WORST COMBINATION OF LOADS TO WHICH IT WILL BE SUBJECTED IN ACCORDANCE WITH THE RELEVANT AUSTRALIAN STANDARDS. THE BASIC DESIGN CODE USED IN THIS DESIGN WAS AS1170 FOR LOADS AND GENERALLY ACCEPTED ENGINEERING PRINCIPLES.

NAME: RICHARD MULLIGAN RPEQ: 7850
SIGNATURE: DATE: 16.07.24



Issue	Description	DR	CH	VE	Date
B	DETAILS UPDATED	A.O.	S.S.	B.K.	15.07.24
A	ISSUED FOR CONSTRUCTION	J.B.	T.F.	G.E.	16.02.24



Surveyor

WOLTER
consulting group

Planning Urban Design Landscape Environment Surveying

Client

Charter Hall

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Original Issue Signatures		Original Size	
Drawn	P.LAGANAO	Height	A1
Designed	G.PUMNUT	Datum	AHD
Project Manager	T.FANNING	Grid	LOCAL
Verified	B.KITSON	R.P.E.Q. No: 07884	Date: 01.08.24

Project

**FLAGSTONE LOGISTICS
ESTATE - STAGE 1**

Title

**CUSTOM X TYPE
MANHOLE STRUCTURE DETAILS
SHEET 2**

ARCADIS

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Project Number: 30109334

Issue: B

Drawing No: 30109334-AAP-P3010P-CV-DRG-0586

SEQ CODE WATER NOTES

GENERAL NOTES

- ALL WORK AND MATERIALS SHALL BE IN ACCORDANCE WITH CURRENT SOUTH EAST QUEENSLAND WATER SUPPLY CODE SPECIFICATIONS AND STANDARDS.
- UNLESS SPECIFIED OTHERWISE ALL MATERIALS AND WORK SHALL COMPLY WITH THE RELEVANT AUSTRALIAN STANDARDS.
- ADOPT LIP OF KERB OR SHOULDER OF ROAD AS PERMANENT LEVEL.
- COVER ON MAINS FROM PERMANENT LEVEL TO BE AS SHOWN IN SEQ-WAT-1200-2.
- CONDUITS TO BE INSTALLED IN ACCORDANCE WITH THE STANDARD DRAWINGS.
- ALL MATERIALS USED IN THE WORKS SHALL COMPLY WITH THE QUT's ACCEPTED PRODUCTS AND MATERIALS LIST OR BE APPROPRIATELY SHOWN, LISTED AND DEFINED IN THE ENGINEERING SUBMISSION SO THAT THE ALTERNATIVE PRODUCT OR MATERIAL CAN BE ASSESSED AND IF APPROPRIATE, APPROVED BY QUT.
- TEST/CHLORINATION POINTS TO BE INSTALLED IN ACCORDANCE WITH STANDARD DRAWING NO. SEQ-WAT-1410-1.
- THE CONSTRUCTION OF THE WATER RETICULATION WORK SHOWN ON THIS DRAWING MUST BE SUPERVISED BY AN ENGINEER WHO HAS RPEQ REGISTRATION. WORKS NOT COMPLYING WITH THIS REQUIREMENT WILL NOT BE PERMITTED TO CONNECT TO THE RETICULATION SYSTEM.

ALL ENVIRONMENT PROTECTION MEASURES SHALL BE IMPLEMENTED PRIOR TO ANY CONSTRUCTION WORK, INCLUDING CLEARING, COMMENCING.

VEGETATION PROTECTION

- A. TREES LOCATED ALONG THE FOOTPATH SHALL BE, TRANSPLANTED PRIOR TO CONSTRUCTION, OR REPLACED IF DESTROYED.
- B. WHEN WORKING WITHIN 4m OF TREES, RUBBER OR HARDWOOD GIRDLES SHALL BE CONSTRUCTED WITH 1.8m BATTENS CLOSELY SPACED AND ARRANGED VERTICALLY FROM GROUND LEVEL. GIRDLES SHALL BE STRAPPED TO TREES PRIOR TO CONSTRUCTION AND REMAIN UNTIL COMPLETION.
- C. TREE ROOTS SHALL BE TUNNELLED UNDER, RATHER THAN SEVERED. IF ROOTS ARE SEVERED THE DAMAGED AREA SHALL BE TREATED WITH A SUITABLE FUNGICIDE. CONTACT RELEVANT COUNCIL ARBORIST FOR FURTHER ADVICE. ANY TREE LOPPING REQUIRED SHOULD BE UNDERTAKEN BY AN APPROVED ARBORIST.

SOIL

- A. TOPSOIL AND SUBSOIL SHALL BE STOCKPILED SEPARATELY.
- B. CARE SHALL BE TAKEN TO PREVENT SEDIMENT FROM ENTERING THE STORMWATER SYSTEM. THIS MAY INVOLVE PLACING APPROPRIATE SEDIMENT CONTROLS AROUND STOCKPILES.
- C. ACID SULPHATE SOILS EXIST IN THE WORKS AREA. THE OUTPUTS FROM THE RISK ASSESSMENT BASED ON THE QUEENSLAND ACID SULPHATE SOIL TECHNICAL MANUAL REQUIRES THAT ACID SULPHATE SOILS BE MANAGED AS FOLLOWS: (DELETE IF NO ACID SULPHATE SOILS)

REHABILITATION

- A. PREDISTURBANCE SOIL PROFILES AND COMPACTION LEVELS SHALL BE REINSTATED.
- B. PREDISTURBANCE VEGETATION PATTERNS SHALL BE RESTORED.

SAFETY

- A. THE DESIGN AND CONSTRUCTION OF THE WORKS SHALL COMPLY WITH ALL QUEENSLAND LEGISLATION.

DN150 WATERMAIN CONSTRUCTION METHODOLOGY

- EXCAVATE AND EXPOSE EXISTING MAIN AT PROPOSED LIVE CONNECTION POINTS TO ENSURE CONNECTION VERTICAL LEVEL OF NEW MAIN AND ENSURE PROPOSED POINT OF CONNECTION IS MIN. 1.5m AWAY FROM EXISTING SPIGOT / SOCKET JOINT.
- CONSTRUCT NEW DN150 WATERMAIN UP TO CONNECTION LIVE WORKS CONNECTION POINTS.
- UNDERTAKE CHLORINATION AND PRESSURE TESTING OF NEW MAIN TO SEQ CODE REQUIREMENTS.
- LIAISE WITH LOGAN WATER FOR SHUT DOWN REQUIREMENTS AND ISOLATION POINTS OF EXISTING MAIN.
- EXISTING DN150 WATERMAINS CONNECTION POINT TO BE ISOLATED BY LOGAN WATER.
- LOGAN WATER TO MAKE CONNECTION TO EXISTING MAIN USING PRE-CHLORINATED FITTINGS, REMOVING PORTION OF EXISTING WATERMAIN WHERE NECESSARY.
- LOGAN WATER TO REINSTATE MAIN SERVICE.
- ANY REDUNDANT FITTINGS OR WATER MAIN TO BE REMOVED AND APPROPRIATELY DISPOSED OF BY CIVIL CONTRACTOR.

NOTE:

TYPICAL EMBEDMENT SUPPORT TYPE D IN ACCORDANCE WITH SEQ-WAT-1201-1 REV A (UNLESS GEOTECHNICAL ADVICE DEMONSTRATES TYPE C IS ADEQUATE). WHERE GROUND WATER IS DISCOVERED DURING EXCAVATIONS THE CONTRACTOR IS TO IMMEDIATELY CEASE ASSOCIATED WORKS AND NOTIFY SUPERINTENDENT WHO IS TO PROVIDE FURTHER ASSESSMENT AND INSTRUCTION ON THE EMBEDMENT SUPPORT TYPE TO BE CONSTRUCTED WITHIN THESE AREAS.

LEGEND

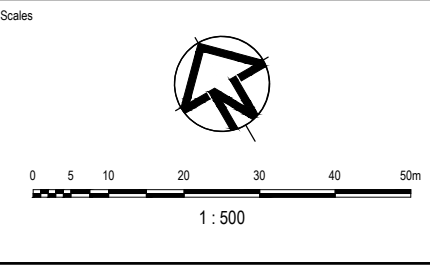
- DESIGN SURFACE CONTOUR
- EXISTING SURFACE CONTOUR
- EXTENT OF WORK BOUNDARY
- FUTURE STAGE BOUNDARY
- PROPOSED BLOCKWORK RETAINING WALL - SINGLE TIER
- PROPOSED CONCRETE SLEEPER RETAINING WALL - SINGLE TIER
- PROPOSED ROCK GABION RETAINING WALL
- NOMINAL KERB LINE
- PROPOSED EDGE OF BITUMEN
- PROPOSED Ø150 DCL PN35 ROAD CROSSING WATER RETICULATION
- PROPOSED Ø250 PVC-M PN20 SERIES 2 WATER RETICULATION
- PROPOSED Ø250 PVC-M PN20 SERIES 2 TRUNK WATER MAIN
- PROPOSED STORMWATER DRAINAGE RETICULATION
- PROPOSED SEWER RETICULATION
- EXISTING SEWER RETICULATION
- EXISTING STORMWATER DRAINAGE RETICULATION
- EXISTING WATER RETICULATION
- EXISTING UNDERGROUND ELECTRICAL RETICULATION
- EXISTING OVERHEAD ELECTRICAL RETICULATION
- FUTURE SEWER RETICULATION
- FUTURE STORMWATER DRAINAGE RETICULATION
- FUTURE WATER RETICULATION

FOR CONTINUATION REFER DRG-CV-622

WATER FITTINGS AND THRUST BLOCK TABLE				
NOTE: THRUST BLOCK SIZE HAS BEEN DETERMINED USING 1200 kPa BASED ON GEOTECHNICAL ASSUMPTION. CONTRACTOR TO CONFIRM IN-SITU BEARING CAPACITY ONSITE. REFER SEQ-WATER-1205-1 TO 1208-1 FOR THRUST BLOCK DETAILS.				
ITEM	FITTING	PIPE SIZE (mm)	MAX THRUST (kN)	THRUST BLOCK LENGTH (mm)
1	11.25° BEND	Ø150	5.8	600
		Ø250	15.1	600
2	22.50° BEND	Ø150	11.5	600
		Ø250	30.1	600
3	45.00° BEND	Ø150	22.6	600
		Ø225	59.0	910
4	90.00° BEND	Ø150	41.7	930
		Ø250	109.0	1700
5	DEAD END CAP	Ø150	29.5	660
		Ø250	77.1	1200
6	POTABLE HYDRANT	Ø150	-	-
		Ø250	-	-
7	STOP VALVE	Ø150	33.3	X=500; Y=300; Z=700
		Ø250	86.7	X=850; Y=500; Z=1400
8	Ø150 X Ø150 TEE	Ø150	29.5	660
9	Ø225 X Ø225 TEE	Ø250	77.1	1200
10	Ø250 X Ø150 TEE	Ø250-Ø150	77.1	1200

NON-CONFORMANCES	
1	WSAA-SEQ CODE CLAUSE 5.12.5.2 & TABLE 5.5: REDUCED VERTICAL CLEARANCE NOTED ON PLAN.

Issue	Description	DR	CH	VE	Date
B	TEMPORARY ACCESS ROAD REMOVED	J.B.	S.S.	B.K.	15.07.24
A	ISSUED FOR CONSTRUCTION	J.B.	T.F.	G.E.	16.02.24



Surveyor

Planning Urban Design Landscape Environment Surveying

Client

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Original Issue Signatures		Original Size	
Drawn	P.LAGANAO	Height	A1
Designed	G.PUMNUT	Datum	AHD
Project Manager	T.FANNING	Grid	LOCAL
Verified	B.KITSON	R.P.E.Q. No: 07884	Date: 01.08.24

Project

FLAGSTONE LOGISTICS ESTATE - STAGE 1

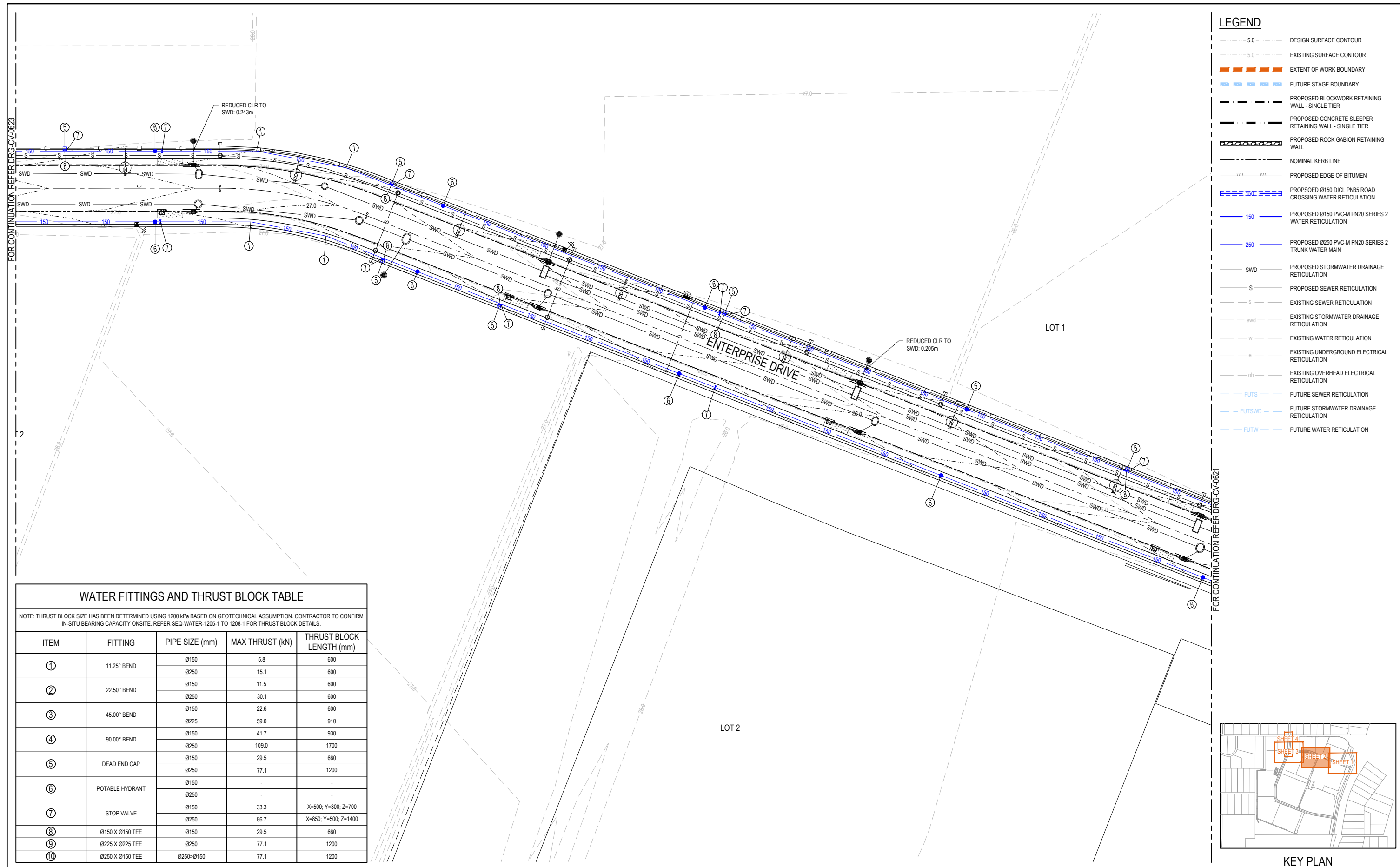
Title

WATER RETICULATION LAYOUT PLAN SHEET 1

Project Number 30109334

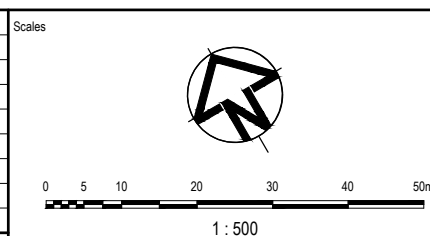
Issue B

30109334-AAP-P3010P-CV-DRG-0621



WATER FITTINGS AND THRUST BLOCK TABLE				
NOTE: THRUST BLOCK SIZE HAS BEEN DETERMINED USING 1200 kPa BASED ON GEOTECHNICAL ASSUMPTION. CONTRACTOR TO CONFIRM IN-SITU BEARING CAPACITY ONSITE. REFER SEQ-WATER-1205-1 TO 1208-1 FOR THRUST BLOCK DETAILS.				
ITEM	FITTING	PIPE SIZE (mm)	MAX THRUST (kN)	THRUST BLOCK LENGTH (mm)
①	11.25° BEND	Ø150	5.8	600
		Ø250	15.1	600
②	22.50° BEND	Ø150	11.5	600
		Ø250	30.1	600
③	45.00° BEND	Ø150	22.6	600
		Ø225	59.0	910
④	90.00° BEND	Ø150	41.7	930
		Ø250	109.0	1700
⑤	DEAD END CAP	Ø150	29.5	660
		Ø250	77.1	1200
⑥	POTABLE HYDRANT	Ø150	-	-
		Ø250	-	-
⑦	STOP VALVE	Ø150	33.3	X=500; Y=300; Z=700
		Ø250	86.7	X=850; Y=500; Z=1400
⑧	Ø150 X Ø150 TEE	Ø150	29.5	660
⑨	Ø225 X Ø225 TEE	Ø250	77.1	1200
⑩	Ø250 X Ø150 TEE	Ø250/Ø150	77.1	1200

A	ISSUED FOR CONSTRUCTION	J.B.	T.F.	G.E.	16.02.24
Issue	Description	DR	CH	VE	Date

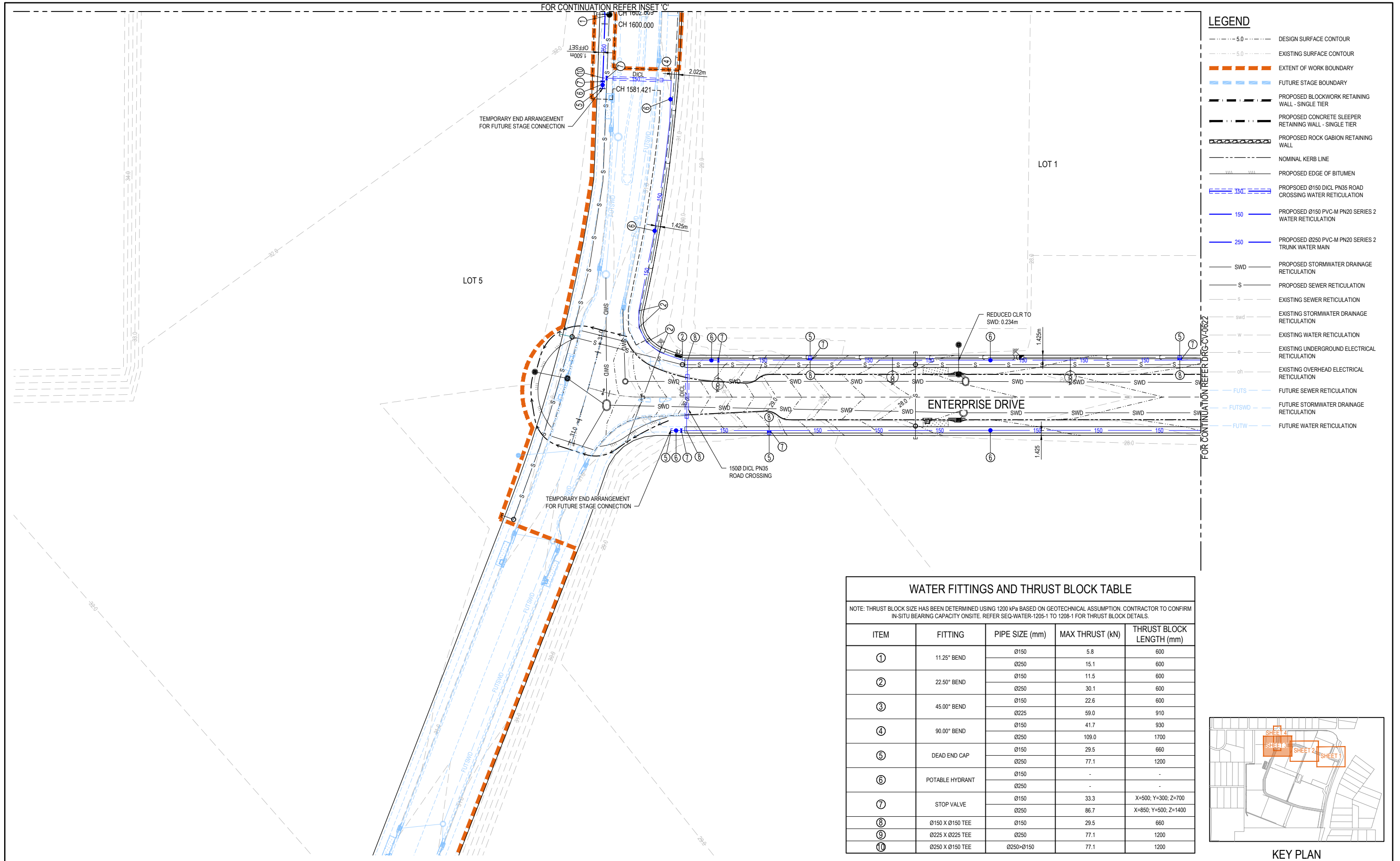


Status	FOR CONSTRUCTION		
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Original Issue Signatures			
Drawn	P.LAGANAO	Original Size	A1
Designed	G.PUMNUT	Height Datum	AHD
Project Manager	T.FANNING	Grid	LOCAL
Verified	B.KITSON	R.P.E.Q. No: 07884 Date: 01.08.24 	

Project	FLAGSTONE LOGISTICS ESTATE - STAGE 1
Title	WATER RETICULATION LAYOUT PLAN SHEET 2



Drawing No.		Issue
30109334-AAP-P301OP-CV-DRG-0622		A



A ISSUED FOR CONSTRUCTION		J.B.	T.F.	G.E.	16.02.24
Issue	Description	DR	CH	VE	Date

Scales

0 5 10 20 30 40 50m

1 : 500

Surveyor

WOLTER
consulting group

Planning Urban Design Landscape Environment Surveying

Client

Charter Hall

Status

FOR CONSTRUCTION

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Original Issue Signatures

Drawn P.LAGANAO Original Size A1

Designed G.PUMNUT Height Datum AHD

Project Manager T.FANNING Grid LOCAL

Verified B.KITSON R.P.E.Q. No: 07884 Date 01.08.24

Project

FLAGSTONE LOGISTICS ESTATE - STAGE 1

Title

WATER RETICULATION LAYOUT PLAN SHEET 3

ARCADIS

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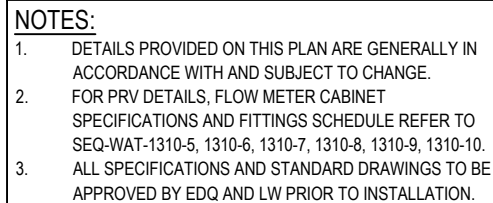
Project Number 30109334

Issue

30109334-AAP-P3010P-CV-DRG-0623 A

Date Plotted: 1 Aug 2024 - 01:05PM File Name: C:\Users\ao67297\Documents\Arcadis\AAU-30109334-4499-4651 Mount Lindesay Highway\Project Files\01_WIP\01_Stage-01_Internal Works\DRG\30109334-AAP-P3010P-CV-DRG-0621-Water.dwg

*INDICATES BLOCK LENGTH OF 600
*SPECIAL DESIGN



CROWSON LANE PRV DETAIL
SCALE 1 : 25

Scales

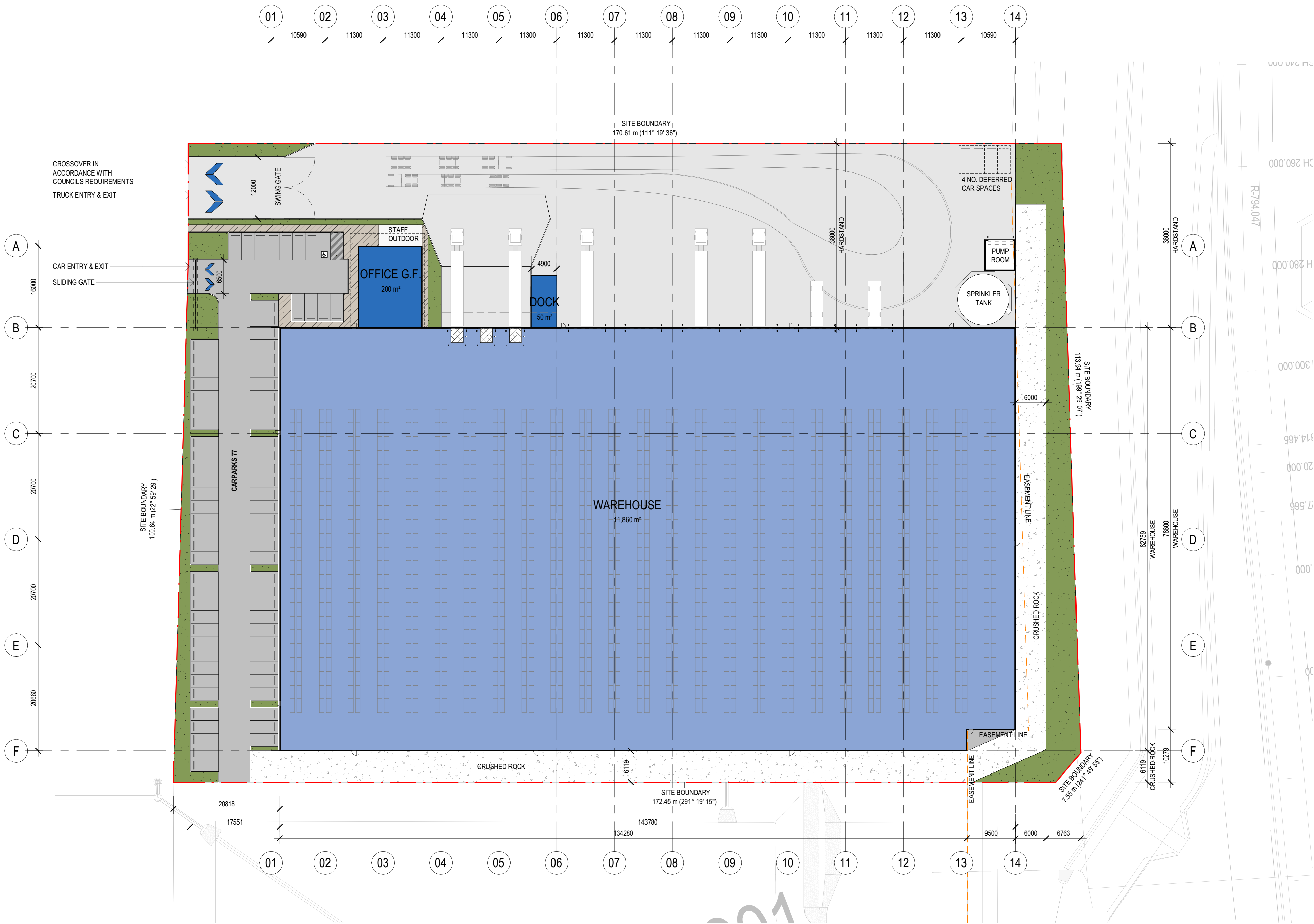
0 0.5 1 1.5 2m

1 : 20



Project	FLAGSTONE LOGISTICS ESTATE - STAGE 1
Title	WATER RETICULATION DETAILS

Appendix C – Architectural Drawings



SITE PLAN ; OVERALL GROUND FLOOR PLAN
SCALE: 1 : 500

NOTES

- ALL NEW CROSSOVERS IN ACCORDANCE WITH LOCAL COUNCIL REQUIREMENTS
- ALL PARKING SPACES IN ACCORDANCE WITH VICTORIAN PLANNING SCHEME
- ALL DISABLED PARKING SPACES IN ACCORDANCE WITH AUSTRALIAN STANDARD AS2890 (5.4m x 2.4m)
- SITE STORMWATER DRAINAGE IN ACCORDANCE WITH LOCAL AUTHORITY & COUNCIL REQUIREMENTS
- ALL RELATIVE LEVELS ARE SHOWN TO A.H.D. (Australian Height Datum)
- GROSS FLOOR AREA (GFA)**
THE TOTAL FLOOR AREA OF ALL STOREYS OF A BUILDING, INCLUDING MEZZANINES, MEASURED FROM THE OUTSIDE OF EXTERNAL WALLS OR THE CENTRE OF A COMMON WALL, EXCLUDING AREA USED FOR:
- BUILDING SERVICES
 - GROUND FLOOR PUBLIC LOBBY
 - A PUBLIC MALL IN A SHOPPING COMPLEX
 - THE PARKING, LOADING AND MANOEUVERING OF MOTOR VEHICLES
 - PRIVATE BALCONIES WHETHER ROOFED OR NOT.

GROSS FLOOR AREA (GFA)

- THE TOTAL FLOOR AREA OF ALL STOREYS OF A BUILDING, INCLUDING MEZZANINES, MEASURED FROM THE OUTSIDE OF EXTERNAL WALLS OR THE CENTRE OF A COMMON WALL, EXCLUDING AREA USED FOR:
- BUILDING SERVICES
 - GROUND FLOOR PUBLIC LOBBY
 - A PUBLIC MALL IN A SHOPPING COMPLEX
 - THE PARKING, LOADING AND MANOEUVERING OF MOTOR VEHICLES
 - PRIVATE BALCONIES WHETHER ROOFED OR NOT

DEVELOPMENT ANALYSIS LOT 103

BUILDING	GLA	GFA
WAREHOUSE		11,860 m ²
OFFICE G.F.		200 m ²
OFFICE F.F.		200 m ²
DOCK OFFICE		50 m ²
TOTAL AREA		12,310 m ²

EXTERNAL AREAS (APPROX)

CANOPIES	1,139 m ²
CRUSHED ROCK	1,576 m ²
HARDSTAND	4,687 m ²
LIGHT DUTY	1,869 m ²
PAVING	160 m ²
LANDSCAPE	1,187 m ²
LANDSCAPE RATIO	5.4%

PARKING	
BAYS PROVIDED	81
DEFERRED CARSPACES INCLUDED	

SITE COVERAGE	
TOTAL SITE AREA	21,692.5m ²
TOTAL BUILDING FOOTPRINT	12,110 m ²

EXCL. PUMP HOUSE	
SITE COVERAGE	56%

LEGEND

- WAREHOUSE
- OFFICE
- INDICATES EXTENT OF HEAVY DUTY HARDSTAND TO CIVIL ENGINEERS DETAILS
- INDICATES EXTENT OF LIGHT DUTY PAVEMENT TO CIVIL ENGINEERS DETAILS
- CONCRETE PAVING WITH EXPOSED AGGREGATE FINISH OR SIMILAR
- INDICATES EXTENT OF CRUSHED ROCK
- AREA OF GRASS / LANDSCAPING, REFER TO LANDSCAPE ARCHITECTS DRAWINGS FOR LANDSCAPE LAYOUT AND DETAILS
- EASEMENT LINE
- FN1 FENCE TYPE 2 - 2100mm HIGH BLACK PVC COATED CHAINMESH FENCING WITH 3X ROWS OF BARBED WIRE ABOVE
- FN2 FENCE TYPE 1 - 2100mm HIGH PALISADE/ DIPLOMAT TYPE FENCING, BLACK POWDERCOATED
- SG SLIDING GATE

DRAFT

PRELIMINARY NOT FOR CONSTRUCTION

No.	DATE:	REVISION:	BY:	CHK:
P1	10.04.2025	PRELIMINARY ISSUE	ST	ML

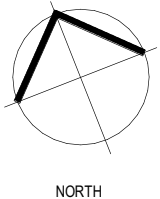
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PROJECT:
SPECULATIVE WAREHOUSE & OFFICE
LOT 103, FLAGSTONE LOGISTICS ESTATE
Crownson Lane North MaLean, QLD

TITLE:
SITE PLAN (GFA) PDA DEVELOPMENT
SCHEME



CLIENT:
CHARTER HALL

DATE: APRIL, 2025
DRAWN BY: ST
SCALE: 1 : 500 @ A1
SCALE: 1 : 250 @ A3

JOB NO:	25077
DRAWING NO:	DA01
REVISION:	P1

Appendix D – Arcadis Water Network Analysis

WATER NETWORK ASSESSMENT

4499 – 4651 MOUNT LINDESAY HIGHWAY NORTH MACLEAN

CHARTER HALL PRIME INDUSTRIAL FUND

COMPLIANCE ENDORSEMENT
referred to in the PDA
DEVELOPMENT APPROVAL

Approval no: DEV2018/961/9

Date: 22-Feb-24



Queensland
Government

4499 – 4651 MOUNT LINDESAY HIGHWAY, NORTH MACLEAN

WATER NETWORK ASSESSMENT

Author Mike Cazerres



Checker Thea Fanning



Approver Richard Mulligan
RPEQ 7850



Report No EAG005–30109334-AAR-WNA

Date 15/02/2024

Revision Text 03

This report has been prepared for Charter Hall Prime Industrial Fund in accordance with the terms and conditions of appointment for 4499-4651 Mount Lindesay Highway, North MacLean QLD 4280. Arcadis Australia Pacific Pty Limited (ABN 76 104 485 289) cannot accept any responsibility for any use of or reliance on the contents of this report by any third party.

Revision	Date	Description	Prepared by	Approved by
01	28/08/2023	Issued for Compliance Assessment	MC	RM
02	25/01/2024	Amended Connection Strategy	MC	RM
03	15/02/2024	Response to RFI	HQ	RM

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1 INTRODUCTION

Arcadis has been engaged by Charter Hall Prime Industrial Fund to prepare a Water Network Assessment (WNA) for a proposed development located in North Maclean, QLD over the following allotments:

- Lot 39 on SP258739 (4499-4651 Mount Lindesay Highway, North Maclean)

With the use of the Greater Flagstone PDA Infrastructure Planning and Background Report (IPBR), Logan City Council Desired Standards of Service (2019) and Logan Water Draft Technical Memorandum (DD8001 North Maclean), a hydraulic assessment of the proposed development's internal potable water network has been undertaken.

The existing potable water supply network adjacent to the site is comprised of the following:

- 200mm DIA watermain along the eastern verge of the Mount Lindesay Highway; and
- 200mm DIA PN16 mPVC main located along the northern verge of Crowson Lane.

Revision 01 of the WNA previously specified and assessed the proposed internal water network under connections to both the existing networks within Crowson Lane (made in Stage 1) and Mt Lindesay Highway (made in Stage 2), including a proposed water main along the eastern service road connecting the internal water networks within the northern and southern internal roads as per the endorsed EDQ sewer and water context plan for the site.

1.1 Revision 02

Revision 02 has been undertaken to demonstrate internal water network DSS compliance via connection to Crowson Lane only, and reduction of the proposed water main alignment within the eastern service road with a water main extended from the southern internal road only to the future connection point to the existing Mount Lindesay Highway network prior to the Mount Lindesay Highway road crossing.

The proposed connection point to service the development is the existing DN200 main in the northern verge of Crowson Lane, constructed as part of Stage 1 works.

The proposed development will consist of 3 stages, and it is assumed that the internal water supply network within Stage 3 will be constructed in conjunction with Stage 2 works prior to the operation of Stage 2. This provides the full looped supply arrangement through Stage 3 to allow for the internal network to meet the required DSS across all stages of the development via a single connection to the existing network within Crowson Lane.

A second connection is to be made to the existing DN200 water main within the eastern verge of the Mt Lindesay Hwy during Stage 2 or Stage 3 works in accordance with the approved EDQ DCOP and provides redundancy of supply to the supply area. It is noted that this connection is not required to allow the proposed development to meet the required performance DSS and is to be isolated under normal operating conditions.

An alternative supply arrangement is further investigated in this report which explores the impacts to the internal network DSS in the unlikely event that the internal water network within Stage 3 is not constructed prior to Stage 2 operation. This alternative supply arrangement requires an additional connection to be made to the existing DN200 water network within Mt Lindesay Hwy.

The following WNA compares the existing allowances made within the Logan City Council Draft Technical Memorandum to the current development layout completed by Watson Young (MP01 P10, March 2023). The purpose of this assessment is to demonstrate internal water network compliance with the relevant Desired Standards of Service (DSS) for the proposed development across all proposed staging scenarios in accordance with the Logan City Council Desired Standards of Service 2019 documentation in accordance with the Greater Flagstone PDA Infrastructure Planning and Background Report, and the Logan Water Draft Technical Memorandum. The report also confirms that future satisfactory water servicing provision is available for the external Lot to the south.

1.2 Revision 03

Revision 03 has been created in response to the information request received from Marco Bonato of EDQ on 02/02/2024, requesting the following information:

1. *Please provide detailed blown-up layout of the DMA feed in the Overall Water Main Sketch Plan to address interaction with the other infrastructure within the verge and land requirement.*
Refer to updated drawing 30109334-AAP-WS00OP-CV-SKT-031-03 in appendix B for detailed blown-up layout of the DMA.
2. *Please include in the report a strategy to address potential high-pressure issues during the interim supply of Stage 2 through to the Mt Lindesay Hwy water network.*
Private pressure relief valves will be installed at the lot property connections to address potential high-pressure issue should Stage 2 be constructed independent of Stage 3 (refer to section 11.1).

2 SITE CHARACTERISTICS

2.1 LOCATION DETAILS

The subject site is located within North Maclean, South-East Queensland, Australia over the following allotments:

- Lot 39 on SP258739 (4499-4651 Mount Lindesay Highway, North Maclean)

The site is bordered by Crowson Lane to the north, Mount Lindesay Hwy to the east, a vacant lot to the south and residential lots to the west.

The total area of the site is approximately 1,177,359m² or 117.7359 ha.

Logan City Council is the local government authority.

2.2 LAND USAGE

In its current state, the project site has undergone recent vegetation clearing works and contains a high voltage electrical easement. Figure 2-1 below provides a current locality plan of the site.



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

2.3 TOPOGRAPHY AND FEATURES

The site topography consists of hills and valleys with gradual to steep grades. The site contains an overland flow path that discharges flows via a natural channel to an existing headwall that crosses Mount Lindesay Hwy. The site has a high point of approximately RL 43m AHD and a low point of RL 21m AHD.

3 PROPOSED DEVELOPMENT

The proposed development consists of five super lots and six auxiliary lots, comprising drainage, open space and a sewer pumpstation. A plan extract of the proposed development has been provided in Figure 3-1.

This plan is also provided within Appendix A and should be referred to for further clarity.

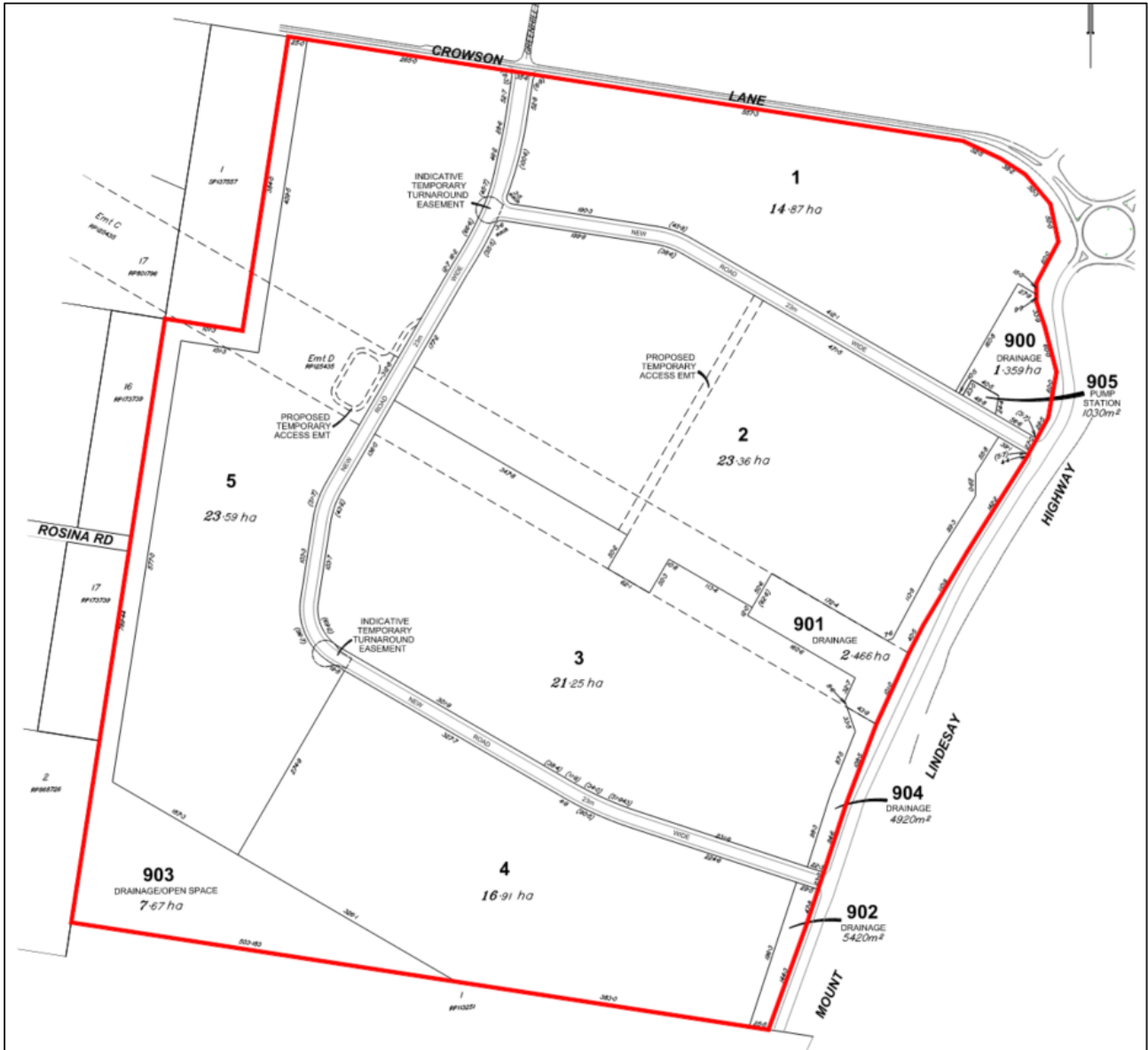


Figure 3-1 Proposed Amended ROL Layout (Source: Wolters, August 2023)

3.1 DEVELOPMENT STAGING

The proposed staging of the development site is summarised below and illustrated in Figure 3-2.

- Stage 1 – Includes Superlots 1 to 2
- Stage 2 – Includes Superlots 3 to 4
- Stage 3 – Includes Superlot 5

It is assumed that the proposed internal water network within Stage 3 of the development will be constructed during Stage 2 works.

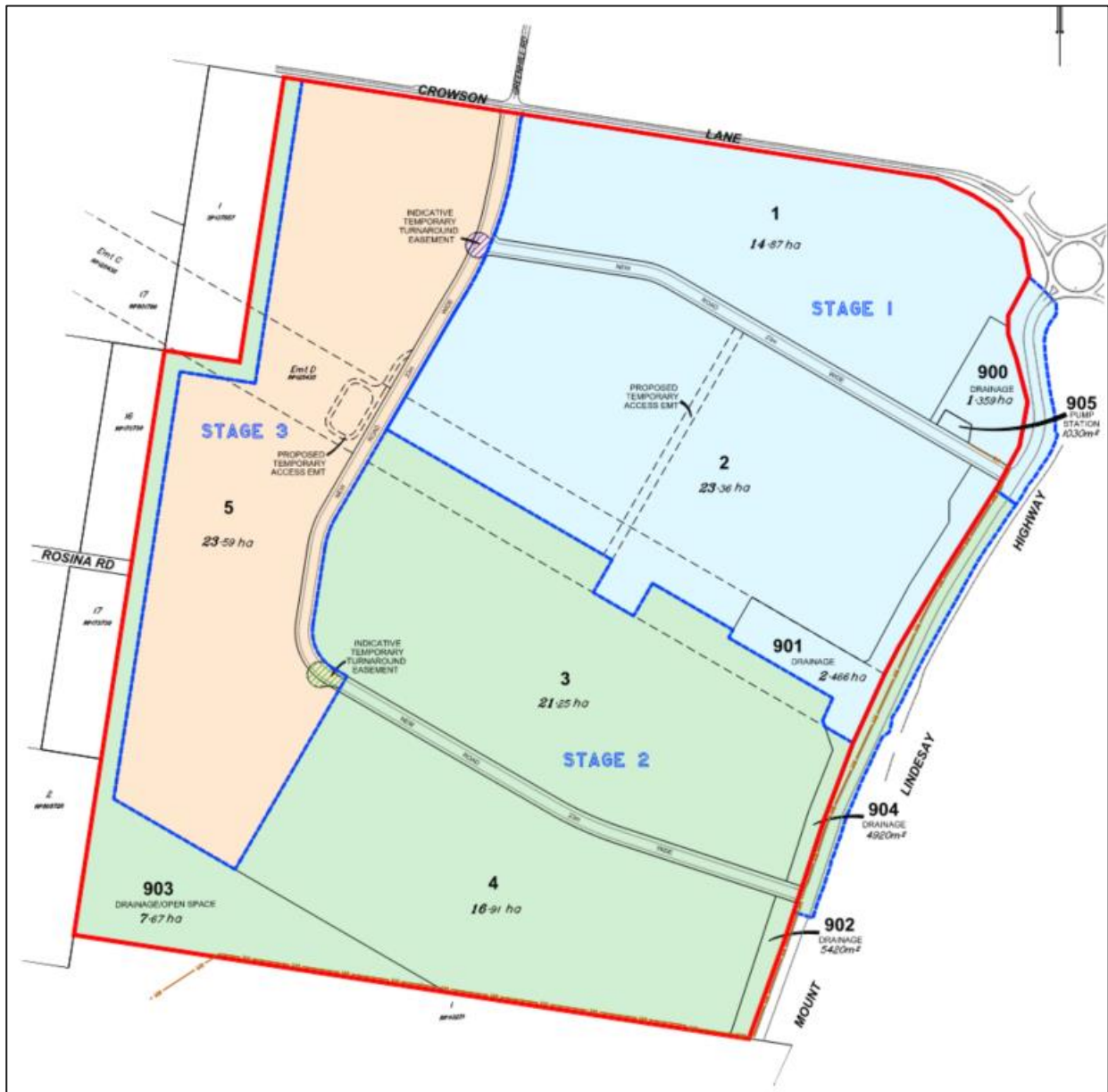


Figure 3-2 Proposed Development Staging Plan

3.2 DEVELOPMENT LOADING

For the purposes of this report, the development has been assessed under two demand cases to better determine the anticipated impact to be had on the surrounding network. These cases are as follows:

- **Logan Water Projected Case** – Results as per the assessment completed by Logan Water within the Draft Technical Memorandum DD8001. Logan water generated EPs in accordance with Infrastructure Demand Model 2020 (IP0017) to allow for optioneering. The EPs have been assigned to 70% of the developable area as an “allowable GFA” and excludes roads, open spaces, carparks etc.
- **Arcadis Calculated Developed Case** – The calculated demand for the development based on the EP’s outlined by Logan Water for Industry Medium and Commercial. GFAs are based on development layout plans and exclude roads, open spaces, carparks etc. A 10% contingency has been applied to the demand calculated via this concept development layout for future design flexibility.

These values are compared to ensure that NM1 can suitably cater for the development as per its current designed state (Watson Young MP01 P10, March 2023). For this comparison the Projected Case will consider Industry Medium and Commercial only as per the current intention for the development.

Figure 3-3 shows the non-residential conversion rates (Equivalent Persons (EP)) for the proposed development as per Logan Water’s Draft Technical Memorandum DD8001 North Maclean included within Appendix D. Refer to Appendix C for the developed case development EP and demand summary.

IDM Development Type	Average Water Consumption Method Adopted	Conversion Rates - Water		Return to Sewer (%)	Conversion Rates - Sewage	
		Gross Site Area Water EP/HA (Density Gross)	Gross Floor Area Water EP/HA (Density GFA)		Gross Site Area Water EP/HA (Density Gross)	Gross Floor Area Water EP/HA (Density GFA)
Commercial	GFA, 5 th -95 th %ile	-	55.90	0.90	-	50.31
Office	As per Commercial		55.90	0.90		50.31
Warehouse Distribution	As per Commercial		55.90	0.90		50.31
Education	GFA, 5 th -95 th %ile	-	105.30	0.80	-	84.24
Health	GFA, 5 th -95 th %ile	-	226.50	0.90	-	203.85
Industry Heavy	50% above Light Industrial	-	56.60	0.80	-	45.28
Industry Medium	25% above Light Industrial	-	47.25	0.80	-	37.80
Industry Light	GFA, 5 th -95 th %ile	-	37.80	0.80	-	30.24
Sport Recreation	Gross, 10 th -90 th %ile	1.05	-	0.90	0.945	-
Rural	Based on Water Meter Consumption	-	-	-	-	-
Retail Services	GFA, 5 th -95 th %ile	-	97.60	0.90	-	87.84
Showroom Bulk Goods	GFA, 5 th -95 th %ile	-	110.80	0.90	-	99.72
Accommodation	GFA, 5 th -95 th %ile	-	233.90	0.90	-	210.51

Reference: Table 7.2 Development of Infrastructure Demand Model, LWIA 2018 (PI-181).

Figure 3-3 Non-residential conversion rates (Table 7.2 Development of Infrastructure Demand Model)



Figure 3-4 Concept Masterplan (Watson Young MP01 P10, March 2023)

3.3 PROJECTED CASE

The proposed development and an additional upstream allotment were accounted for as part of the assessed NM1 study catchment aligning with the Logan Water study and associated draft technical memorandum DD8001, with the assumption GFA = 70% of developable area totalling a GFA of 74 ha.

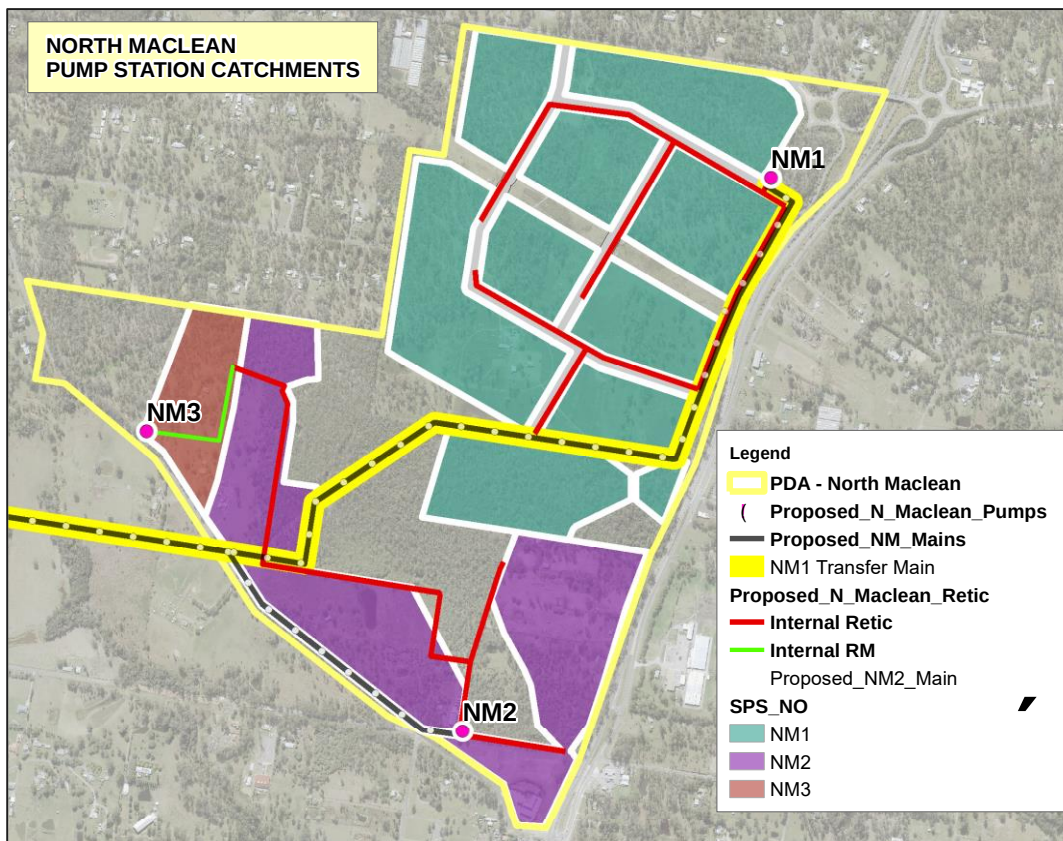


Figure 3-5 Logan Water NM1 Catchment

3.4 ARCADIS CALCULATED DEVELOPMENT LOADING

The demand for the development based on the EP's outlined by Logan Water for Industry Medium and Commercial was applied to the concept development layout completed by Watson Young (MP01 P10, March 2023) to generate a comparison of ultimate demand on the potable water. A 10% contingency has been applied to the demand calculated via this concept development layout for future design flexibility.

Lot 1RP113251 is located immediately south of the site area illustrated in Figure 2-1 and also forms a part of the overall NM1 catchment illustrated in Figure 3-5. This area has also been included in this assessment, with assumed demand for this lot specified below in line with Logan Water demand estimation methodology:

- Lot 1RP113251 Area = 16.0435ha
- Assume 70% GFA = 11.23045Ha GFA
- Corresponding Lot 1 RP113251 EP demand = 425 EPs +10% Contingency = 530.7 EPs

The results of this were then compared against the projected loads completed by Logan Water, included in Table 3-1 below. Refer to Appendix C for further details on EP calculations.

Table 3-1 North Maclean PDA – Proposed vs Projected Loads (Medium Industry)

	Study Catchment No	Ultimate Water EPs
Logan Water Projected Loading	NM1	3482
Arcadis Calculated Proposed Loading	NM1	3448
Difference (%)		-1%

As seen above, the proposed development demand based on the concept lot layout MP01 P10 and the assumed development demand of the southern Lot 1 RP 113251 also forming a part of the NM1 study catchment remains generally in accordance with Logan Water's projected demand.

4 ASSESSMENT SCENARIOS

Four assessment scenarios have been adopted for the purposes of this report.

- Stage 1 – This scenario consists of Stage 1 of the proposed development only.
- Stage 1+2 – This scenario consists of Stage 1 and Stage 2 of the proposed development.
- Ultimate – This scenario consists of the ultimate development internal to the site area (Stages 1+2+3).
- Ultimate + External Lot – This scenario consists of the ultimate development internal to the site area plus the external lot immediately south of the development site corresponding to the full area of the NM1 catchment assessed in the Logan Water draft technical memorandum DD8001. A GFA of 11.23 ha has been assumed for this external lot.

**Figure 4-1 Water Network Assessment Scenario Areas**

5 WATER SUPPLY INFRASTRUCTURE

5.1 EXISTING NETWORK

The North Maclean proposed industrial development is located within the urban catchment and around associated existing water infrastructure operated by Logan Water in the region. Based on the Logan Water Asset Location Data - GIS mapping, below shows the location of the site relative to the existing potable water reticulation network. The following relevant water infrastructure was identified in proximity:

- 200mm DIA watermain along the eastern verge of the Mount Lindesay Highway; and
- 200mm DIA PN16 mPVC main located along the northern verge of Crowson Lane.

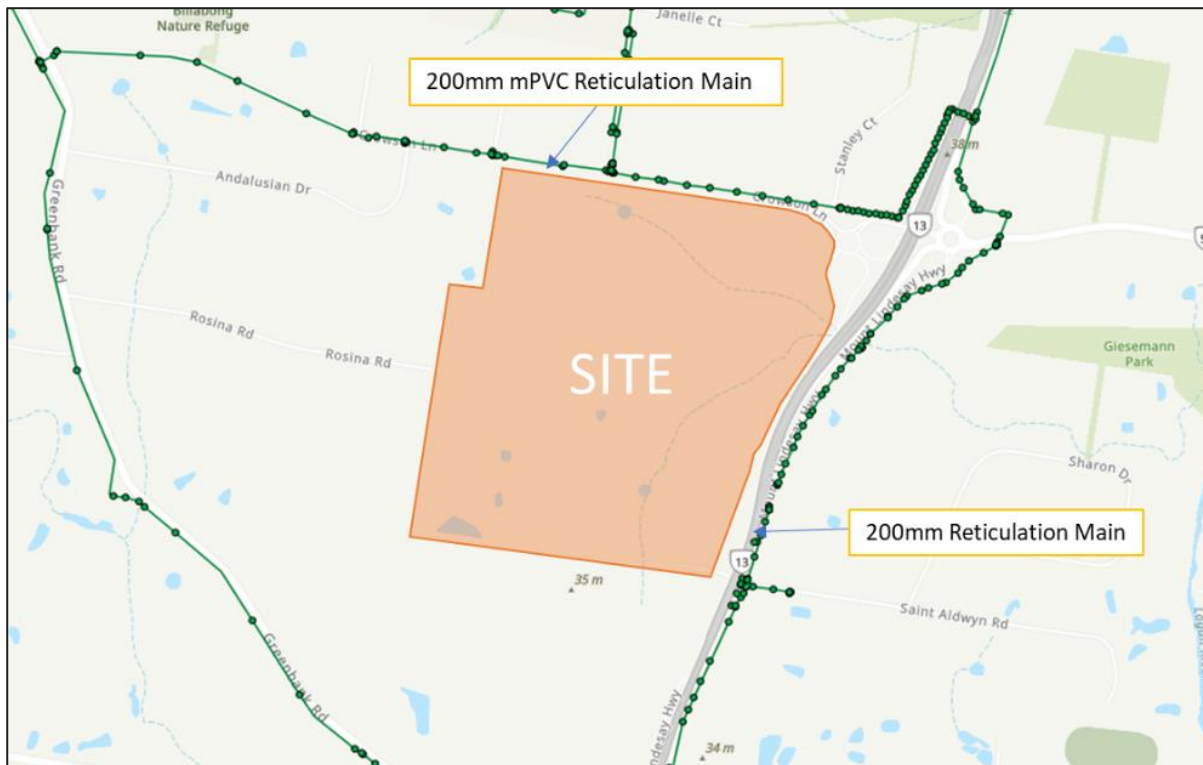


Figure 5-1 – Existing Potable Water Infrastructure (Logan Water, June 2022)

5.2 EDQ DCOP, ENDORSED NORTH MACLEAN CONTEXT PLAN & CONNECTIONS

As part of the planning for the Greater Flagstone PDA, EDQ have developed a Development Charges and Offset Plan (DCOP). This document sets out the required charges levied to Developers to contribute towards funding the delivery of required trunk infrastructure for the area. An extract from the DCOP is shown in Figure 5-2 below.

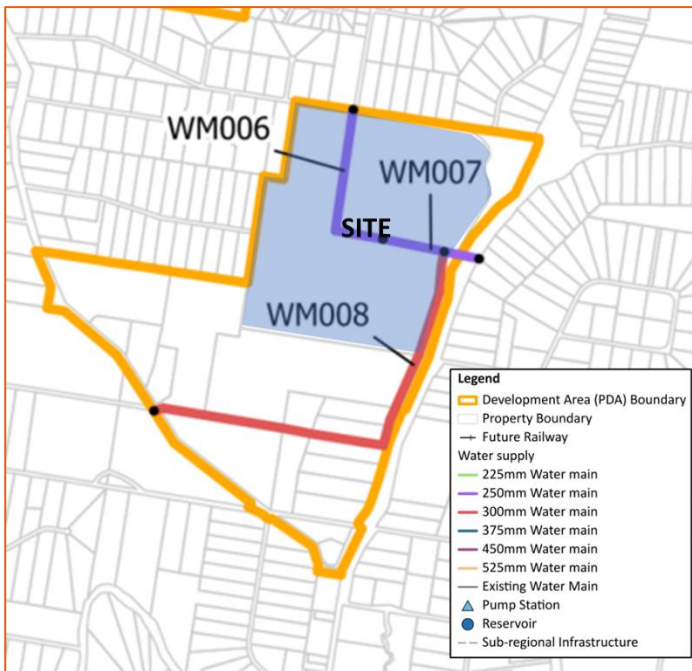


Figure 5-2 – Water Supply Trunk Infrastructure in DCOP

Figure 5-3 shows the endorsed EDQ Sewer and Water plan for the site. As shown in the plan, the development has been approved for connection to the trunk watermains located along Crowson Lane and the Mount Lindesay Highway.

The existing DN200 water main within the northern side of Crowson Lane will be adopted as the connection point for the site.

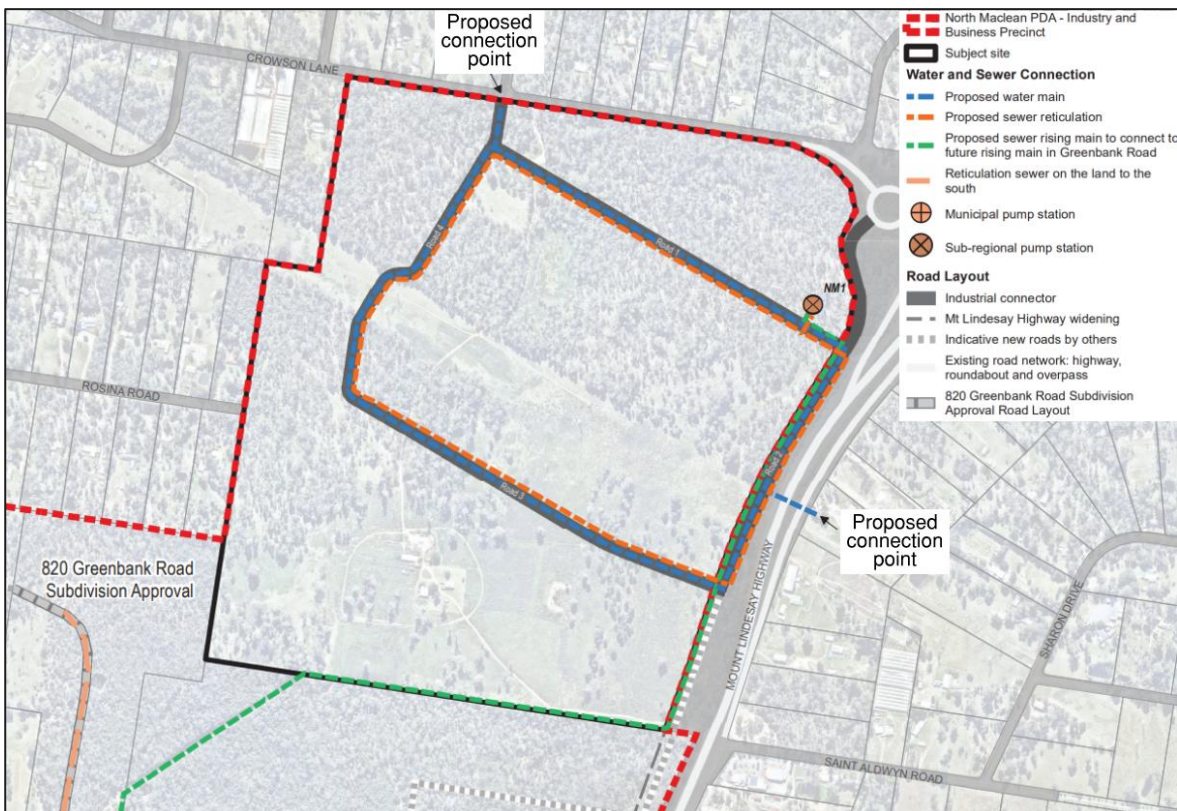


Figure 5-3 – Endorsed EDQ Water & Sewer Context Plan

6 MODELLING ASSUMPTIONS & DSS

The water network modelling was undertaken using Bentley modelling software WaterCAD Connect Edition network and designed using the current Logan City Council Desired Standards of Service 2019 documentation as referenced in the Greater Flagstone PDA IPBR.

- The extent of the network studied is the Logan Water NM1 Catchment Area.
- Colebrook-White equation is used for hydraulic calculations.
- 0.3mm Colebrook-White k value adopted.
- DICL & M-PVC PN20 assumed, as such most conservative IDs of M-PVC mains adopted. DN300 PN20 PVC-M main ID $\approx$ 306mm, DN250 PN20 M-PVC main ID $\approx$ 253mm, DN150 PN20 M-PVC main ID $\approx$ 157mm
- External southern catchment area adopted as 11.23ha GFA
- Allowable head loss design criteria applicable under Peak Hour demand scenario only

Table 6-1 LCC Desired Standard of Service for Water Supply 2019

Service Pressure	
Minimum Operating Pressure @MH	Min. 22 m at the property boundary
Maximum Operating Pressure	Max. 80m at the property boundary on the reservoir
Target Pressure	55m at the property boundary
Fire Fighting	
Commercial / Industrial Fire Flow Demand	30L/s for 4 hours
Rural Commercial/Industrial	15L/s for 2 hours
Background Demand Commercial/ Industrial	2/3 PH demand (single fire event only)
Pipeline Design	
Pipeline Capacity Requirements	Trunk system:
	MDMM for gravity supply
	MDMM over 20hrs for pumped supply
	Reticulation Mains: MH + fire flow
Maximum Velocity	2.5m/s
Item	Value
Average Day Demand (AD)	190 L/EP/day
Industry Mean Day Max Month (MDMM)	AD x 1.2
Industry Max Day (MD)	AD x 1.3
Industry Max Hour (MH)	AD x 1.7
Commercial Mean Day Maximum Month (MDMM)	AD x 1.2
Commercial Max Day (MD)	AD x 1.3
Commercial Max Hour (MH)	AD x 2.0
Pipe Friction Loss	

Colebrook White k values (mm)	Pipe Material	Pipeline Age (years)		
		< 10	10 to 25	> 25
	Asbestos Cement	0.15	0.3	0.3
	Plastic (UPVC, MDPE, Hobas, etc)	0.06	0.06	0.15
	MSCL/DICL	0.3	0.3	0.6
	CICL	0.3	0.3	0.6
Allowable Head Loss				
Design of future infrastructure to be conducted to achieve less than the head losses as indicated		(a) 5 m head/km for $\leq$ DN 150 (CIOD) or $\leq$ DN 180 (ISO). (b) 3 m head/km for $\geq$ DN 200 (CIOD) or $\geq$ DN 250 (ISO). Head loss shall be calculated using computer models or hydraulic formulas		

6.1 PIPE MATERIAL

In accordance with the SEQ IPAM list and confirmed by EDQ, M-PVC and DICL water mains are suitable for use in LCC and the proposed development site.

- Pipes in the road shall be DICL
- Pipe sections under road crossings and industrial/commercial driveways shall be DICL PN35
- Pipes in verges shall be M-PVC pipes minimum PN20

7 POTABLE WATER DEMAND

Table 7-1 below lists the estimated water supply demand generated by the proposed development. This has been calculated in accordance with the LCC Desired Standards of Service 2019 documentation.

Table 7-1 Potable Water Demand Estimate

Scenario	Total EP	AD+NRW (L/s)	MDMM+NRW(L/s)	MD+NRW (L/s)	MH+NRW (L/s)	2/3MH + FF (L/s)
Stage 1	1057	2.32	2.73	2.93	3.74	32.49
Stage 1+2	2178	4.79	5.62	6.04	7.70	35.13
Ultimate	2864	6.30	7.39	7.94	10.13	36.75
Ultimate + Southern External Lot	3448	7.58	8.90	9.56	12.19	38.13

8 BOUNDARY CONDITION

8.1 HYDRANT PRESSURE AND FLOW MODELLING REPORT – 2021

Flow and pressure modelling was undertaken near the two proposed connection points in the eastern verge of Mt Lindesay Highway and in the northern verge of Crowson Lane (101-109 Crowson Lane) on Test Hydrant WFH019651 and Test Hydrant WFH019651 respectively. Figure 8-1 below provides the hydrant locations.

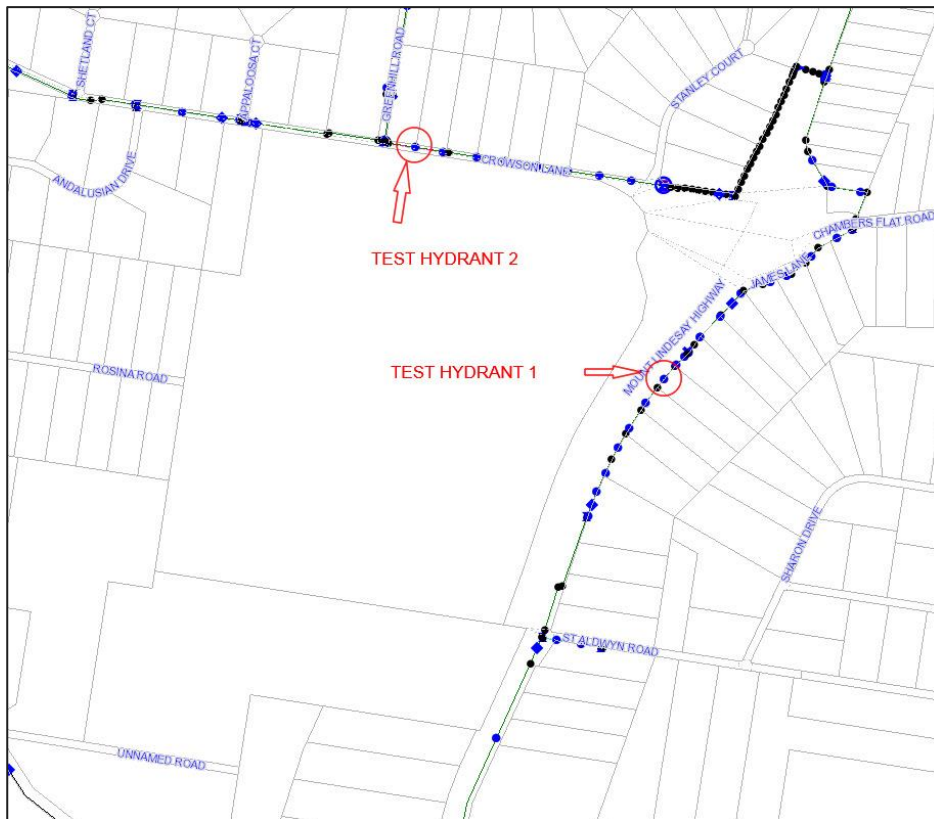


Figure 8-1 Flow Test Hydrant Locations

The Hydrant Curve function is used in the H2OMap network modelling software to simulate an increasing demand scenario in the water supply network with peak hour background demand to assess and evaluate peak hour flow. The residual pressure in the water supply network at the hydrant is calculated by the model for each increase in flow. The report notes it is strongly suggested that field tests are conducted to verify the theoretical results which has been undertaken and further discussed in Section 8.2 below.

The hydraulic modelling results are presented in Table 8-1 below.

Table 8-1 Hydrant Test Results – 2021 Modelling

Normal Supply Conditions / (Peak Day Analysis)		
Available Flow (L/s)	Test Hydrant 1 – Residual Pressure (m)	Test Hydrant 2 – Residual Pressure (m)
0.00	54.14	42.31
5.00	49.66	40.56
10.00	48.19	39.00
15.00	46.33	37.40
20.00	44.08	35.40
25.00	41.51	33.13
30.00	38.64	30.34
35.00	35.47	27.94
40.00	32.03	25.05
45.00	28.34	22.00
50.00	24.34	18.76

8.2 FLOW & PRESSURE TESTING RESULTS – 2022

Flow and pressure field testing was undertaken in October 2022 at multiple test hydrant location points around Crowson Lane and Mt Lindesay Highway North and South of the site. The field tests are undertaken to cross check, evaluate and verify theoretical outcomes. Figure 8-2 and Figure 8-3 below illustrates the hydrant testing locations.

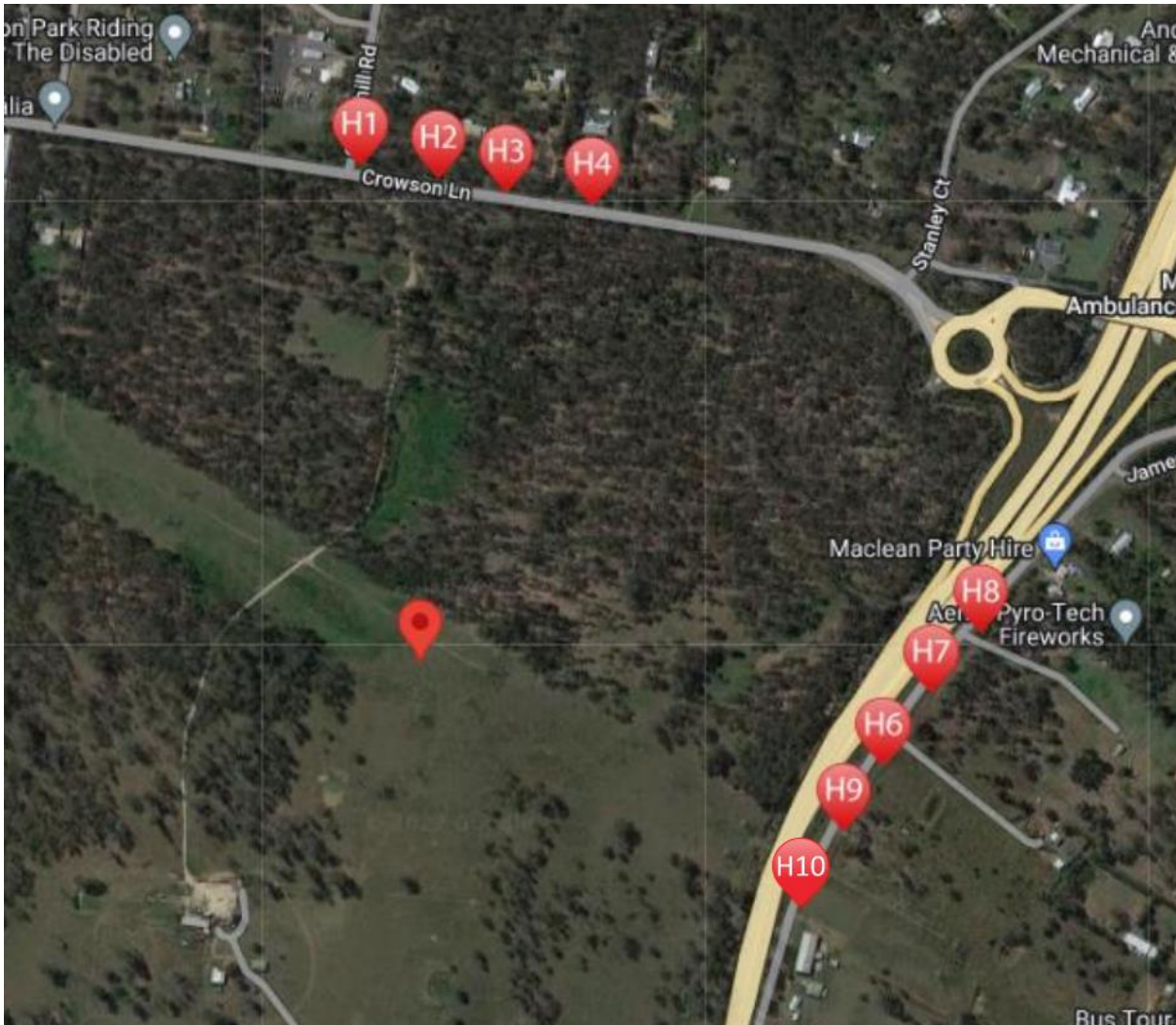


Figure 8-2 Flow Test Hydrant Locations – Crowson Lane (H1-4) & Mt Lindesay Hwy North (H6-10)

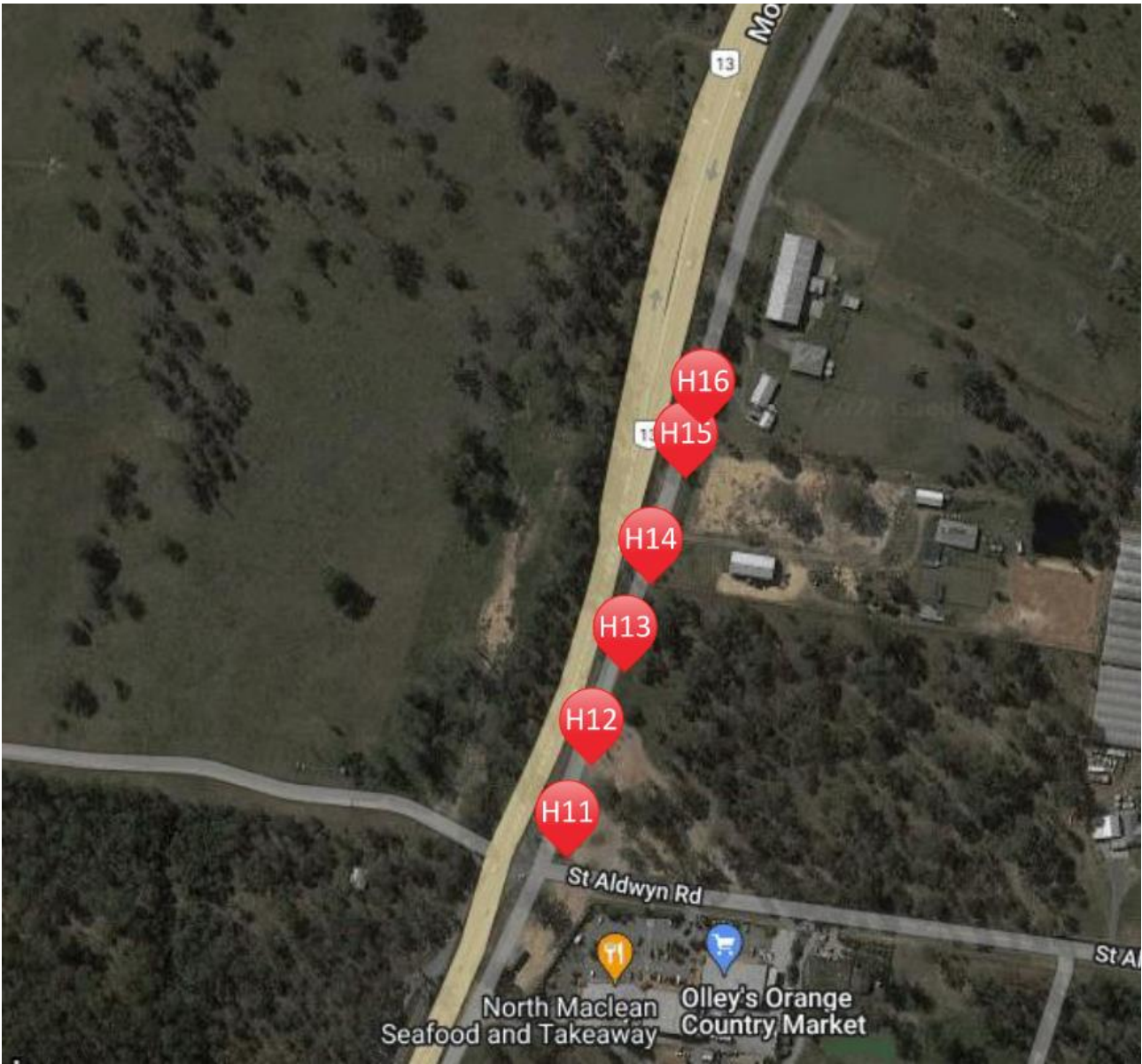


Figure 8-3 Flow Test Hydrant Locations – Mt Lindesay Highway South (H11-16)

The flow and pressure results for each of the number of tests performed at various test hydrant locations is summarised in Table 8-2 below.

Table 8-2 Hydrant Test Results Summary – 2022 Testing

Test Hydrants H1-4 Crowson Lane – Residual Pressure (m)		Test Hydrants H6-10 Mt Lindesay Highway North – Residual Pressure (m)		Test Hydrants H11-16 Mt Lindesay Highway South – Residual Pressure (m)	
Flow (L/s)	Hydrant Residual Pressure (m)	Flow (L/s)	Hydrant Residual Pressure (m)	Flow (L/s)	Hydrant Residual Pressure (m)
0	66.4	0	74.3	0	71.4
15	64.2	15	70.3	15	63.3
30	58.8	30	61.2	30	54.8
45	52.8	45	49.0	45	38.0
60	46.9	56.9	32.5	52.2	26.8
65	45.8				
75	40.1				
77.6	38.5				

8.3 FLOW AND PRESSURE RESULTS BOUNDARY HGL COMPARISON

A comparison of the calculated boundary HGLs based on the two available 2021 and 2022 flow and pressure results and the development demands is provided in Table 8-3 below. These results show that the 2022 hydrant field testing yields significantly higher boundary HGLs than the 2021 flow and pressure modelling report by LCC. As such, 2021 boundary HGLs have been adopted for the purposes of this assessment, remaining conservative and aligning with LCC modelling for the area.

Table 8-3 Boundary HGL Comparison

Scenario	Location 1 – Crowson Lane		Location 2 – Mt Lindesay Highway North		Location 3 – Mt Lindesay Highway South	
	2021 Modelling Report HGL (m)	2022 Hydrant Testing HGL (m)	2021 Modelling Report HGL (m)	2022 Hydrant Testing HGL (m)	2021 Modelling Report HGL (m)	2022 Hydrant Testing HGL (m)
MH Stage 1	71.68	96.60	72.39	94.67	-	89.21
FF Stage 1	58.89	88.71	57.77	80.79	-	72.37
MH Stage 1+2	70.47	95.77	70.77	93.89	-	87.15
FF Ultimate	58.45	87.77	56.09	78.56	-	69.98
MH Ultimate	69.99	95.21	69.71	93.23	-	85.94
FF Ultimate	57.55	87.18	55.04	77.11	-	68.38
MH ULTIMATE + EXT	68.94	94.72	68.78	92.57	-	84.93
FF ULTIMATE + EXT	56.76	86.66	54.13	75.84	-	66.94

Note – the above table includes HGL – whereas Table 8-2 specifies pressure head.

9 CONCEPT ULTIMATE INTERNAL WATER NETWORK LAYOUT & CONNECTIONS

The concept ultimate internal water network layout and sizing adopted for this assessment is illustrated in Figure 9-1 below.

This involves connection to the existing DN200 water main within the northern verge of Crowson Lane as per the endorsed EDQ water & sewer context plan, with a DN250 water main extended across Crowson Lane to the site in accordance with EDQ DCOP mapping.

The existing DN200 water main within the northern side of Crowson Lane will be adopted as the connection point for the site to be made as part of Stage 1 works.

Parallel DN150 water mains have been modelled for the internal reticulation to the proposed development site, with a separate main modelled in each verge. A DN250 trunk water main has been modelled along the southern internal road alignment to adhere with DCOP planning, with lot connections to be made directly to this DN250 main for adjacent lots and confirmed by EDQ. A DN300 water main has been modelled continuing south from the DN250 at the intersection of the Mt Lindesay Highway and the southern site entrance to cater for future southern external areas in accordance with EDQ DCOP mapping. The external demand of the southern Lot 1RP113251 has been applied at the end of this modelled DN300 main, however it is noted that this DN300 extension will not be constructed by Charter Hall as part of the current proposed development works.

A second connection is to be made to the existing DN200 water main within the eastern verge of the Mt Lindesay Hwy in accordance with the approved EDQ DCOP and provides redundancy of supply to the supply area. It is noted however that this connection is not required to allow the proposed development to meet the required performance DSS and is to be isolated under normal operating conditions.

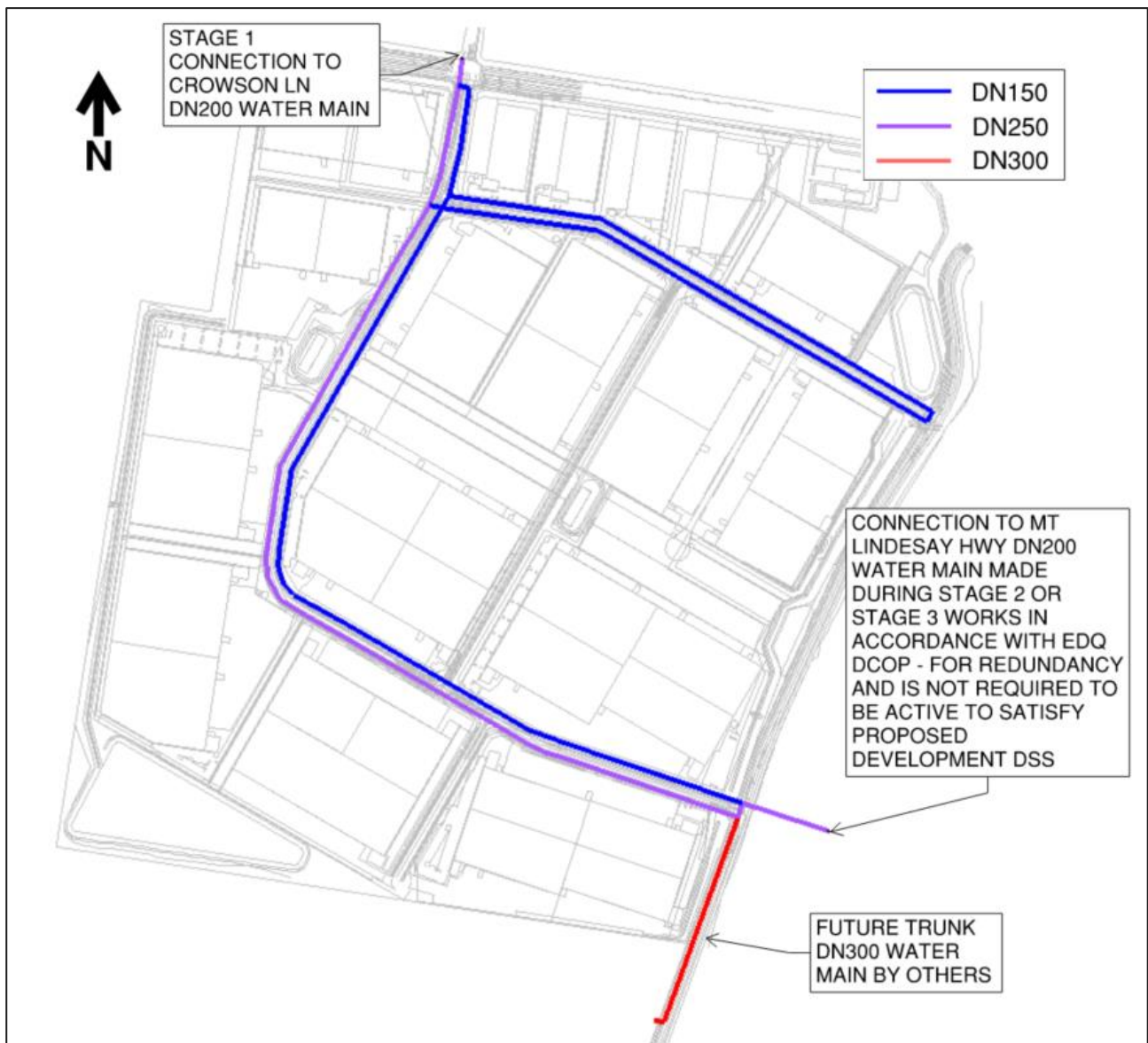


Figure 9-1 Concept Ultimate Internal Water Network Layout

9.1 STAGE 1 INTERNAL WATER NETWORK LAYOUT

As part of Stage 1 works, a new DN250 water main connection will be undertaken to the existing DN200 main within the northern verge of Crowson Ln adjacent to the future northern internal road connection. This DN250 connection will extend south across Crowson Ln to the northern site boundary and forms the initial section of the DCOP planning DN250 trunk water main alignment.

A DN150 reticulation water main has been modelled from this future DN250 site connection extending south to the northern internal road alignment, to supply parallel DN150 mains within the northern and southern verges of the northern internal road. A DN150 cross-connection has been included at the end of the parallel DN150 mains to mitigate dead ends. The concept Stage 1 internal water network layout is illustrated in Figure 9-2 below.

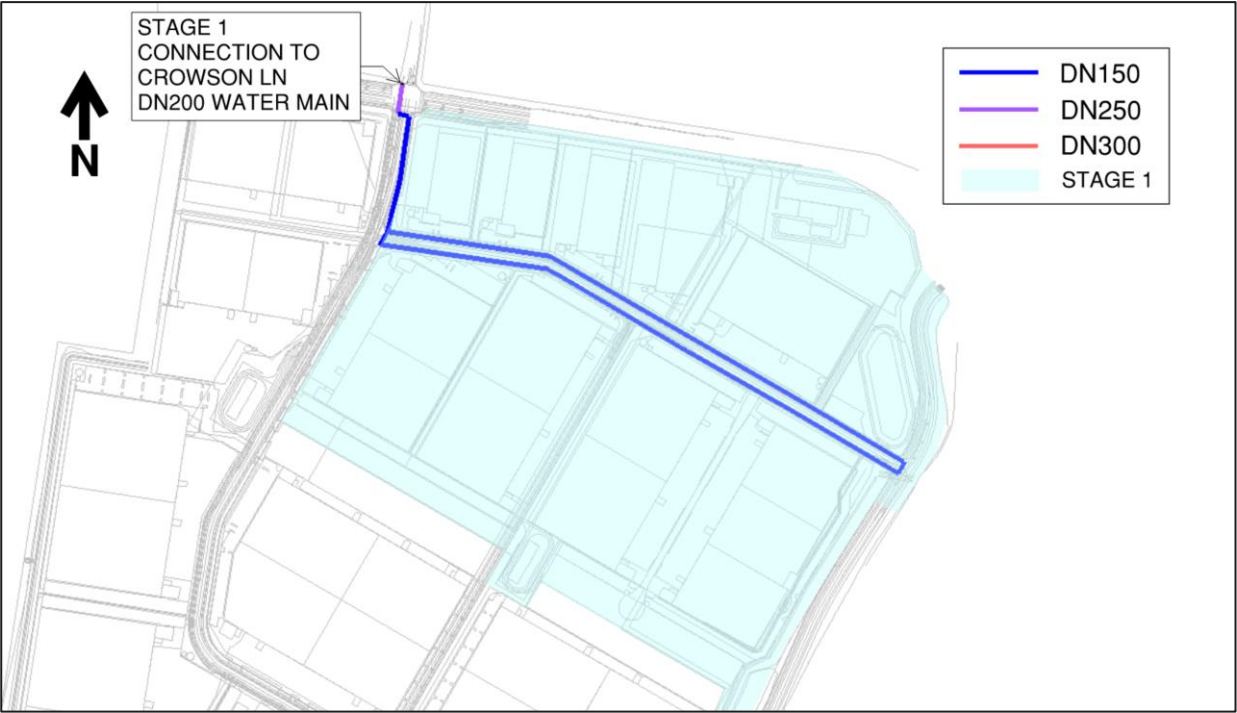


Figure 9-2 Concept Stage 1 Internal Water Network Layout

9.2 STAGE 2 INTERNAL WATER NETWORK LAYOUT

As part of Stage 2 works, a second DN250 connection will be undertaken to the existing DN200 water main within the eastern verge of the Mt Lindesay Hwy. A new trunk DN250 water main will be constructed to the eastern service road and continue south along the southern internal road servicing the Stage 2 area. A DN150 reticulation main will be constructed within the northern verge of the southern internal road. The proposed water network within Stage 3 will be constructed during Stage 2 works to provide the full looped connection through Stage 3 to allow the development to meet the hydraulic performance DSS. This also provides the complete trunk DN250 water main alignment in accordance with EDQ DCOP planning.

A DN150 main will also be constructed north along the eastern service road to connect to the DN150 water network within Stage 1 through Stage 3. The concept Stage 1-2 internal water network layout is illustrated in Figure 9-3 below.



Figure 9-3 Concept Stage 1-2 Internal Water Network Layout

9.3 STAGE 3 INTERNAL WATER NETWORK LAYOUT

With the Stage 3 internal water network proposed for construction during Stage 2, no additional elements will be required to the internal water network as part of Stage 3 works. The concept Stage 1-3 internal water network layout is illustrated in Figure 9-4 below.



Figure 9-4 Concept Stage 1-3 Internal Water Network Layout

9.4 DMA BOUNDARY VALVE

Logan City Council has advised that the intent for this site is to form part of a single future District Metered Area (DMA). To this end, a boundary valve assembly is to be implemented at the proposed connection to the existing network within Crowson Lane, to be designed and constructed in accordance with SEQ drinking water supply drawings SEQ-WAT-1310-5 to SEQ-WAT-1310-10. Refer to the water layout plan included in Appendix B for concept locations of the boundary valves.

10 RESULTS AND DISCUSSION

The assessment modelling results across the four assessment scenarios are summarised in Table 10-1 below. Refer to Appendix C for modelling results across both assessment scenarios and model junctions.

Table 10-1 Water Network Modelling Results Summary

Scenario	Standard Flow Simulation		Fire Flow Simulation	
	Min Pressure (m)	Max Pressure (m)	Min Residual Pressure (m)	Maximum Velocity (m/s)
Stage 1	39.6	47.4	25.0	1.71
Stage 1+2	38.4	46.8	24.6	1.57
Ultimate	37.6	46.3	23.7	1.57
Ultimate + External	36.8	45.9	21.8	1.71

As observed in the above summary, network hydraulic performance meets the specified DSS across all assessed staging scenarios.

11 ALTERNATIVE SUPPLY ARRANGEMENT – STAGE 2 SERVICE PRIOR TO STAGE 3 NETWORK

An alternative supply arrangement is explored below to demonstrate the performance of the internal water network in the unlikely event that Stage 2 is constructed and serviced prior to the construction of the water network within Stage 3, illustrated in Figure 11-1 below.

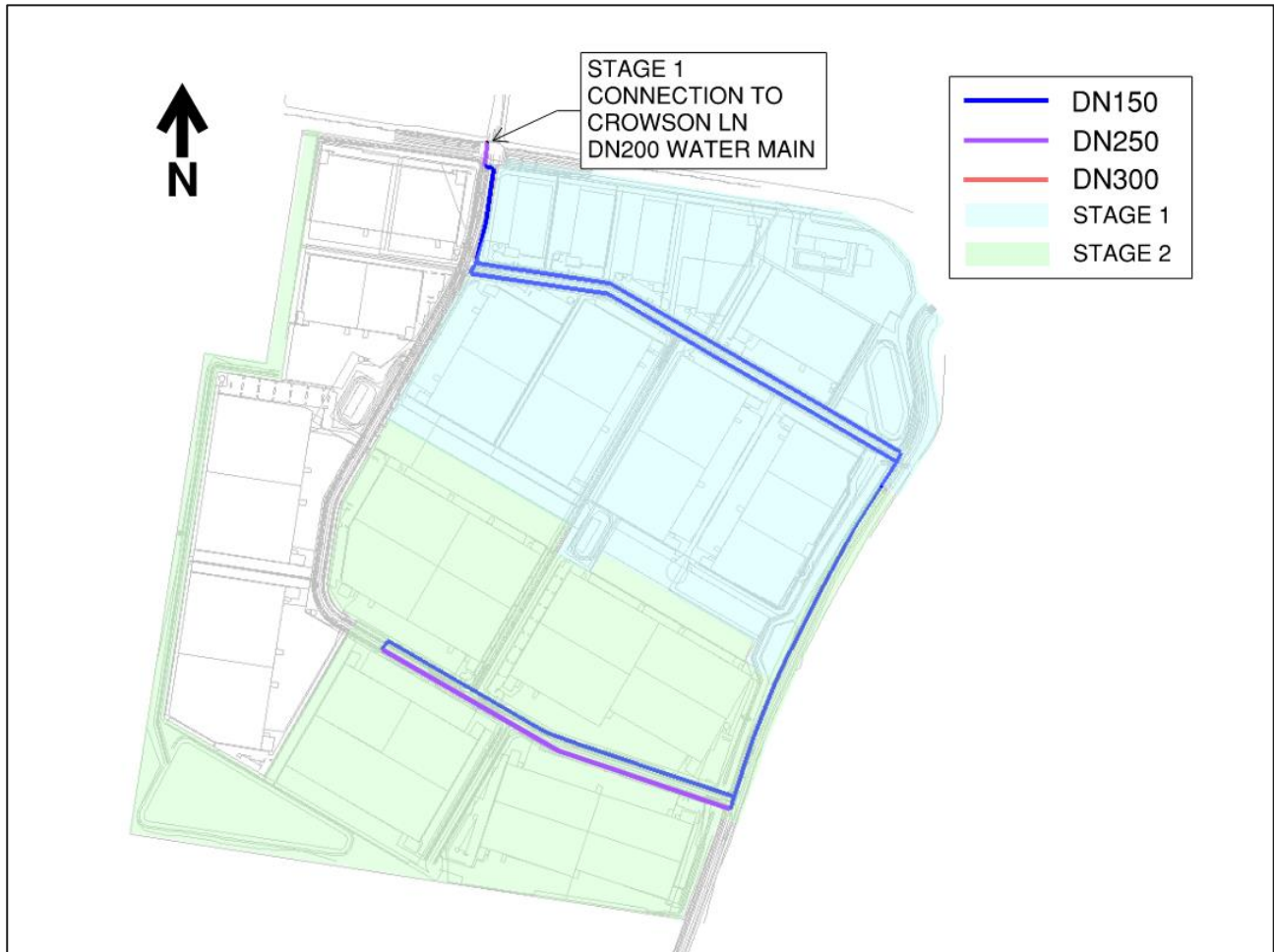


Figure 11-1 Alternative Supply Arrangement – Crowson Lane Only Internal Water Network Layout

As per Table 11-1 below, this scenario results in a minimum residual pressure DSS non-compliance under fire flow simulation of 4.3m (7.7m below DSS).

Table 11-1 Alternate Supply Arrangement Water Network Modelling Results Summary – Crowson Ln Connection Only

Scenario	Standard Flow Simulation		Fire Flow Simulation	
	Min Pressure (m)	Max Pressure (m)	Min Residual Pressure (m)	Maximum Velocity (m/s)
Stage 1+2 – Crowson Ln Connection Only	38.4	46.6	4.3	1.84

11.1 CROWSON LANE + MT LINDESAY HIGHWAY CONNECTIONS

To allow for adequate service to Stage 2 of the development prior to the construction of the water network within Stage 3, a second connection to the existing water network within Mt Lindesay Hwy is required (illustrated in Figure 11-2 below).

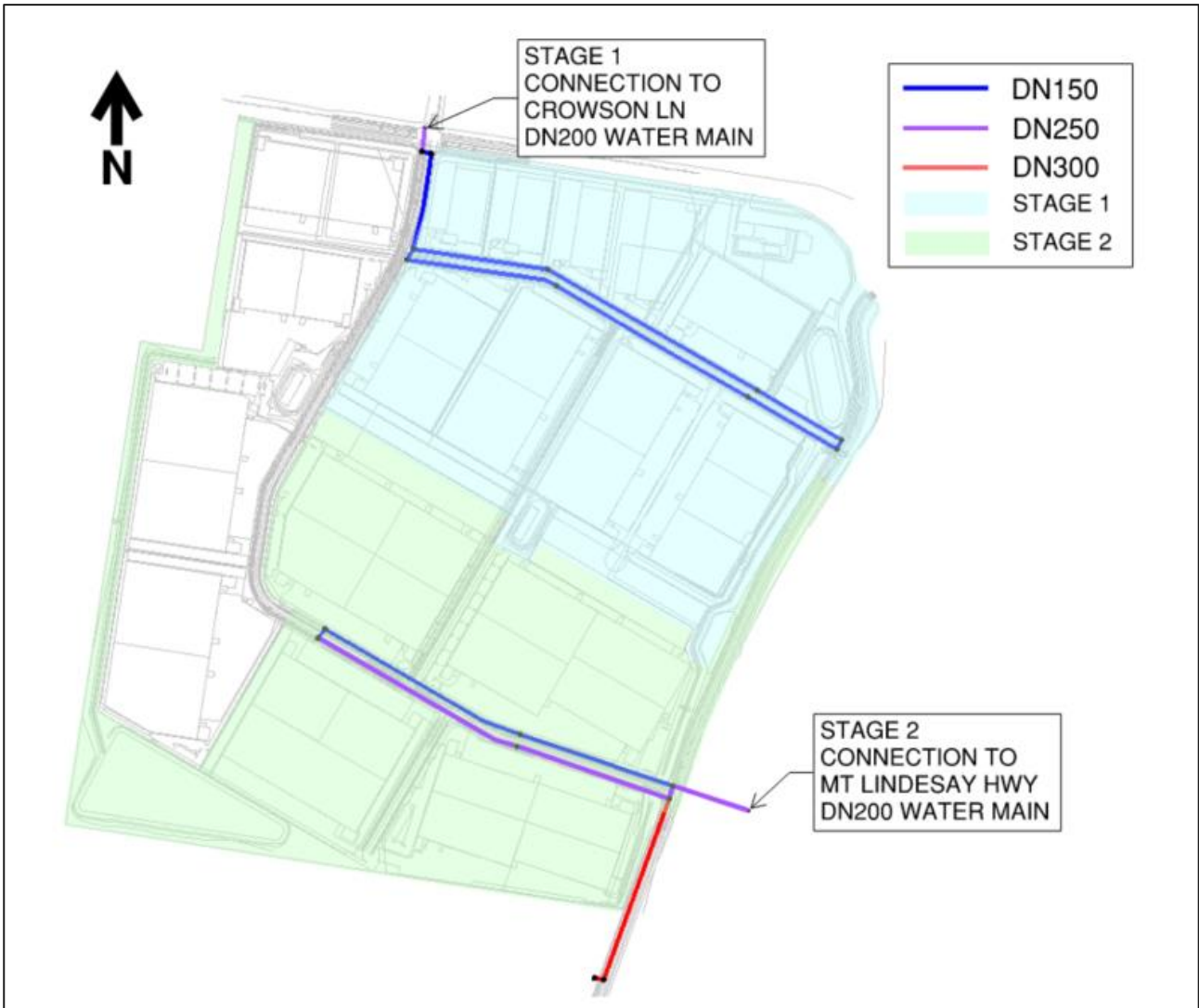


Figure 11-2 Alternative Supply Arrangement – Crowson Lane + Mt Lindesay Hwy Internal Water Network Layout

As per Table 11-2 below, this scenario provides adequate network performance meeting the specified DSS. Private pressure relief valves are proposed at the lot property connections in lieu of an additional DMA boundary valve assembly.

Table 11-2 Alternate Supply Arrangement Water Network Modelling Results Summary – Crowson Ln + Mt Lindesay Hwy Connections

Scenario	Standard Flow Simulation		Fire Flow Simulation	
	Min Pressure (m)	Max Pressure (m)	Min Residual Pressure (m)	Maximum Velocity (m/s)
Stage 1+2 – Crowson Ln + Mt Lindesay Hwy Connections	38.4	46.9	17.3	1.71

12 CONCLUSION

This Water Network Capacity Assessment shows that the proposed development can be adequately serviced via connection to the existing network within Crowson Lane. Furthermore, adequate provision has been made for the external Lot to the south. A second connection is to be made to the existing DN200 water main within the eastern verge of the Mt Lindesay Hwy during Stage 2 or Stage 3 works in accordance with the approved EDQ DCOP and provides redundancy of supply to the supply area. It is noted that this connection is not required to allow the proposed development to meet the required performance DSS and is to be isolated under normal operating conditions.

An alternative supply arrangement is further investigated in this report which explores the impacts to the internal network DSS in the unlikely event that the internal water network within Stage 3 is not constructed prior to Stage 2 operation. This alternative supply arrangement requires an additional active connection to be made to the existing DN200 water network within Mt Lindesay Hwy and corresponding boundary valve assembly.

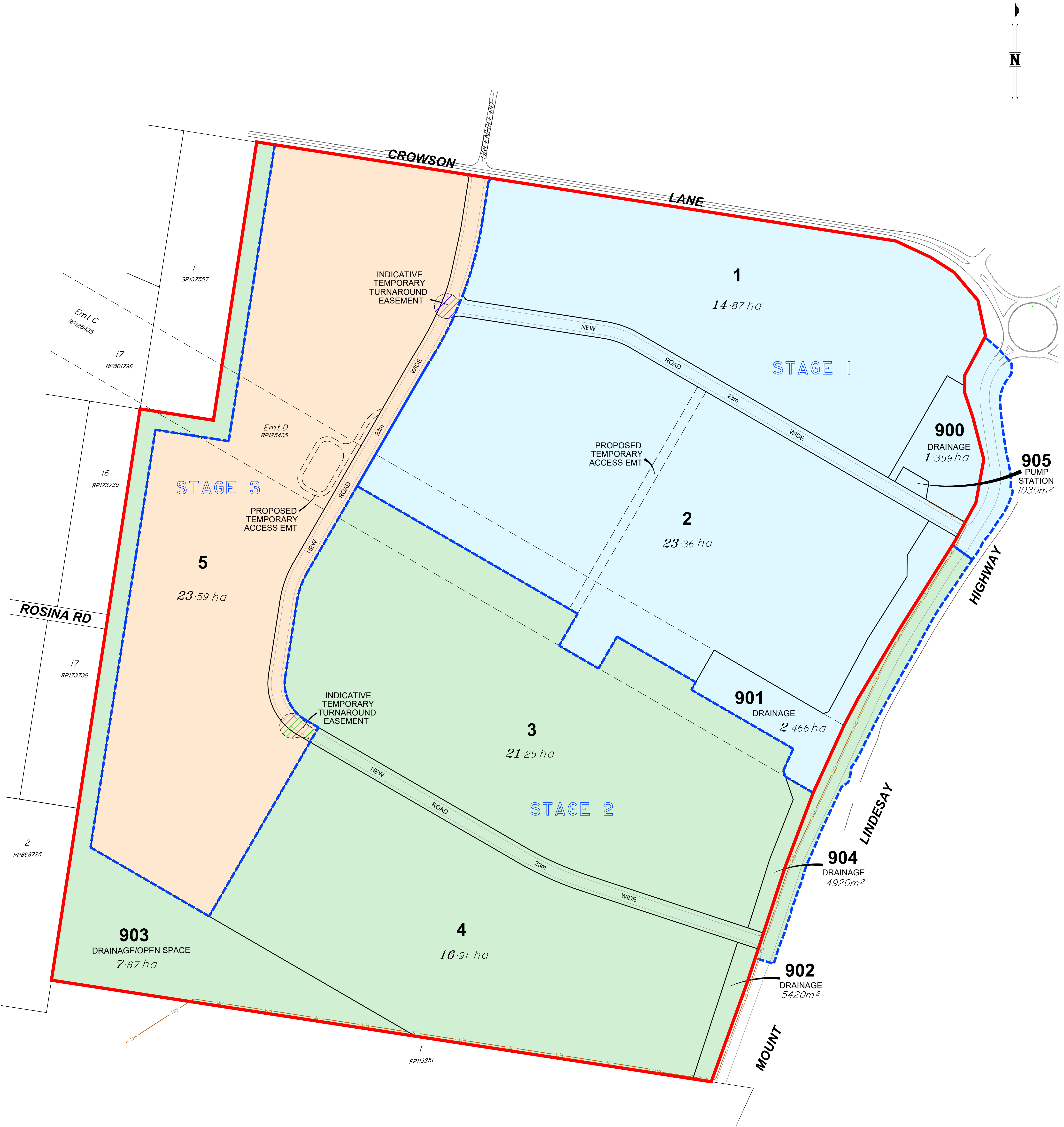
The water network has been designed in accordance with LCC Desired Standards of Service 2019 in accordance with the Greater Flagstone PDA Infrastructure Planning and Background Report.

Further changes and requirements are subject to detailed design not covered as a part of the present report. A detailed assessment of the performance and design requirements of this proposed potable water network will be required as design progresses to ensure compliance with all relevant criteria.



APPENDIX A

Development Layout Plans



Notes

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- Cadastral data supplied by others and is approximate only.
- Earthworks for Sewer Rising Main and full service road will be completed with Stage 1.
- Indicative road horizontal design, subject to biopods and engineering review.
- This note is an integral part of this plan. This plan may not be reproduced without this notation being included.



LEGEND

- HARDSTAND
- CAR PARK
- COLLECTOR ROAD
- CRUSHED ROCK TO FIRE ACCESS TRACK
- AREA OF GRASS / LANDSCAPING
- BIO DETENTION, GREEN CORRIDOR, STORMWATER EASEMENT
- WAREHOUSE
- OFFICE
- STAFF OUTDOOR
- AWNING
- ESTATE ROAD CONNECTION TO EXTERNAL ROAD NETWORK
- TRUCK ENTRY/EXIT
- POWER EASEMENT MAINTENANCE ACCESS POINT
- ESTATE BOUNDARY LINE
- LOT BOUNDARY LINE
- BUILDING SETBACK LINE
- LANDSCAPE SETBACK LINE
- FENCE LINE
- RETAINING WALL

PARKING PROVISION

SITE	PARKING RATIO	
WAREHOUSES	0.66 (approximately 1/150m²)	
PARKING TOTAL	REQUIRED	PROVIDED
activity/amenities	TBC	3915

NOTE : Ratio applied to calculate required car parking for combined facility area including warehouse & associated offices

DEVELOPMENT ANALYSIS

LOT 1	30,990m²
LOT 2	31,274m²
WAREHOUSE 1	20,000m²
OFFICE (INCLD. 100m² DOCK OFFICE)	1,100m²
LOT 3	24,981m²
WAREHOUSE 1	6,600m²
OFFICE	300m²
WAREHOUSE 2	5,850m²
OFFICE	300m²
LOT 4	17,479m²
WAREHOUSE 1	7,950m²
OFFICE	400m²
LOT 5	15,005m²
WAREHOUSE 1	6,850m²
OFFICE	350m²
LOT 6	15,503m²
WAREHOUSE 1	6,550m²
OFFICE	300m²
LOT 7	49,645m²
WAREHOUSE 1A	12,100m²
OFFICE (INCLD. 100m² DOCK OFFICE)	600m²
WAREHOUSE 2A	7,000m²
OFFICE (INCLD. 100m² DOCK OFFICE)	400m²
WAREHOUSE 2B	5,800m²
OFFICE (INCLD. 100m² DOCK OFFICE)	400m²
LOT 8	39,921m²
WAREHOUSE 1A	9,750m²
OFFICE (INCLD. 100m² DOCK OFFICE)	600m²
WAREHOUSE 1B	9,250m²
OFFICE (INCLD. 100m² DOCK OFFICE)	600m²
LOT 9	108,081m²
WAREHOUSE 1A	14,100m²
OFFICE (INCLD. 100m² DOCK OFFICE)	800m²
WAREHOUSE 1B	14,300m²
OFFICE (INCLD. 100m² DOCK OFFICE)	800m²
WAREHOUSE 2A	15,900m²
OFFICE (INCLD. 100m² DOCK OFFICE)	900m²
WAREHOUSE 2B	15,900m²
OFFICE (INCLD. 100m² DOCK OFFICE)	900m²
LOT 10	120,643m²
WAREHOUSE 1A	19,300m²
OFFICE (INCLD. 100m² DOCK OFFICE)	1000m²
WAREHOUSE 1B	19,300m²
OFFICE (INCLD. 100m² DOCK OFFICE)	1000m²
WAREHOUSE 2A	10,700m²
OFFICE (INCLD. 100m² DOCK OFFICE)	700m²
WAREHOUSE 2B	10,200m²
OFFICE (INCLD. 100m² DOCK OFFICE)	600m²
WAREHOUSE 2C	9,300m²
OFFICE (INCLD. 100m² DOCK OFFICE)	700m²
LOT 11	109,982m²
WAREHOUSE 1A	17,650m²
OFFICE (INCLD. 100m² DOCK OFFICE)	900m²
WAREHOUSE 1B	17,800m²
OFFICE (INCLD. 100m² DOCK OFFICE)	900m²
WAREHOUSE 1C	13,200m²
OFFICE (INCLD. 100m² DOCK OFFICE)	800m²
WAREHOUSE 1D	13,200m²
OFFICE (INCLD. 100m² DOCK OFFICE)	800m²
LOT 12	98,224m²
WAREHOUSE 1A	15,700m²
OFFICE (INCLD. 100m² DOCK OFFICE)	800m²
WAREHOUSE 1B	14,350m²
OFFICE (INCLD. 100m² DOCK OFFICE)	800m²
WAREHOUSE 1C	12,400m²
OFFICE (INCLD. 100m² DOCK OFFICE)	800m²
WAREHOUSE 1D	12,400m²
OFFICE (INCLD. 100m² DOCK OFFICE)	800m²
LOT 13	142,280m²
WAREHOUSE 1A	20,550m²
OFFICE (INCLD. 100m² DOCK OFFICE)	1100m²
WAREHOUSE 1B	19,850m²
OFFICE (INCLD. 100m² DOCK OFFICE)	1100m²
WAREHOUSE 2A	20,800m²
OFFICE (INCLD. 100m² DOCK OFFICE)	1100m²
WAREHOUSE 2B	20,000m²
OFFICE (INCLD. 100m² DOCK OFFICE)	1100m²
LOT 14	80,077m²
WAREHOUSE 1A	12,100m²
OFFICE (INCLD. 100m² DOCK OFFICE)	700m²
WAREHOUSE 1B	12,100m²
OFFICE (INCLD. 100m² DOCK OFFICE)	700m²
WAREHOUSE 1C	24,050m²
OFFICE (INCLD. 100m² DOCK OFFICE)	1300m²
LOT 15	82,432m²
WAREHOUSE 1A	10,350m²
OFFICE	500m²
WAREHOUSE 1B	9,050m²
OFFICE	500m²
WAREHOUSE 1C	12,250m²
OFFICE	600m²
WAREHOUSE 1D	7,850m²
OFFICE	400m²
TOTAL BLDG AREA (LOT 1 Amenities not included)	540,800m²
SITE COVERAGE	
TOTAL SITE AREA	1,177,359m²
INTERNAL ROADS	71,013m²
BIO-DETENTION BASIN	14,302m²
BIO-DIVERSITY+25m BUFFER	76,670m²
STORMWATER EASEMENT 1	5,790m²
STORMWATER EASEMENTS (2)	26,074m²
ROAD WIDENING	16,992m²
TOTAL DEVELOPABLE AREA	966,518m²
SITE COVERAGE	55.95%

No. DATE:	REVISION:	BY:	CHK:
P7 26.06.2022	PRELIMINARY ISSUE	JWK	GP
P8 01.08.2022	CIVIL & LOT ALIGNMENT ISSUE	JWK	GP
P9 02.09.2022	CIVIL UPDATES	JWK	GP
P1 26.09.2022	TRUCK MOVEMENT UPDATES	JWK	GP
0			

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PROJECT:
North Maclean
Crowson Ln, North Maclean, Logan, QLD

TITLE:
MASTERPLAN

CLIENT:
Charter Hall

NOTE:
HARDSTAND LEVELS BASED ON 6.0m EXCLUSION ZONE BELOW LOWEST SAG POINT OF EXISTING POWERLINES INCLUDING 5.0m OPERATIONAL ZONE CLEAR BELOW.
ACCESS TO ELECTRICAL TOWERS FROM COLLECTOR AND PRIVATE ROADS TO CIVIL ENG'S DESIGN
PROVIDE PROTECTION TO TOWERS LOCATED 5m MINIMUM FROM EACH LEG

DATE: MARCH, 2022
DRAWN BY: MB/JWK
SCALE: 1:2500 @ A1
SCALE: 1:5000 @ A3

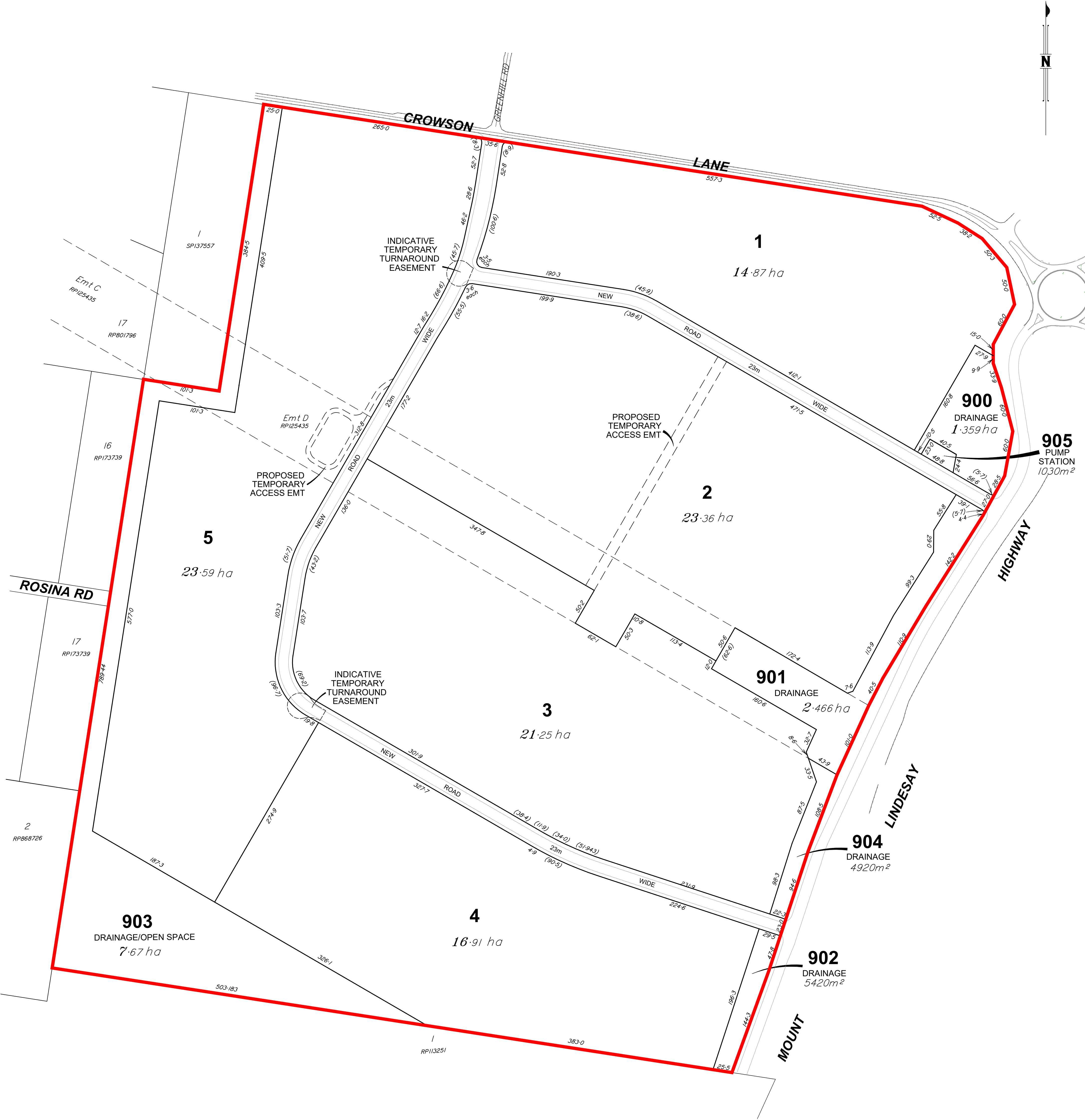
JOB NO:	22055
DRAWING NO:	MP01
REVISION:	P10





Appendix B

Plan of Reconfiguration

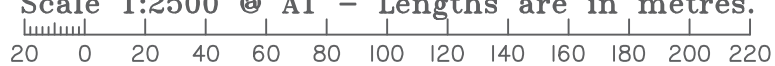


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WOLTER
consulting group

Scale 1:2500 @ A1 - Lengths are in metres.



 Planning

 Urban Design

 Landscape

 Environment

 Surveying

Plan of Reconfiguration
4499-4651 Mount Lindesay Highway
Description Local Authority Lot 39 on SP258739 Logan City

CLIENT
Charter Hall Group

DRAWING NO.	VERSION
22-0007P/01-02	E
DATE DRAWN	SHEET NO.
14-08-2023	1 of 1

PLANS AND DOCUMENTS referred to in the PDA DEVELOPMENT APPROVAL
Approval no.: DEV2018/961/8
Date: 27/09/2023


Queensland Government

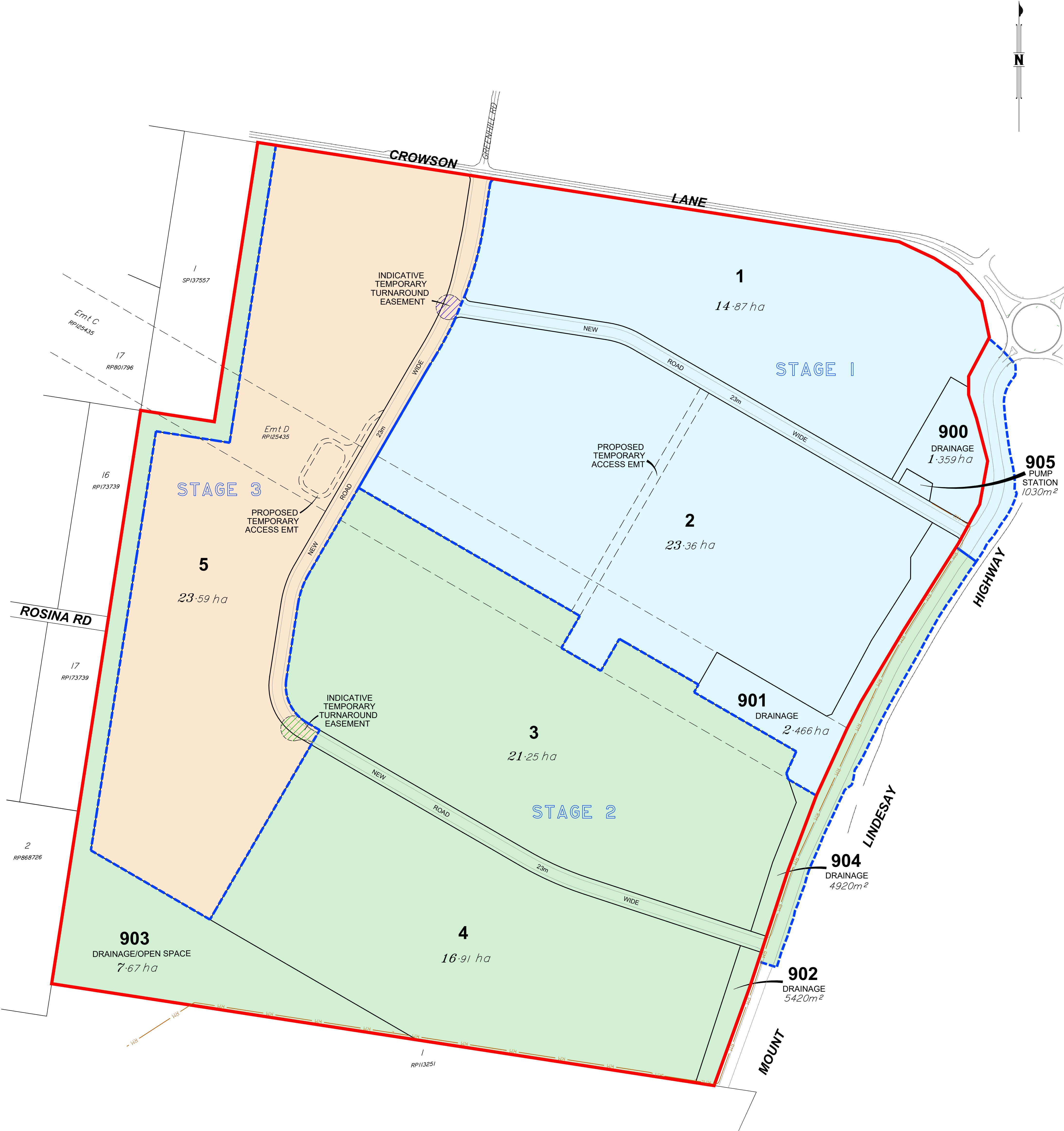
Legend	
	Site Boundary
	Stage Boundary

Table of Development	
Gross area of subject land.....	117.9 ha
Area of proposed park, drainage and open space....	12.6 ha (Including pump station)
Area of new road.....	5.32 ha
Length of new road.....	2299m
Net area of subject land.....	99.98 ha (Excluding park & open space)
Number of proposed lots.....	11
Number of existing lots.....	1

Appendix C

Staging Plan





Notes

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PLANS AND DOCUMENTS referred to in the PDA DEVELOPMENT APPROVAL
Approval no.: **DEV2018/961/8**
Date: **27/09/2023**



Legend	
—	Site Boundary
—	Stage Boundary
 	Stage 1
 	Indicative Temporary Turnaround - Stage 1
 	Stage 2
 	Indicative Temporary Turnaround - Stage 2
 	Stage 3
—	Sewer Rising Main



APPENDIX B

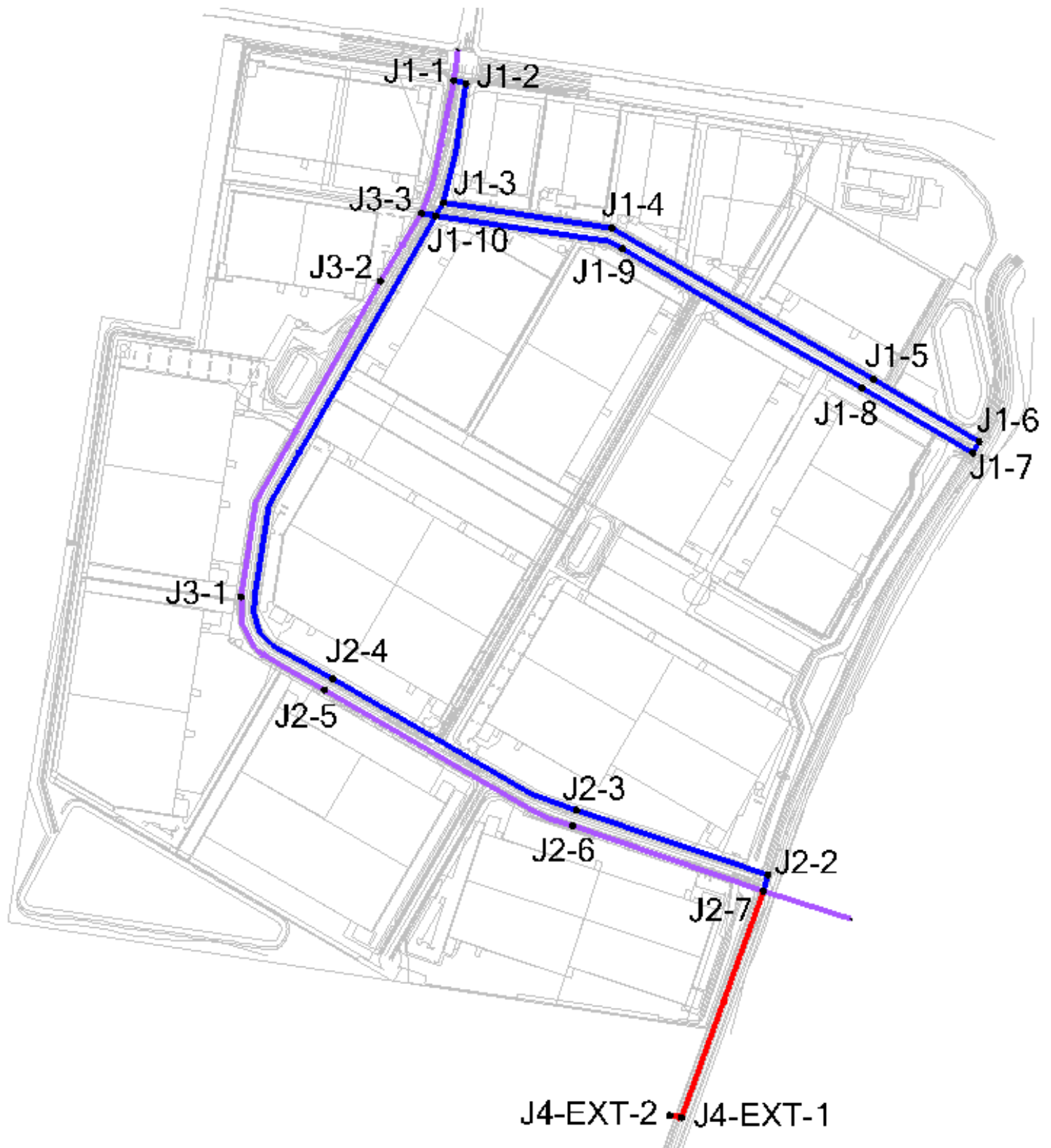
Concept Water Network Sizing and Layout Plan



APPENDIX C

EP Water Demand Calculations & WaterCAD Modelling Results

WATER NETWORK MODEL JUNCTION LABELLING PLAN



PROJECT: North Maclean Author: MC
 PROJECT NUMBER: 30109334 Software: WaterCad
 DATE: 23/08/2023

WaterCAD Connect Edition 10.01.01.04



STAGE	Lot Number	Lot Area (Ha)	Lot Number	Med Industrial Site (GFA)	Service Station (ha)	EP	10% Contingency	Total Eps	AD (L/s)	NRW (L/s)	MDMM (L/s)	PD (L/s)	PH (L/s)	PH+NRW Design Flow (L/s)
1	Lot 1	3.099	Lot 1		0.5	49	5	54	0.10	0.02	0.12	0.13	0.17	0.19
1	Lot 2	3.1274	Lot 2	2.11		100	10	110	0.21	0.03	0.25	0.27	0.36	0.39
1	Lot 3	2.4981	Lot 3	1.305		62	6	68	0.13	0.02	0.16	0.17	0.22	0.24
1	Lot 4	1.7479	Lot 4	0.835		39	4	43	0.08	0.01	0.10	0.11	0.14	0.15
1	Lot 5	1.5005	Lot 5	0.72		34	3	37	0.07	0.01	0.09	0.09	0.12	0.13
1	Lot 6	1.5503	Lot 6	0.685		32	3	36	0.07	0.01	0.08	0.09	0.12	0.13
1	Lot 9	10.8081	Lot 9	6.36		301	30	331	0.63	0.10	0.76	0.82	1.07	1.17
1	Lot 10	12.0643	Lot 10	7.28		344	34	378	0.72	0.11	0.87	0.94	1.23	1.34
2	Lot 11	10.9982	Lot 11	6.525		308	31	339	0.65	0.10	0.78	0.84	1.10	1.20
2	Lot 12	9.8224	Lot 12	5.805		274	27	302	0.58	0.09	0.69	0.75	0.98	1.07
2	Lot 14	8.0077	Lot 14	5.095		241	24	265	0.51	0.08	0.61	0.66	0.86	0.94
2	Lot 15	8.2432	Lot 15	4.15		196	20	216	0.41	0.06	0.49	0.54	0.70	0.76
3	Lot 7	4.9645	Lot 7	2.63		124	12	137	0.26	0.04	0.31	0.34	0.44	0.48
3	Lot 8	3.9921	Lot 8	2.02		95	10	105	0.20	0.03	0.24	0.26	0.34	0.37
3	Lot 13	14.228	Lot 13	8.56		404	40	445	0.85	0.13	1.02	1.10	1.44	1.57
4	External Lot	16.0435	External Lot	11.23045		531	53	584	1.11	0.17	1.34	1.45	1.90	2.06
Total				65.31045		3135	313	3448	6.59	1.00	7.90	8.56	11.19	12.19

PROJECT: 30109334		Author: Mike Cazerres					
DATE: 21/01/2024		Software: WaterCAD Connect Edition					
ULTIMATE + EXTERNAL SCENARIO MODELLING RESULTS							
						Design & Consultancy for natural and built assets	
		STANDARD FLOW		FIRE FLOW			
ELEVATION (m)	JUNCTION LABEL NUMBER	MIN. PRESSURE (PH) (m)	MAX. PRESSURE (AD) (m)	FLOW NEEDED (L/s)	SATISFIES FF	MIN. RESIDUAL PRESSURE (m)	MAX. VELOCITY (m/s)
32.0	J1-1	36.85	38.43	30.00	TRUE	24.40	1.36
30.5	J1-10	38.32	39.91	30.00	TRUE	24.91	1.36
32.0	J1-2	36.85	38.43	30.00	TRUE	24.04	1.71
30.5	J1-3	38.32	39.91	30.00	TRUE	24.87	1.36
27.5	J1-4	41.29	42.9	30.00	TRUE	25.52	1.36
25.0	J1-5	43.77	45.39	30.00	TRUE	26.35	1.36
24.5	J1-6	44.27	45.88	30.00	TRUE	26.70	1.36
25.0	J1-7	43.77	45.38	30.00	TRUE	26.19	1.36
25.5	J1-8	43.27	44.89	30.00	TRUE	25.81	1.36
27.5	J1-9	41.28	42.89	30.00	TRUE	25.27	1.36
25.5	J2-2	43.25	44.87	30.00	TRUE	27.81	1.36
27.0	J2-3	41.75	43.38	30.00	TRUE	24.80	1.36
29.5	J2-4	39.26	40.88	30.00	TRUE	21.81	1.36
29.5	J2-5	39.27	40.89	30.00	TRUE	24.57	1.36
27.0	J2-6	41.75	43.38	30.00	TRUE	26.71	1.36
25.5	J2-7	43.25	44.87	30.00	TRUE	27.99	1.36
30.5	J3-1	38.28	39.89	30.00	TRUE	23.77	1.36
32.0	J3-2	36.81	38.41	30.00	TRUE	22.88	1.36
31.0	J3-3	37.82	39.41	30.00	TRUE	24.52	1.36
31.0	J4-EXT-1	37.76	39.38	30.00	TRUE	22.30	1.36
31.0	J4-EXT-2	37.76	39.38	30.00	TRUE	22.28	1.36

Author: Mike Cazeres
Software: WaterCAD Connect Edition

DATE: 21/01/2024

ULTIMATE SCENARIO MODELLING RESULTS



		STANDARD FLOW		FIRE FLOW			
ELEVATION (m)	JUNCTION LABEL NUMBER	MIN. PRESSURE (PH) (m)	MAX. PRESSURE (AD) (m)	FLOW NEEDED (L/s)	SATISFIES FF	MIN. RESIDUAL PRESSURE (m)	MAX. VELOCITY (m/s)
32.0	J1-1	37.58	38.83	30.00	TRUE	25.41	0.73
30.5	J1-10	39.05	40.31	30.00	TRUE	26.49	1.12
32.0	J1-2	37.57	38.83	30.00	TRUE	25.20	1.29
30.5	J1-3	39.05	40.31	30.00	TRUE	26.40	1.05
27.5	J1-4	42.02	43.3	30.00	TRUE	27.07	1.17
25.0	J1-5	44.5	45.79	30.00	TRUE	27.92	1.10
24.5	J1-6	45	46.29	30.00	TRUE	28.26	1.10
25.0	J1-7	44.5	45.79	30.00	TRUE	27.76	1.10
25.5	J1-8	44	45.29	30.00	TRUE	27.38	1.10
27.5	J1-9	42.01	43.3	30.00	TRUE	26.85	1.17
25.5	J2-2	44.01	45.29	30.00	TRUE	29.88	1.23
27.0	J2-3	42.5	43.79	30.00	TRUE	26.75	1.02
29.5	J2-4	40.01	41.3	30.00	TRUE	23.66	0.83
29.5	J2-5	40.02	41.3	30.00	TRUE	26.65	0.73
27.0	J2-6	42.51	43.8	30.00	TRUE	28.80	0.73
25.5	J2-7	44.01	45.29	30.00	TRUE	30.08	0.73
30.5	J3-1	39.03	40.31	30.00	TRUE	25.85	0.73
32.0	J3-2	37.55	38.82	30.00	TRUE	24.97	0.73
31.0	J3-3	38.55	39.82	30.00	TRUE	26.14	0.73
31.0	J4-EXT-1	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)
31.0	J4-EXT-2	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)

PROJECT:

30109334

DATE:

21/01/2024

Author:

Mike Cazerres

Software:

WaterCAD Connect Edition

STAGE 1 + 2 SCENARIO MODELLING RESULTS



		STANDARD FLOW		FIRE FLOW			
ELEVATION (m)	JUNCTION LABEL NUMBER	MIN. PRESSURE (PH) (m)	MAX. PRESSURE (AD) (m)	FLOW NEEDED (L/s)	SATISFIES FF	MIN. RESIDUAL PRESSURE (m)	MAX. VELOCITY (m/s)
32.0	J1-1	38.39	39.29	30.00	TRUE	26.32	0.70
30.5	J1-10	39.87	40.78	30.00	TRUE	27.42	1.13
32.0	J1-2	38.39	39.29	30.00	TRUE	26.11	1.28
30.5	J1-3	39.87	40.78	30.00	TRUE	27.32	1.05
27.5	J1-4	42.84	43.76	30.00	TRUE	27.99	1.17
25.0	J1-5	45.32	46.25	30.00	TRUE	28.84	1.10
24.5	J1-6	45.82	46.75	30.00	TRUE	29.19	1.11
25.0	J1-7	45.32	46.25	30.00	TRUE	28.69	1.11
25.5	J1-8	44.82	45.75	30.00	TRUE	28.30	1.11
27.5	J1-9	42.83	43.76	30.00	TRUE	27.77	1.17
25.5	J2-2	44.84	45.76	30.00	TRUE	30.86	1.24
27.0	J2-3	43.33	44.26	30.00	TRUE	27.71	1.02
29.5	J2-4	40.84	41.77	30.00	TRUE	24.61	0.83
29.5	J2-5	40.86	41.77	30.00	TRUE	27.63	0.70
27.0	J2-6	43.35	44.27	30.00	TRUE	29.78	0.70
25.5	J2-7	44.84	45.76	30.00	TRUE	31.06	0.70
30.5	J3-1	39.86	40.78	30.00	TRUE	26.83	0.70
32.0	J3-2	38.37	39.28	30.00	TRUE	25.91	0.70
31.0	J3-3	39.37	40.28	30.00	TRUE	27.07	0.70
31.0	J4-EXT-1	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)
31.0	J4-EXT-2	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)

PROJECT:

30109334

DATE:

21/01/2024

Author:

Mike Cazerres

Software:

WaterCAD Connect Edition

STAGE 1 SCENARIO MODELLING RESULTS



Design & Consultancy
for natural and
built assets

		STANDARD FLOW		FIRE FLOW			
ELEVATION (m)	JUNCTION LABEL NUMBER	MIN. PRESSURE (PH) (m)	MAX. PRESSURE (AD) (m)	FLOW NEEDED (L/s)	SATISFIES FF	MIN. RESIDUAL PRESSURE (m)	MAX. VELOCITY (m/s)
32.0	J1-1	39.6	40	30.00	TRUE	27.76	0.65
30.5	J1-10	41.03	41.47	30.00	TRUE	25.01	1.71
32.0	J1-2	39.59	40	30.00	TRUE	27.41	1.71
30.5	J1-3	41.04	41.47	30.00	TRUE	25.36	1.71
27.5	J1-4	44.01	44.46	30.00	TRUE	25.94	1.71
25.0	J1-5	46.49	46.94	30.00	TRUE	26.74	1.71
24.5	J1-6	46.99	47.44	30.00	TRUE	27.06	1.71
25.0	J1-7	46.49	46.94	30.00	TRUE	26.56	1.71
25.5	J1-8	45.99	46.44	30.00	TRUE	26.16	1.71
27.5	J1-9	44	44.45	30.00	TRUE	25.55	1.71
25.5	J2-2	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)
27.0	J2-3	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)
29.5	J2-4	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)
29.5	J2-5	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)
27.0	J2-6	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)
25.5	J2-7	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)
30.5	J3-1	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)
32.0	J3-2	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)
31.0	J3-3	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)
31.0	J4-EXT-1	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)
31.0	J4-EXT-2	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)

APPENDIX D

Logan Water Draft Technical Memorandum DD8001 North Maclean

Technical Memorandum

To: Water Infrastructure Project Development Program Leader

From: M Seymour (Planning Engineer)

Actioned by: Click or tap here to enter text.

Date: 21 July 2022

Reference: DD8001 North Maclean

Subject: Load Projections for North Maclean PDA

1. Overview

The purpose of this memo is to confirm the estimated loads associated with the North Maclean PDA based on the best available current information as provided by developers.

1.1 Developer Information

The developer of “Charter Hall – Industrial Subdivision”, 4499-4651 Mount Lindesay Highway, North Maclean is represented by Arcadis who have provided several plans showing the extent of the development that they are proposing. These are included in Attachment A. The development areas within the North Maclean PDA are shown in Figure 1.

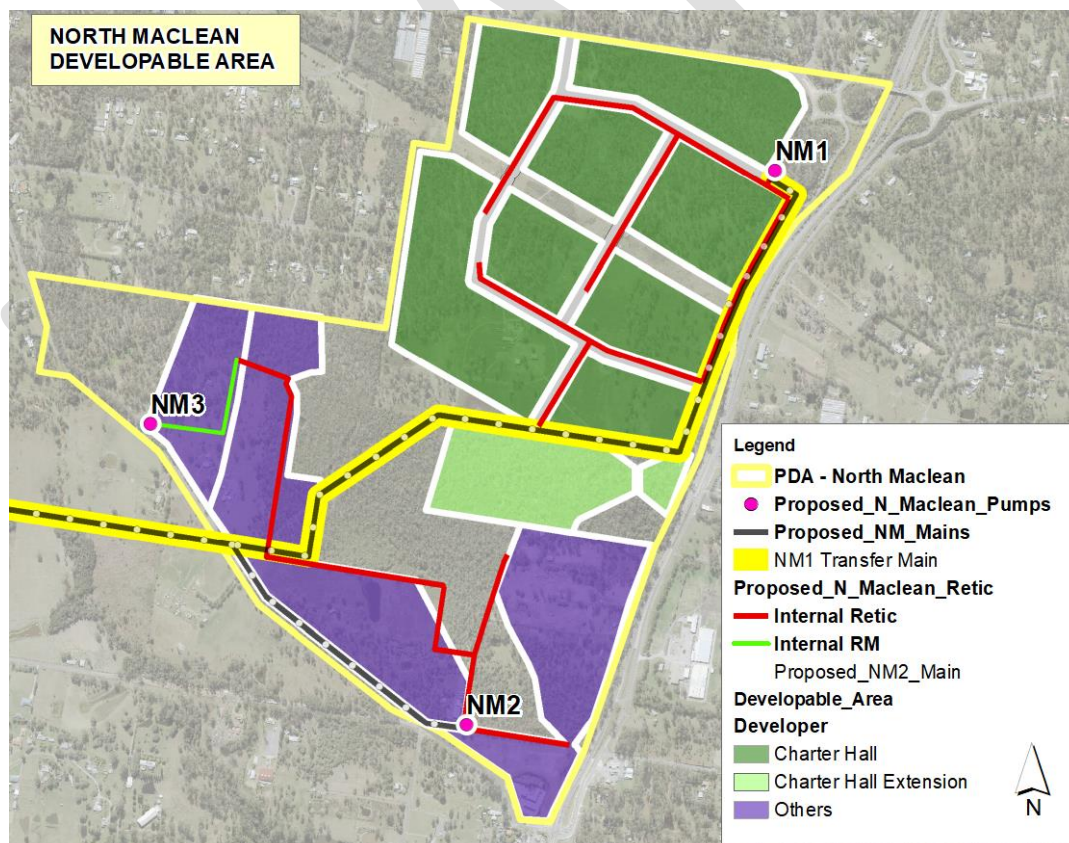


Figure 1: Development areas

The development areas include:

- Charter Hall subdivision which is the main focus for development (represented by Arcadis)

- Charter Hall extension immediately south of the main focus of development (also represented by Arcadis)
- Development areas draining to NM2 and NM3 (number of individual property owners)

Preliminary development plans have been submitted by Arcadis (developer's representative) for areas draining to NM1 transfer pump station.

The North Maclean PDA has been designated as an industrial precinct. The Charter Hall sub-division has not indicated the type of development (i.e. light, medium or heavy industry) and this will depend on the individual lot sales.

1.1.1 Development Constraints

The main constraint within the North Maclean PDA is flooding and Arcadis is proposing significant earthworks to raise the area above the Q100 flood level shown in Figure 2. They will also be installing stormwater basins and drainage channels.

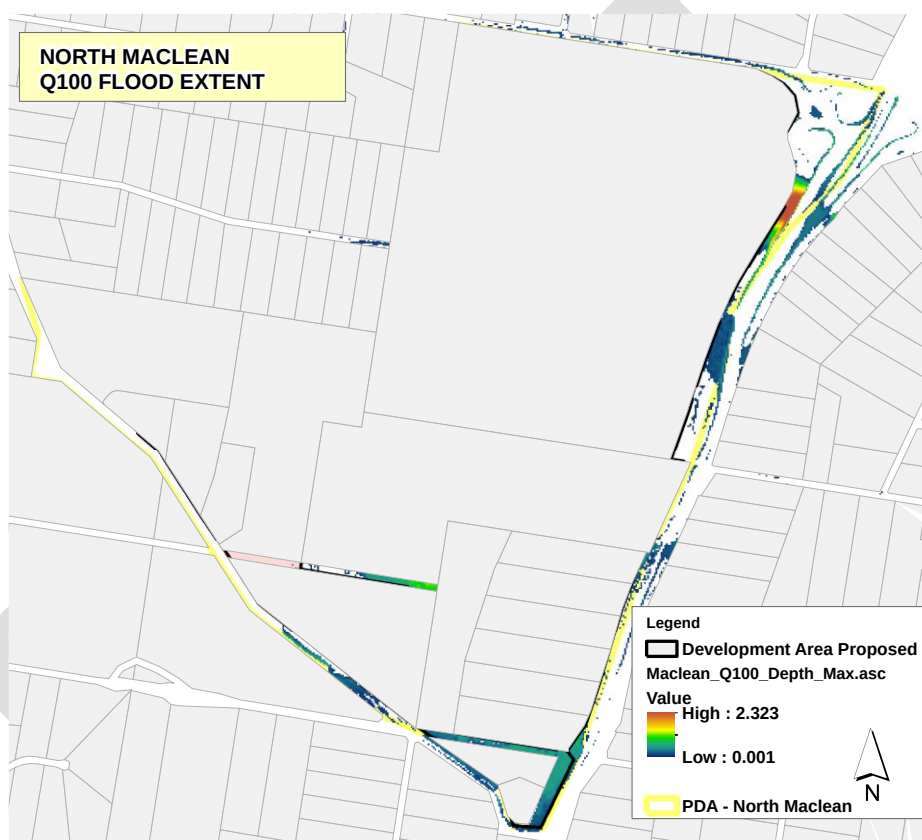


Figure 2: Q100 Flood Constraints

Arcadis have submitted bulk earthworks plans for the areas proposed for development. These are shown in Figure 3 and Figure 4.



Figure 3: Bulk Earthworks in Charter Hall Subdivision

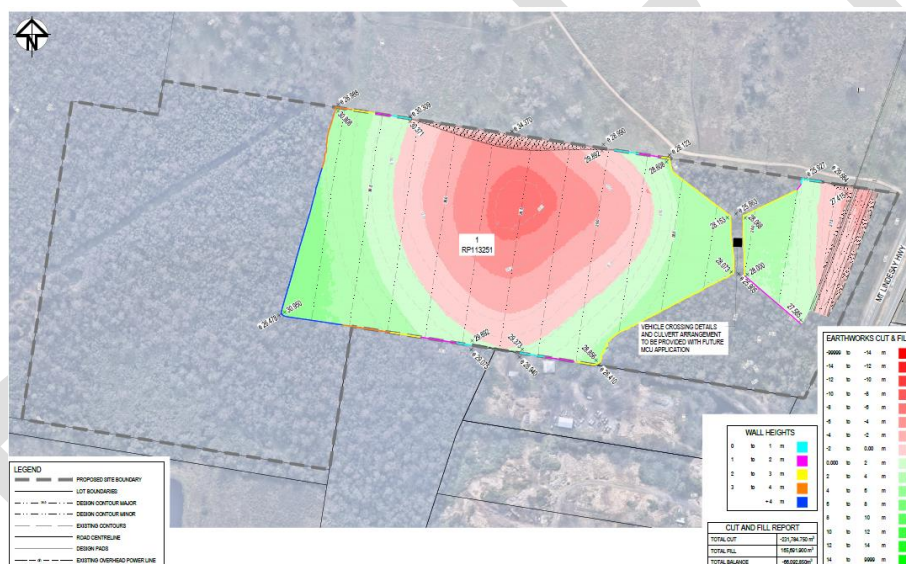


Figure 4: Bulk Earthworks in Charter Hall extension area.

2. Load assumptions

The North Maclean PDA is a designated industrial use precinct. The load estimates have been based on the following table extract from the task report "Infrastructure Demand Model 2020 (IP0017), September 2021. The industrial conversion rates were based on typical water consumption rates associated with several non-residential uses along with a return to sewer factor.

Table 4-2: Non-residential conversion rates – Base Year and/or growth years*

IDM Development Type	Average Water Consumption Method Adopted	Conversion Rates - Water		Return to Sewer (%)	Conversion Rates - Sewage	
		Gross Site Area Water EP/HA (Density Gross)	Gross Floor Area Water EP/HA (Density GFA)		Gross Site Area Water EP/HA (Density Gross)	Gross Floor Area Water EP/HA (Density GFA)
Commercial	GFA, 5 th -95 th %ile	-	55.90	0.90	-	50.31
Office	As per Commercial		55.90	0.90		50.31
Warehouse Distribution	As per Commercial		55.90	0.90		50.31
Education	GFA, 5 th -95 th %ile	-	105.30	0.80	-	84.24
Health	GFA, 5 th -95 th %ile	-	226.50	0.90	-	203.85
Industry Heavy	50% above Light Industrial	-	56.60	0.80	-	45.28
Industry Medium	25% above Light Industrial	-	47.25	0.80	-	37.80
Industry Light	GFA, 5 th -95 th %ile	-	37.80	0.80	-	30.24
Sport Recreation	Gross, 10 th -90 th %ile	1.05	-	0.90	0.945	-
Rural	Based on Water Meter Consumption	-	-	-	-	-
Retail Services	GFA, 5 th -95 th %ile	-	97.60	0.90	-	87.84
Showroom Bulk Goods	GFA, 5 th -95 th %ile	-	110.80	0.90	-	99.72
Accommodation	GFA, 5 th -95 th %ile	-	233.90	0.90	-	210.51

Reference: Table 7.2 Development of Infrastructure Demand Model, LWIA 2018 (PI-181).

Table 1: Non-residential conversion rates

Industrial use was subdivided into consumption rates for light, medium and heavy industry. It should be noted that these are averages and in the case of very high users such as bottling plants, abattoirs, concrete manufacturers, etc individual assessments of load will be necessary.

The consumption rates have been based on GFA and it has been assumed that this is equal to 70% of the developable area that excludes roads, public open space and stormwater lagoons and drainage channels, etc.

The ultimate loads were determined for the developable areas assuming light, medium and heavy industrial uses.

In the absence of any growth rate assumptions from the developer it has been assumed that.

- North Maclean 1 Pump Station catchment
 - 10% of the ultimate load in 2023
 - 90% of ultimate load in 2051
- North Maclean 2 and 3 pump station catchments
 - 10 % of the ultimate load in 2026
 - 90% of the ultimate load in 2051

Ultimate development is assumed in 2081 and linear growth has been assumed between 2023 / 2026 and 2051.

It should be noted that the growth rates are unlikely to have any impact on the transfer infrastructure which has been sized on ultimate loads.

3. Load Estimates and Projection

Figure 5 includes the pump stations servicing the North Maclean PDA.

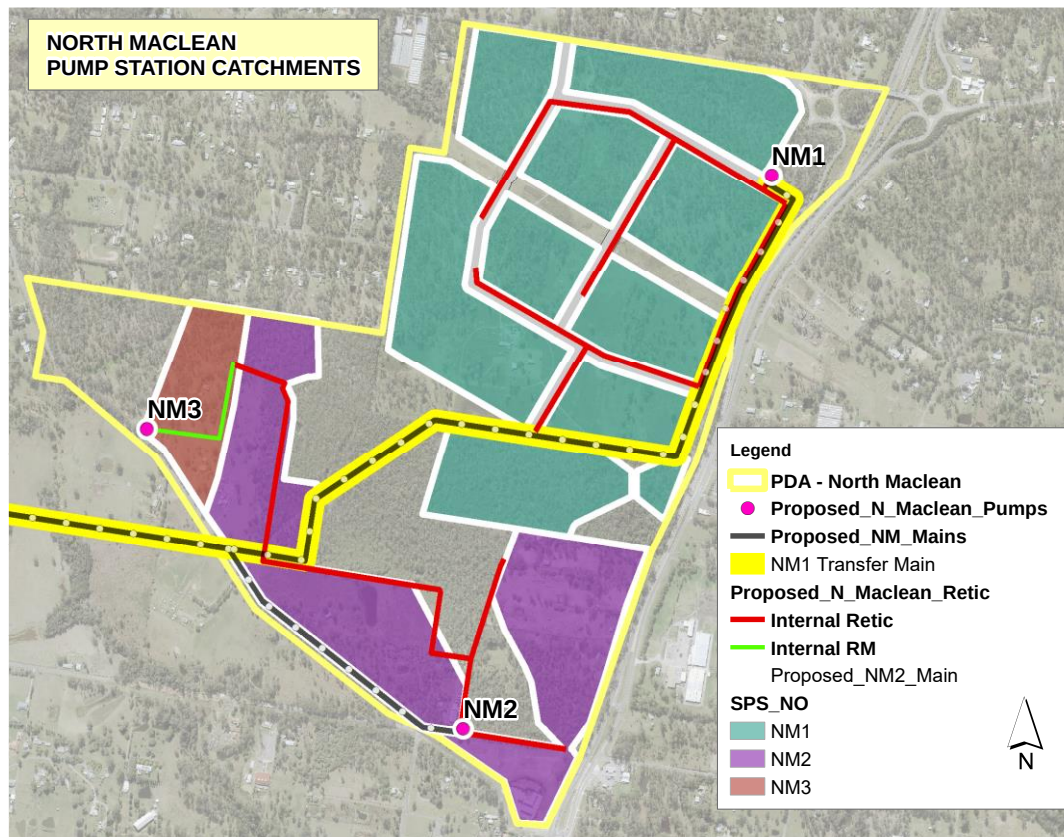


Figure 5: North Maclean pump station catchments

There are three pump stations, NM1 and NM2 are transfer pump stations and inject into a common rising main. NM3 is an internal pump station, and it transfers load to NM2 pump station via internal reticulation.

The ultimate loads have been estimated for the three pump stations and these are included in Table 2.

Table 2: Ultimate Loads

SPS NO	Developable Lot Area Ha	GFA Ha (1)	Light Ind EP (2)	Med Ind EP (3)	Heavy Ind EP (4)	IDM EP ULT
NM1	105	74	2,228	2,785	3,336	3,460
NM2	55	38	1,164	1,455	1,743	1,880
NM3	11	8	230	288	345	255
NM2 Total	66	46	1,394	1,743	2,088	2,135
Totals:	171	120	3,623	4,528	5,424	5,595

Note:

1. GFA assumed 70% of Developable Area
2. Light Industry: 30.24 EP / HA (based on GFA)
3. Medium Industry: 37.80 EP / HA (based on GFA)
4. Heavy Industry: 45.28 EP / HA (based on GFA)

Table 2 also includes ultimate loads for light, medium and heavy industry along with IDM2020 assumptions. The IDM_2020 load assumed in earlier studies was 5,595 EP.

The loads based on industrial use along with projections are included in Table 3.

Table 3: North Maclean PDA – Projected Loads

Medium Industry (3)

SPS NO	Sum of Sewer EP 2023	Sum of Sewer EP 2026	Sum of Sewer EP 2031	Sum of Sewer EP 2036	Sum of Sewer EP 2041	Sum of Sewer EP 2051	Sum of Sewer EP ULT	Developable Lot Area Ha	GFA Ha (1)
NM1	279	517	915	1,313	1,711	2,507	2,785	105	74
NM2		146	349	553	757	1,164	1,455	55	38
NM3		29	69	109	150	230	288	11	8
NM2 Total		174	418	662	906	1,394	1,743	66	46
Totals:	279	692	1,333	1,975	2,617	3,901	4,528	171	120

Light Industry (2)

SPS NO	Sum of Sewer EP 2023	Sum of Sewer EP 2026	Sum of Sewer EP 2031	Sum of Sewer EP 2036	Sum of Sewer EP 2041	Sum of Sewer EP 2051	Sum of Sewer EP ULT	Developable Lot Area Ha	GFA Ha (1)
NM1	223	414	732	1,050	1,369	2,005	2,228	105	74
NM2		116	279	442	605	931	1,164	55	38
NM3		23	55	87	120	184	230	11	8
NM2 Total		139	335	530	725	1,115	1,394	66	46
Totals:	223	553	1,067	1,580	2,094	3,121	3,623	171	120

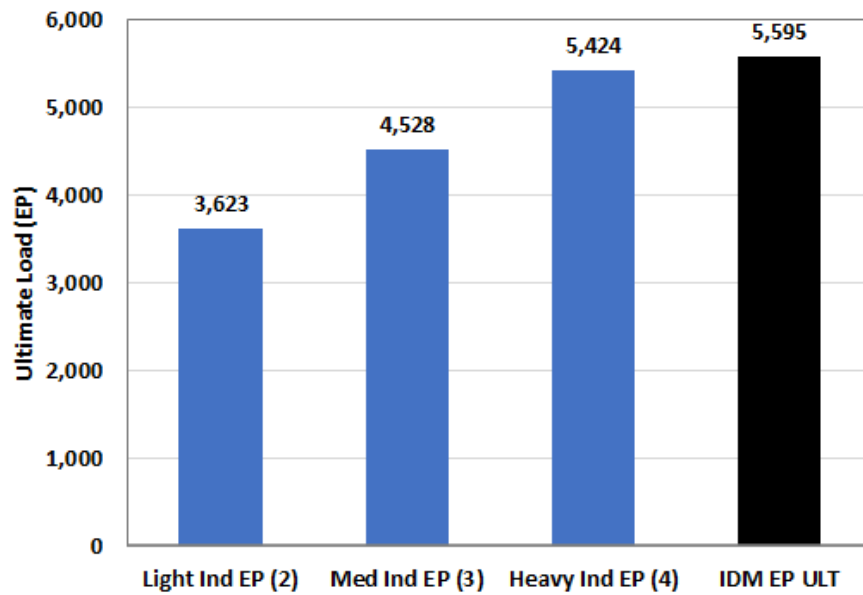
Heavy Industry (4)

SPS NO	Sum of Sewer EP 2023	Sum of Sewer EP 2026	Sum of Sewer EP 2031	Sum of Sewer EP 2036	Sum of Sewer EP 2041	Sum of Sewer EP 2051	Sum of Sewer EP ULT	Developable Lot Area Ha	GFA Ha (1)
NM1	334	620	1,096	1,573	2,050	3,003	3,336	105	74
NM2		174	418	662	906	1,395	1,743	55	38
NM3		34	83	131	179	276	345	11	8
NM2 Total		209	501	793	1,086	1,670	2,088	66	46
Totals:	334	828	1,597	2,366	3,135	4,673	5,424	171	120

Note:

1. GFA assumed 70% of Developable Area
2. Light Industry: 30.24 EP / HA (based on GFA)
3. Medium Industry: 37.80 EP / HA (based on GFA)
4. Heavy Industry: 45.28 EP / HA (based on GFA)

The following Figure 6 compares the ultimate loads based on the industrial use and the IDM_2020 assumption.



Note:

- 1 GFA assumed 70% of Developable Area
- 2 Light Industry 30.24 EP / HA (based on GFA)
- 3 Medium Industry 37.80 EP / HA (based on GFA)
- 4 Heavy Industry 45.28 EP / HA (based on GFA)

Figure 6: Ultimate Loads based on Industrial Use

The growth rates included in Table 3 are shown in the following Figure 7, Figure 8 and Figure 9 for the NM1 and NM2 transfer pump stations and the total North Maclean PDA load.

NM1 Pump Station

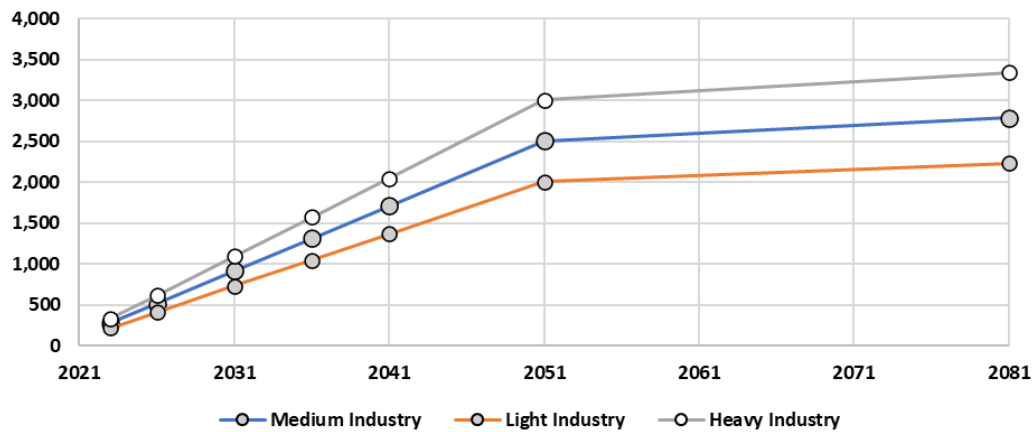


Figure 7: North Maclean 1 Pump Station – Growth Projections

NM2 Pump Station

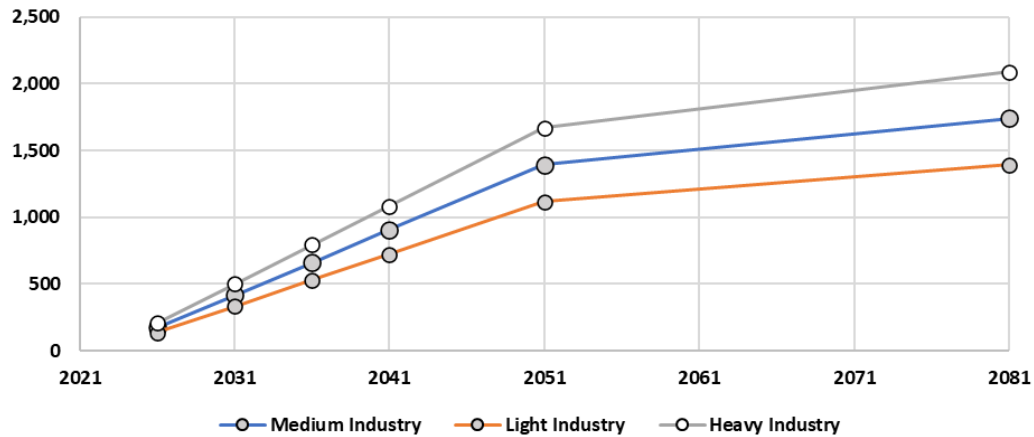


Figure 8: North Maclean 2 Pump Station – Growth Projections

North Maclean PDA Total

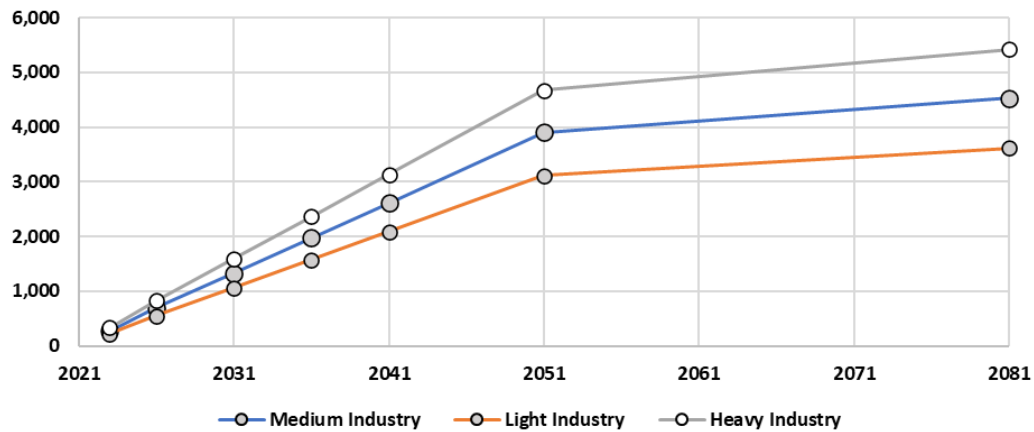


Figure 9: North Maclean PDA – Growth Projections

The type of industry will impact on the loads

- Light Industry 3,623 EP or 65% of IDM 2020 load (5,595 EP)
- Medium Industry 4,528 EP or 81% of IDM 2020 load (5,595 EP)
- Heavy industry 5,424 EP or 97% of IDM 2020 load (5,595 EP)

Indications are that the industrial development is unlikely to be heavy industrial use and will be a mix of light and medium industry.

4. Conclusions

In the absence of more accurate indication of uses it is proposed to adopt the loads based on medium industrial loads. It is unlikely to result in any significant reduction in infrastructure sizing and will allow for some flexibility if there is a need to service any industry with high sewage loads.

5. Recommendations

It is recommended that Logan Water adopt the loads included in Table 4 for development within the North Maclean PDA:

Table 4: Recommended Loads for North Maclean PDA (based on Medium Industrial use)

SPS NO	Sum of Sewer EP 2023	Sum of Sewer EP 2026	Sum of Sewer EP 2031	Sum of Sewer EP 2036	Sum of Sewer EP 2041	Sum of Sewer EP 2051	Sum of Sewer EP ULT
NM1	279	517	915	1,313	1,711	2,507	2,785
NM2		146	349	553	757	1,164	1,455
NM3		29	69	109	150	230	288
NM2 Total		174	418	662	906	1,394	1,743
Totals:	279	692	1,333	1,975	2,617	3,901	4,528

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Attachment 1: Developer Drawings

DRAFT



APPENDIX E

Logan Flow and Pressure Modelling Report - 2021

Hydrant Pressure and Flow Modelling Report

Preamble

This Hydrant Pressure and Flow Modelling Report presents a theoretical estimate of the residual pressure in the water main at the nominated location when water is taken from the system at the indicated flow rate. The information has not been verified by field tests and is presented for information purposes only. Please refer to the limitations described at the end of the report.

It is strongly suggested that field tests are conducted to verify the theoretical results. Note that pressure management has been implemented and it may take up to 60 seconds for the control valve in the water supply network to respond to increases in fire flow demand.

Method

The Hydrant Curve function is used in the H2Omap network modelling software to simulate an increasing demand at a nominated hydrant in the water supply network with peak hour background demand. The residual pressure in the water supply network at the hydrant is calculated by the model for each increase in flow.

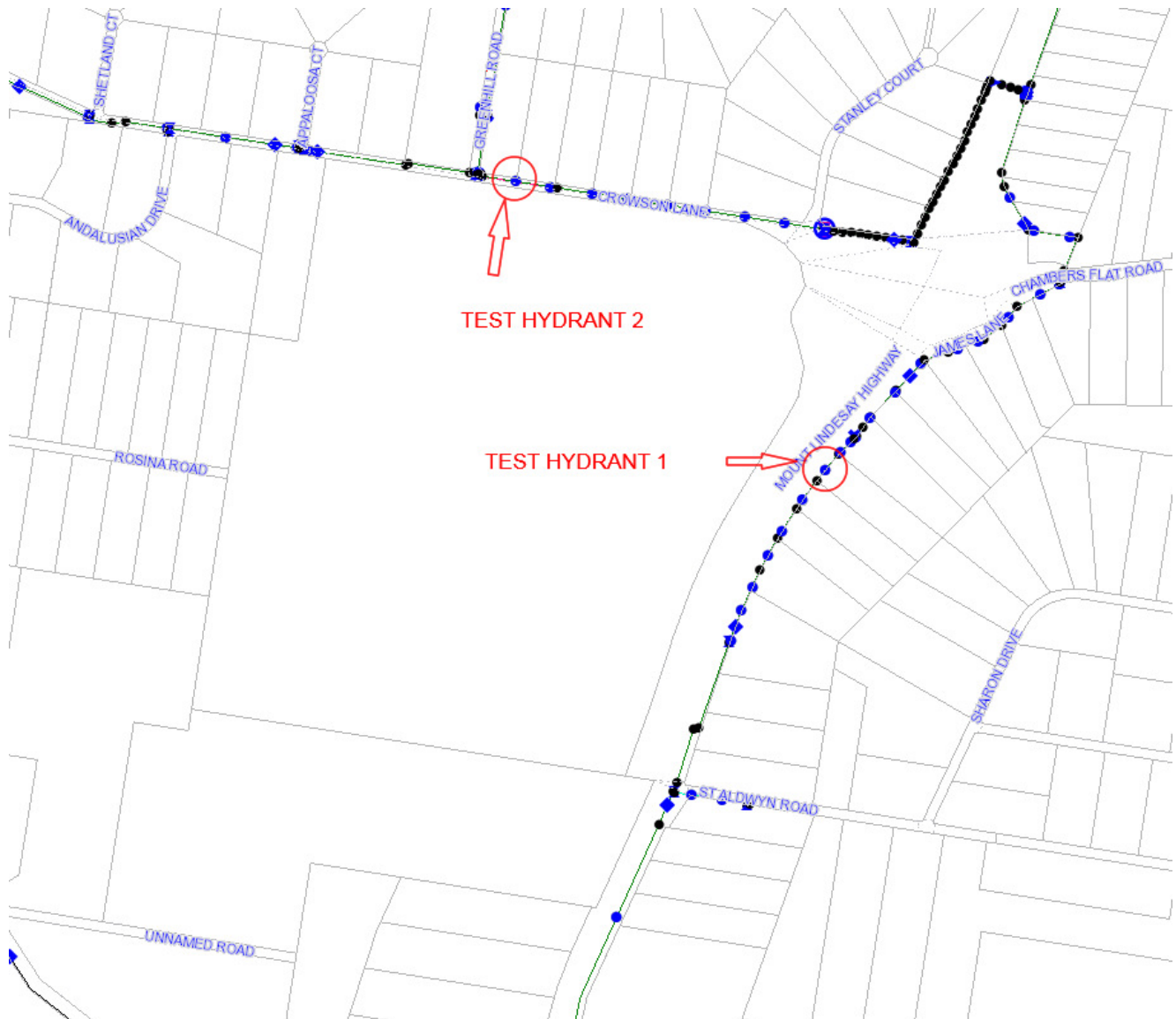
Location

The subject property details and test hydrant locations are provided in Table 1 and the locations of test hydrants are shown in Figure 1.

Table 1 Hydrant Location and Network Parameters

Subject Property Details	
Property Address	4499-4651 Mount Lindesay Highway
Hydrant and Network Parameters – Test Hydrant –connection point 1	
Test Hydrant Asset ID	WFH019651
Hydrant Location	Eastern Verge of Mount Lindesay Highway (at 4556-4564 Mount Lindesay Highway)
Node Elevation (m)	20.97 m AHD
Hydrant and Network Parameters – Test Hydrant –connection point 2	
Test Hydrant Asset ID	WFH019651
Hydrant Location	Northern Verge of Crowson Lane (at 101-109 Crowson Lane)
Node Elevation (m)	30.56 m AHD

Figure 1 Hydrant Test Locations



Results

The results of the hydraulic modelling are presented in Table 2. A graphical representation of the hydrant curve results are shown in Figure 2 and Figure 3.

Table 2 Hydrant Test Results

<i>Normal Supply Conditions / (Peak Day Analysis)</i>		
<i>Hydrant</i>		
Available Flow (L/s)	Test Hydrant 1- Residual Pressure (m)	Test Hydrant 2- Residual Pressure (m)
0.00	54.14	42.31
5.00	49.66	40.56
10.00	48.19	39.00
15.00	46.33	37.40
20.00	44.08	35.40
25.00	41.51	33.13
30.00	38.64	30.64
35.00	35.47	27.94
40.00	32.03	25.05
45.00	28.34	22.00
50.00	24.34	18.76

Figure 2 Hydrant Curve for test hydrant 1

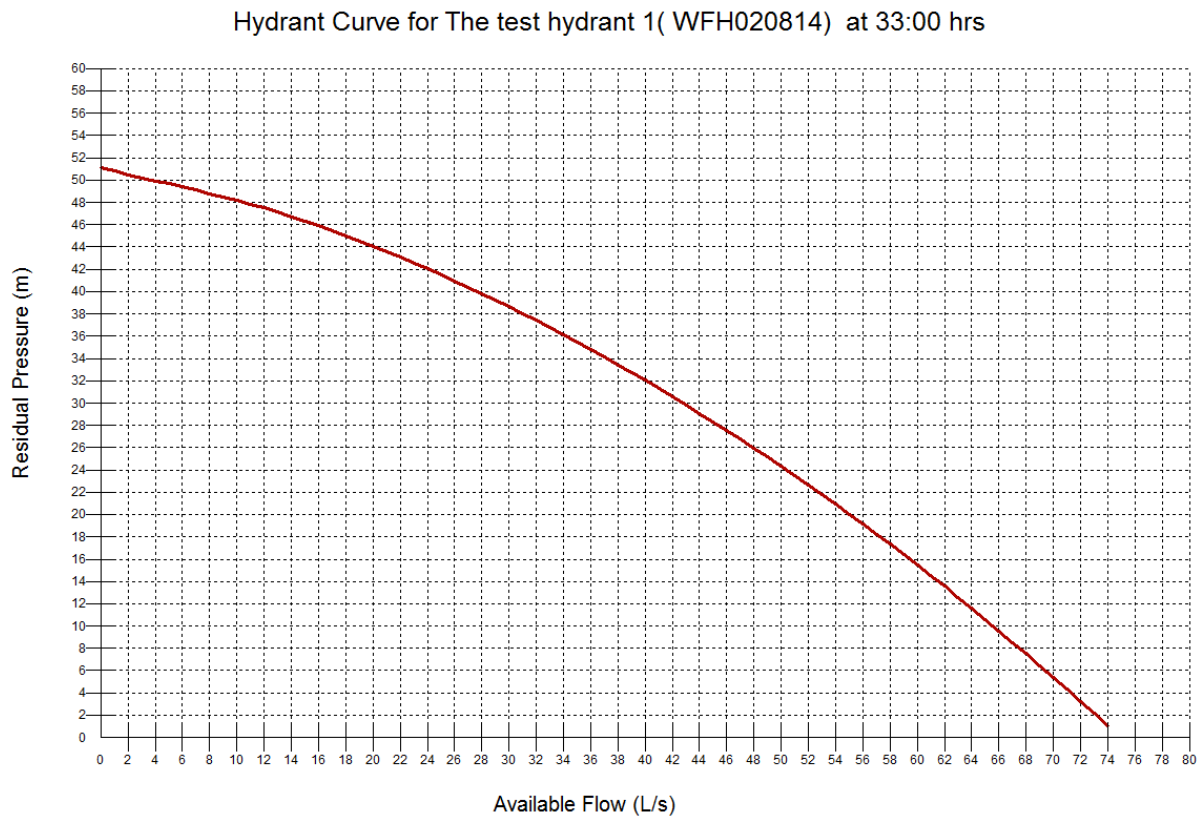
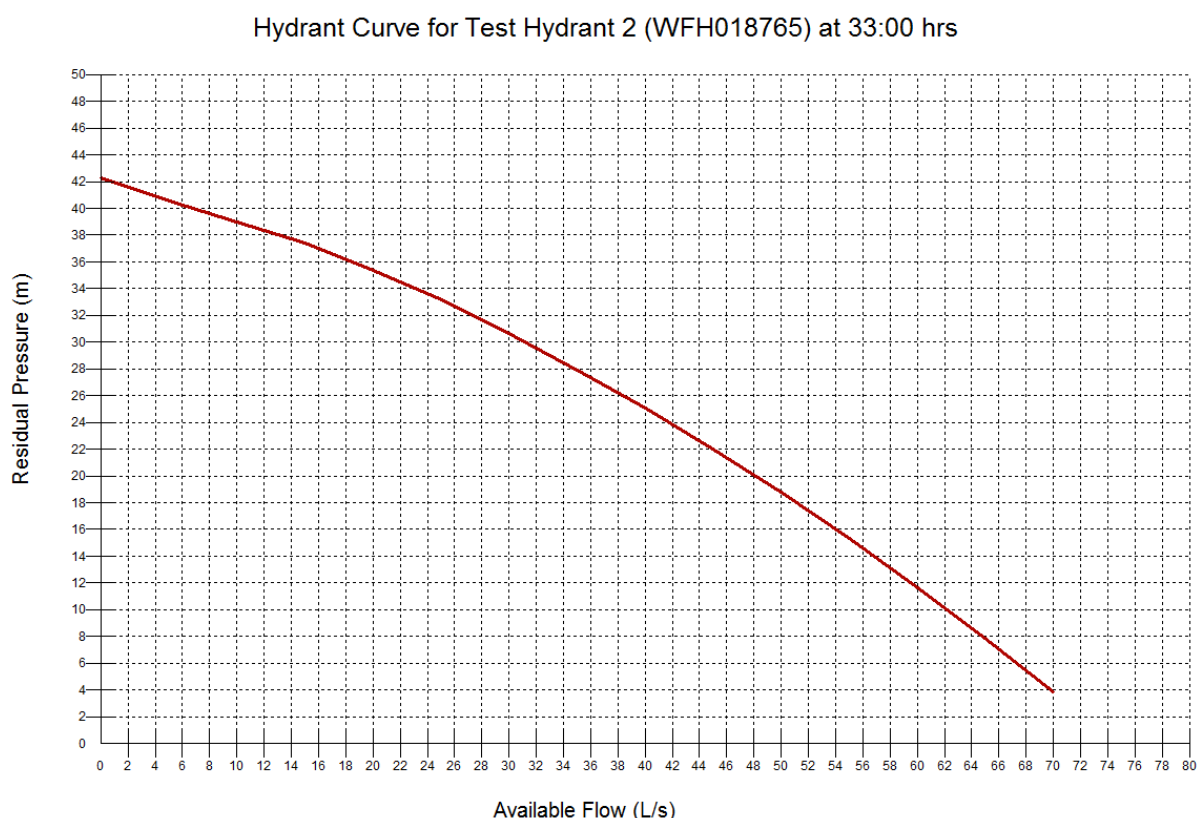


Figure 3 Hydrant Curve for test hydrant 2



Disclaimer

Information requested from Logan Water Infrastructure Development Services relating to hydraulic pressure and flow information is undertaken with the knowledge that such information is based on the most representative hydraulic modelling information available at the time (Hydraulic Modelling Information).

Information provided by Logan Water Infrastructure Development Services is based on hydraulic modelling of an area under the Pressure and Leakage Management Program undertaken by Logan City Council pursuant to government Regulation.

Model results are for the anticipated performance of a commissioned District Metered Area (DMA). Flow rates and system pressures may change after a DMA is commissioned.

The results of the hydraulic assessment may vary from practice due to changes in water supply operational philosophies, water supply policy decisions, maintenance activities on the water supply network and changes in customer demands.

The Hydraulic Modelling Information has not been verified by field measurements and may be inaccurate due to field conditions. Users relying on Hydraulic Modelling Information do so at their

own risk and should make their own independent investigations to verify model outputs after the DMA is commissioned.

Logan Water Infrastructure Development Services do not guarantee and accept no legal liability whatsoever arising from or connected to, the accuracy, reliability, currency or completeness of the Hydraulic Modelling Information. The Hydraulic Modelling Information is made available to users only upon the terms of this disclaimer and no conditions imposed by users apply.



APPENDIX F

HTC Group Flow and Pressure Testing Report - 2022

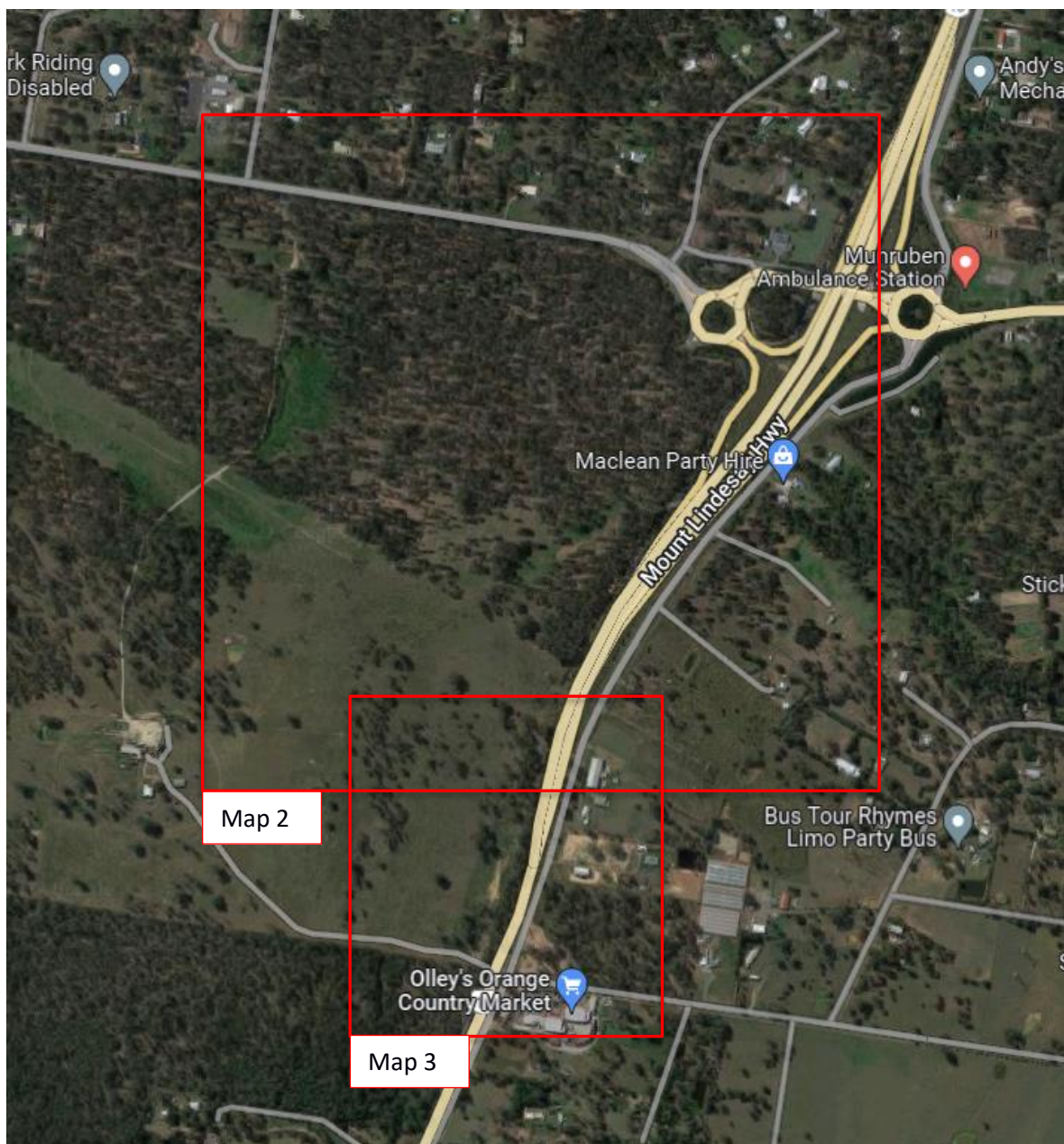
Attention: **Erin Peek**

Arcadis Australia Pacific
Erin.Peek@arcadis.com

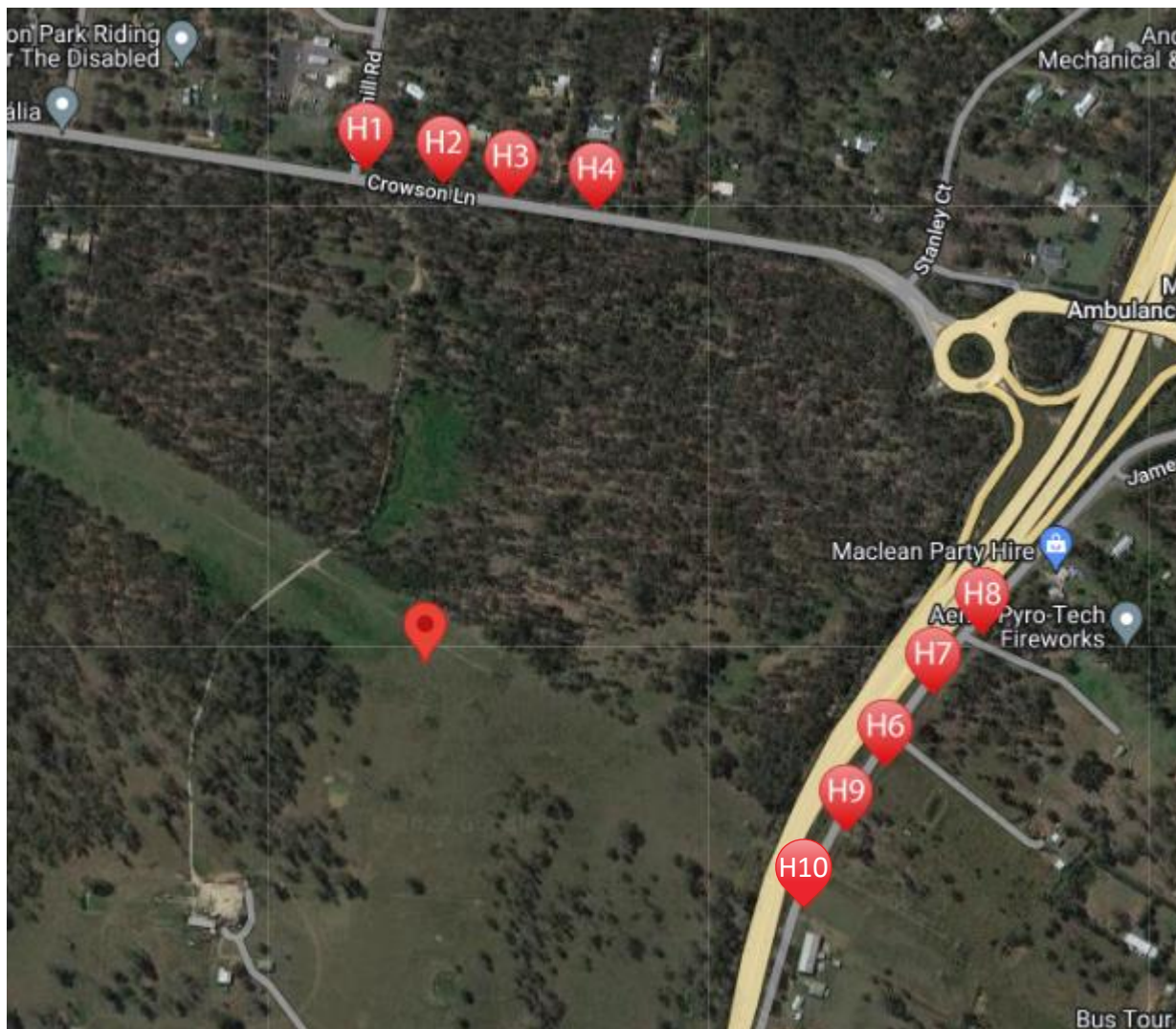
HTC Reference: Q6237

Date: 12th of October, 2022

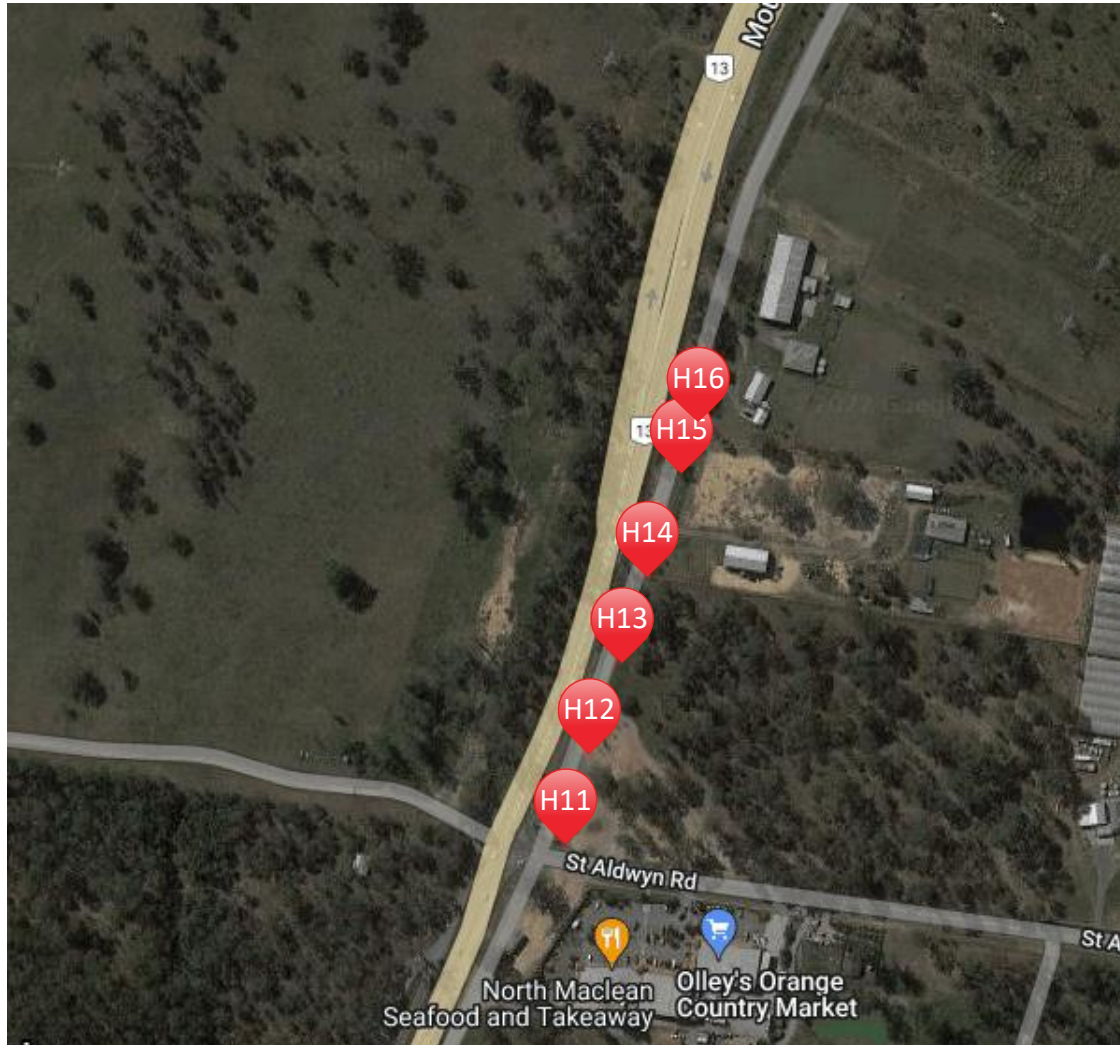
SEQ WS&S D&C Code Test Report for 4499-4651 Mount Lindesay Highway, North MacLean



Map 1: Test location overview



Map 2: Hydrant locations for Crowson Lane (Test 1) and Mount Lindsay Highway North Tests 2 and 3.



Map 3: Hydrant locations for the Mount Lindsay Highway South Tests 4, 5 and 6.

Test Summary

1. The Crowson Lane main (Test 1) was the strongest supply with 3 hydrants flowing simultaneously providing 60L/s at a residual pressure of greater than 120kPa.
2. Mount Lindsay Highway North (Tests 2 and 3) required 4 hydrants to flow simultaneously to provide 60L/s at a residual pressure of greater than 120kPa.
3. Mount Lindsay Highway South (Tests 4, 6 and 6) required 5 hydrants to flow simultaneously to provide 60L/s at a residual pressure of greater than 120kPa.

Test 1: SEQ WS&S D&C Code Crowson Lane Test

Water was simultaneously drawn, at the flow rates below, from a single outlet of street spring hydrants H1, H2 and H3. The pressure was recorded at the outlet of H1, H2 and H3 to determine the hydrant performance. These pressures are used to determine if the main meets the requirements of the SEQ WS&S D&C Code. The residual pressure was recorded from the outlet of street spring hydrant H4.

H1 Flow (L/s)	H1 Hydrant Pressure (kPa)	H2 Flow (L/s)	H2 Hydrant Pressure (kPa)	H3 Flow (L/s)	H3 Hydrant Pressure (kPa)	Total Flow (L/s)	H4 Water Main Residual Pressure (kPa)
0	649	0	645	0	646	0	651
5	600	5	598	5	591	15	630
10	520	10	537	10	538	30	577
15	440	15	434	15	430	45	518
20	320	20	318	20	315	60	460
25	266	20	309	20	306	65	449
25	180	25	155	25	152	75	393
26.2	120	25.8	120	25.6	120	77.6	378

Test 1 Comments: No onsite tap was available for any test due to being a locked gate rural area.

Test 2: SEQ WS&S D&C Code Mount Lindesay Highway North Supply Test 1

Water was simultaneously drawn, at the flow rates below, from a single outlet of street spring hydrants H8, H7 and H6. The pressure was recorded at the outlet of H8, H7 and H6 to determine the hydrant performance. These pressures are used to determine if the main meets the requirements of the SEQ WS&S D&C Code. The residual pressure was recorded from the outlet of street spring hydrant H9.

H8 Flow (L/s)	H8 Hydrant Pressure (kPa)	H7 Flow (L/s)	H7 Hydrant Pressure (kPa)	H6 Flow (L/s)	H6 Hydrant Pressure (kPa)	Total Flow (L/s)	H9 Water Main Residual Pressure (kPa)
0	682	0	695	0	740	0	729
5	628	5	683	5	685	15	689
10	504	10	525	10	566	30	600
15	321	15	343	15	393	45	481
17.9	128	17.8	134	20	179	55.7	337
17.6	120	17.5	120	21.8	120	56.9	319

Test 2 Comments: The flow test was unable to achieve 65L/s @ 120kpa so Test 3 was performed.

Test 3: SEQ WS&S D&C Code Mount Lindesay Highway North Supply Test 2

Water was simultaneously drawn, at the flow rates below, from H6, H7, H8 and H9. The type of equipment and the number of flowing outlets are shown in the table below. The pressure was recorded at the outlet of H6, H7, H8 and H9 to determine the hydrant performance. These pressures are used to determine if the main meets the requirements of the SEQ WS&S D&C Code. The residual pressure was recorded from the outlet of street spring hydrant H10.

H6 Flow (L/s)	H6 Hydrant Pressure (kPa)	H7 Flow (L/s)	H7 Hydrant Pressure (kPa)	H8 Flow (L/s)	H8 Hydrant Pressure (kPa)	H9 Flow (L/s)	H9 Hydrant Pressure (kPa)	Total Flow (L/s)	Water Main Residual Pressure – H10 (kPa)
0	682	0	695	0	734	0	726	0	706
16.3	120	16.6	120	20	122	10	182	62.9	292
15.3	120	15.8	120	17.6	120	18	120	66.7	232

Test 4: SEQ WS&S D&C Code Mount Lindesay Highway South Supply Test 1

Water was simultaneously drawn, at the flow rates below, from a single outlet of street spring hydrants H11, H12 and H13. The pressure was recorded at the outlet of H11, H12 and H13 to determine the hydrant performance. These pressures are used to determine if the main meets the requirements of the SEQ WS&S D&C Code. The residual pressure was recorded from the outlet of street spring hydrant H14.

H11 Flow (L/s)	H11 Hydrant Pressure (kPa)	H12 Flow (L/s)	H12 Hydrant Pressure (kPa)	H13 Flow (L/s)	H13 Hydrant Pressure (kPa)	Total Flow (L/s)	H14 Water Main Residual Pressure (kPa)
0	690	0	692	0	700	0	700
5	610	5	605	5	595	15	621
10	490	10	462	10	490	30	537
15	265	15	267	15	287	45	373
17.5	120	17.4	120	17.3	120	52.2	263

Test 4 Comments: The flow test was unable to achieve 65 L/S @ 120kpa. A further flow test was therefore performed

Test 5: SEQ WS&S D&C Code Mount Lindesay Highway South Supply Test 2

Water was simultaneously drawn, at the flow rates below, from H11, H12, H13 and H14. The type of equipment and the number of flowing outlets are shown in the table below. The pressure was recorded at the outlet of H11, H12, H13 and H14 to determine the hydrant performance. These pressures are used to determine if the main meets the requirements of the SEQ WS&S D&C Code. The residual pressure was recorded from the outlet of street spring hydrant H15.

H11 Flow (L/s)	H11 Hydrant Pressure (kPa)	H12 Flow (L/s)	H12 Hydrant Pressure (kPa)	H13 Flow (L/s)	H13 Hydrant Pressure (kPa)	H14 Flow (L/s)	H14 Hydrant Pressure (kPa)	Total Flow (L/s)	H15 Water Main Residual Pressure (kPa)
0	685	0	692	0	701	0	697	0	705
13.9	120	13.8	120	14	120	13.7	120	55.4	211

Test 5 Comments: The flow test was unable to achieve 65 L/s at 120kpa. A further flow test was therefore performed

Test 6: SEQ WS&S D&C Code Mount Lindesay Highway South Supply Test 3

Water was simultaneously drawn, at the flow rates below, from H11, H12, H13, H14 and H16. The type of equipment and the number of flowing outlets are shown in the table below. The pressure was recorded at the outlet of H11, H12, H13, H14 and H16 to determine the hydrant performance. These pressures are used to determine if the main meets the requirements of the SEQ WS&S D&C Code. The residual pressure was recorded from the outlet of street spring hydrant H15.

H11 Flow (L/s)	H11 Hydrant Pressure (kPa)	H12 Flow (L/s)	H12 Hydrant Pressure (kPa)	H13 Flow (L/s)	H13 Hydrant Pressure (kPa)	H14 Flow (L/s)	H14 Hydrant Pressure (kPa)	H16 Flow (L/s)	H16 Hydrant Pressure (kPa)	Total Flow (L/s)	H15 Water Main Residual Pressure (kPa)
0	685	0	692	0	685	0	675	0	694	0	679
13.2	120	13.3	120	13.1	120	12.9	120	12.8	120	65.3	175

Hydrant Condition: All the hydrants (H1 to H16) were in good condition with a powder coat exterior.

General Notes:

- The test results are correct at the time of the tests
- Flow meters and pressure gauges are calibrated annually
- It is the responsibility of the recipient to determine the effect of changes in domestic/industrial usage, modifications to the main, differences in RL and extra hydraulic losses between the hydrant and tie in locations
- Flows are accurate to ± 0.2 L/s. Pressures are accurate to ± 10 kPa

Approvals:

Test Authority



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Test Leading Hand

Michael Gough

10:02hrs, 11th of October, 2022

A handwritten signature in black ink, appearing to read "M Gough".

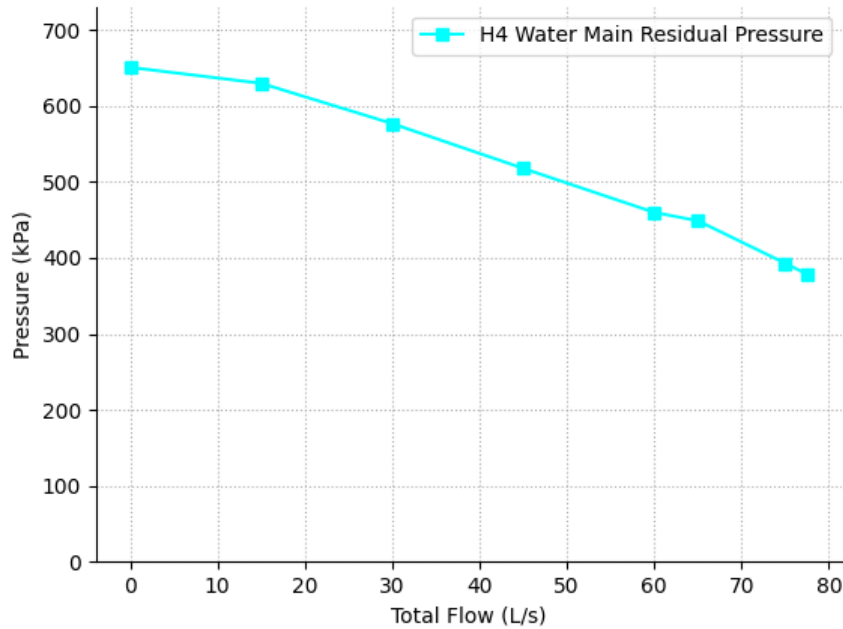
Report Approval

Daniel Barwick

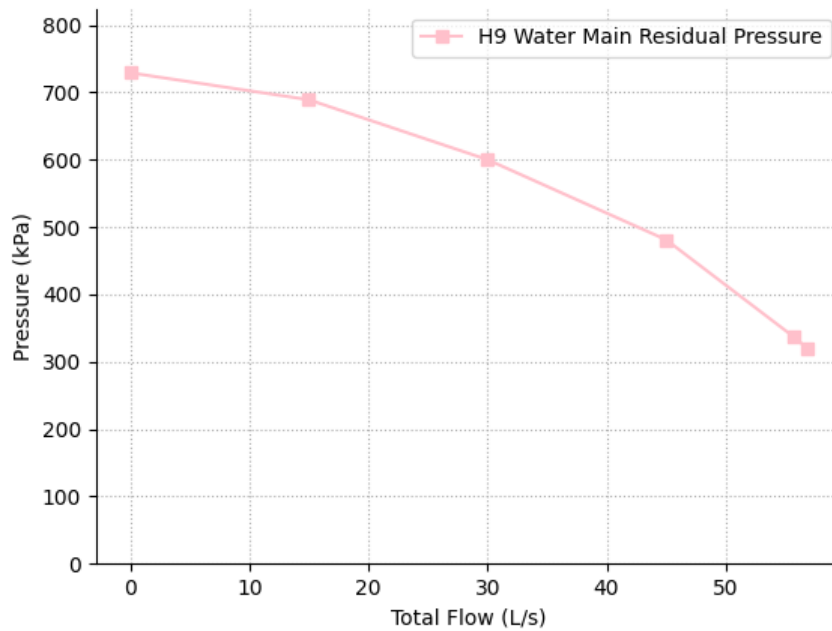
13th of October, 2022

A handwritten signature in black ink, appearing to read "D Barwick".

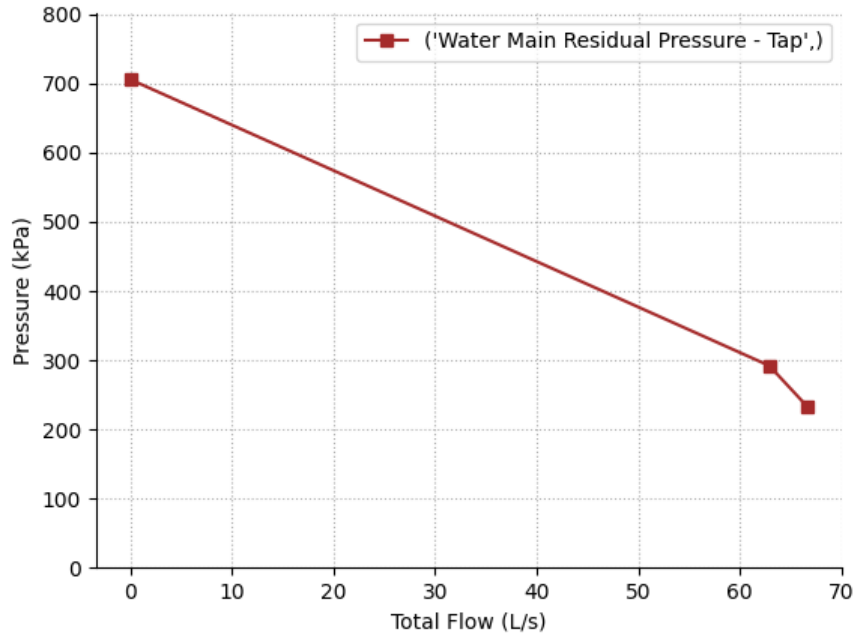
Appendix 1: Test Result Graphs



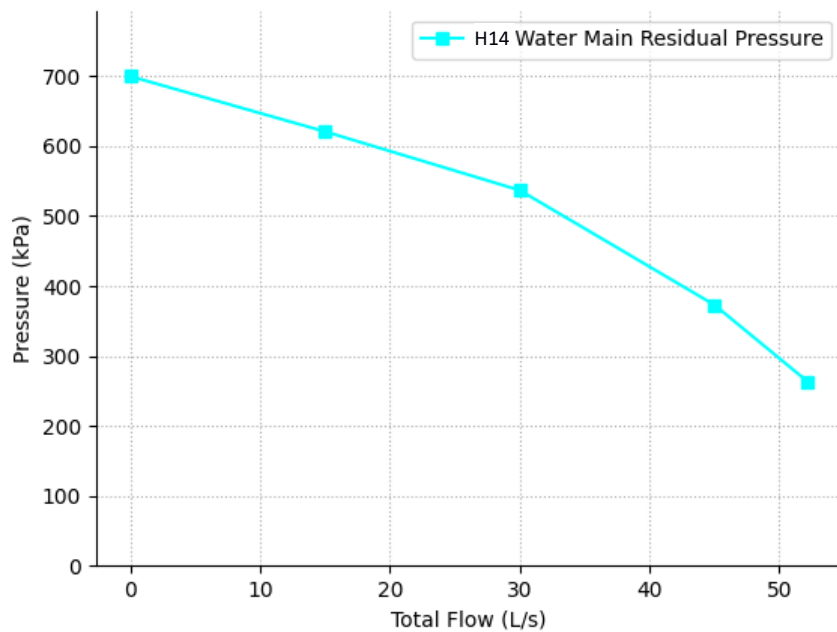
Test 1: H1, H2 and H3 Combined Performance and Street Supply Test



Test 2: H8, H7 and H6 Combined Performance and Street Supply Test



Test 3: H6, H7, H8 and H9 Combined Performance and Street Supply Test



Test 4: H11, H12 and H13 Combined Performance and Street Supply Test

Appendix E – Arcadis Sewer Network Analysis

SEWER NETWORK ASSESSMENT

**4499 – 4651 MOUNT LINDESAY HIGHWAY
NORTH MACLEAN**

CHARTER HALL PRIME INDUSTRIAL FUND

COMPLIANCE ENDORSEMENT
referred to in the PDA
DEVELOPMENT APPROVAL

Approval no: DEV2018/961/5

Date: 22-Feb-24



4499 – 4651 MOUNT LINDESAY HIGHWAY, NORTH MACLEAN

SEWER NETWORK ASSESSMENT

Author	Mike Cazeres	
Checker	Richard Mulligan	
Approver	Richard Mulligan RPEQ 7850	
Report No	EAG006–30109334-AAR-SNA	
Date	15/02/2024	
Revision Text	04	

This report has been prepared for Charter Hall Prime Industrial Fund in accordance with the terms and conditions of appointment for 4499-4651 Mount Lindesay Highway, North MacLean QLD 4280. Arcadis Australia Pacific Pty Limited (ABN 76 104 485 289) cannot accept any responsibility for any use of or reliance on the contents of this report by any third party.

Revision	Date	Description	Prepared by	Approved by
01	1/11/2022	Issued For Information	ADA	RM
02	3/07/2023	Issued For Compliance Assessment	MC	RM
03	14/09/2023	Response to Information Request	MC	RM
04	15/02/2024	Updated Development Plan	HQ	RM

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1 EXECUTIVE SUMMARY

Arcadis has been engaged by Charter Hall Prime Industrial Fund to prepare a Sewer Network Assessment (SNA) for a proposed development located in North Maclean, QLD over the following allotments:

- Lot 39 on SP258739 (4499-4651 Mount Lindesay Highway, North Maclean)

With the use of the SEQ Design Criteria, Logan City Council Planning Scheme and Logan City Council Technical Memorandum (DD8001 North Maclean), a hydraulic assessment of the proposed development's impact on the surrounding wastewater network and proposed internal network has been undertaken. The proposed connection point is the NM1 Pump Station.

The following SNA compares the existing allowances made within the Logan City Council Technical Memorandum to the current development layout completed by Watson Young (MP01 P10 March 2023). The purpose of this assessment is to determine whether the proposed development has been adequately accounted for within the greater sewer network and to size the sewer pipes within the local network in accordance with the Greater Flagstone PDA Infrastructure Planning and Background Report (IPBR), SEQ Design Criteria, Logan City Council Planning Scheme, and the Logan City Council Technical Memorandum DD8001. The assessment also confirms that satisfactory sewer capacity is available to convey external flows from the south to the NM1 SPS.

REVISION 02

An updated revision 02 of the Sewer Network Assessment has been undertaken to reflect the latest proposed development layout and staging. This revision demonstrates that the updated development has been adequately accounted for within the design of NM1 and that sewer gravity mains ranging from DN150 to DN225 are adequate to cater for the subject site in accordance with the Greater Flagstone PDA IPBR, SEQ Design Criteria, Logan City Council Planning Scheme, and the Logan City Council Technical Memorandum.

REVISION 03

Revision 03 of this report was prepared in response to an email received from Marco Bonotto of EDQ on 9 August 2023, requesting a response to the following items raised by Logan Water:

1. *Provide a plan to demonstrate how proposed connection for each lot (including the southern external lot) can control the whole body of the lot. Internal plumbing should be able to maintain minimum of 1:60 gradient.*

The Preliminary Sewer Sketch Plan Sheets 1 and 2 (30109334-AAP-WS00OP-CV-SKT-009 – 009G), enclosed with in Appendix B, provides the approximate extent of the lot serviceability catchment. The serviceability is based on ~3m deep property connections with 1:100 grade and achieves significant coverage across the development. There are localised areas within allotments which are not included in the lot serviceability catchment. Several approaches can be taken for these areas at the detailed/building design phases, including:

- Adjusting the architectural design to ensure areas requiring plumbing are situated within the lot serviceability catchment;
- Installation of a private pump station;
- Potential further extension of the sewer network following further subdivision of the super lots.

Please note that the SEQ Code allows 1:100 gradient for DN150 property connection branches and has been adopted accordingly (refer to SEQ-SEW-1104-1-D Note 1 and SEQ-SEW-1104-3-A, Note 2).

2. *Deep sewer is not supported by Council. Demonstrate why deep sewer is required to service the development.*

The proposed property connections have been raised to ~3m depth, thus avoiding deep property connections. The preliminary sewer grading provided in Appendix B includes sewer depths >5m to allow for the drainage of the large allotments over the 1.512km distance. As portions of super lot 4 grade away from the Sewer Line 3, the connection from Sewer Line 5 into Sewer Line 3 is a controlling factor forcing the sewer deeper.

Figure 6-1 has been updated to reflect additional branch lines included in the design to service the lots that grade away from the main gravity sewer lines.

3. *Provide design calculations to demonstrate proposed gravity mains can achieve cleansing velocity (minimum velocity should be checked for PDWF not for PWWF as per the SEQ Code).*

The pipe sizing has been amended such that the DN225 pipe commences further downstream at Structure 2/3 where the flow is greater. The design now meets the minimum grade for the corresponding pipe sizes. The sewer sizing calculations included in Appendix C have been updated accordingly.

REVISION 04

An updated revision 04 of the Sewer Network Assessment has been undertaken to reflect the latest proposed development layout and staging. Catchment boundaries have been updated to optimise the sewer network. Sewer gravity main has been relocated outside of the stormwater easement 2. The updated sewer network design demonstrates that the development has been adequately accounted for within the design of NM1 and that sewer gravity mains ranging from DN150 to DN225 are adequate to cater for the subject site in accordance with the Greater Flagstone PDA IPBR, SEQ Design Criteria, Logan City Council Planning Scheme, and the Logan City Council Technical Memorandum.

2 SITE CHARACTERISTICS

2.1 LOCATION DETAILS

The subject site is located within North Maclean, South-East Queensland, Australia over the following allotments:

- Lot 39 on SP258739 (4499-4651 Mount Lindesay Highway, North Maclean)

The site is bordered by Crowson Lane to the north, Mount Lindesay Hwy to the east, a vacant lot to the south and residential lots to the west.

The total area of the site is approximately 1,177,359m² or 117.7359 ha.

Logan City Council is the local government authority.

2.2 LAND USAGE

In its current state, the project site has undergone recent vegetation clearing works and contains a high voltage electrical easement. Figure 2-1 below provides a current locality plan of the site.



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

2.3 TOPOGRAPHY AND FEATURES

The site topography consists of hills and valleys with gradual to steep grades. The site contains an overland flow path that discharges flows via a natural channel to an existing headwall that crosses Mount Lindesay Hwy. The site has a high point of approximately RL 43m AHD and a low point of RL 21m AHD.

3 PROPOSED DEVELOPMENT

The proposed development involves the delivery of 5 superlots and 4 drainage/open space lots. A plan extract of the proposed development has been provided in Figure 3-1.

This plan is also provided within Appendix A and should be referred to for further clarity.

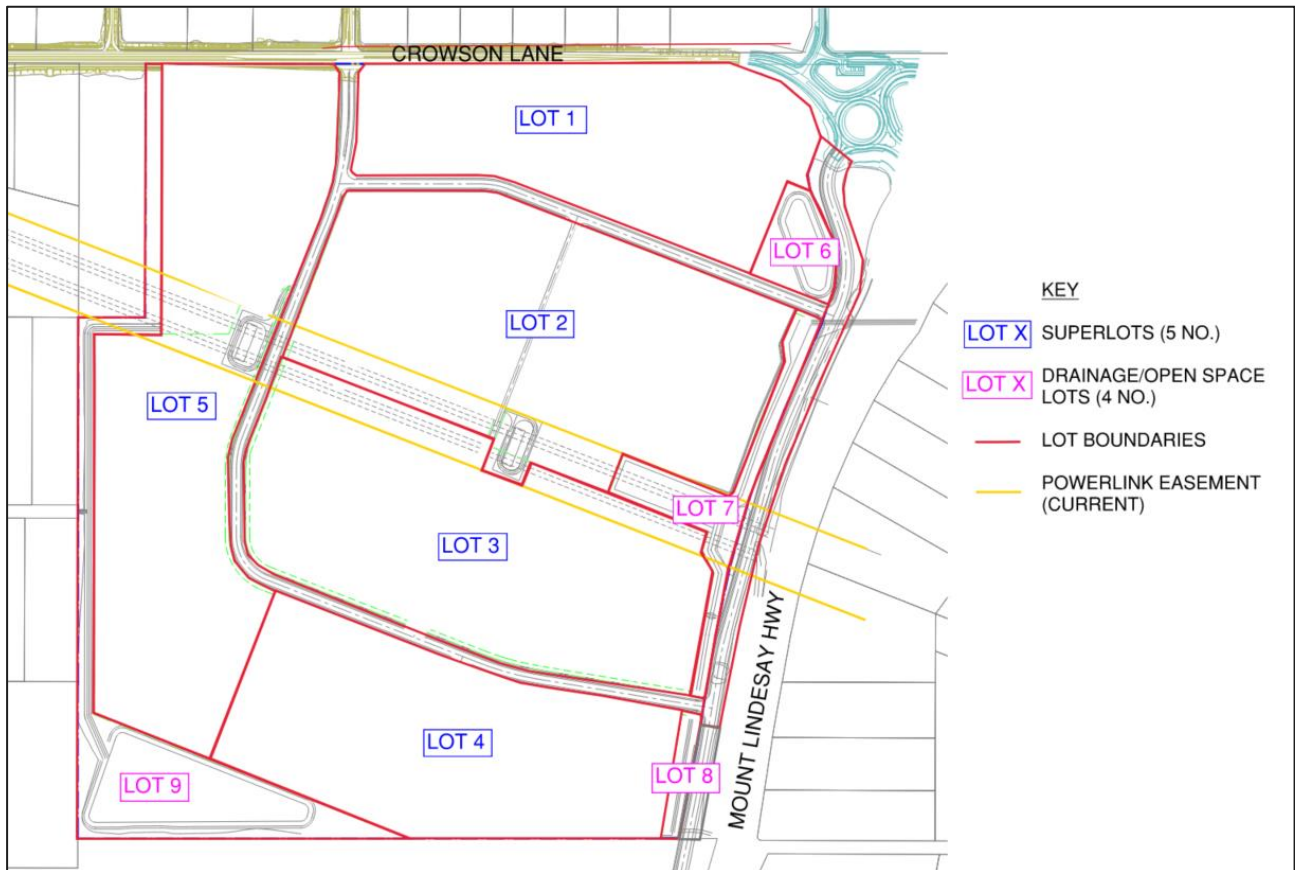


Figure 3-1 Proposed Development Superlot Plan (Watson Young MP01 P10, March 2022)

3.1 DEVELOPMENT STAGING

The proposed staging of the development site is summarised below and illustrated in Figure 3-2.

- Stage 1 – Includes Superlots 1 to 2
- Stage 2 – Includes Superlots 3 to 4
- Stage 3 – Includes Superlot 5

An additional development demand reflecting the ultimate sewer servicing scenario for the NM1 SPS catchment was also included as summarised below and further discussed in Section 3.3.

- Ultimate – Includes External Lot 1RP113251 which also forms a part of the NM1 SPS catchment

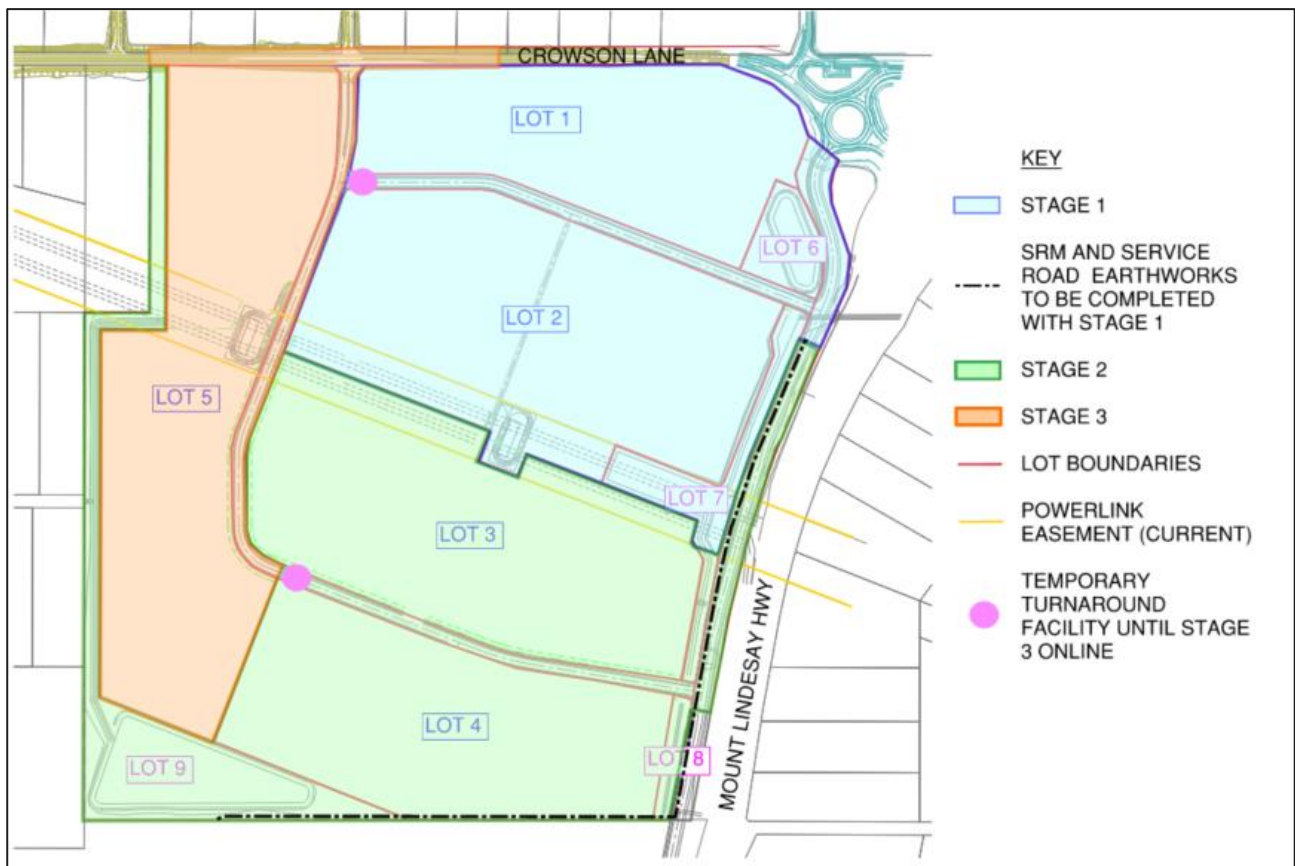


Figure 3-2 Proposed Development Staging Plan

3.2 DEVELOPMENT LOADING

For the purposes of this report, the development loading has been assessed under two loading cases to better determine the anticipated impact to be had on the surrounding network. These cases are as follows:

- Logan Water Projected Case** – In accordance with the assessment completed by Logan Water within Technical Memorandum DD8001. Logan water generated Eps in accordance with Infrastructure Demand Model 2020 (IP0017) to allow for optioneering. The EPs have been assigned to 70% of the developable area as an “allowable GFA” and excludes roads, open spaces, carparks etc.

Figure 3-3 shows the non-residential conversion rates (Equivalent Persons (EP)) for the proposed development as per Logan Water’s Technical Memorandum DD8001 North Maclean included within Appendix D.

- Arcadis Calculated Developed Case** – The calculated demand for the development based on the EP’s outlined by Logan Water for Industry Medium and Retail (service station conservative assumption). GFAs are based on a concept development layout plan (Watson Young MP01 P10, March 2023) excluding roads, open spaces, carparks etc. A 10% contingency has been applied to the demand calculated via this concept development layout for future design flexibility.

An extract of the masterplan used for this scenario is included in Figure 3-4 below and provided in Appendix A.

These values are compared to ensure that NM1 can suitably cater for the development in its current designed state (Watson Young MP01 P10, March 2023). For this comparison the Projected Case will consider Industry Medium and Commercial only as per the current intention for the development.

IDM Development Type	Average Water Consumption Method Adopted	Conversion Rates - Water		Return to Sewer (%)	Conversion Rates - Sewage	
		Gross Site Area Water EP/HA (Density Gross)	Gross Floor Area Water EP/HA (Density GFA)		Gross Site Area Water EP/HA (Density Gross)	Gross Floor Area Water EP/HA (Density GFA)
Commercial	GFA, 5 th -95 th %ile	-	55.90	0.90	-	50.31
Office	As per Commercial	-	55.90	0.90	-	50.31
Warehouse Distribution	As per Commercial	-	55.90	0.90	-	50.31
Education	GFA, 5 th -95 th %ile	-	105.30	0.80	-	84.24
Health	GFA, 5 th -95 th %ile	-	226.50	0.90	-	203.85
Industry Heavy	50% above Light Industrial	-	56.60	0.80	-	45.28
Industry Medium	25% above Light Industrial	-	47.25	0.80	-	37.80
Industry Light	GFA, 5 th -95 th %ile	-	37.80	0.80	-	30.24
Sport Recreation	Gross, 10 th -90 th %ile	1.05	-	0.90	0.945	-
Rural	Based on Water Meter Consumption	-	-	-	-	-
Retail Services	GFA, 5 th -95 th %ile	-	97.60	0.90	-	87.84
Showroom Bulk Goods	GFA, 5 th -95 th %ile	-	110.80	0.90	-	99.72
Accommodation	GFA, 5 th -95 th %ile	-	233.90	0.90	-	210.51

Reference: Table 7.2 Development of Infrastructure Demand Model, LWIA 2018 (PI-181).

Figure 3-3 Non-residential conversion rates (Table 7.2 Development of Infrastructure Demand Model)



Figure 3-4 Concept Masterplan (Watson Young MP01 P10, March 2023)

3.3 LOGAN WATER PROJECTED DEVELOPMENT LOADING

The proposed development and an additional upstream catchment will be serviced by pump station NM1 and inject into a common rising main. The catchment plan used by Logan Water in their regional servicing strategy documentation is included in Figure 3-5.

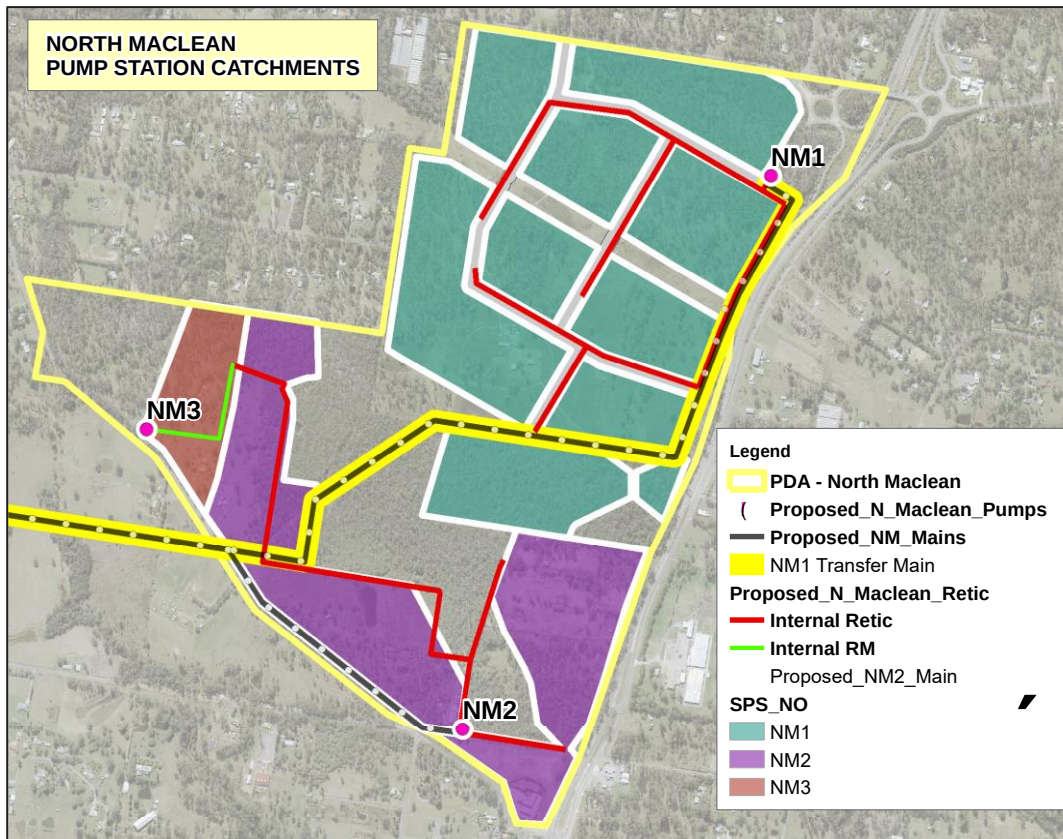


Figure 3-5 Sewer Pump Station Catchments

Based on this Logan Water has estimated loads for NM1 with the assumption GFA = 70% of developable area. The results of Logan Water's Technical Memorandum DD8001 can be seen highlighted in Table 3-1 below.

SPS NO	Sum of Sewer EP 2023	Sum of Sewer EP 2026	Sum of Sewer EP 2031	Sum of Sewer EP 2036	Sum of Sewer EP 2041	Sum of Sewer EP 2051	Sum of Sewer EP ULT	Developabl e Lot Area Ha	GFA Ha (1)
NM1	279	517	915	1,313	1,711	2,507	2,785	105	74
NM2		146	349	553	757	1,164	1,455	55	38
NM3		29	69	109	150	230	288	11	8
NM2 Total		174	418	662	906	1,394	1,743	66	46
Totals:	279	692	1,333	1,975	2,617	3,901	4,528	171	120

Table 3-1 North Maclean PDA – Projected Loads

3.4 ARCADIS CALCULATED DEVELOPMENT LOADING

The demand for the development based on the EP's outlined by Logan Water for Industry Medium and Commercial was applied to the concept development layout completed by Watson Young (MP01 P10, March 2023) to generate a comparison of ultimate demand on the sewer network. A 10% contingency has been applied to the demand calculated via this concept development layout for future design flexibility.

Lot 1RP113251 is located immediately south of the site area illustrated in Figure 2-1 and also forms a part of the overall NM1 catchment illustrated in Figure 3-5. This area has also been included in this assessment, with assumed demand for this lot specified below in line with Logan Water demand estimation methodology:

- Lot 1RP113251 Area = 16.0435Ha
- Assume 70% GFA = 11.23045Ha GFA
- Corresponding Lot 1 RP113251 EP demand = 425 EPs +10% Contingency = 467 EPs

The results of this were then compared against the projected loads completed by Logan Water, included in Table 3-2 below. Refer to Appendix C for further details on EP calculations. The calculation summary in Appendix C also specifies the assumed contributing lots to each manhole structure, and it is noted that large variances to these contributing lot assumptions will impact the conclusions of this sewer network assessment accordingly.

Table 3-2 North Maclean PDA – Proposed vs Projected Loads (Medium Industry)

	SPS Catchment No	Ultimate Sewer EPs
Logan Water Projected Loading	NM1	2785
Arcadis Calculated Proposed Loading	NM1	2764
Difference (%)		-1%

As seen above, the proposed development loading based on the concept lot layout MP01 P10 and the assumed development loading of the southern Lot 1 RP 113251 also forming a part of the NM1 sewer pump station catchment remains generally in accordance with Logan Water's projected loading.

It is recommended to maintain infrastructure sizing based on the Logan Water projected loadings as it will allow for some flexibility in the network if there is future need to service development with higher sewage loads. The sewer calculations undertaken in this assessment have therefore factored the proposed contributing EPs to each sewer structure up to meet Logan Water's total projected loading of 2785 EPs to remain conservative and ensure alignment with the previous studies undertaken for the NM1 SPS.

4 DESIGN ASSUMPTIONS

The sewer network surrounding the proposed development site was designed using the SEQ WS&SDC, Logan City Council Planning Scheme Policy and Logan Water's Technical Memorandum DD8001 North Maclean. The demand due to the proposed development has been applied to the Colebrook-White equation and minimum pipe sizes and grades were generated.

- The extent of the network studied is to the downstream manhole prior to the NM1 SPS (gravity line from collection manhole to SPS and SPS excluded).
- Industry Medium Average Dry Weather Flow (ADWF) = 165 L/EP/d.
- Peak Dry Weather Flow (PDWF) = $d \times 165$ L/EP/d.
- Peak Wet Weather Flow – Industry Medium (PWWF) = 840 L/EP/d
- Gravity Main Maximum Velocity = 3m/s at PWWF.
- Colebrook-White equation is used to calculate flows.
- Roughness coefficient is taken as $k = 1.5\text{mm}$.

- Depth of flow @ PWWF – Proposed new sewers = Max flow depth shall not exceed 75% of full pipe depth.

5 MODELLING METHODOLOGY

The PWWF of the internal gravity sewer network was calculated and compared against the theoretical performance of the network determined via the Colebrook-White equation to confirm the adequacy of the proposed sewer network under the proposed development loading. Refer to Appendix C for EP & Sewer Sizing Calculation results.

For the purposes of this assessment, the ultimate development scenario has been assessed. Interim staging scenarios for the sewer network result in lower peak flows through the system and therefore less conservative scenarios. The proposed gravity sewer network is to meet or exceed minimum grades to ensure self-cleansing throughout the interim staging scenarios and the ultimate assessment aims to confirm adequacy under the most conservative peak flow network state.

5.1 DEPTH OF FLOW

The depth of flow was assessed for all new pipes to be installed to service the developed scenario. In accordance with the Logan City Council Planning Scheme requirements and as listed in the Design Assumptions above. Depth of flow compliance under PWWF (75% max depth for new pipes) was assessed in accordance with the sewer network design criteria as specified in the Greater Flagstone PDA IPBR Table 4.2.1.

6 RESULTS AND DISCUSSION

6.1 GRAVITY LINE ASSESSMENT

For the developed scenario, the pipe reaches assessed are shown below in Figure 6-1.



Figure 6-1 Assessed Gravity Line

Loads have been assigned to each structure as per the proposed loads of the development. Based on this loading and in accordance with the Greater Flagstone PDA IPBR, SEQ WS&SDC and Logan City Council Planning Scheme Policy the following reticulation main sizes are required:

- DN150 PVC to DN225 PVC

The tabulated results are attached in Appendix C that show the detailed outputs of each structure assessed. Longitudinal sections and a Sewer Sketch Plan showing the depth of flow have also been included in Appendix B. We note the lot numbering in the Sewer Sketch Plan has been superseded by the lot numbering illustrated in the masterplan layout as per Figure 3-4 and included in Appendix A.

7 CONCLUSION

This assessment has concluded that the proposed development has been adequately accounted for within the design of NM1 and that sewer gravity mains ranging from DN150 PVC to DN225 PVC are adequate to cater for the subject site. The assessment also confirms that satisfactory sewer capacity is available to convey external flows from the southern Lot 1 RP113251 also included in the NM1 SPS catchment to the NM1 SPS.

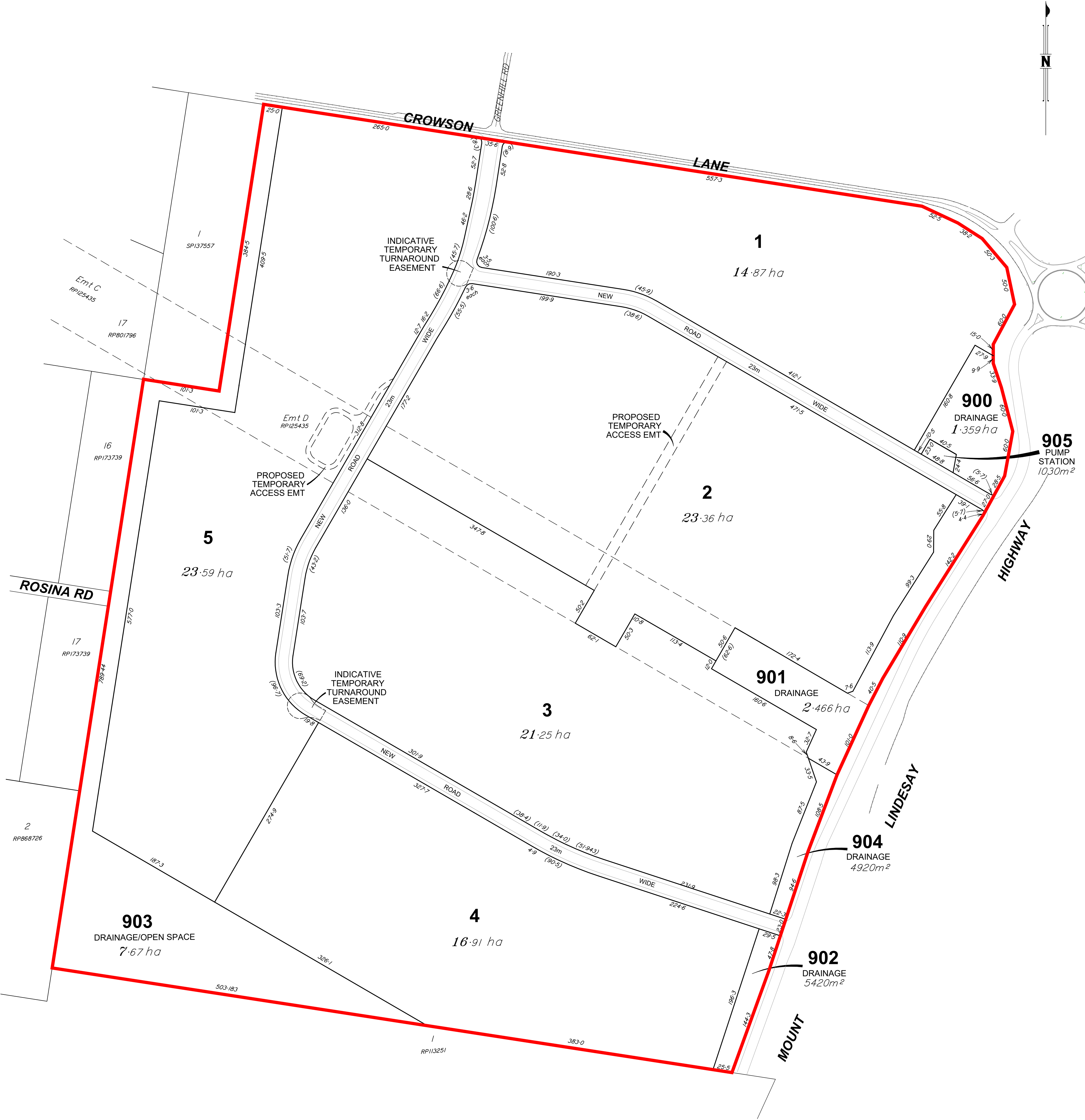
APPENDIX A

Development Layout Plans



Appendix B

Plan of Reconfiguration

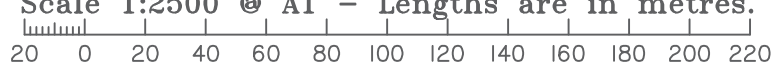


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 - Cadastral data supplied by others and is approximate only.
 - Indicative road horizontal design, subject to biopods and engineering review.
 - This note is an integral part of this plan. This plan may not be reproduced without this notation being included.



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Scale 1:2500 @ A1 - Lengths are in metres.



Planning Urban Design Landscape Environment Surveying

Plan of Reconfiguration
4499-4651 Mount Lindesay Highway
Description Local Authority Lot 39 on SP258739 Logan City

CLIENT
Charter Hall Group

DRAWING NO.	VERSION
22-0007P/01-02	E
DATE DRAWN	SHEET NO.
14-08-2023	1 of 1

PLANS AND DOCUMENTS referred to in the PDA DEVELOPMENT APPROVAL

Approval no.: **DEV2018/961/8**

Date: **27/09/2023**



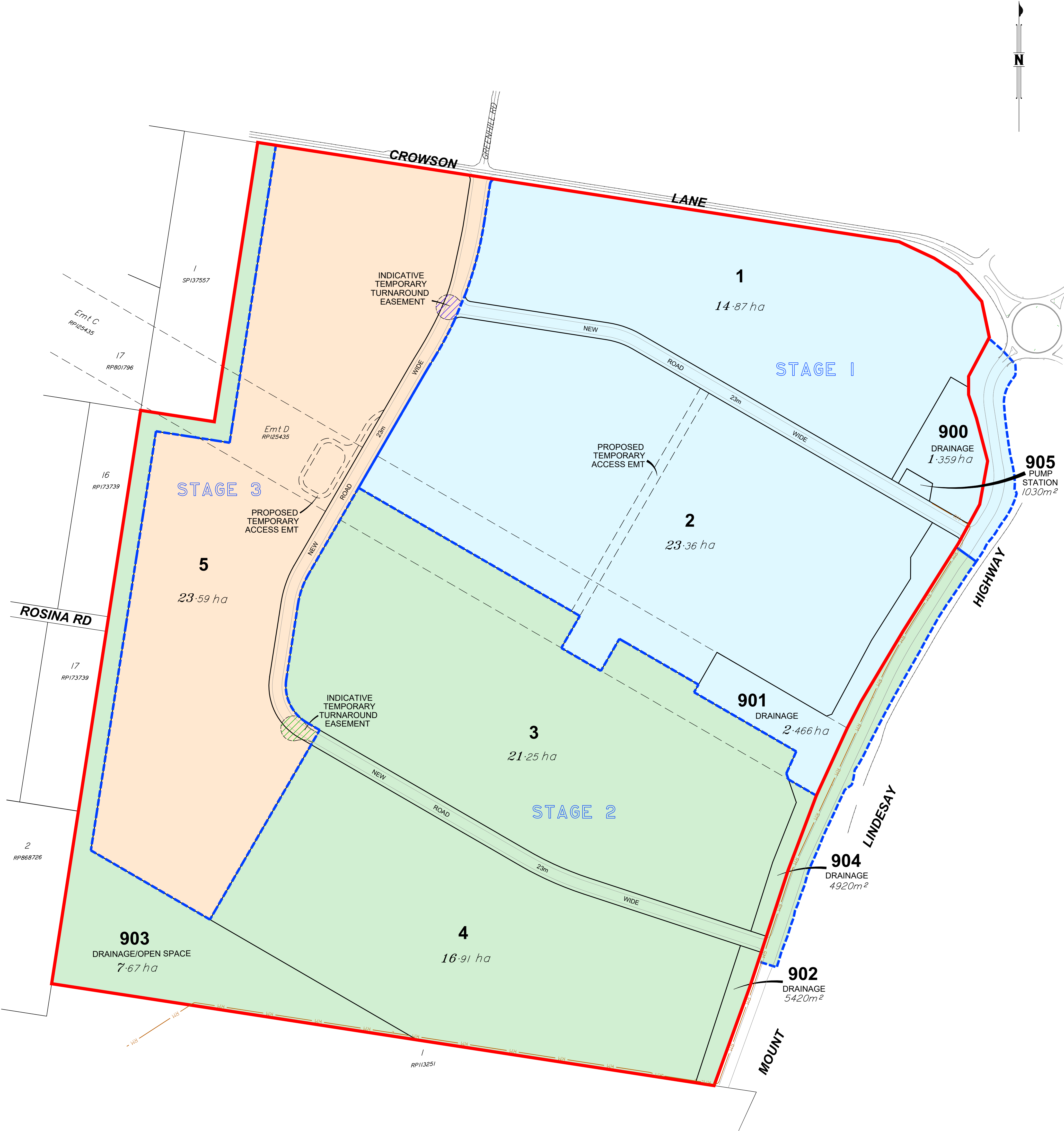
Legend	
—	Site Boundary
—	Stage Boundary

Table of Development	
Gross area of subject land.....	117.9 ha
Area of proposed park, drainage and open space....	12.6 ha (Including pump station)
Area of new road.....	5.32 ha
Length of new road.....	2299m
Net area of subject land.....	99.98 ha (Excluding park & open space)
Number of proposed lots.....	11
Number of existing lots.....	1

Appendix C

Staging Plan





- Notes**
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 - Design subject to local authority approval & detailed engineering requirements, areas and dimensions are approximate only and are subject to survey. Therefore this drawing is not to be used for engineering design.
 - Cadastral data supplied by others and is approximate only.
 - Earthworks for Sewer Rising Main and full service road will be completed with Stage 1.
 - Indicative road horizontal design, subject to biopods and engineering review.
 - This note is an integral part of this plan. This plan may not be reproduced without this notation being included.



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Scale 1:2500 @ A1 - Lengths are in metres.



Planning Urban Design Landscape Environment Surveying

Staging Sketch Plan
4499-4651 Mount Lindesay Highway
Description Local Authority Lot 39 on SP258739 Logan City

CLIENT
Charter Hall Group

DRAWING NO. 22-0007P/01-03	VERSION E
DATE DRAWN 14-08-2023	SHEET NO. 1 of 1

PLANS AND DOCUMENTS referred to in the PDA DEVELOPMENT APPROVAL
Approval no.: **DEV2018/961/8**
Date: **27/09/2023**



- Legend**
- Site Boundary
 - Stage Boundary
 - Stage 1
 - Indicative Temporary Turnaround - Stage 1
 - Stage 2
 - Indicative Temporary Turnaround - Stage 2
 - Stage 3
 - Sewer Rising Main



LEGEND

- HARDSTAND
- CAR PARK
- COLLECTOR ROAD
- CRUSHED ROCK TO FIRE ACCESS TRACK
- AREA OF GRASS / LANDSCAPING
- BIO DETENTION, GREEN CORRIDOR, STORMWATER EASEMENT
- WAREHOUSE
- OFFICE
- STAFF OUTDOOR
- AWNING
- ESTATE ROAD CONNECTION TO EXTERNAL ROAD NETWORK
- TRUCK ENTRY/EXIT
- POWER EASEMENT MAINTENANCE ACCESS POINT
- ESTATE BOUNDARY LINE
- LOT BOUNDARY LINE
- BUILDING SETBACK LINE
- LANDSCAPE SETBACK LINE
- FENCE LINE
- RETAINING WALL

PARKING PROVISION

SITE	PARKING RATIO
WAREHOUSES	0.66 (approximately 1/150m²)
PARKING TOTAL	3570
REQUIRED	3915
PROVIDED	3915

activity/amenities TBC

NOTE : Ratio applied to calculate required car parking for combined facility area including warehouse & associated offices

DEVELOPMENT ANALYSIS

LOT 1	30,990m²
LOT 2	31,274m²
WAREHOUSE 1	20,000m²
OFFICE (INCLD. 100m² DOCK OFFICE)	1,100m²
LOT 3	24,981m²
WAREHOUSE 1	6,600m²
OFFICE	300m²
WAREHOUSE 2	5,850m²
OFFICE	300m²
LOT 4	17,479m²
WAREHOUSE 1	7,950m²
OFFICE	400m²
LOT 5	15,005m²
WAREHOUSE 1	6,850m²
OFFICE	350m²
LOT 6	15,503m²
WAREHOUSE 1	6,550m²
OFFICE	300m²
LOT 7	49,645m²
WAREHOUSE 1A	12,100m²
OFFICE (INCLD. 100m² DOCK OFFICE)	600m²
WAREHOUSE 2A	7,000m²
OFFICE (INCLD. 100m² DOCK OFFICE)	400m²
WAREHOUSE 2B	5,800m²
OFFICE (INCLD. 100m² DOCK OFFICE)	400m²
LOT 8	39,921m²
WAREHOUSE 1A	9,750m²
OFFICE (INCLD. 100m² DOCK OFFICE)	600m²
WAREHOUSE 1B	9,250m²
OFFICE (INCLD. 100m² DOCK OFFICE)	600m²
LOT 9	108,081m²
WAREHOUSE 1A	14,100m²
OFFICE (INCLD. 100m² DOCK OFFICE)	800m²
WAREHOUSE 1B	14,300m²
OFFICE (INCLD. 100m² DOCK OFFICE)	800m²
WAREHOUSE 2A	15,900m²
OFFICE (INCLD. 100m² DOCK OFFICE)	900m²
WAREHOUSE 2B	15,900m²
OFFICE (INCLD. 100m² DOCK OFFICE)	900m²
LOT 10	120,643m²
WAREHOUSE 1A	19,300m²
OFFICE (INCLD. 100m² DOCK OFFICE)	1000m²
WAREHOUSE 1B	19,300m²
OFFICE (INCLD. 100m² DOCK OFFICE)	1000m²
WAREHOUSE 2A	10,700m²
OFFICE (INCLD. 100m² DOCK OFFICE)	700m²
WAREHOUSE 2B	10,200m²
OFFICE (INCLD. 100m² DOCK OFFICE)	600m²
WAREHOUSE 2C	9,300m²
OFFICE (INCLD. 100m² DOCK OFFICE)	700m²
LOT 11	109,982m²
WAREHOUSE 1A	17,650m²
OFFICE (INCLD. 100m² DOCK OFFICE)	900m²
WAREHOUSE 1B	17,800m²
OFFICE (INCLD. 100m² DOCK OFFICE)	900m²
WAREHOUSE 1C	13,200m²
OFFICE (INCLD. 100m² DOCK OFFICE)	800m²
WAREHOUSE 1D	13,200m²
OFFICE (INCLD. 100m² DOCK OFFICE)	800m²
LOT 12	98,224m²
WAREHOUSE 1A	15,700m²
OFFICE (INCLD. 100m² DOCK OFFICE)	800m²
WAREHOUSE 1B	14,350m²
OFFICE (INCLD. 100m² DOCK OFFICE)	800m²
WAREHOUSE 1C	12,400m²
OFFICE (INCLD. 100m² DOCK OFFICE)	800m²
WAREHOUSE 1D	12,400m²
OFFICE (INCLD. 100m² DOCK OFFICE)	800m²
LOT 13	142,280m²
WAREHOUSE 1A	20,550m²
OFFICE (INCLD. 100m² DOCK OFFICE)	1100m²
WAREHOUSE 1B	19,850m²
OFFICE (INCLD. 100m² DOCK OFFICE)	1100m²
WAREHOUSE 2A	20,800m²
OFFICE (INCLD. 100m² DOCK OFFICE)	1100m²
WAREHOUSE 2B	20,000m²
OFFICE (INCLD. 100m² DOCK OFFICE)	1100m²
LOT 14	80,077m²
WAREHOUSE 1A	12,100m²
OFFICE (INCLD. 100m² DOCK OFFICE)	700m²
WAREHOUSE 1B	12,100m²
OFFICE (INCLD. 100m² DOCK OFFICE)	700m²
WAREHOUSE 1C	24,050m²
OFFICE (INCLD. 100m² DOCK OFFICE)	1300m²
LOT 15	82,432m²
WAREHOUSE 1A	10,350m²
OFFICE	500m²
WAREHOUSE 1B	9,050m²
OFFICE	500m²
WAREHOUSE 1C	12,250m²
OFFICE	600m²
WAREHOUSE 1D	7,850m²
OFFICE	400m²
TOTAL BLDG AREA (LOT 1 Amenities not included)	540,800m²
SITE COVERAGE	
TOTAL SITE AREA	1,177,359m²
INTERNAL ROADS	71,013m²
BIO-DETENTION BASIN	14,302m²
BIO-DIVERSITY+25m BUFFER	76,670m²
STORMWATER EASEMENT 1	5,790m²
STORMWATER EASEMENTS (2)	26,074m²
ROAD WIDENING	16,992m²
TOTAL DEVELOPABLE AREA	966,518m²
SITE COVERAGE	55.95%

No. DATE:	REVISION:	BY:	CHK:
P7 26.06.2022	PRELIMINARY ISSUE	JWK	GP
P8 01.08.2022	CIVIL & LOT ALIGNMENT ISSUE	JWK	GP
P9 02.09.2022	CIVIL UPDATES	JWK	GP
P1 26.09.2022	TRUCK MOVEMENT UPDATES	JWK	GP
0			

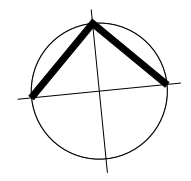
All areas indicated are indicative for design and planning purposes only and should not be used for any contractual reasons without verification by a licensed surveyor or further design development being completed.

Watson Young Architects P/L Melbourne | Perth | Sydney 03 9516 8555 ACN: 111388700
8 Gratton Street Prahran VIC 3181 | e: info@watsonyoung.com.au | w: watsonyoung.com.au
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PROJECT:
North Maclean
Crowson Ln, North Maclean, Logan, QLD

TITLE:
MASTERPLAN



CLIENT:
Charter Hall

NOTE:
HARDSTAND LEVELS BASED ON 6.0m EXCLUSION ZONE BELOW LOWEST SAG POINT OF EXISTING POWERLINES INCLUDING 5.0m OPERATIONAL ZONE CLEAR BELOW.
ACCESS TO ELECTRICAL TOWERS FROM COLLECTOR AND PRIVATE ROADS TO CIVIL ENG'S DESIGN PROVIDE PROTECTION TO TOWERS LOCATED 5m MINIMUM FROM EACH LEG

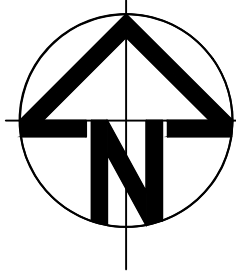
DATE: MARCH, 2022
DRAWN BY: MB/JWK
SCALE: 1:2500 @ A1
SCALE: 1:5000 @ A3

JOB NO:	22055
DRAWING NO:	MP01
REVISION:	P10



APPENDIX B

Preliminary Sewer Plans



NOTE:

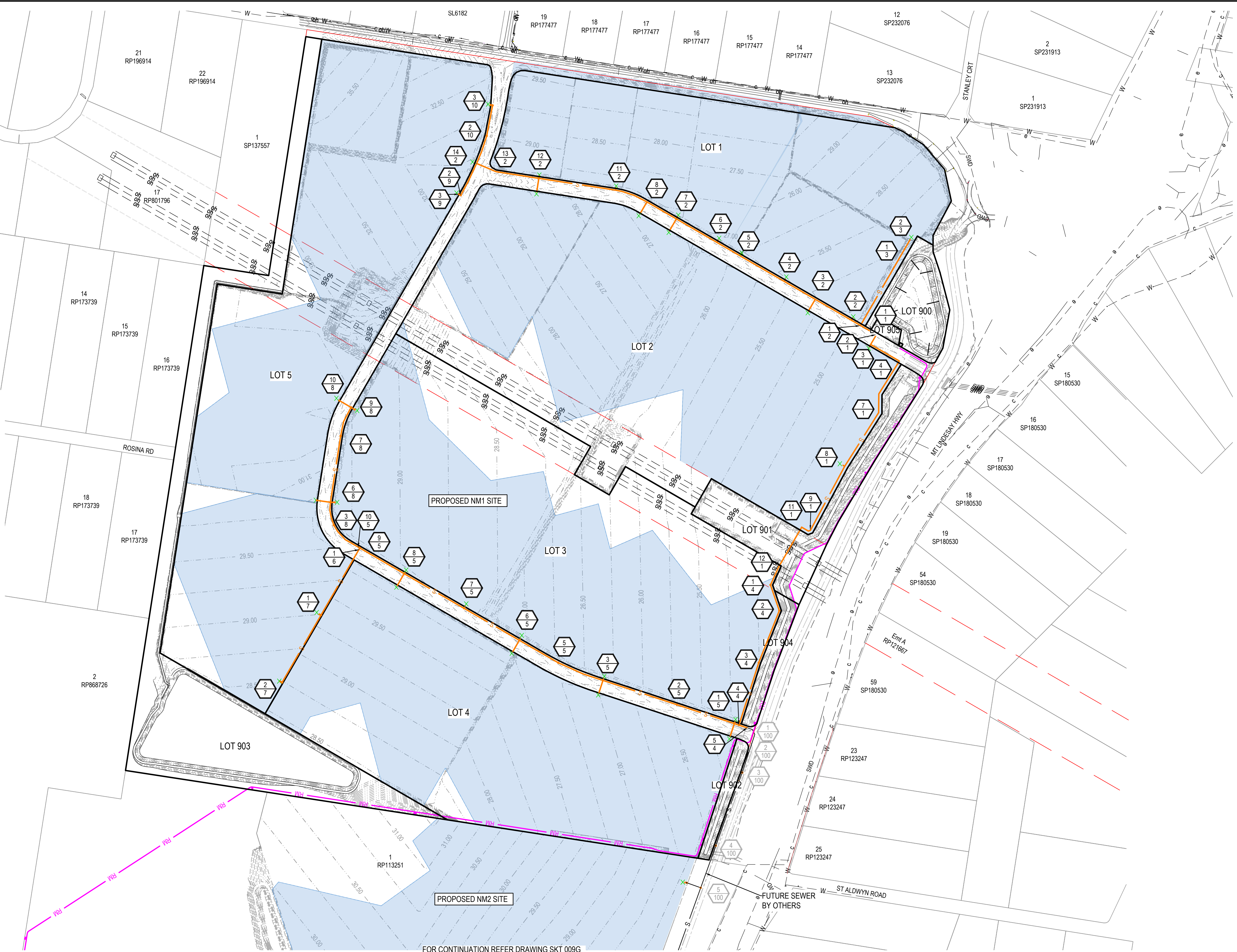
- THIS DRAWING IS BASED ON:
 - EXISTING LIDAR SURVEY FROM WOLTERS RECEIVED 09.03.2022.
 - FINISHED SURFACE LEVELS SHOWN ON THE PLANS.

LOT SERVICEABILITY CATCHMENTS BASED ON THE FOLLOWING DESIGN CRITERIA.

- 3.0m DEEP CONNECTION AT SEWER MAIN / BOUNDARY U.N.O.
- 1:100 INTERNAL GRADING, PERPENDICULAR TO LOT ORIENTATION (WORST CASE RUN).
- MAX 0.60m COVER TO PROPOSED FINISH SURFACE AT UPPER MOST REACH.

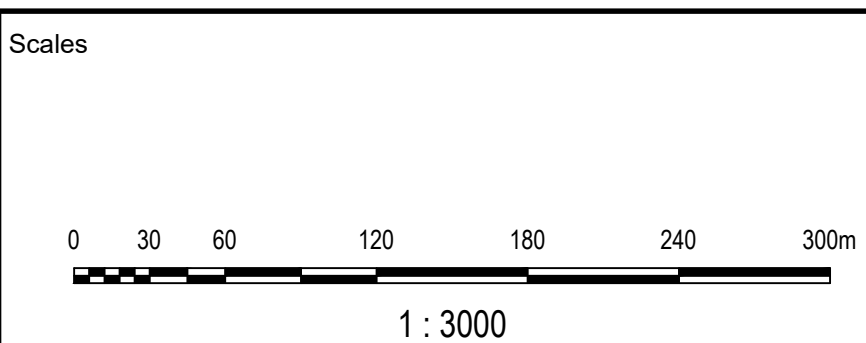
LEGEND

- 0.5% DESIGN GRADING
- 29.5 --- PROPOSED FINISH SURFACE CONTOUR
- OVERLAND FLOW PATHS
- SWD --- PROPOSED STORMWATER DRAINAGE
- RM --- PROPOSED SEWER RISING MAIN
- S --- PROPOSED SEWER GRAVITY MAIN
- PROPOSED SEWER MANHOLE
- X PROPOSED LOT CONNECTION POINT
- SWD --- EXISTING STORMWATER DRAINAGE
- oh --- EXISTING OVERHEAD POWER LINE
- W --- EXISTING WATER MAIN
- e --- EXISTING UNDERGROUND ELECTRICITY
- c --- EXISTING COMMUNICATIONS
- POWERLINK EASEMENT
- RM --- FUTURE SEWER RISING MAIN (BY OTHERS)
- S --- FUTURE SEWER GRAVITY MAIN (BY OTHERS)
- APPROXIMATE LOT SERVICEABILITY CATCHMENT - REFER TYPICAL NOTES



FOR CONTINUATION REFER DRAWING SKT 009G

Issue	Description	DR	CH	VE	Date
06	SEWER LAYOUT AND LONGITUDINAL SECTION UPDATED	GP	TF	GE	31.01.24
05	SEWER LAYOUT AND LONGITUDINAL SECTION UPDATED	GP	TF	GE	25.08.23
04	SEWER LAYOUT AND LONGITUDINAL SECTION UPDATED	AO	SS	GE	03.07.23
03	LINE 04 ADDED	JG	EP	GE	24.10.22
02	LINES 2 AND 3 ADDED	JG	EP	GE	26.08.22
01	ORIGINAL ISSUE	JG	EP	GE	19.07.22



Surveyor

WOLTER
consulting group

Planning Urban Design Landscape Environment Surveying

Architect

Client

Charter Hall

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Original Issue Signatures			
Drawn	A.OSORIO	Original Size	A1
Designed	S.SEM	Height Datum	AHD
Project Manager	B.KITSON	Grid	
Verified	G.ELLIS		

Project

4499-4651 MOUNT LINDESAY
HIGHWAY, NORTH MACLEAN

Title

PRELIMINARY SEWER
SKETCH PLAN

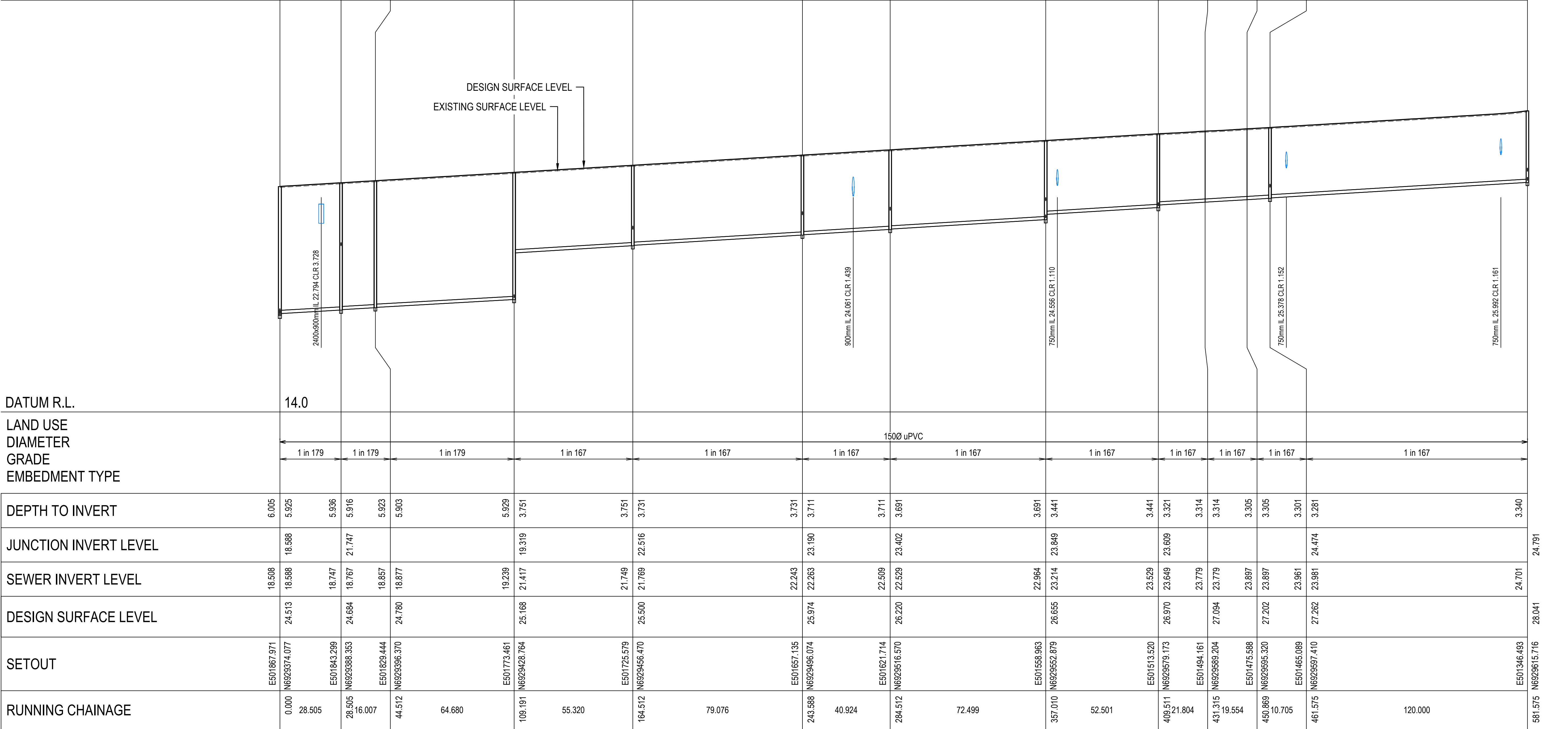
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ABN 76 104 485 289
Tel No: +61 7 3337 0000
www.arcadis.com/au

Project No. | Folder Prefix | Zone | Stage | Phase | Discipline | Type | Drawing No. | Issue

30109334 - AAP - WS000P - CV - SKT - 009 - 06

STRUC/ BEND/ END NAME	2/1	1/2	2/2	3/2	4/2	5/2	6/2	7/2	8/2	9/2	10/2	11/2	12/2
STRUCTURE TYPE	X PE LINED	P2 PE LINED	P2 PE LINED	P2 PE LINED	P2 PE LINED	P2 PE LINED	P2 PE LINED	P2 PE LINED	P2 PE LINED	HTP 3.0m RADIUS	HTP 3.0m RADIUS	P2 PE LINED	P2 PE LINED
STRUCTURE LID TYPE	B	D	B	B	B	B	B	B	B			B	B
STRUCTURE DROP TYPE													
JUNCTION LINE	LINE 2	LINE 3		LINE HC03	LINE HC04	LINE HC05	LINE HC06	LINE HC07	LINE HC09			LINE HC10	LINE HC11
DEPTH TO HC													
HC INVERT LEVEL													
HC TYPE													
HC LOT No													
CH. FROM D/S STRUC/ BEND													



2

06	SEWER LAYOUT AND LONGITUDINAL SECTION UPDATED	GP	TF	GE	31.01.24
05	SEWER LAYOUT AND LONGITUDINAL SECTION UPDATED	GP	TF	GE	25.08.23
04	SEWER LONGITUDINAL SECTION UPDATED	AO	SS	GE	03.07.23
03	SEWER LONGITUDINAL SECTION UPDATED	JG	EP	GE	24.10.22
02	SEWER LONGITUDINAL SECTION UPDATED	JG	EP	GE	11.10.22
01	ORIGINAL ISSUE	JG	EP	GE	19.07.22

Issue	Description	DR	CH	VE	Date
-------	-------------	----	----	----	------

Scales

HORZ 0 10 20 40 60 80 100m

1 : 1000

VERT 0 1 2 4 6 8 10m

1 : 100

Surveyor

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consulting group

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Architect

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Designed	S.SEM
Project Manager	B.KITSON
Verified	G.ELLIS

Original Size	A1
Height Datum	AHD
Grid	

Project

4499-4651 MOUNT LINDESAY
HIGHWAY, NORTH MACLEAN

Title

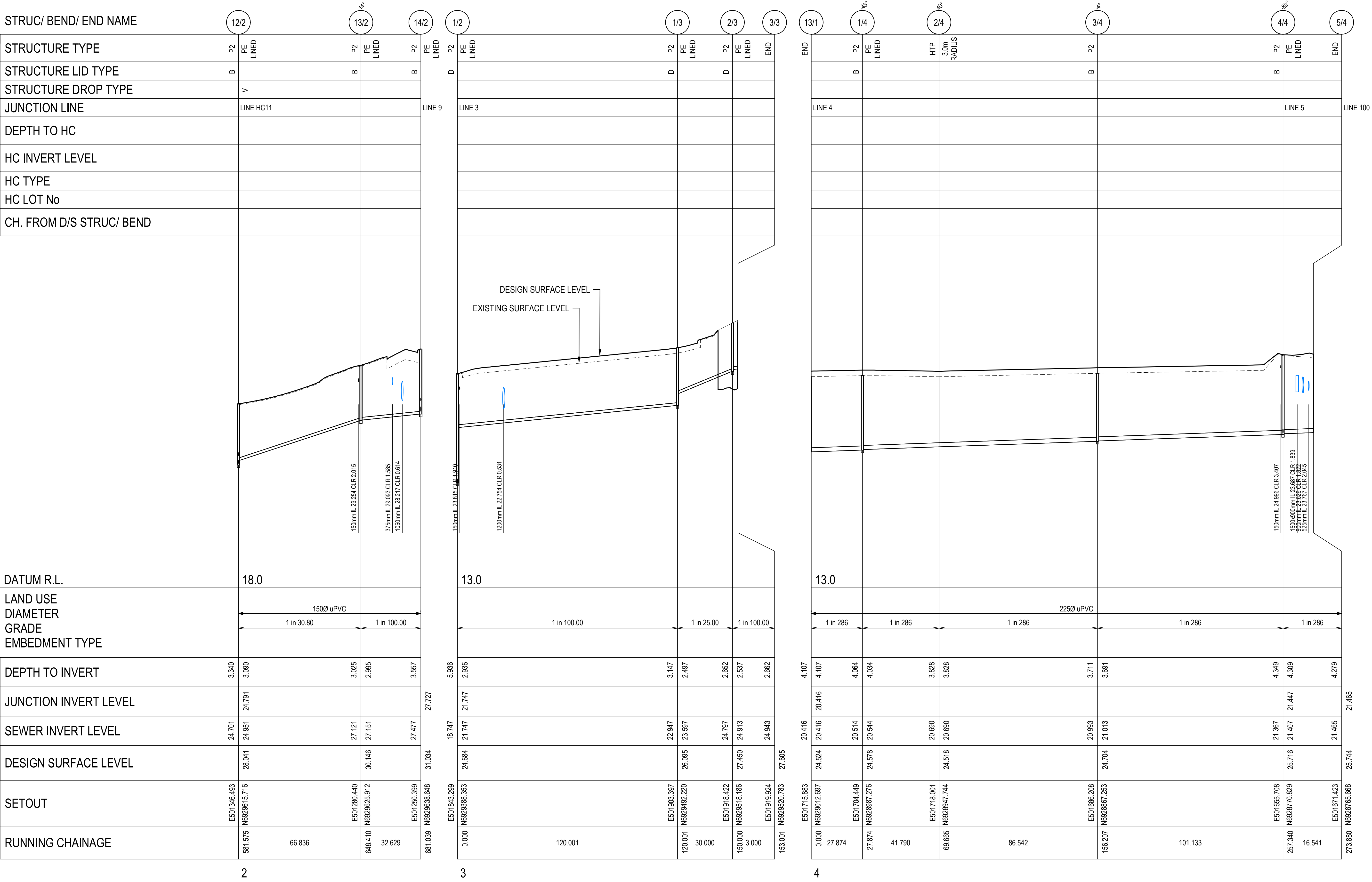
PRELIMINARY SEWER
LONGITUDINAL SECTION
SHEET 2 OF 8

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Project No. Folder Prefix Zone Stage Phase Discipline Type Drawing No. Issue

30109334 - AAP - WS000P - CV - SKT - 009B - 06



Issue	Description	DR	CH	VE	Date
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05	SEWER LAYOUT AND LONGITUDINAL SECTION UPDATED	GP	TF	GE	25.08.23
04	SEWER LONGITUDINAL SECTION UPDATED	AO	SS	GE	03.07.23
03	SEWER LONGITUDINAL SECTION UPDATED	JG	EP	GE	24.10.22
02	SEWER LONGITUDINAL SECTION UPDATED	JG	EP	GE	11.10.22
01	ORIGINAL ISSUE	JG	EP	GE	19.07.22

Scales

HORZ 0 10 20 40 60 80 100m

1 : 1000

VERT 0 1 2 4 6 8 10m

1 : 100

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Drawn	A.OSORIO
Original Size	A1
Designed	S.SEM
Height Datum	AHD
Project Manager	B.KITSON
Grid	
Verified	G.ELLIS

Project

4499-4651 MOUNT LINDESAY
HIGHWAY, NORTH MACLEAN

Title

PRELIMINARY SEWER
LONGITUDINAL SECTION
SHEET 3 OF 8

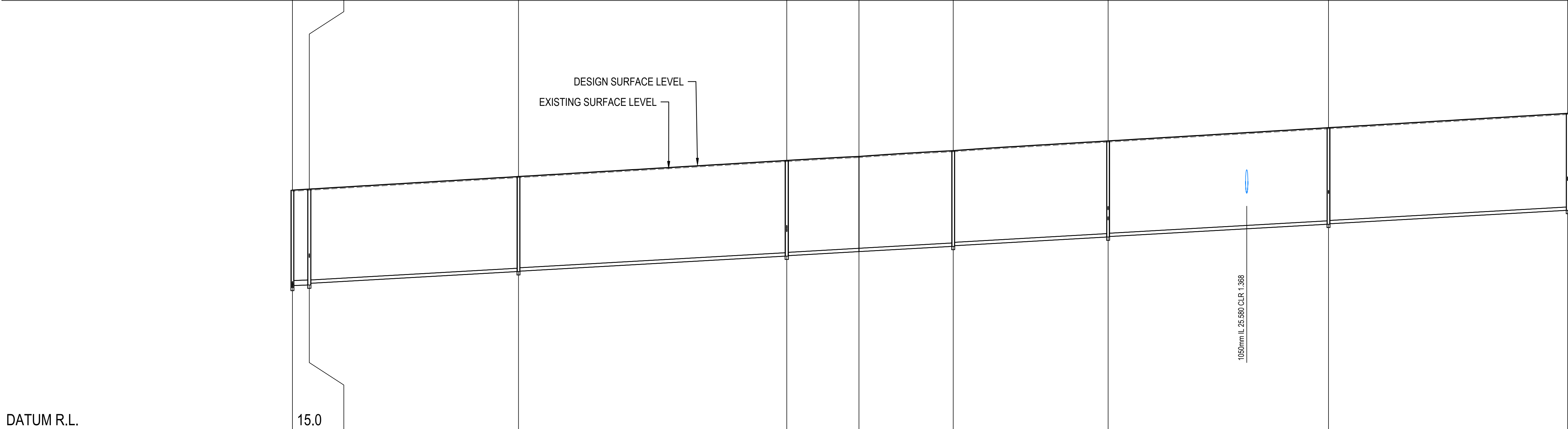
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Project No. Folder Prefix Zone Stage Phase Discipline Type Drawing No. Issue

30109334 - AAP - WS000P - CV - SKT - 009C - 06

STRUC/ BEND/ END NAME	4/4	1/5	2/5	3/5	4/5	5/5	6/5	7/5	8/5
STRUCTURE TYPE	P2 PE LINED	P2-1200mm PE LINED	P2 PE LINED	P2-1200mm PE LINED	HTP 3.0m RADIUS	P2 PE LINED	P2 PE LINED	P2 PE LINED	P2 PE LINED
STRUCTURE LID TYPE	B		B	B		B	B	B	B
STRUCTURE DROP TYPE									
JUNCTION LINE	LINE 5	LINE HC14		LINE HC16			LINE HC18	LINE HC20	LINE HC21
DEPTH TO HC									
HC INVERT LEVEL									
HC TYPE									
HC LOT No									
CH. FROM D/S STRUC/ BEND									



DATUM R.L.	15.0								
LAND USE									
DIAMETER	2250 uPVC					1500 uPVC			
GRADE	1 in 286	1 in 179	1 in 179	1 in 179	1 in 179	1 in 179	1 in 179	1 in 179	
EMBEDMENT TYPE									
DEPTH TO INVERT	4.349	4.269	4.288	4.213	4.250	4.230	4.278	4.258	4.257
JUNCTION INVERT LEVEL		21.447		22.700			23.856		
SEWER INVERT LEVEL	21.367	21.447	21.473	21.548	22.072	22.092	22.764	22.784	22.965
DESIGN SURFACE LEVEL		25.716		25.761			27.043		27.223
SETOUT	E501655.708	N6928770.929	E501648.539	N6928773.183	E501559.616	N6928802.386	E501445.607	N6928839.831	E501414.917
RUNNING CHAINAGE	0.000	7.546	7.546	93.596	101.142	120.000	221.142	32.303	253.445

5

06	SEWER LAYOUT AND LONGITUDINAL SECTION UPDATED	GP	TF	GE	31.01.24
05	SEWER LAYOUT AND LONGITUDINAL SECTION UPDATED	GP	TF	GE	25.08.23
04	SEWER LONGITUDINAL SECTION UPDATED	AO	SS	GE	03.07.23
03	SEWER LONGITUDINAL SECTION UPDATED	JG	EP	GE	24.10.22
02	SEWER LONGITUDINAL SECTION UPDATED	JG	EP	GE	11.10.22
01	ORIGINAL ISSUE	JG	EP	GE	19.07.22
Issue	Description	DR	CH	VE	Date

Scales

HORZ 0 10 20 40 60 80 100m

1 : 1000

VERT 0 1 2 4 6 8 10m

1 : 100

Surveyor

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consulting group

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Architect

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Verified	G.ELLIS
Original Size	A1
Height Datum	AHD
Grid	

Project

4499-4651 MOUNT LINDESAY
HIGHWAY, NORTH MACLEAN

Title

PRELIMINARY SEWER
LONGITUDINAL SECTION
SHEET 4 OF 8

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Project No. Folder Prefix Zone Stage Phase Discipline Type Drawing No. Issue

30109334 - AAP - WS000P - CV - SKT - 009D - 06

Date Plotted: 16 Feb 2024 - 05:48PM File Name: C:\Users\gp117798\Documents\Arcadis\AAU-30109334-4499-4651 Mount Lindesay Highway\Project Files\01_WIP\01_Package-00_Civil_CV\Drawings\30109334-AAP-WS000P-CV-SKT-009-SewerSketchPlan.dwg V1

STRUC/ BEND/ END NAME	8/5	9/5	10/5	9/5	1/6	1/6	1/7	2/7	3/7	10/5	1/8	2/8	3/8	4/8	5/8	6/8
STRUCTURE TYPE	P2 PE LINED	P2 PE LINED	END	P2 PE LINED	END	END	P2 PE LINED	P2 PE LINED	END	END	HTP 3.0m RADIUS	HTP 3.0m RADIUS	P2 PE LINED	HTP 3.0m RADIUS	HTP 3.0m RADIUS	B P2-1200mm PE LINED
STRUCTURE LID TYPE	B	B					B	B					B			B
STRUCTURE DROP TYPE																
JUNCTION LINE	LINE HC21	LINE 6	LINE 8	LINE 6	LINE 7	LINE 7				LINE 8						LINE HC24
DEPTH TO HC																
HC INVERT LEVEL																
HC TYPE																
HC LOT No																
CH. FROM D/S STRUC/ BEND																
DATUM R.L.	17.0			17.0		17.0				18.0						
LAND USE																
DIAMETER	1500 uPVC			1500 uPVC			1500 uPVC			1500 uPVC						
GRADE	1 in 179	1 in 83.33		1 in 180		1 in 180	1 in 180	1 in 100.00		1 in 83.33	1 in 83.33	1 in 83.33	1 in 167	1 in 167	1 in 167	
EMBEDMENT TYPE																
DEPTH TO INVERT	4.339	4.319		4.351	4.271	4.027	2.972	1.794	1.732	4.313	4.170	4.093	4.036	4.022	4.021	4.040
JUNCTION INVERT LEVEL		26.145		25.354	25.370	25.370				25.330						26.662
SEWER INVERT LEVEL	24.811	24.831		25.274	25.354	25.370	26.021	26.707	26.777	25.330	25.605	25.810	25.949	26.051	26.124	26.196
DESIGN SURFACE LEVEL		29.150		29.624		29.397	28.993	28.501		29.642	29.775	29.904	29.985	30.073	30.146	30.236
SETOUT	E501138.507 N6929004.783	E501070.046 N6929004.396	E501067.449 N6929045.899	E501070.046 N6929004.396	E501068.544 N6929041.800	E501068.544 N6929041.800	E501009.946 N6928940.531	E500949.846 N6928836.665	E500947.250 N6928838.168	E501067.449 N6929045.899	E501047.606 N6929057.381	E501035.859 N6929069.851	E501029.921 N6929079.745	E501025.986 N6929091.112	E501023.682 N6929103.103	E501024.566 N6929115.082
RUNNING CHAINAGE	570.480	79.095	649.575	3.000	662.576	0.000	117.000	237.001	3.000	22.926	22.926	17.131	11.539	12.029	12.210	12.012

06	SEWER LAYOUT AND LONGITUDINAL SECTION UPDATED	GP	TF	GE	31.01.24
05	SEWER LAYOUT AND LONGITUDINAL SECTION UPDATED	GP	TF	GE	25.08.23
04	SEWER LONGITUDINAL SECTION UPDATED	AO	SS	GE	03.07.23
03	SEWER LONGITUDINAL SECTION UPDATED	JG	EP	GE	24.10.22
02	SEWER LONGITUDINAL SECTION UPDATED	JG	EP	GE	11.10.22
01	ORIGINAL ISSUE	JG	EP	GE	19.07.22
Issue	Description	DR	CH	VE	Date

0 10 20 40 60 80 100m

1 : 1000

0 1 2 4 6 8 10m

1 : 100

Surveyor



PlanningUrban DesignLandscapeEnvironmentSurveying

Architect

-

Client



Status

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Original Issue Signatures

Drawn

A.OSORIO

Original Size

A1

Designed

S.SEM

Height Datum

AHD

Project Manager

B.KITSON

Grid

Verified

G.ELLIS

Project

4499-4651 MOUNT LINDESAY
HIGHWAY, NORTH MACLEAN

Title

PRELIMINARY SEWER
LONGITUDINAL SECTION
SHEET 5 OF 8



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Project No. | Folder Prefix | Zone | Stage | Phase | Discipline | Type | Drawing No. | Issue

30109334 - AAP - WS000P - CV - SKT - 009E - 06

Date Plotted: 16 Feb 2024 - 05:49PM

File Name: C:\Users\gp117798\Documents\Arcadis\AAU-30109334-4499-4651 Mount Lindesay Highway\Project Files\01_WIP\01_Package-00_Civil_CV\Drawings\30109334-AAP-WS000P-CV-SKT-009-SewerSketchPlan.dwg

V1

LEGEND

TOP OF BATTER

TOE OF BATTER

DESIGN CONTOUR MAJOR

DESIGN CONTOUR MINOR

EXISTING CONTOURS

OVERLAND FLOW PATHS

PROPOSED SEWER RISING MAIN

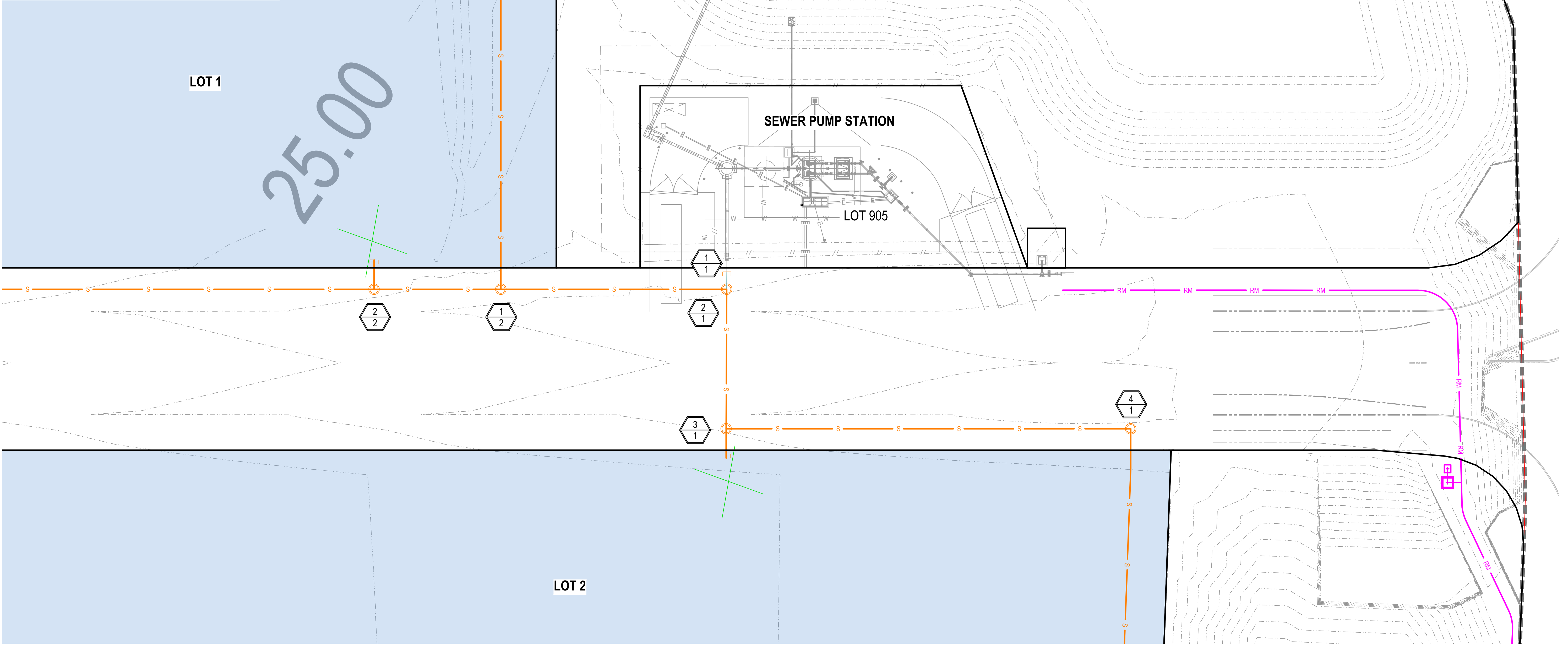
PROPOSED SEWER GRAVITY MAIN

PROPOSED SEWER MANHOLE

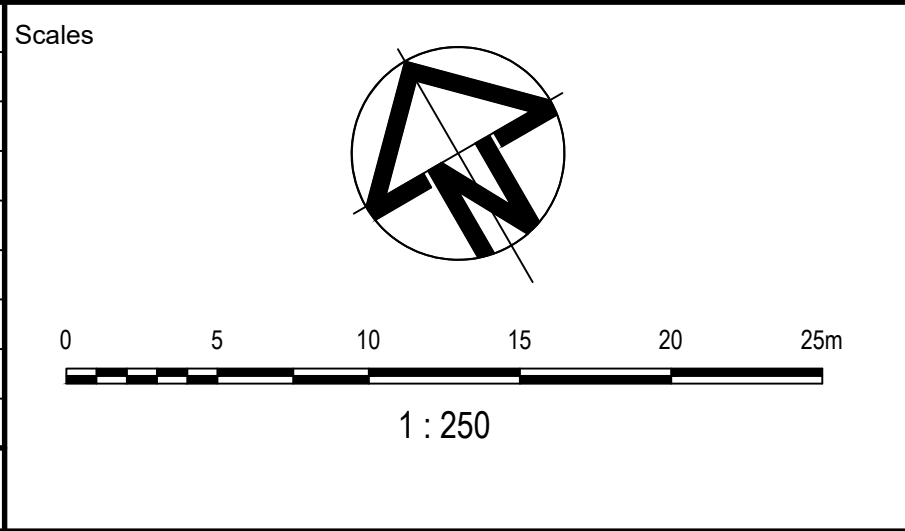
WATSON YOUNG MASTERPLAN LAYOUT P6

NOTE:

- SEWER PUMP STATION OPTION 2 ARRANGEMENT AS PER LOGAN WATER CONCEPT DESIGN INFORMATION RECEIVED 16th SEPTEMBER 2022.
- FINISHED SURFACE LEVELS SHOWN ON THE PLANS.



04	SEWER LAYOUT AND LONGITUDINAL SECTION UPDATED	GP	TF	GE	25.08.23
03	UPDATED SEWER PUMP STATION LAYOUT	AO	SS	GE	03.07.23
02	UPDATED SEWER PUMP STATION LAYOUT	JG	EP	GE	24.10.22
01	ORIGINAL ISSUE	JG	EP	GE	23.08.22
Issue	Description	DR	CH	VE	Date



Surveyor

WOLTER
consulting group

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Architect

-

Client

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Drawn	A.OSORIO	Original Size	A1
Designed	S.SEM	Height Datum	AHD
Project Manager	B.KITSON	Grid	
Verified	G.ELLIS		

Project

4499-4651 MOUNT LINDESAY
HIGHWAY, NORTH MACLEAN

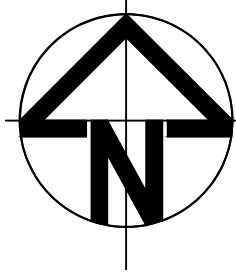
Title

SEWER PUMP STATION
SKETCH PLAN

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Project No. | Folder Prefix | Zone | Stage | Phase | Discipline | Type | Drawing No. | Issue

30109334 - AAP - WS000P - CV - SKT - 009F - 04



FOR CONTINUATION REFER DRAWING SKT 009

NOTE:

- THIS DRAWING IS BASED ON:
 - EXISTING LIDAR SURVEY FROM WOLTERS RECEIVED 09.03.2022.
 - FINISHED SURFACE LEVELS SHOWN ON THE PLANS.

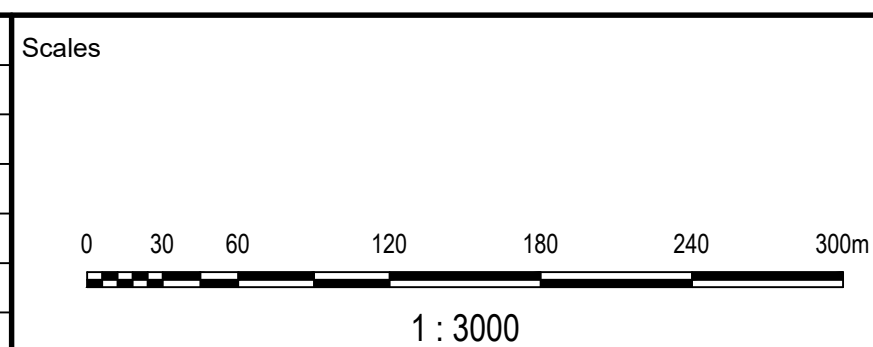
LOT SERVICEABILITY CATCHMENTS BASED ON THE FOLLOWING DESIGN CRITERIA.

- 3.0m DEEP CONNECTION AT SEWER MAIN / BOUNDARY U.N.O.
- 1:100 INTERNAL GRADING, PERPENDICULAR TO LOT ORIENTATION (WORST CASE RUN).
- MAX 0.60m COVER TO PROPOSED FINISH SURFACE AT UPPER MOST REACH.

LEGEND

0.5%	DESIGN GRADING
29.5	PROPOSED FINISH SURFACE CONTOUR
→ → →	OVERLAND FLOW PATHS
SWD	PROPOSED STORMWATER DRAINAGE
RM	PROPOSED SEWER RISING MAIN
S	PROPOSED SEWER GRAVITY MAIN
•	PROPOSED SEWER MANHOLE
X	PROPOSED LOT CONNECTION POINT
SWD	EXISTING STORMWATER DRAINAGE
oh	EXISTING OVERHEAD POWER LINE
W	EXISTING WATER MAIN
e	EXISTING UNDERGROUND ELECTRICITY
c	EXISTING COMMUNICATIONS
---	POWERLINK EASEMENT
RM	FUTURE SEWER RISING MAIN (BY OTHERS)
S	FUTURE SEWER GRAVITY MAIN (BY OTHERS)
	APPROXIMATE LOT SERVICEABILITY CATCHMENT - REFER NOTES

02	SEWER LAYOUT AND LONGITUDINAL SECTION UPDATED	GP	TF	GE	31.01.24
01	ORIGINAL ISSUE	GP	TF	GE	25.08.23
Issue	Description	DR	CH	VE	Date



Status	CONCEPT DESIGN ONLY NOT TO BE USED FOR CONSTRUCTION		
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Original Issue Signatures			
Drawn	A.OSORIO	Original Size	A1
Designed	G.PUMNUT	Height Datum	AHD
Project Manager	B.KITSON	Grid	
Verified	G.ELLIS		

Project	4499-4651 MOUNT LINDESAY HIGHWAY, NORTH MACLEAN
Title	PRELIMINARY SEWER SKETCH PLAN SHEET 2

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Project No.	Folder Prefix	Zone Stage Phase	Discipline	Type	Drawing No.	Issue
30109334	AAP	WS000P	CV	SKT	009G	02



APPENDIX C

EP & Sewer Sizing Calculations

Author: Hannah Qiao																
PROJECT NUMBER: 10037557		Software:		Updated ID, same catchment		Structure Removed	Updated ID and Catchment		New Structure		0.915 flow factor to 75% depth 1.15 velocity factor to 75% depth				AS2200 AS2200	
DATE: 6/02/2024		Sewer Sizing Calculations  Design & Consultancy Engineering Built worth it														
Structure #	Contributing Lots	EPs	Factored EPs matching Logan Water Ultimate Loading	ADWF	d	PDWF	PWWF (L/s)	Downstream Pipe DN	Pipe Grade min.	100% Pipe Capacity Qo (l/s)	100% Velocity Vo (m/s)	Capacity at 75% depth (L/s)	Velocity at 75% depth (m/s)	75% Pipe Depth Flow Exceeds PWWF?	75% Depth Velocity within 3m/s?	
4/100	NM2-EXT	467	471	0.90	2.37	2.13	4.57	DN150	0.56%	10.5	0.64	9.61	0.74	YES	YES	
17/1	NM2-EXT	467	471	0.90	2.37	2.13	4.57	DN150	0.56%	10.5	0.64	9.61	0.74	YES	YES	
2-3/100	Lot 13, Lot 12, Lot 14, 75% of Lot 11, Lot 15, EXT-NM2	1652	1665	3.18	2.37	7.53	16.18	DN225	0.56%	33.0	0.85	30.20	0.98	YES	YES	
3/4	Lot 13, Lot 12, Lot 14, 75% of Lot 11, Lot 15, EXT-NM2	1652	1665	3.18	2.37	7.53	16.18	DN225	0.35%	26.0	0.67	23.79	0.77	YES	YES	
2/4	Lot 13, Lot 12, Lot 14, Lot 11, Lot 15, EXT-NM2	1720	1733	3.31	2.37	7.84	16.85	DN225	0.35%	26.0	0.67	23.79	0.77	YES	YES	
1/4	Lot 13, Lot 12, Lot 14, Lot 11, Lot 15, EXT-NM2	1720	1733	3.31	2.37	7.84	16.85	DN225	0.35%	26.0	0.67	23.79	0.77	YES	YES	
12/1	Lot 13, Lot 12, Lot 14, Lot 11, Lot 15, EXT-NM2	1720	1733	3.31	2.37	7.84	16.85	DN225	0.35%	26.0	0.67	23.79	0.77	YES	YES	
11/1	Lot 13, Lot 12, Lot 14, Lot 11, Lot 15, EXT-NM2	1720	1733	3.31	2.37	7.84	16.85	DN225	0.35%	26.0	0.67	23.79	0.77	YES	YES	
8/1	Lot 13, Lot 12, Lot 14, Lot 11, 30% of Lot 10, Lot 15, EXT-NM2	1860	1874	3.58	2.37	8.48	18.22	DN225	0.35%	26.0	0.67	23.79	0.77	YES	YES	
7/1	Lot 13, Lot 12, Lot 14, Lot 11, 30% of Lot 10, Lot 15, EXT-NM2	1860	1874	3.58	2.37	8.48	18.22	DN225	0.35%	26.0	0.67	23.79	0.77	YES	YES	
4/1	Lot 13, Lot 12, Lot 14, Lot 11, 30% of Lot 10, Lot 15, EXT-NM2	1860	1874	3.58	2.37	8.48	18.22	DN225	0.35%	26.0	0.67	23.79	0.77	YES	YES	
3/1	Lot 13, Lot 12, Lot 14, Lot 11, Lot 15, EXT-NM2, 50% of Lot 10	1871	1886	3.60	2.37	8.53	18.33	DN225	0.35%	26.0	0.67	23.79	0.77	YES	YES	
1/1	All	2764	2785	5.32	2.37	12.60	27.08	-	-	-	-	-	-	-	-	
3/10	50% of Lot 8	42	42	0.08	2.37	0.19	0.41	DN150	1.00%	14.0	0.86	12.81	0.99	YES	YES	
2/10	50% of Lot 8	42	42	0.08	2.37	0.19	0.41	DN150	1.00%	14.0	0.86	12.81	0.99	YES	YES	
3/9	50% of Lot 8	42	42	0.08	2.37	0.19	0.41	DN150	1.00%	14.0	0.86	12.81	0.99	YES	YES	
1/9	Lot 8, Lot 7	193	195	0.37	2.37	0.88	1.89	DN150	1.00%	14.0	0.86	12.81	0.99	YES	YES	
13/2	Lot 8, Lot 7	193	195	0.37	2.37	0.88	1.89	DN150	1.00%	14.0	0.86	12.81	0.99	YES	YES	
12/2	Lot 8, Lot 7, Lot 6, 30% of Lot 9	301	303	0.58	2.37	1.37	2.95	DN150	0.60%	11.0	0.67	10.07	0.77	YES	YES	
11/2	Lot 8, Lot 7, Lot 6, 30% of Lot 9, Lot 5	331	334	0.64	2.37	1.51	3.24	DN150	0.60%	11.0	0.67	10.07	0.77	YES	YES	
12/2	Lot 8, Lot 7, Lot 6, 50% of Lot 9, Lot 5	384	387	0.74	2.37	1.75	3.76	DN150	0.60%	11.0	0.67	10.07	0.77	YES	YES	
8/2	Lot 8, Lot 7, Lot 6, 60% of Lot 9, Lot 5	410	414	0.79	2.37	1.87	4.02	DN150	0.60%	11.0	0.67	10.07	0.77	YES	YES	
7/2	Lot 8, Lot 7, Lot 6, Lot 9, Lot 5, Lot 4	551	555	1.06	2.37	2.51	5.40	DN150	0.60%	11.0	0.67	10.07	0.77	YES	YES	
6/2	Lot 8, Lot 7, Lot 6, Lot 9, Lot 5, Lot 4, 50% of Lot 3	578	582	1.11	2.37	2.63	5.66	DN150	0.60%	11.0	0.67	10.07	0.77	YES	YES	

Structure #	Contributing Lots	EPs	Factored EPs matching Logan Water Ultimate Loading	ADWF	d	PDWF	PWWF (L/s)	Downstream Pipe DN	Pipe Grade min.	100% Pipe Capacity Qo (L/s)	100% Velocity Vo (m/s)	Capacity at 75% depth (L/s)	Velocity at 75% depth (m/s)	75% Pipe Depth Flow Exceeds PWWF?	75% Depth Velocity within 3m/s?
5/2	Lot 8, Lot 7, Lot 6, Lot 9, Lot 5, Lot 4, Lot 3	605	610	1.16	2.37	2.76	5.93	DN150	0.60%	11.0	0.67	10.07	0.77	YES	YES
4/2	Lot 8, Lot 7, Lot 6, Lot 9, Lot 5, Lot 4, Lot 3, 33% of Lot 2	634	639	1.22	2.37	2.89	6.21	DN150	0.60%	11.0	0.67	10.07	0.77	YES	YES
3/2	Lot 8, Lot 7, Lot 6, Lot 9, Lot 5, Lot 4, Lot 3, 33% of Lot 2, 50% of Lot 10	786	791	1.51	2.37	3.58	7.69	DN150	4.50%	22.5	1.7	20.59	1.96	YES	YES
2/2	Lot 8, Lot 7, Lot 6, Lot 9, Lot 5, Lot 4, Lot 3, Lot 2, 50% of Lot 10	844	851	1.62	2.37	3.85	8.27	DN150	0.56%	10.5	0.64	9.61	0.74	YES	YES
1/2	Lot 8, Lot 7, Lot 6, Lot 9, Lot 5, Lot 4, Lot 3, Lot 2, 50% of Lot 10, Lot 1	893	899	1.72	2.37	4.07	8.74	DN150	0.56%	10.5	0.64	9.61	0.74	YES	YES
2/3	Lot 1	48	49	0.09	2.37	0.22	0.47	DN150	1.00%	14.0	0.86	12.81	0.99	YES	YES
1/3	Lot 1	48	49	0.09	2.37	0.22	0.47	DN150	4.00%	21.0	1.6	19.22	1.84	YES	YES
1/1	All	2764	2785	5.32	2.37	12.60	27.08	-	-	-	-	-	-	-	-

Structure #	Contributing Lots	EPs	Factored EPs matching Logan Water Ultimate Loading	ADWF	d	PDWF	PWWF (L/s)	Downstream Pipe DN	Pipe Grade min.	100% Pipe Capacity Qo (L/s)	100% Velocity Vo (m/s)	Capacity at 75% depth (L/s)	Velocity at 75% depth (m/s)	75% Pipe Depth Flow Exceeds PWWF?	75% Depth Velocity within 3m/s?
10/8	20% of Lot 13	71	72	0.14	2.37	0.32	0.70	DN150	1.00%	14.0	0.86	12.81	0.99	YES	YES
9/8	15% of Lot 12	36	36	0.07	2.37	0.17	0.35	DN150	1.00%	14.0	0.86	12.81	0.99	YES	YES
7/8	20% of Lot 13, 15% of Lot 12	107	108	0.21	2.37	0.49	1.05	DN150	0.59%	14.0	0.86	12.81	0.99	YES	YES
6/8	50% of Lot 13, 25% of Lot 12	238	240	0.46	2.37	1.09	2.33	DN150	0.59%	11.0	0.67	10.07	0.77	YES	YES
3/8	50% of Lot 13, 25% of Lot 12	238	240	0.46	2.37	1.09	2.33	DN150	0.59%	11.0	0.67	10.07	0.77	YES	YES
9/5	Lot 13, 25% of Lot 12	416	419	0.80	2.37	1.90	4.08	DN150	0.56%	10.5	0.64	9.61	0.74	YES	YES
8/5	Lot 13, 33% of Lot 12, 25% of Lot 14	489	492	0.94	2.37	2.23	4.79	DN150	0.56%	10.5	0.64	9.61	0.74	YES	YES
7/5	Lot 13, Lot 12, 25% of Lot 14	650	655	1.25	2.37	2.96	6.37	DN150	0.56%	10.5	0.64	9.61	0.74	YES	YES
6/5	Lot 13, Lot 12, Lot 14, 10% of Lot 11	836	843	1.61	2.37	3.81	8.19	DN150	0.56%	10.5	0.64	9.61	0.74	YES	YES
5/5	Lot 13, Lot 12, Lot 14, 10% of Lot 11	836	843	1.61	2.37	3.81	8.19	DN150	0.56%	10.5	0.64	9.61	0.74	YES	YES
3/5	Lot 13, Lot 12, Lot 14, 33% of Lot 11, 33% of Lot 15	956	963	1.84	2.37	4.36	9.36	DN150	0.56%	10.5	0.64	9.61	0.74	YES	YES
2/5	Lot 13, Lot 12, Lot 14, 33% of Lot 11, 33% of Lot 15	956	963	1.84	2.37	4.36	9.36	DN150	0.56%	10.5	0.64	9.61	0.74	YES	YES
1/5	Lot 13, Lot 12, Lot 14, 75% of Lot 11, Lot 15	1185	1194	2.28	2.37	5.40	11.61	DN225	0.35%	26.0	0.67	23.79	0.77	YES	YES
14/100	10% of NM2-EXT	47	47	0.09	2.37	0.21	0.46	DN150	0.56%	10.5	0.64	9.61	0.74	YES	YES
13/100	10% of NM2-EXT	47	47	0.09	2.37	0.21	0.46	DN150	0.56%	10.5	0.64	9.61	0.74	YES	YES
12/100	10% of NM2-EXT	47	47	0.09	2.37	0.21	0.46	DN150	0.56%	10.5	0.64	9.61	0.74	YES	YES
11/100	40% of NM2-EXT	187	188	0.36	2.37	0.85	1.83	DN150	0.56%	10.5	0.64	9.61	0.74	YES	YES
10/100	40% of NM2-EXT	187	188	0.36	2.37	0.85	1.83	DN150	0.56%	10.5	0.64	9.61	0.74	YES	YES
9/100	40% of NM2-EXT	187	188	0.36	2.37	0.85	1.83	DN150	0.56%	10.5	0.64	9.61	0.74	YES	YES
8/100	40% of NM2-EXT	187	188	0.36	2.37	0.85	1.83	DN150	0.56%	10.5	0.64	9.61	0.74	YES	YES

Structure #	Contributing Lots	EPs	Factored EPs matching Logan Water Ultimate Loading	ADWF	d	PDWF	PWWF (L/s)	Downstream Pipe DN	Pipe Grade min.	100% Pipe Capacity Qo (L/s)	100% Velocity Vo (m/s)	Capacity at 75% depth (L/s)	Velocity at 75% depth (m/s)	75% Pipe Depth Flow Exceeds PWWF?	75% Depth Velocity within 3m/s?
7/100	40% of NM2-EXT	187	188	0.36	2.37	0.85	1.83	DN150	0.56%	10.5	0.64	9.61	0.74	YES	YES
6/100	NM2-EXT	467	471	0.90	2.37	2.13	4.57	DN150	0.56%	10.5	0.64	9.61	0.74	YES	YES
5/100	NM2-EXT	467	471	0.90	2.37	2.13	4.57	DN150	0.56%	10.5	0.64	9.61	0.74	YES	YES
2/4	NM2-EXT	467	471	0.90	2.37	2.13	4.57	DN150	0.56%	10.5	0.64	9.61	0.74	YES	YES
2/7	40% of Lot 13	142	143	0.27	2.37	0.65	1.39	DN150	0.56%	10.5	0.64	9.61	0.74	YES	YES
1/7	50% of Lot 13	178	179	0.34	2.37	0.81	1.74	DN150	0.56%	10.5	0.64	9.61	0.74	YES	YES
1/7	60% of NM2-EXT	280	282	0.54	2.37	1.28	2.74	DN150	1.00%	14.0	0.86	12.81	0.99	YES	YES

APPENDIX D

Logan Water Technical Memorandum DD8001 North Maclean

Technical Memorandum

To: Water Infrastructure Project Development Program Leader

From: **M Seymour (Planning Engineer)**

Actioned by: [Click or tap here to enter text.](#)

Date: 21 July 2022

Reference: DD8001 North Maclean

Subject: **Load Projections for North Maclean PDA**

1. Overview

The purpose of this memo is to confirm the estimated loads associated with the North Maclean PDA based on the best available current information as provided by developers.

1.1 Developer Information

The developer of “Charter Hall – Industrial Subdivision”, 4499-4651 Mount Lindesay Highway, North Maclean is represented by Arcadis who have provided several plans showing the extent of the development that they are proposing. These are included in Attachment A. The development areas within the North Maclean PDA are shown in Figure 1.

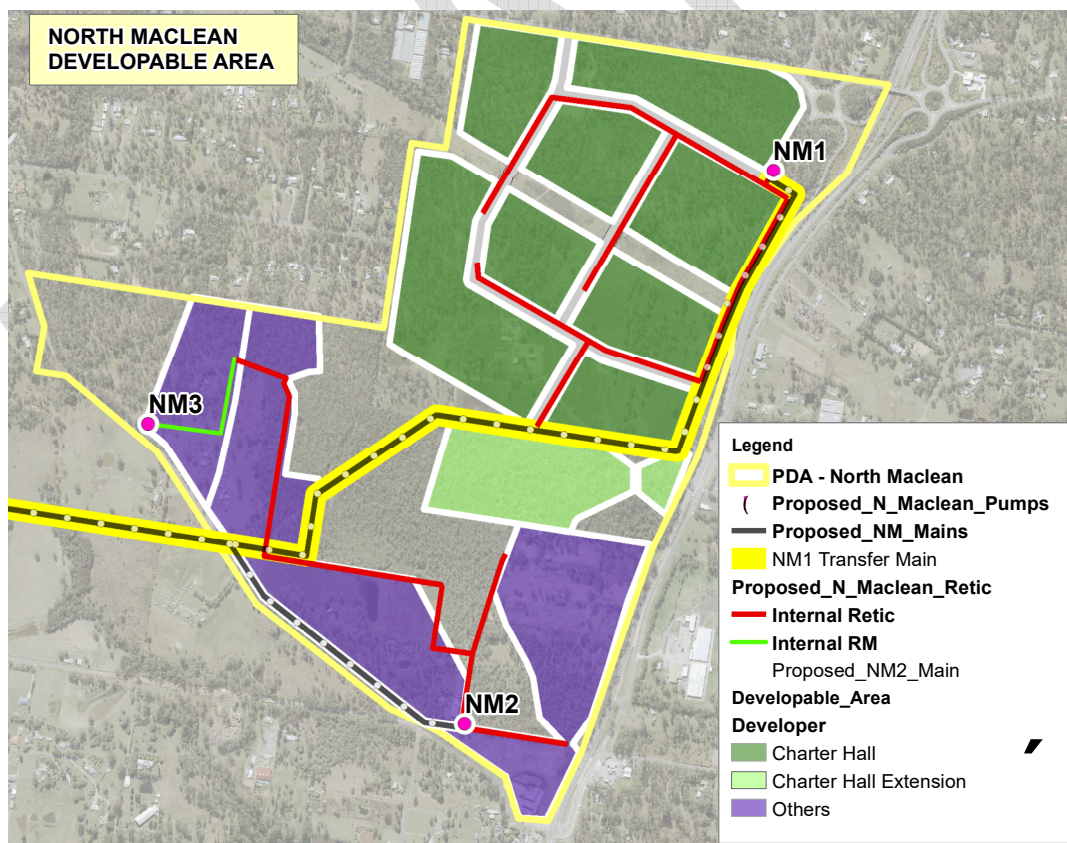


Figure 1: Development areas

The development areas include:

- Charter Hall subdivision which is the main focus for development (represented by Arcadis)

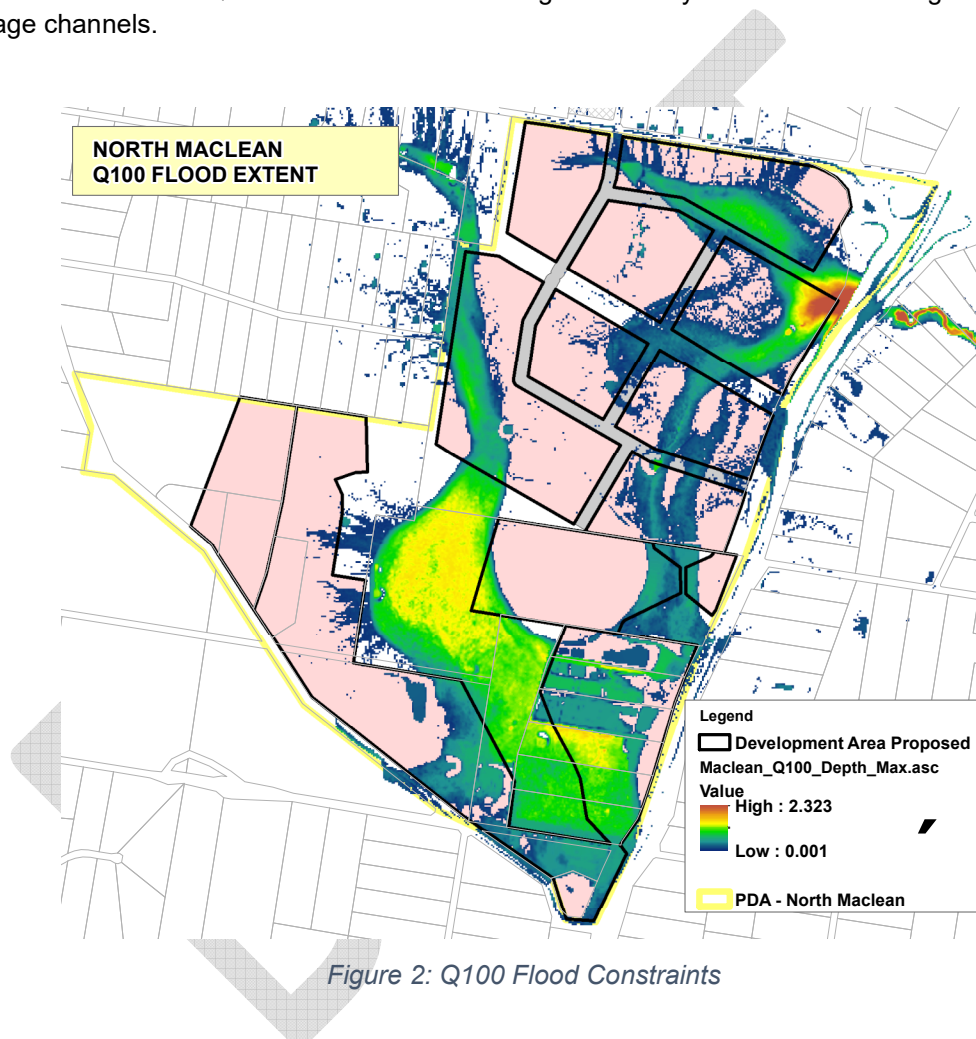
- Charter Hall extension immediately south of the main focus of development (also represented by Arcadis)
- Development areas draining to NM2 and NM3 (number of individual property owners)

Preliminary development plans have been submitted by Arcadis (developer's representative) for areas draining to NM1 transfer pump station.

The North Maclean PDA has been designated as an industrial precinct. The Charter Hall sub-division has not indicated the type of development (i.e. light, medium or heavy industry) and this will depend on the individual lot sales.

1.1.1 Development Constraints

The main constraint within the North Maclean PDA is flooding and Arcadis is proposing significant earthworks to raise the area above the Q100 flood level shown in Figure 2. They will also be installing stormwater basins and drainage channels.



Arcadis have submitted bulk earthworks plans for the areas proposed for development. These are shown in Figure 3 and Figure 4.

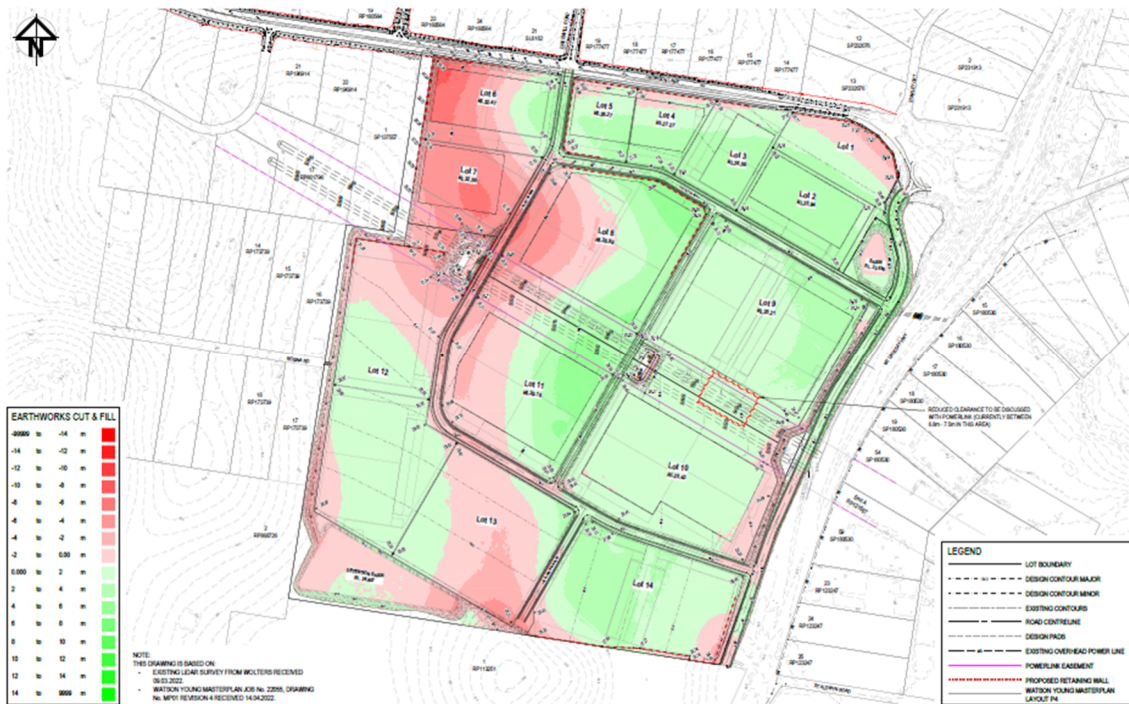


Figure 3: Bulk Earthworks in Charter Hall Subdivision

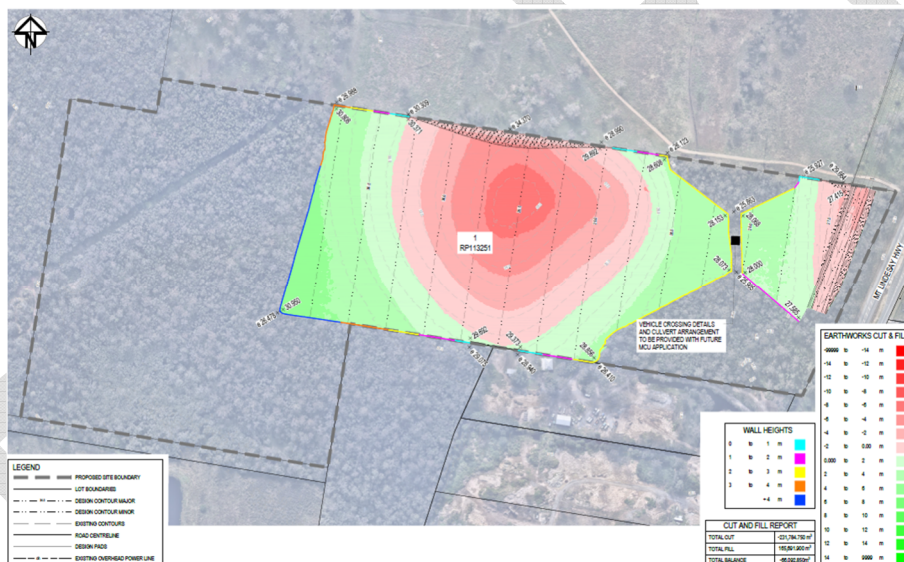


Figure 4: Bulk Earthworks in Charter Hall extension area.

2. Load assumptions

The North Maclean PDA is a designated industrial use precinct. The load estimates have been based on the following table extract from the task report “Infrastructure Demand Model 2020 (IP0017), September 2021. The industrial conversion rates were based on typical water consumption rates associated with several non-residential uses along with a return to sewer factor.

Table 4-2: Non-residential conversion rates – Base Year and/or growth years*

IDM Development Type	Average Water Consumption Method Adopted	Conversion Rates - Water		Return to Sewer (%)	Conversion Rates - Sewage	
		Gross Site Area Water EP/HA (Density Gross)	Gross Floor Area Water EP/HA (Density GFA)		Gross Site Area Water EP/HA (Density Gross)	Gross Floor Area Water EP/HA (Density GFA)
Commercial	GFA, 5 th -95 th %ile	-	55.90	0.90	-	50.31
Office	As per Commercial		55.90	0.90		50.31
Warehouse Distribution	As per Commercial		55.90	0.90		50.31
Education	GFA, 5 th -95 th %ile	-	105.30	0.80	-	84.24
Health	GFA, 5 th -95 th %ile	-	226.50	0.90	-	203.85
Industry Heavy	50% above Light Industrial	-	56.60	0.80	-	45.28
Industry Medium	25% above Light Industrial	-	47.25	0.80	-	37.80
Industry Light	GFA, 5 th -95 th %ile	-	37.80	0.80	-	30.24
Sport Recreation	Gross, 10 th -90 th %ile	1.05	-	0.90	0.945	-
Rural	Based on Water Meter Consumption	-	-	-	-	-
Retail Services	GFA, 5 th -95 th %ile	-	97.60	0.90	-	87.84
Showroom Bulk Goods	GFA, 5 th -95 th %ile	-	110.80	0.90	-	99.72
Accommodation	GFA, 5 th -95 th %ile	-	233.90	0.90	-	210.51

Reference: Table 7.2 Development of Infrastructure Demand Model, LWIA 2018 (PI-181).

Table 1: Non-residential conversion rates

Industrial use was subdivided into consumption rates for light, medium and heavy industry. It should be noted that these are averages and in the case of very high users such as bottling plants, abattoirs, concrete manufacturers, etc individual assessments of load will be necessary.

The consumption rates have been based on GFA and it has been assumed that this is equal to 70% of the developable area that excludes roads, public open space and stormwater lagoons and drainage channels, etc.

The ultimate loads were determined for the developable areas assuming light, medium and heavy industrial uses.

In the absence of any growth rate assumptions from the developer it has been assumed that.

- North Maclean 1 Pump Station catchment
 - 10% of the ultimate load in 2023
 - 90% of ultimate load in 2051
- North Maclean 2 and 3 pump station catchments
 - 10 % of the ultimate load in 2026
 - 90% of the ultimate load in 2051

Ultimate development is assumed in 2081 and linear growth has been assumed between 2023 / 2026 and 2051.

It should be noted that the growth rates are unlikely to have any impact on the transfer infrastructure which has been sized on ultimate loads.

3. Load Estimates and Projection

Figure 5 includes the pump stations servicing the North Maclean PDA.

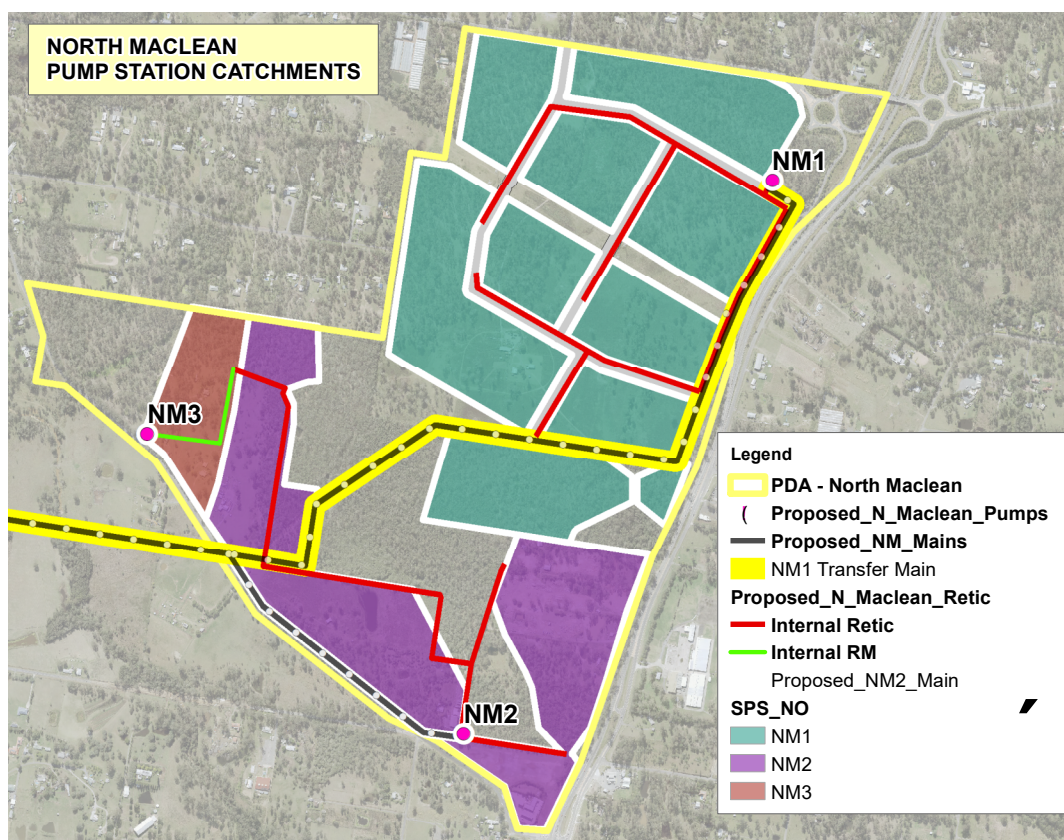


Figure 5: North Maclean pump station catchments

There are three pump stations, NM1 and NM2 are transfer pump stations and inject into a common rising main. NM3 is an internal pump station, and it transfers load to NM2 pump station via internal reticulation.

The ultimate loads have been estimated for the three pump stations and these are included in Table 2.

Table 2: Ultimate Loads

SPS NO	Developable Lot Area Ha	GFA Ha (1)	Light Ind EP (2)	Med Ind EP (3)	Heavy Ind EP (4)	IDM EP ULT
NM1	105	74	2,228	2,785	3,336	3,460
NM2	55	38	1,164	1,455	1,743	1,880
NM3	11	8	230	288	345	255
NM2 Total	66	46	1,394	1,743	2,088	2,135
Totals:	171	120	3,623	4,528	5,424	5,595

Note:

1. GFA assumed 70% of Developable Area
2. Light Industry: 30.24 EP / HA (based on GFA)
3. Medium Industry: 37.80 EP / HA (based on GFA)
4. Heavy Industry: 45.28 EP / HA (based on GFA)

Table 2 also includes ultimate loads for light, medium and heavy industry along with IDM2020 assumptions. The IDM_2020 load assumed in earlier studies was 5,595 EP.

The loads based on industrial use along with projections are included in Table 3.

Table 3: North Maclean PDA – Projected Loads

Medium Industry (3)

SPS NO	Sum of Sewer EP 2023	Sum of Sewer EP 2026	Sum of Sewer EP 2031	Sum of Sewer EP 2036	Sum of Sewer EP 2041	Sum of Sewer EP 2051	Sum of Sewer EP ULT	Developable Lot Area Ha	GFA Ha (1)
NM1	279	517	915	1,313	1,711	2,507	2,785	105	74
NM2		146	349	553	757	1,164	1,455	55	38
NM3		29	69	109	150	230	288	11	8
NM2 Total		174	418	662	906	1,394	1,743	66	46
Totals:	279	692	1,333	1,975	2,617	3,901	4,528	171	120

Light Industry (2)

SPS NO	Sum of Sewer EP 2023	Sum of Sewer EP 2026	Sum of Sewer EP 2031	Sum of Sewer EP 2036	Sum of Sewer EP 2041	Sum of Sewer EP 2051	Sum of Sewer EP ULT	Developable Lot Area Ha	GFA Ha (1)
NM1	223	414	732	1,050	1,369	2,005	2,228	105	74
NM2		116	279	442	605	931	1,164	55	38
NM3		23	55	87	120	184	230	11	8
NM2 Total		139	335	530	725	1,115	1,394	66	46
Totals:	223	553	1,067	1,580	2,094	3,121	3,623	171	120

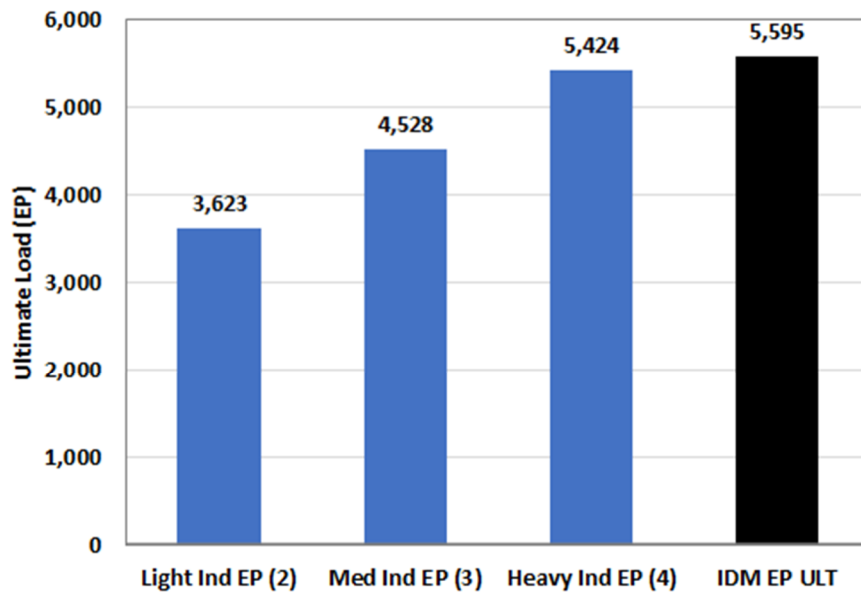
Heavy Industry (4)

SPS NO	Sum of Sewer EP 2023	Sum of Sewer EP 2026	Sum of Sewer EP 2031	Sum of Sewer EP 2036	Sum of Sewer EP 2041	Sum of Sewer EP 2051	Sum of Sewer EP ULT	Developable Lot Area Ha	GFA Ha (1)
NM1	334	620	1,096	1,573	2,050	3,003	3,336	105	74
NM2		174	418	662	906	1,395	1,743	55	38
NM3		34	83	131	179	276	345	11	8
NM2 Total		209	501	793	1,086	1,670	2,088	66	46
Totals:	334	828	1,597	2,366	3,135	4,673	5,424	171	120

Note:

1. GFA assumed 70% of Developable Area
2. Light Industry: 30.24 EP / HA (based on GFA)
3. Medium Industry: 37.80 EP / HA (based on GFA)
4. Heavy Industry: 45.28 EP / HA (based on GFA)

The following Figure 6 compares the ultimate loads based on the industrial use and the IDM_2020 assumption.



Note:

- 1 GFA assumed 70% of Developable Area
- 2 Light Industry 30.24 EP / HA (based on GFA)
- 3 Medium Industry 37.80 EP / HA (based on GFA)
- 4 Heavy Industry 45.28 EP / HA (based on GFA)

Figure 6: Ultimate Loads based on Industrial Use

The growth rates included in Table 3 are shown in the following Figure 7, Figure 8 and Figure 9 for the NM1 and NM2 transfer pump stations and the total North Maclean PDA load.

NM1 Pump Station

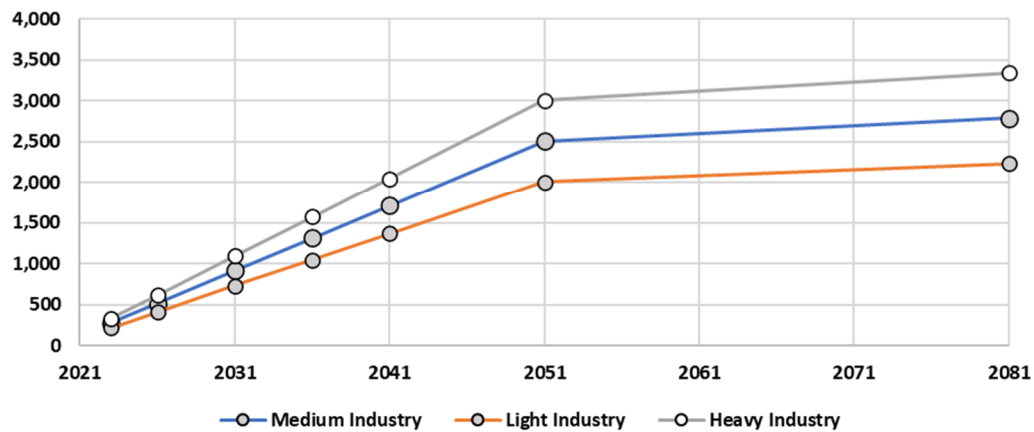


Figure 7: North Maclean 1 Pump Station – Growth Projections

NM2 Pump Station

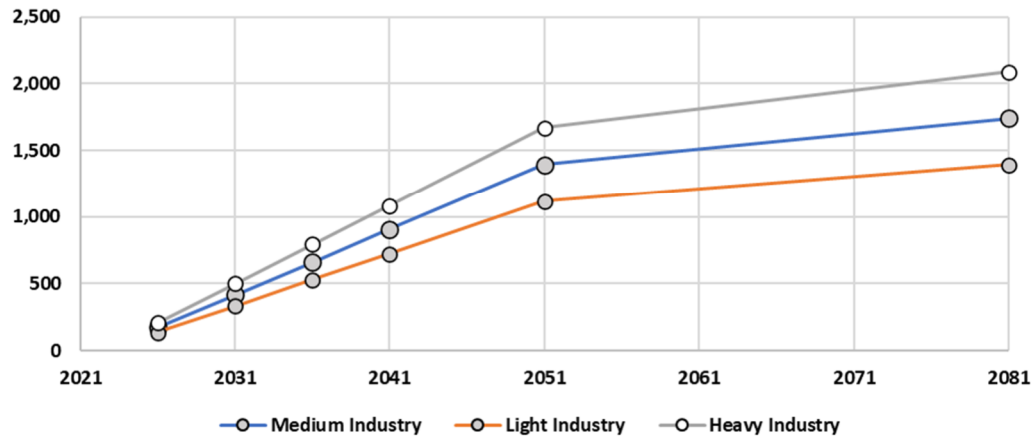


Figure 8: North Maclean 2 Pump Station – Growth Projections

North Maclean PDA Total

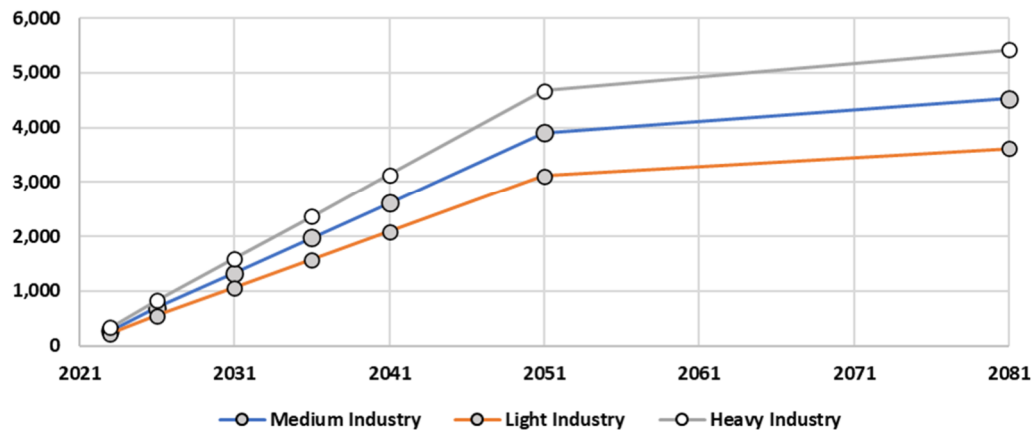


Figure 9: North Maclean PDA – Growth Projections

The type of industry will impact on the loads

- Light Industry 3,623 EP or 65% of IDM 2020 load (5,595 EP)
- Medium Industry 4,528 EP or 81% of IDM 2020 load (5,595 EP)
- Heavy industry 5,424 EP or 97% of IDM 2020 load (5,595 EP)

Indications are that the industrial development is unlikely to be heavy industrial use and will be a mix of light and medium industry.

4. Conclusions

In the absence of more accurate indication of uses it is proposed to adopt the loads based on medium industrial loads. It is unlikely to result in any significant reduction in infrastructure sizing and will allow for some flexibility if there is a need to service any industry with high sewage loads.

5. Recommendations

It is recommended that Logan Water adopt the loads included in Table 4 for development within the North Maclean PDA:

Table 4: Recommended Loads for North Maclean PDA (based on Medium Industrial use)

SPS NO	Sum of Sewer EP 2023	Sum of Sewer EP 2026	Sum of Sewer EP 2031	Sum of Sewer EP 2036	Sum of Sewer EP 2041	Sum of Sewer EP 2051	Sum of Sewer EP ULT
NM1	279	517	915	1,313	1,711	2,507	2,785
NM2		146	349	553	757	1,164	1,455
NM3		29	69	109	150	230	288
NM2 Total		174	418	662	906	1,394	1,743
Totals:	279	692	1,333	1,975	2,617	3,901	4,528

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Attachment 1: Developer Drawings

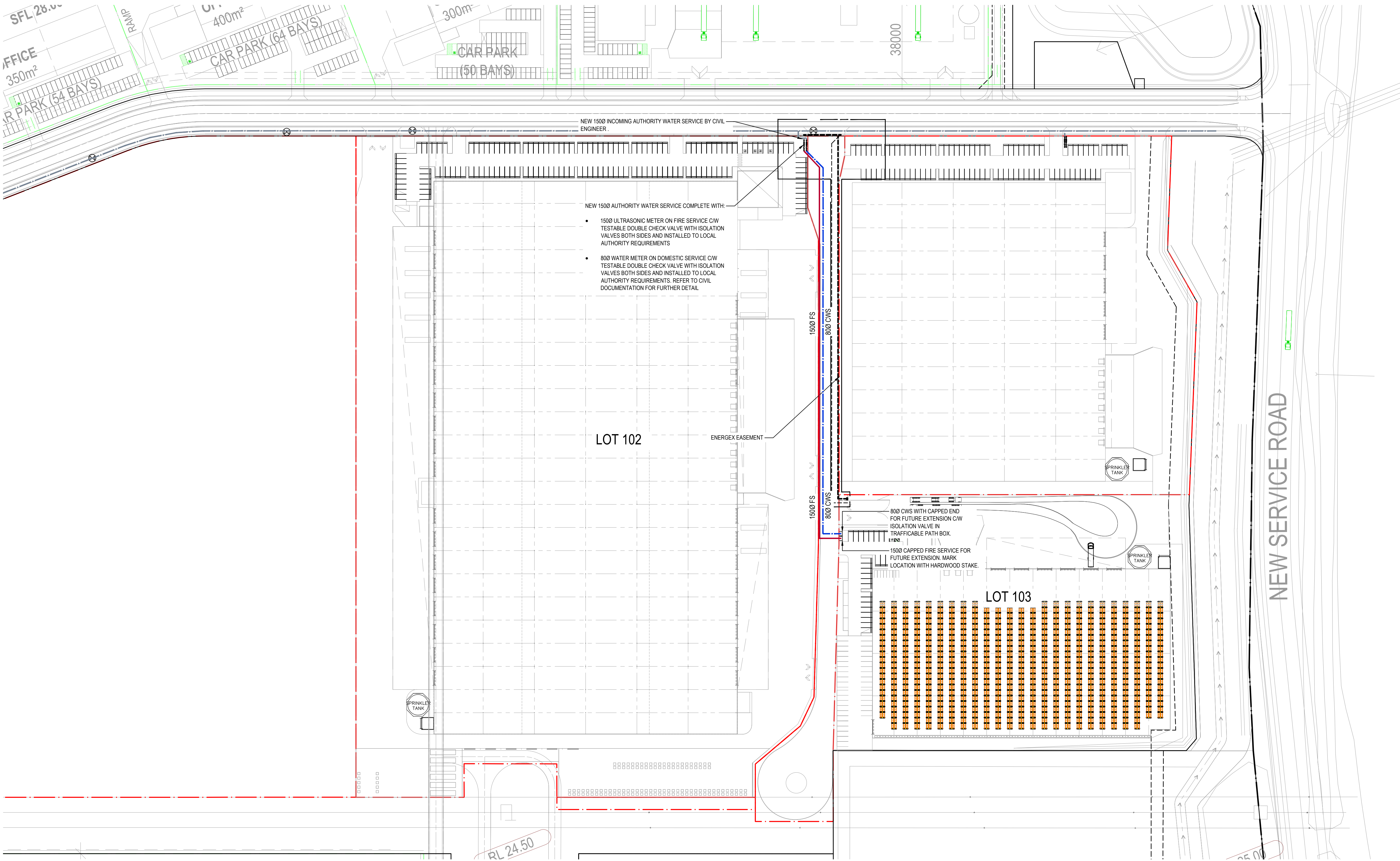
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Appendix F – ACOR Consultants Lot 103 Hydraulics Concept

BARCODE

NOTES

1. THE WHOLE OF THE PLUMBING AND DRAINAGE WORK SHALL BE INSTALLED IN ACCORDANCE WITH QLD PLUMBING AND DRAINAGE ACT 2018, QLD PLUMBING AND DRAINAGE REGULATION 2019, AS/NZS:3500, THE LOCAL AUTHORITY APPROVED DRAWINGS, REQUIREMENTS & COMPLIANCE PERMIT CONDITIONS.
2. ALL WORK TO BE CO-ORDINATED ON SITE WITH MECHANICAL CONTRACTOR PRIOR TO INSTALLING.
3. FINAL LOCATION OF ALL FITTINGS AND FIXTURES TO BE CO-ORDINATED ON SITE WITH ALL SERVICES.



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				SK	01.11.24	SKETCH		AA			MASTER SITE NUMBER		DISCIPLINE PROJECT NUMBER	
				SK	07.11.24	SKETCH		AA			NA240765			
								DISCIPLINE TEAM LEADER	DATE	DRAWING NUMBER		ISSUE	SHEET NO	
								AUTHORISED FOR ISSUE	DATE	SK01			SK	