

Planning Proposal to enable a Kaufland Supermarket - 393 Pacific Highway, Belmont North

Local Government Area	Lake Macquarie City
Name of Draft LEP:	Draft Lake Macquarie Local Environmental Plan 2014 – Belmont North
Subject Land:	Lot 101 in DP 1021186, 393 Pacific Highway, Belmont North
Owner:	BWP Management Ltd
Applicant:	BWP Management Ltd
Council Folder Number:	RZ/1/2019
Figures:	Figure 1: Coastal Wetland and Coastal Wetland Buffer Map Figure 1: Bushfire Prone Land Buffer Map Figure 3: Flooding Map
Attachments:	Attachment 1: Locality Map Attachment 2: Aerial Photograph Attachment 3: Existing Zoning LMLEP 2014 Attachment 4: Existing Additional Permitted Uses' in Locality Attachment 5: Proposed Additional Permitted Use Attachment 6: Concept Plan Attachment 7: Overland Flow Report Attachment 8: Transport Impact Assessment Attachment 9: Economic Impact Assessment
Prepared by:	Adam Ovenden – Strategic Planner Economic Focus

Part 1 – Objective of the Planning Proposal

This Planning Proposal applies to Lot 101 in DP 1021186, 393 Pacific Highway, Belmont North (the subject site). The subject site is approximately four hectares of B4 Mixed Use and B7 Business Park zoned land with direct access to the Pacific Highway.

The proposal seeks to amend *Lake Macquarie Local Environmental Plan 2014 (LMLEP 2014)* to insert Additional Permitted Uses of a *Shop* and *Food and Drink Premise* within Schedule 1 for the B7 Business Park zoned area of the subject site. The proposal also seeks to include a floor space limitation for the use of the site as a *Food and Drink Premise* in Part 7 Additional Local Provisions of *LMLEP 2014*. The specific floor space limitation will be determined following further economic impact analysis.

The objective of this proposal is to facilitate the development of a Kaufland supermarket and associated food and drink premises through a concurrent development application.

Part 2 – Explanation of the Provisions

The amendment proposes the following changes to *LMLEP 2014*:

Schedule 1 - Additional Permitted Uses	Permit development for the purposes of <i>Shop</i> and <i>Food and Drink Premise</i> on the B7 Business Park zoned area of Lot 101 in DP 1021186, 393 Pacific Highway, Belmont North
Part 7 – Additional Local Provisions	Limit development for the purpose of a <i>Food and Drink Premise</i> to a maximum floor area on the B7 Business Park zoned area of Lot 101 in DP 1021186, 393 Pacific Highway, Belmont North

Part 3 – Justification for the Provisions

A. NEED FOR THE PLANNING PROPOSAL

1. Is the planning proposal a result of any strategic study or report?

This Planning Proposal is not the result of a strategic study or report.

The site is currently zoned a mixture of B4 Mixed Use and B7 Business Park under *LMLEP 2014* and has been occupied by a Bunnings Warehouse since 2001. Bunnings recently have made a commercial decision to relocate their operations to a nearby B7 Business Park zoned precinct at Bennetts Green.

The purpose of the Planning Proposal is to facilitate the development of a Kaufland supermarket and associated retail outlets through a concurrent development application. The proposal will retain significant local employment opportunities within a key employment precinct within the growth corridor between Belmont and Charlestown.

The proposed use of the site as a supermarket and associated retail is defined as *Shops* and *Food and Drink Premises* under *LMLEP 2014*. Whilst these uses are permissible within the B4 zoned component of the site adjacent to the Pacific Highway, they are both prohibited within the B7 zoned area.

2. Is the planning proposal the best means of achieving the objectives or intended outcomes, or is there a better way?

In order to achieve the indented outcome the following options were considered:

Option 1 – Encourage the Proposed Supermarket Elsewhere

The first option considered as part of this Planning Proposal was to consider encouraging the use on alternative sites within the City. Traditionally, supermarkets have been encouraged within economic and local centres. A review of available and developable land within nearby areas, where *Shops* and *Food and Drink Premises are permissible* failed to identify suitable alternative sites.

Furthermore, the proposed development is expected to have a significantly larger market catchment serving the needs of residents across eastern Lake Macquarie and beyond. As such, the site area required to accommodate the building footprint and associated car parking would not support Council's objective of creating fine grain, compact, and walkable economic centres.

It is considered that the subject site is an appropriate strategic location for the proposed use as the site is:

- Located within an Urban Renewal Corridor under the Hunter Regional Plan, Newcastle Metropolitan Plan, and Imagine Lake Mac;
- Partially zoned B4 Business Park where the proposed uses are permissible. The uses are also permitted within the remaining 3.7 hectares within the Belmont North Business Precinct;
- Located 1km from the Belmont Economic Centre;
- On the main north / south movement corridor on the eastern side of Lake Macquarie with strong public transport links; and
- Located in a residential area with over 3,200 persons living within a 10 minute walkable catchment. This walkable catchment population is higher than the economic centres of Cardiff, Glendale, Mount Hutton, Morisset, and Toronto.

Option 2 – Rezone site to B4 Mixed Use

Rezoning the B7 Business Use component of the site to B4 Mixed Use would facilitate the proposed supermarket (*Shop*) and associated retail (*Food and Drink Premise*) with consent. The site adjoins 3.7 hectares of land zoned B4 Mixed Use, and the rezoning would be a logical extension of that land use.

However, the subject land is below the 1:100 flood level. As the B4 Mixed Use zone permits multiple residential uses with consent, this is considered an inappropriate use of the land.

Option 3 – Additional Permitted Use

The third option considered was to amend Schedule 1 of *LMLEP 2014* and insert *Shops* and *Food and Drink Premise* as an Additional Permitted Use and assess the development application for the supermarket and associated retail concurrently. This will ensure that the LEP amendment will only proceed if the proposed development meets council's requirements as part of the development assessment process.

Option 3 is considered the most efficient means of achieving the objectives of the Planning Proposal.

B. RELATIONSHIP TO STRATEGIC PLANNING FRAMEWORK

- 1. Is the planning proposal consistent with the objectives and actions contained within the applicable regional or sub-regional strategy (including the Sydney Metropolitan Strategy and exhibited draft strategies)?**

Hunter Regional Plan 2036

The proposed amendment to *LMLEP 2014* and the concurrent development application are consistent and supportive of the relevant Goals and Directions within the Hunter Regional Plan 2036. The subject site is located within the Urban Renewal Corridor identified within the Plan stretching from Belmont to Charlestown.

The proposal is consistent with the following directions:

Direction 23: Grow centres and renewal corridors

As identified above, the subject site is located within the Charlestown to Belmont Urban Renewal Corridor, about 1km from the Belmont Economic Centre. Once constructed, the proposed development will support approximately 150 direct ongoing jobs.

Direction 24: Protect the economic functions of employment land

The proposed LEP amendment and concurrent development application will retain and enhance the economic and employment function of existing activates within the site and precinct. The proposal and subsequent redevelopment of the site has the potential to stimulate and enhance economic and employment activities within the adjoining employment land.

Greater Newcastle Metropolitan Plan 2036

The proposed LEP amendment is generally consistent with the vision and strategies within the Greater Newcastle Metropolitan Plan 2036 (the Metro Plan). The subject site is located within the Metro Core that contains nearly two-thirds of Greater Newcastle's homes and jobs.

The Planning Proposal is consistent with Action 7.1 in the Metro Plan which calls on Council's to:

- Build capacity for new economy jobs in areas well serviced by public transport and close to established centres by:
 - Enabling a greater range of employment generating uses in appropriate industrial and business areas, and
- Ensure an adequate supply of employment land, including industrial zoned land, to cater for demand of urban services in accessible locations.

The subject site is located within the Urban Renewal Corridor between Belmont and Charlestown and is close to the established Belmont economic centre. The site is on the main north-south public transport corridor with two bus stops on both sides of the highway, close to the site.

2. Is the planning proposal consistent with the local council's Community Strategic plan or other local strategic plan?

Community Strategic Plan 2017-2027

The proposal is considered consistent with the Community Strategic Plan by providing economic activity and employment opportunities in an area serviced by good mobility and accessibility.

Imagine Lake Mac

The proposed amendment aligns with the aspiration within Imagine Lake Mac to create a City that attracts investment, creates jobs, and fosters innovation. The site is located within the Belmont North Business-Industrial Precinct that seeks to provide a range of flexible spaces for a variety of employment uses while ensuring the conservation and enhancement of the adjoining Belmont Wetlands. The proposed amendment is considered to be consistent and supportive of the aspirations within Imagine Lake Mac.

3. Is the planning proposal consistent with applicable state environmental planning policies?

An assessment has been undertaken to determine the level of consistency the proposal has with relevant State Environmental Planning Policies (SEPPs). The assessment is provided below.

SEPP	Relevance	Comment
SEPP 55 – Remediation of Land	Establishes planning controls and provisions for the remediation of contaminated land.	<p>A Site Audit Statement (November 2000) has previously been issued for the site under the <i>Contaminated Land Management Act 1997</i> and <i>Contaminated Land Management Regulation 1998</i>. The site Audit Statement confirms that the site is suitable for commercial uses.</p> <p>The Site Audit Statement identifies an on-site containment cell in the north-eastern corner of the site. The cell contains asbestos contaminated soil.</p> <p>The impacts on the cell and other containment issues will be assessed as part of the concurrent development application.</p>
SEPP - Coastal Management 2016	This SEPP ensures that development in the NSW coastal zone is appropriate and suitably located to ensure that there is a consistent and strategic approach to coastal planning and management.	<p>Land directly to the east of the site is identified as 'coastal wetlands' for the purpose of the Coastal Management SEPP. The eastern portion of the site is identified with the 'proximity area for coastal wetlands'.</p> <p>The impacts of the proposal on the adjacent sensitive receiving environment will be assessed in detail as part of the concurrent development application.</p>
SEPP (Infrastructure) 2007	The objective of the SEPP is to facilitate the coordination of essential infrastructure	<p>The site is located in an existing urban area and is serviced by essential infrastructure.</p> <p>The proposal meets the definition of traffic generating development requirement referral to Roads and Maritime Service (Transport NSW). Consultation will occur with the RMS should the proposal proceed through the Gateway process.</p>

4. Is the planning proposal consistent with applicable Ministerial Directions?

An assessment has been undertaken to determine the level of consistency the proposal has with relevant Ministerial Directions. The assessment is provided below:

Ministerial Direction	Relevance	Implications
1.1 - Business and Industrial Zones	Aims to encourage employment growth in suitable locations, protect employment land in business and industrial zones, and support the viability of identified strategic centres	The proposed amendment to <i>LMLEP 2014</i> will assist in maintaining existing employment and economic activities on the site and the adjacent B4 zoned land. The proposed amendment is considered to be consistent with this Direction.
1.2 - Rural Zones	Aims to protect the agricultural production value of rural land	N/A
1.3 – Mining, Petroleum and Extractive Industries	The direction requires consultation with the Director-General of the Department of Primary Industries where a draft LEP will restrict extractive resource operations	N/A
1.4 - Oyster Aquaculture	Aims to ensure that Priority Oyster Aquaculture Areas	N/A
1.5 - Rural Lands	Aims to protect the agricultural production value of rural land	N/A
2.1 – Environmental Protection Zones	The direction requires that a draft LEP contain provisions to facilitate the protection of environmentally sensitive land	N/A

Ministerial Direction	Relevance	Implications
2.2 - Coastal Management	This direction seeks to give effect to the objects of the <i>Coastal Management Act 2016</i>	<p>The adjacent land to the east of the site is identified as a 'coastal wetlands' under the <i>SEPP (Coastal Management) 2018</i>. Approx. 13,500m² along the eastern boundary is identified within the 'proximity area for coastal wetlands'.</p> <p>Under the <i>SEPP</i>, consent must not be granted for land within the 'proximity area for coastal wetlands' unless the consent authority is satisfied that the proposed development will not significantly impact on the biophysical, hydrological or ecological integrated of the adjacent coastal wetland, or the quantity and quality of surface and ground water flows to and from the adjacent coastal wetland.</p> <p>The impact of the proposed development on the adjacent coastal wetland will be assessed in detail as part of the concurrent development application.</p>
2.3 – Heritage Conservation	The direction requires that a draft LEP include provisions to facilitate the protection and conservation of aboriginal and European heritage items	N/A
2.4 – Recreation Vehicle Areas	The direction restricts a draft LEP from enabling land to be developed for a recreation vehicle area	N/A
3.1- Residential Zones	The direction requires a draft LEP to include provisions that facilitate housing choice, efficient use of infrastructure, and reduce land consumption on the urban fringe	N/A

Ministerial Direction	Relevance	Implications
3.2 – Caravan Parks and Manufactured Home Estates	The direction requires a draft LEP to maintain provisions and land use zones that allow the establishment of Caravan Parks and Manufactured Home Estates	N/A
3.3 – Home Occupations	The direction requires that a draft LEP include provisions to ensure that Home Occupations are permissible without consent	N/A
3.4 – Integrating Land Use and Transport	The direction requires consistency with State policy in terms of positioning of urban land use zones	The site is accessible by the regional road network from the Pacific Highway. Bus stops along the Pacific Highway provide services to Belmont, Newcastle, Charlestown, Swansea, Warners Bay and Mount Hutton. The development of the site for a supermarket would therefore capitalise on established movement infrastructure and public transport routes.
4.1 Acid Sulfate Soils	Aim to avoid significant adverse environmental impacts from the use of land that has a probability of containing acid sulfate soils	The proposal is consistent with this Direction. The site is identified as ASS Class 3 and 5. Consideration will be given to ASS during any remediation and redevelopment as part of the concurrent development application.
4.2 – Mine Subsidence and Unstable Land	The direction requires consultation with the Subsidence Advisory NSW where a draft LEP is proposed for land within a mine subsidence district	The site is identified as being within a proclaimed Mine Subsidence District. The assessment of impacts and concurrence from the Subsidence Advisory will be sought as part of the concurrent development application.

Ministerial Direction	Relevance	Implications
4.3 - Flood Prone Land	Aims to ensure that development of flood prone land is consistent with the NSW Government Flood Prone Land Policy and the Principles of the Floodplain Development Manual 2005 and to ensure that the provision of an LEP on flood prone land is commensurate with flood hazard and includes consideration of the potential flood impacts both on and off the subject land	<p>The site is identified as comprising flood prone land. The Overland Flow Report indicates that the pre and post development flood scenario assessment provides favourable results that there is unlikely to be no effect on downstream or adjacent properties.</p> <p>Further assessment, including the impacts on the adjacent Coastal Wetland to the east of the site will occur as part of the concurrent development application.</p>
4.4 – Planning for Bushfire Protection	The direction applies to land that has been identified as bushfire prone, and requires consultation with the NSW Rural Fire Service, as well as the establishment of Asset Protection Zones	The site is bushfire prone. Further assessment and consultation with the Rural Fire Service will be required as part of the concurrent development application.
5.10 – Implementation of Regional Plan	The direction seeks to give effect to the vision, land use strategy, policies, outcomes and actions contained in regional strategies	The proposal is consistent with the Hunter Regional Plan and the Newcastle Metropolitan Plan, as outlined in Section B of this document.
6.1 – Approval and Referral Requirements	The direction prevents a draft amendment from requiring concurrence from, or referral to, the Minister or a public authority	N/A
6.2 – Reserving Land for Public Purposes	The direction prevents a draft LEP from altering available land for public use	N/A
6.3 - Site Specific Provisions	Aims to reduce restrictive site-specific planning controls where a draft LEP amends another environmental planning	The proposal seeks to implement a site-specific planning control to limit the maximum floor area of <i>Food and Drink Premises</i> to 435m ² .

Ministerial Direction	Relevance	Implications
	instrument in order to allow a particular development proposal to proceed. Draft LEPs are encouraged to use existing zones rather than have site-specific exceptions	<p>Under the initial LEP amendment request submitted to Council it was considered that any <i>Food and Drink Premise</i> on the site would be an ancillary use to the proposed supermarket (<i>shop</i>). However, legal advice sought by the proponent indicates that ancillary use provisions may not be applicable. As such, it is considered appropriate to include a maximum floor area for any <i>Food and Drink Premise</i> development to ensure the economic value of the adjoining B4 Mixed Use is not undermined.</p> <p>In this instance, the site-specific planning control is considered an appropriate measure to restrict the floor space of any <i>Food and Drink Premise</i> on the site.</p>

C. ENVIRONMENTAL, SOCIAL AND ECONOMIC IMPACT

- 1. Is there any likelihood that critical habitat or threatened species, populations or ecological communities, or their habitats, will be adversely affected as a result of the proposal?**

No. The subject site is currently utilised as a Bunnings Warehouse and associated car parking. A small number of established trees are located along the northern and eastern boundaries that are likely to be retained as part of the concurrent development application.

- 2. Are there any other likely environmental effects as a result of the planning proposal and how are they proposed to be managed?**

Coastal Wetlands

As discussed above, the adjacent land to the east of the site is considered to be a sensitive receiving environment and is classified as a 'coastal wetlands' under *SEPP (Coastal Management) 2018*.

The Overland Flow Report (Attachment 6) indicates that the pre and post development flood scenarios assessment provides favourable results which confirm that there will be no effect on downstream or adjacent properties, including the adjacent coastal wetland.

Under the *SEPP*, consent must not be granted for land within the 'proximity area for coastal wetlands' unless the consent authority is satisfied that the proposed development will not significantly impact on the biophysical, hydrological or ecological integrated of the adjacent coastal wetland, or the quantity and quality of surface and ground water flows to and from the adjacent coastal wetland.

The impact of the proposed development on the adjacent coastal wetland will be assessed in detail as part of the concurrent development application.



Figure 2: Coastal Wetland and Coastal Wetland Buffer Map

Bushfire

The site is identified as being within the bushfire prone land buffer. Consideration of a bushfire assessment will be undertaken as part of the concurrent development application in consultation with the Rural Fire Service.

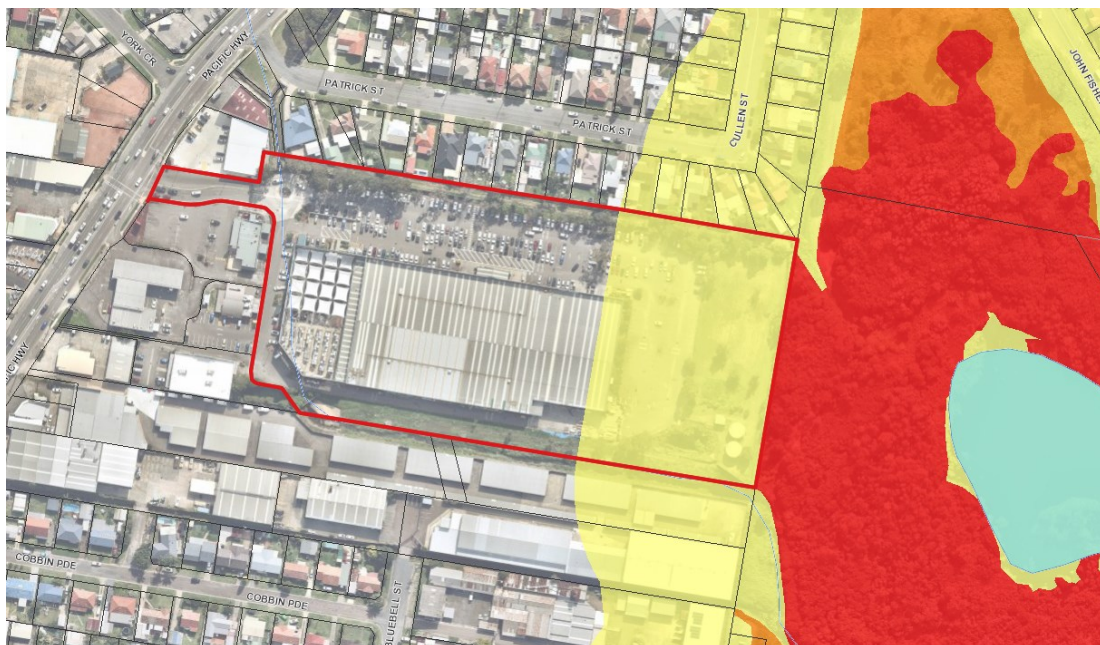


Figure 3: Bushfire Prone Land Buffer Map

Watercourse and Flooding

A tributary of Muraban Creek extends from the norther-western corner of site, along the western boundary (underground), and along the southern site boundary before entering the adjoining

Belmont Wetlands. Another creek line extends through the central section of the site underground in a north-south direction, connecting to the creek line that runs adjacent to the southern site boundary.

The site is identified as a Flood Control High Hazard (1 in 100 year) in Council's flood mapping. As discussed above, the Overland Flow Report submitted (Attachment 6) indicates that the pre and post development flood scenarios assessment provides favourable which confirm that there will be no effect on downstream or adjacent properties, including the adjacent coastal wetland. Further assessment of any potential flooding risk or implications will be assessed as part of the concurrent development application.

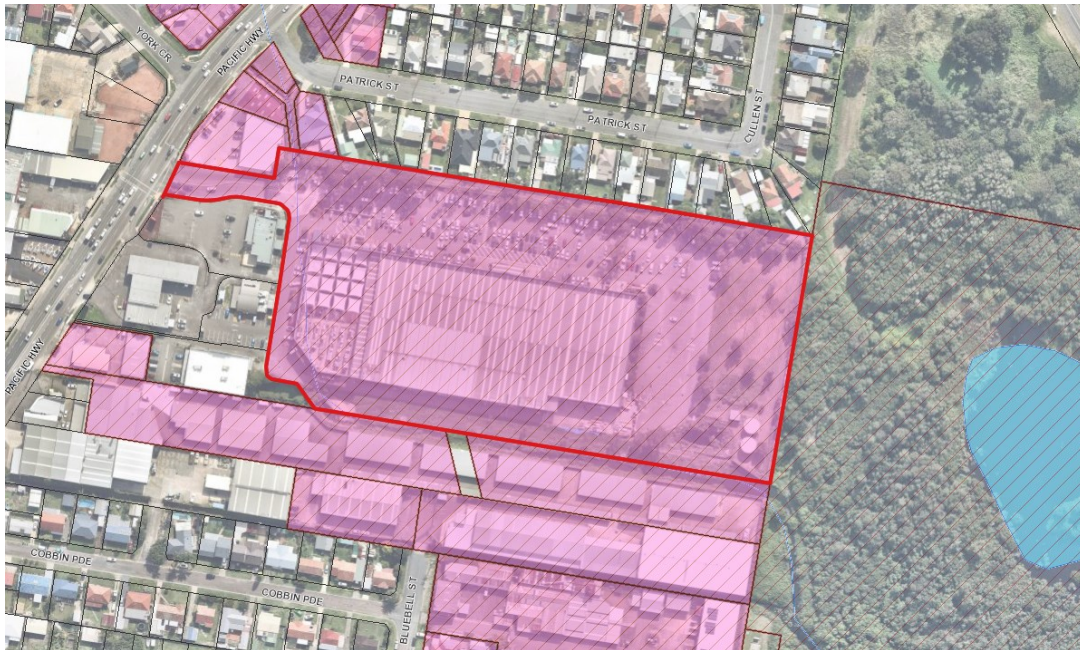


Figure 3: Flooding Map

Contamination

The site is identified as being previously contaminated. An on-site containment cell is located in the north-eastern corner of the site. The cell contains asbestos contaminated cell.

A Site Audit Statement (November 2000) has previously been issued for the site under the *Contaminated Land Management Act 1997* and *Contaminated Land Management Regulation 1998*. The site Audit Statement confirms that the site is suitable for commercial uses.

The impacts on the cell and other containment issues will be assessed as part of the concurrent development application.

Transport

A Transport Impact Assessment has been submitted in support of the application. The site has direct access from the Pacific Highway via a signalised intersection with pedestrian crossing priorities. Improvements to the pedestrian and cyclist access directly to the site will be considered in more detail as part of the development application.

The site is accessible via public transport with a bus stop within 100m of the site in both directions on the Pacific Highway.

Further details on the transport implications of the proposal is located within Attachment 7.

3. How has the planning proposal adequately addressed any social and economic effects?

Social Impacts

The proposed LEP amendment and subsequent development will facilitate the construction of a full-line supermarket and associated retail within a designated growth corridor. The proposed development and uses will generate much-needed local employment opportunities required to support the growing population. Further details on the social impact of the development will be assessed as part of the concurrent development application.

Economic Impacts

An economic impact assessment was submitted a part of the initial planning request (Attachment 8). The analysis shows that there is sufficient latent demand capacity within the trade catchments to support the development. However, further consideration of the economic impact on nearby centres is recommended following Gateway Determination.

D. STATE AND COMMONWEALTH INTERESTS

1. Is there adequate public infrastructure for the planning proposal?

Yes. The subject land is currently serviced with all essential infrastructure and has direct access to the regional road network via the Pacific Highway.


2. What are the views of State and Commonwealth public authorities consulted in accordance with the gateway determination?

It is anticipated consultation will be undertaken with the following agencies:

- Roads and Maritime Services
- Subsidence Advisory NSW
- Hunter Water Corporation
- Rural Fire Service
- Office of Environment and Heritage

Attachment 1: Locality Map



 Subject Land

Locality

0 1
Kilometres



Projection GDA 1994
Zone 56



Base Map Credits: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, © OpenStreetMap contributors, and the GIS User Community

Date: 12/06/2019

Planning Proposal: RZ/1/2019

Attachment 2: Aerial Photograph



- Land Parcel
- Subject Land

Air Photo

2019 Aerial Photography

Nearmap Imagery 2019

0 100
Metres

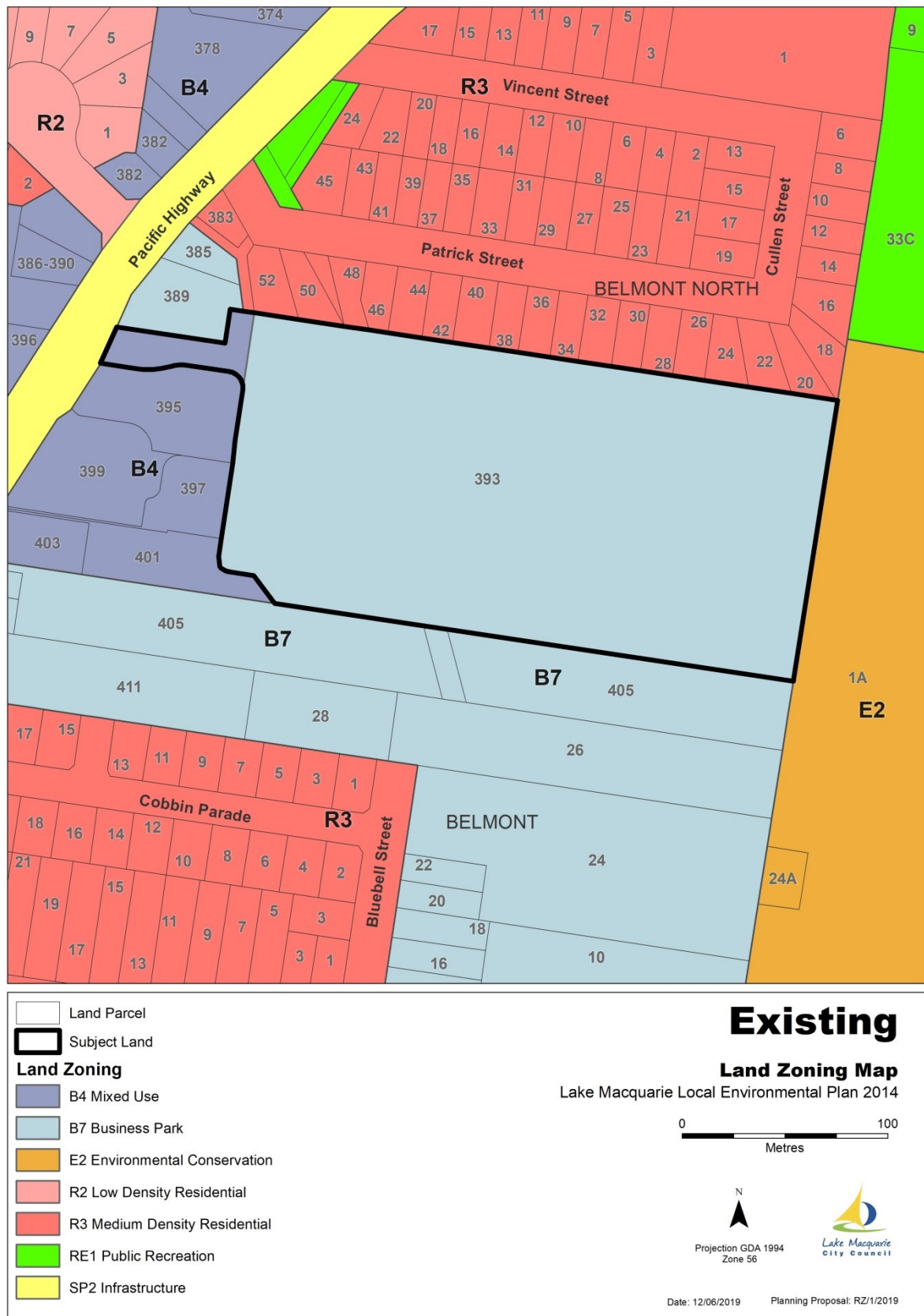
N
Projection GDA 1994
Zone 56



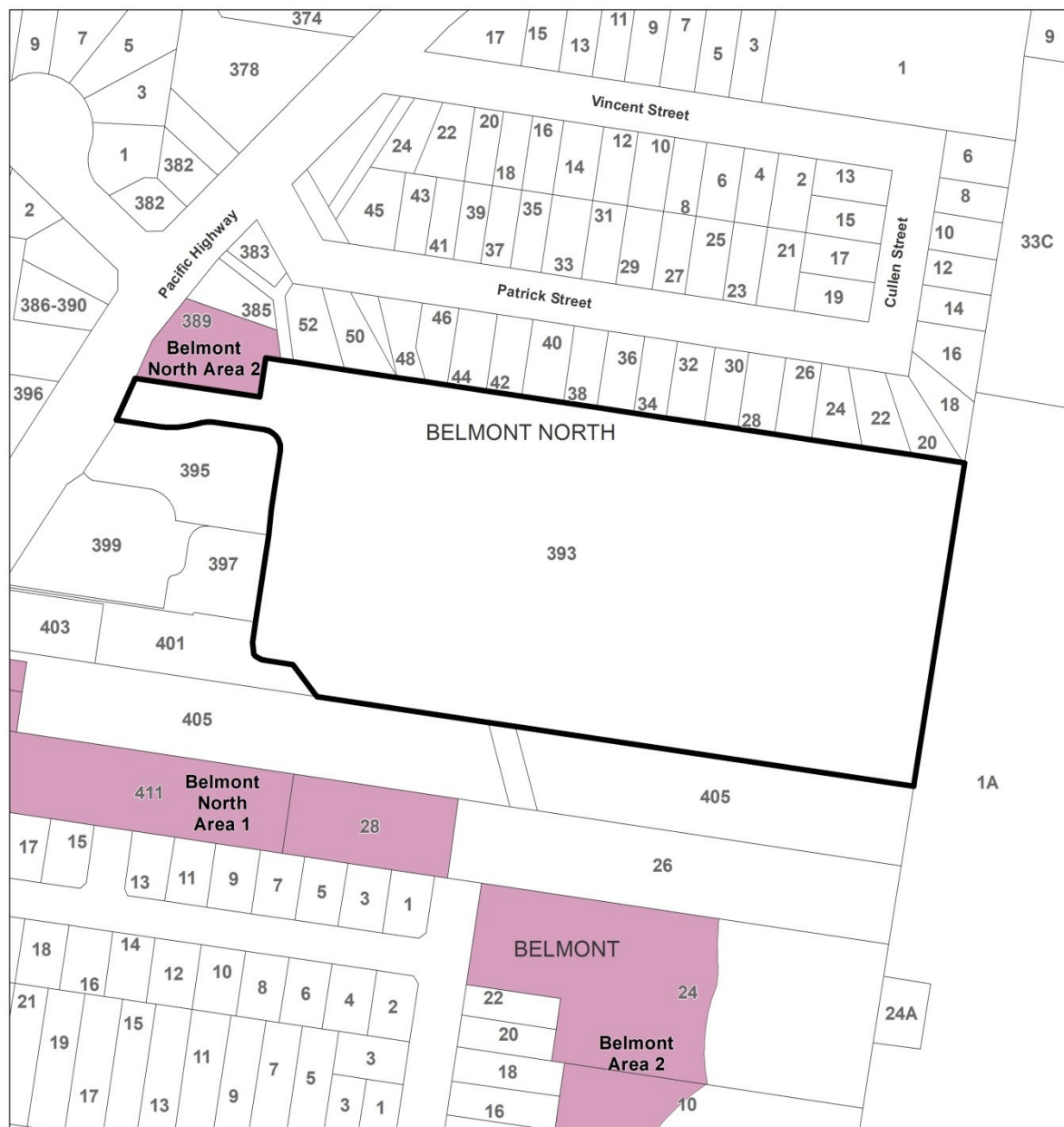
Date: 12/06/2019

Planning Proposal: RZ/1/2019

Attachment 3: Existing Zoning *LMLEP 2014*



Attachment 4: Existing Additional Permitted Uses' in Locality

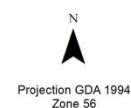
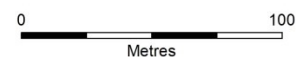


 Subject Land
 Cadastre
 Additional Permissible Uses

Existing

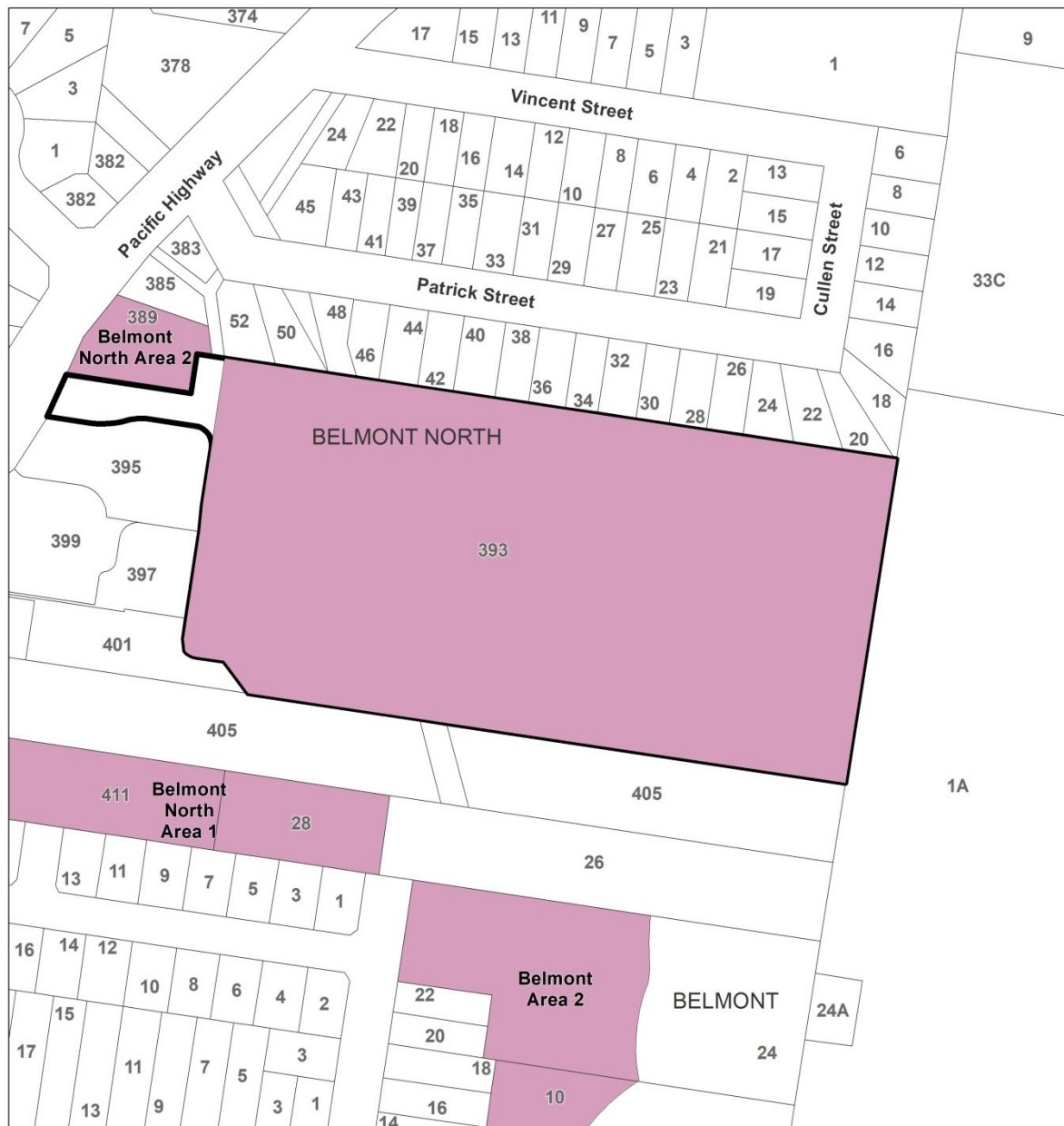
Additional Permitted Uses Map

Lake Macquarie Local Environmental Plan 2014



Date: 12/06/2019 Planning Proposal: RZ/1/2019

Attachment 5: Proposed Additional Permitted Use



-  Subject Land
-  Cadastre
-  Additional Permissible Uses

Proposed **Additional Permitted Uses Map** Lake Macquarie Local Environmental Plan 2014

0 100
Metres

N
Projection GDA 1994
Zone 56



Date: 12/06/2019 Planning Proposal: RZ/1/2019

Attachment 6: Concept Plan



Title boundary is subject to confirm by the licensed surveyor.



AUS - NSW - BELMONT NORTH		
393 Pacific Highway		No. _____
Belmont North		Ver. 2
Preliminary Design		
Plan Date:		27-11-2018
Content:		
Plan Overview		
Site Area	40380 m ²	
Kaufland only	40380 m ²	
Green Area	0 m ²	0%
Space Schedule Kaufland		
		nec. PP
Retail Area (10 m ² /PP)	3921 m ²	392
Tenant (up to 200m ² ; 20m ² /PP)	525 m ²	26
Retailer (over 200m ² ; 40m ² /PP)	0 m ²	0
Shopping Street	330 m ²	
Entrance, Travelator, Escalator	53 m ²	
Auxiliary Rooms	1825 m ²	
Other Space (delivery ramp etc., cold)	0 m ²	
Net Floor Area	6654 m ²	
Gross Area (Ground)	6900 m ²	
Space Schedule exclude Kaufland		
		nec. PP
Retailer	0 m ²	0
Miscellaneous (m ² /PP various)	0 m ²	0
Target Parking Kaufland (440 PP)		458
Target Parking exclude Kaufland		0
Planning Specification:		
Submission of all basic building rights and restrictions. Information on product range and utilization restrictions together with a comparison with the development plan is required.		
Height survey of the local GOK and reconciliation with the stock is necessary before further processing.		
Separate turning movements in all directions required. An expert proof of the performance and functionality of the traffic connections to the traffic network is to be provided! Planning of traffic systems for car and truck traffic, including proof of all the required trailing curves and radius, in particular the delivery is required.		
The delivery situation must be checked in particular with regard to noise protection for neighboring buildings.		
Parking Place		PP
Accessible Parking		AP
Parents with Child		PC
Trolley Box		TRB
Scale:		
		1:1000
Paper Size		
		A3
Object Planner:		Reeta
Approved	<input type="checkbox"/>	
Not Approved	<input type="checkbox"/>	
Date / Signed		

Attachment 7: Overland Flow Report

OVERLAND FLOW REPORT

PROPOSED COMMERCIAL DEVELOPMENT 393 PACIFIC HIGHWAY BELMONT NSW

Prepared For:

**Kaufland
c/- Willow Tree Planning
Suite 4, Level 7
100 Walker Street
NORTH SYDNEY NSW 2060**

Prepared by:

**Costin Roe Consulting
Level 1, 8 Windmill Street
WALSH BAY NSW 2000**

Rev: A

DOCUMENT VERIFICATION

Project Title	Proposed Commercial Development
Document Title	Overland Flow Report
Project No.	Co13802.00
Description	Overland flow assessment for new commercial development.
Client Contact	Ms Rachel Streeter, Willow Tree Planning

	Name	Signature
Prepared by	Mitchell Cross	
Reviewed by	Mark Wilson	
Issued by	Mitchell Cross	
File Name	13802.00-02.rpt.docx	

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APPENDICES

1. INTRODUCTION

Costin Roe Consulting Pty Ltd (CRC) has been commissioned by Kaufland, via Willow Tree Planning, to prepare this Overland Flow Report in support of a planning application submission for the proposed development site. This report analyses flooding impacts to the existing commercial facility at 393 Pacific Highway, Belmont and a proposed redevelopment of the site. The 4.3 Ha parcel of land (“*Site*”) comprises an existing Bunnings Warehouse. The “*Study Area*” will extend locally around this parcel of land extending upstream and downstream sufficient distance to understand the hydraulic conditions in and around the proposed development area.

The overland flow assessment has been completed to confirm flood planning requirements for the property and potential future development associated with the proposed modification of zoning (including building levels and overland flow management and safety), and that the development will not cause any adverse affectation to upstream, downstream or adjoining properties. Overland flow from the upstream contributing catchments must be conveyed through the site, with no effect on upstream and downstream properties.

The scope and primary objectives of the overland flow assessment, are as follows:

- Determine the 1% Annual Exceedance Probability (AEP) Flood design flow generated by the contributing external catchment. Hydrology would be based on the upstream catchment as defined by a hydrological RAFTS model;
- Assess the pre-development overland flow path & underground trunk drainage culverts through the development site for the 1% AEP storm event;
- Assess the post-development impact of development over the site on the underground trunk drainage culvert & overland flow swale through the development site for the 1% AEP storm event so that potential impacts on the development can be assessed and mitigated; and
- Confirm that there is an effect on upstream, downstream and adjacent properties as a result of the development.

The *Study Area* is located within the bounds of the *Lake Macquarie City Council* (LMCC). There is currently no formal council flood study completed on the Belmont region in which the site is located.

As noted, this study will accompany a proposed modification in zoning over the Site. The site is currently zoned *B7 Business Park pursuant to Lake Macquarie Local Environmental Plan 2014* (LMLEP2014) and comprises a Bunnings Warehouse. The objective of the project is to allow the redevelopment of the site for a Kaufland supermarket, being a retail/grocery chain stocking up to 60,000 product lines. In accordance with the LMLEP2014 land use definitions, Kaufland would constitute a ‘Shop’ (being a type of ‘Retail Premises’). Shops are currently not approved on the site, and therefore it is proposed to introduce an *Additional Permitted Use* (APU) for Shops within the B7 zone. This would require a Planning Proposal to amend LMLEP2014 and this report has been prepared in support of this submission.

2. SITE CHARACTERISTICS

2.1. Site Description

The site at 393 Pacific Highway (being Lot 101 in DP 1021186) is approximately 4.3 Ha in area. The site is a ‘battle-axe’ parcel of land and roughly rectangular in shape as shown in **Figure 2.1**. The development footprint is approximately 4.0 Ha of the overall property area.

The site is bounded on the north by residential properties, on the south by industrial properties and the west by existing commercial properties and the Pacific Highway. Land to the east of the site is currently undeveloped.



Figure 2.1 Locality Plan

The existing Bunnings was approved by LMCC in 1999 under DC/99/01634/1M A. As part of this approval, a drainage and overland flow design was produced by Michael Lockley & Associates. This design was obtained by Costin Roe Consulting from LMCC (refer **Appendix C**) and used as reference as part of this assessment. The design drawings show a three-cell box culvert, each cell being 3.3m wide by 1.5m high (refer **Figure 2.2**), is present on the western side of the property. This culvert system conveys flows from a series of concrete lined open channels and associated upstream contributing catchments (approx. 237.8 Ha) from the north-west corner of the property to the south-west. A large trapezoidal open channel (refer **Figure 2.3**) is located adjacent to the southern boundary of the site, conveying flow from the box culvert system and runoff from Lots 100, 103, 104 and 105 in an easterly direction to bushland east of the property. A smaller overland flow swale is present on the north and east of the property (refer **Figure 2.4**). This channel provides a flow path for water which may overtop the box culvert system at the north-east corner of the property along the northern boundary toward bushland on the east.



Figure 2.2. Existing Box Culverts



Figure 2.3. Existing Open Channel (south of building)



Figure 2.4. Existing Overland Flow Path (north side of property).

2.2. Proposed Development

The proposed development is for the construction of a grocery retail shop for Kaufland.

An indicative layout of the development has been produced and can be seen in **Figure 2.2** below.

The development will include the following engineering components:

- Demolition of the existing Bunnings Warehouse building
- Earthworks to create flat pads for the proposed building.
- Stormwater drainage system based on a major/ minor design philosophy;
- Management of stormwater quality using a treatment train approach to pollutant loads on a developed catchment in accordance with councils load based pollutant reduction percentages; and
- Management of stormwater quantity by reducing post developed flow to pre-developed over the range of storms between the 20% AEP to the 1% AEP as per council policy by use/modification of the existing on-site detention basin.
- Maintenance of existing overland flow paths and trunk culvert system.

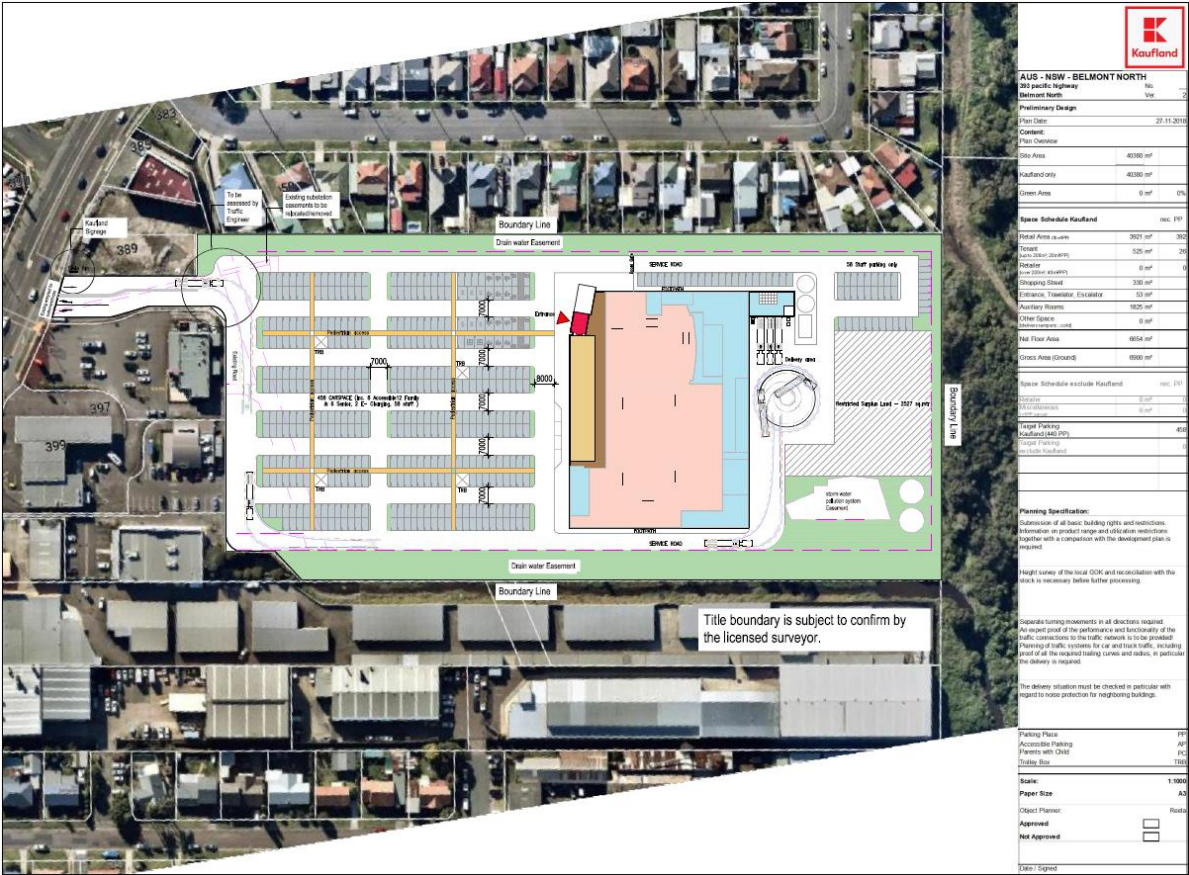


Figure 2.2 Architectural Plan

3. STUDY OBJECTIVES & METHODOLOGY

3.1. Study Objectives

The objectives of the Flood Study are to:

- Identify relevant flood-related information and requirements by searching all relevant data sources and council policy;
- Determine the likely extent and nature of flooding and identify potential hydraulic controls;
- Define existing catchment condition flood behaviours for mainstream flooding in the catchment with due consideration to upstream and downstream controls within the study area;
- Define design flood levels, and velocities for the catchment;
- Define the extent of flooding for the 1% AEP design storm;
- Confirm flood planning requirements for the development;
- Confirm the potential for cumulative effects of possible filling proposals in that area is minimal;
- Confirm the development potential of surrounding properties is not adversely affected by the filling proposal;
- Confirm the flood liability of buildings on surrounding properties is not increased; and
- Confirm no local drainage flow/runoff problems are created by the filling.

3.2. Study Methodology

A numerical hydraulic modelling tool developed a model to convert runoff hydrographs into water levels and velocities throughout the study area. The model simulates the hydraulic behaviour of the water within the study area by accounting for flow in the major channels as well as the potential for overland flow paths, which develop when the capacity of the channel is exceeded. It relies on boundary conditions which include the runoff hydrographs and appropriate downstream boundary level.

The modelling has been undertaken in two stages (as discussed below) and this report provides details and summary of the pre & post development stages of the modelling.

Stage 1 – Pre Development

- Build of a 2D hydrodynamic flood model of the existing overland flow channel & trunk drainage culverts through the proposed site for the existing scenario;
- Modelling has been performed using the TUFLOW modelling engine with the open channels and overbank areas being modelled in 2D, and the existing underground trunk drainage culverts modelled as 1D elements;
- Hydrology determined via rain on grid modelling;
- Modelling of the 1% AEP storm event for the existing site with validation being completed against the design flood levels as per the Michael Lockley & Associates design drawings for the existing Bunnings Facility;
- The Digital Terrain Model (DTM) used in the modelling will be based on survey information received from Positive Survey Solutions and ALS survey information.

Stage 2 – Post Development

- Revision of the Stage 1 model to include the proposed development;
- Post development scenario testing and analysis of differences in flood levels, velocity and general hydraulics against the pre development scenario; and
- Confirmation of the effect on surrounding properties as a result of development.

3.3. Report Format

Section 4 of the report discusses the content and source of relevant data which has been utilised in the study. This section describes relevant flood studies and available historical information and also provides details of the survey used to establish the DTM used in the analysis.

Section 5 discusses the catchment characteristics the hydrological information used in the study.

Section 6 discusses the development of the hydraulic model including establishment of the DTM, boundary conditions, validation, sensitivity analysis and subsequent use for design rainfall events and development scenarios.

Section 7 provides the results of the design flood estimation for the catchment.

Section 8 summarises the results of the assessment and provides discussion on the various aspects of the results while Section 8 provides concluding remarks to the overall study.

A number of figures are included in **APPENDIX A** to illustrate the study results.

APPENDIX B includes the existing site survey, **APPENDIX C** the civil designs included in the Bunnings development approval and **APPENDIX D** includes council flood information certificate.

4. REVIEW OF AVAILABLE DATA

Data has been obtained from a number of sources and includes information required for input to the numerical models, together with information required for validation of model results and the adequate representation and presentation of those results.

4.1. Survey

Survey is required to define the physical attributes of the floodplain topography including the creek cross sections and the associated floodplain levels.

The pre development scenario survey has been compiled based information ALS Survey compiled by the NSW Department of Land and Property Information, and survey information provided by Positive Survey Solution. The survey information has been used to define the existing overland flow path cross section and features.

The proposed site levels, as defined by the architectural layout were integrated into the Post Development model by inputting an inactive 2D area to simulate filling above the 1% AEP flood level.

These surveys and surfaces were used as the basis for the digital terrain model (DTM) used in the hydraulic modelling of the pre and post development scenario respectively.

4.2. Bunnings Design Drawings

The design drawings for the existing Bunnings facility including the design water levels for the 1% AEP flood level. The drawings completed by Michael Lockley and associates provide 1% AEP flood levels for the underground box culverts and southern drainage channel.

4.3. Council Flood Study

There is currently no formal council flood study for the Belmont region.

A flooding certificate was obtained from LMCC (refer **APPENDIX D**) however this did not provide any information relating to flooding in and around the site.

5. CATCHMENT INVESTIGATION & HYDROLOGY

5.1. Hydrological Assessment of Existing Catchment

There are three contributing catchments upstream to the north and west of the site that currently drain to the underground culvert system which runs through the property. A catchment plan has been prepared and included as **Figure 5.1**, and also included as drawing **CO13802.00-F07** in **Appendix A**. The three catchments have been broken up to smaller sub-catchments as shown in the figure and referenced below in **Table 5.1** to a total contributing upstream catchment of 237.8 Ha.

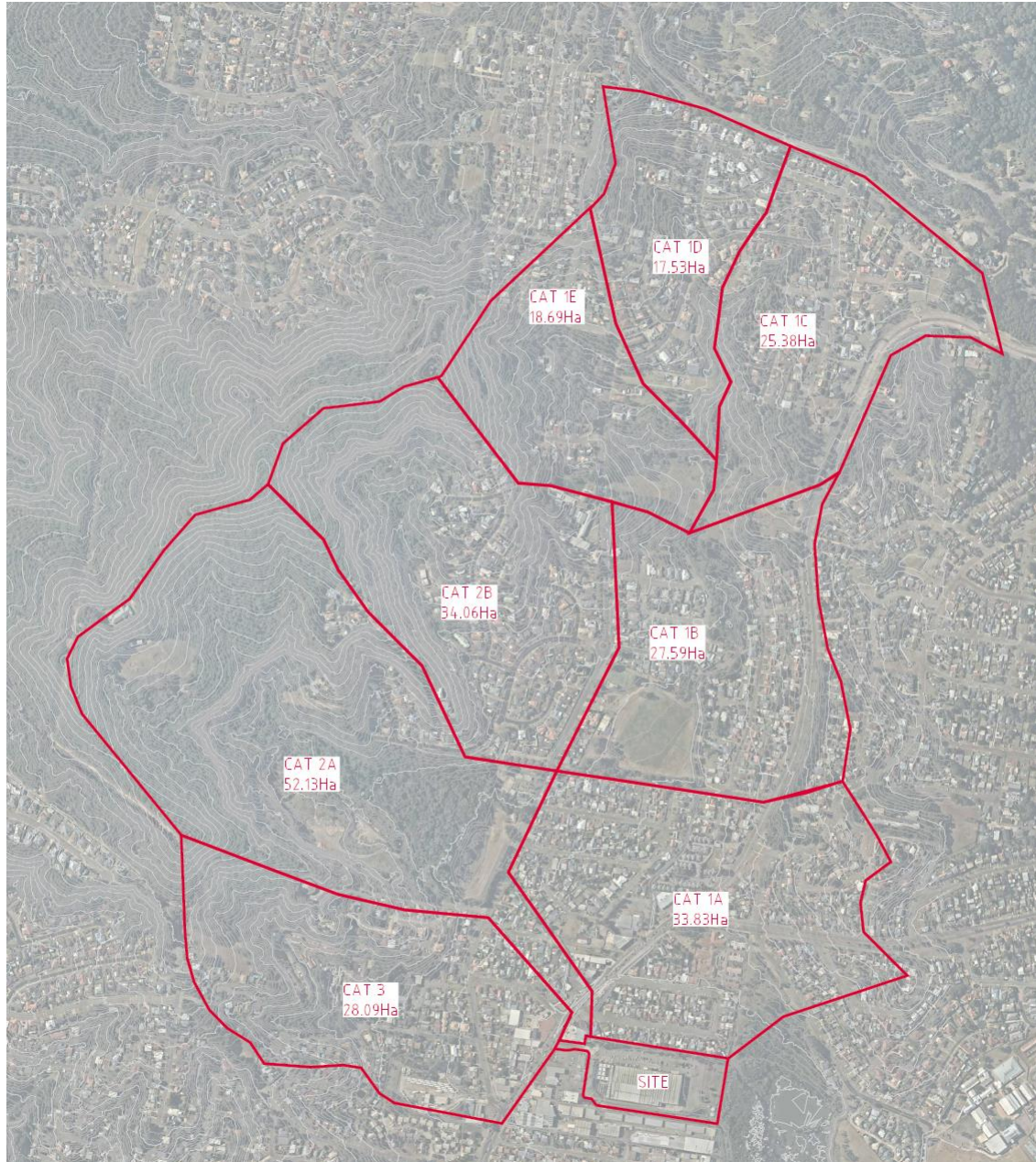


Figure 5.1. Upstream Contributing Catchment

Catchment Name	Area (Ha)
<i>Cat1A</i>	33.83
<i>Cat1B</i>	27.59
<i>Cat1C</i>	25.38
<i>Cat1D</i>	17.53
<i>Cat1E</i>	18.69
Cat1 Sub-total	123.5
<i>Cat2A</i>	52.13
<i>Cat2B</i>	34.06
Cat2 Sub-total	86.2
<i>Cat3</i>	28.09
Cat3 Sub-total	28.09
TOTAL CATCHMENT	237.8

Table 5.1. Catchment Areas

The contributing catchments comprise urban land and bushland. The urban land mainly comprising of low-density residential properties with surrounding dense bushland. The terrain is generally steep within undeveloped bushland areas, and moderate in developed areas. All areas are above the Lake Macquarie and Tasman Sea tidal flood level. Although the catchment is 237.8Ha, it would be considered reasonable small from a hydrological view meaning the catchment will be sensitive to short duration and high intensity storms, with overland flows similarly being short in duration and generally only present during and immediately after major rainfall events. This scenario is commonly referred to as flash flooding.

The Q100 Average Recurrence Interval (ARI) design peak flow, has been calculated using a conservative RAFTS model for the three main upstream catchments. The resultant hydrographs are shown in **Figures 5.2, 5.3 & 5.4**. The flows calculated have been used in both the pre-development and post development model scenarios noting that runoff directly from the site has not been included in the overland flow assessment as it is minor in nature with respect to the much larger upstream runoff and also noting that there will be no change in impermeable surfaces over the site. Hence in relation to flood affectation and overland flow the site run-off will have negligible effect on these assessments.

Rainfall intensities and temporal patterns were derived from the Bureau of Meteorology online IFD tool and Australian Rainfall and Runoff (1987). The assessment resulted in the following flood hydrographs of the 1% AEP storm event, **Figures 5.2, 5.3, & 5.4** for the upstream catchment being defined and used in the TUFLOW modelling. The critical storm duration adopted is 120 minutes.

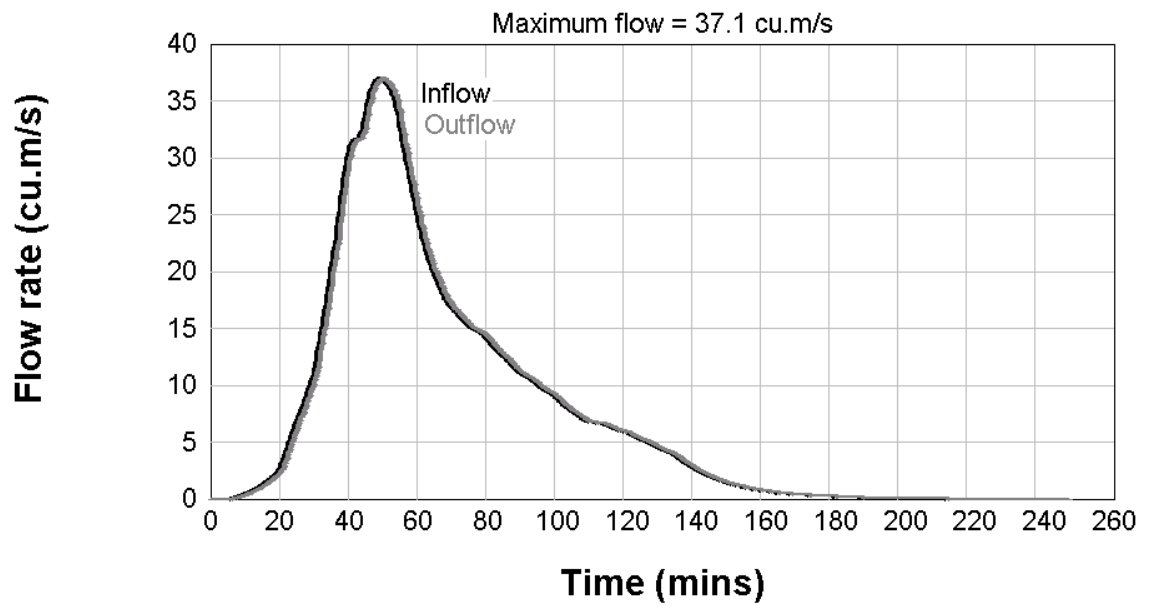


Figure 5.2. 1% AEP Hydrographs – Catchment 1

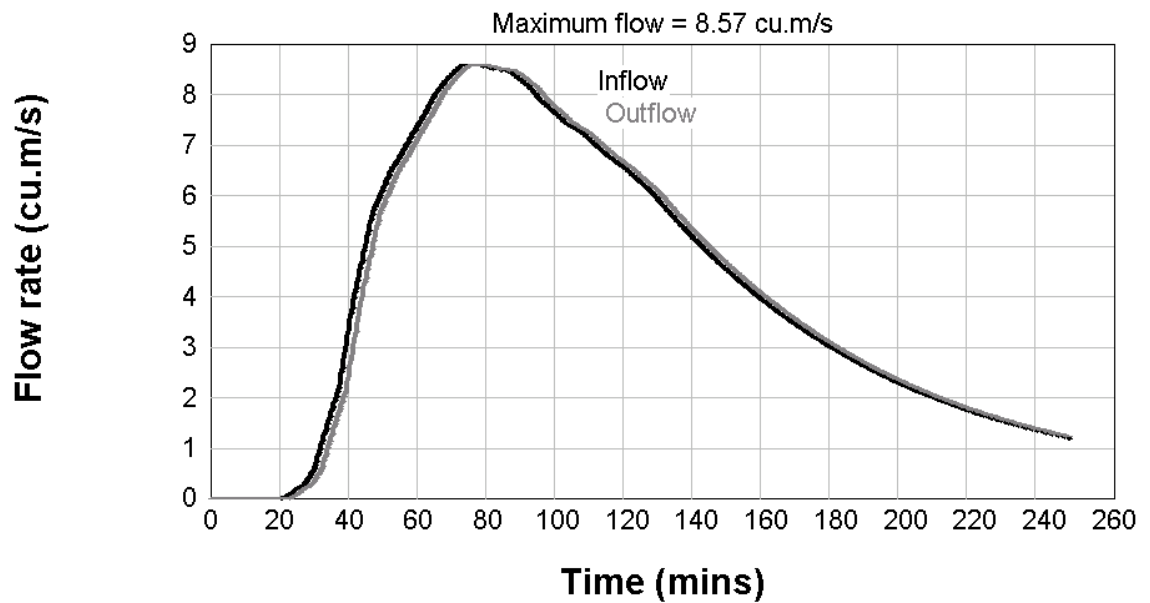


Figure 5.3. 1% AEP Hydrographs – Catchment 2

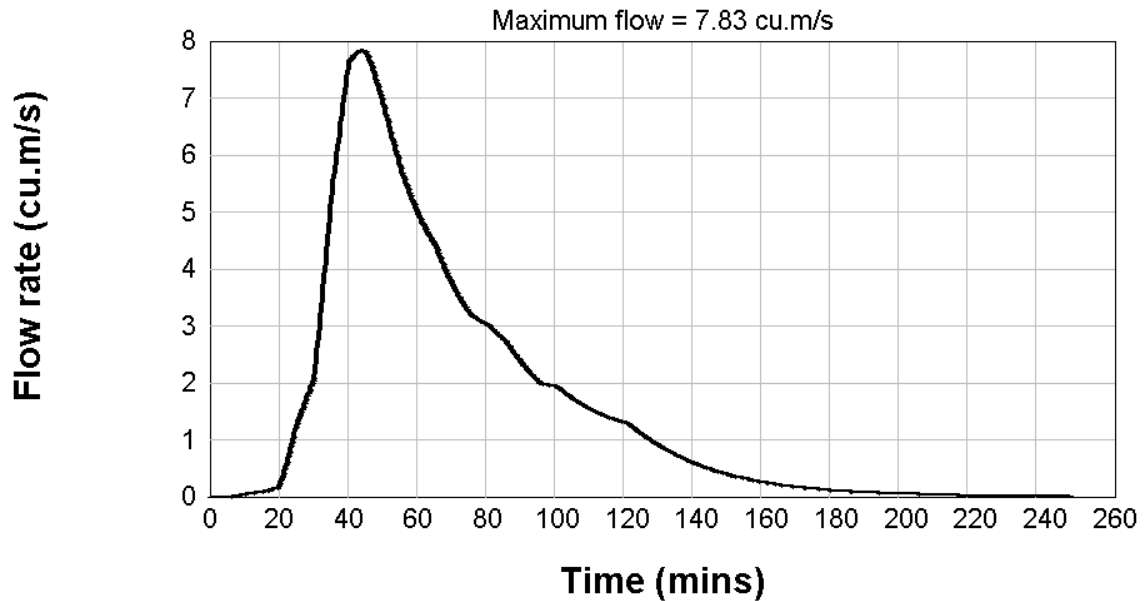


Figure 5.4. 1% AEP Hydrographs – Catchment 3

5.2. Post Developed Scenario Definition

A post development assessment has been completed. The post development conditions are based on the existing management measures approved for the existing Bunnings facility remain operational for the new shop. A summary of the measures has been provided below which is further detailing in **Section 7.2** of the report.

Management measures are as follows:

- Existing three cell box culverts remain;
- Existing open channel on the south of the development site remains; and
- The existing overland flow path on the north of the development site remains. The proposed development will need to ensure the levels of the new development are at least 400mm above the existing level of the flow path. This could be achieved through either filling of the site to the level as noted or providing a small wall or bund along the easement boundary line.

It is noted that the overland flow paths and systems described above will need to remain separate from any site stormwater management measures including site specific detention (OSD) measures and/ or water quality devices. It is noted that any site-specific stormwater management measures would be subject to a separate approval and stormwater management plan.

6. HYDRODYNAMIC MODEL DEVELOPMENT

6.1. Extent and Topography

Hydraulic modelling for this study was undertaken using the TUFLOW engine via the XPStorm-2D Software Platform. The modelled system is based on a 2D approach for the existing cases. The DTM was developed based on the ALS and site survey information & the proposed site design levels as discussed in Section 4 of this report.

The water levels and flows are resolved on a rectangular grid covering the area of interest. The TUFLOW model was set up with a 1m grid cell size, which is an appropriately small cell size to define overland flow behaviour, and more importantly, the difference in the behaviour between two modelled scenarios, through the area of interest.

The model extent is shown in **Figure 6.1**. Modelling has been completed along the study area, beginning approximately 100m upstream of the site and extending 100m to the south-east of the site.

6.2. Boundary Conditions

Inflow Boundaries

Design inflow hydrographs of upstream boundaries of the study area were based on hydrology as discussed in **Section 5** of this report.

The inflow boundaries have been positioned at distances of greater than 2.5 times the flow width from the subject property to ensure that any potential instabilities in the model that may be present at the inflow boundary entry point are resolved in the model prior to the study area. This is consistent with previously approved flooding applications and considered sufficient to produce accurate results for the effect of the development in relation to flooding of the study area.

Outflow Boundaries

The model extent has been continued for approximately 100m downstream of the study area to a point east of the study area. The downstream outflow boundary within the 2D domain has been modelled using the 'head-boundary' control to simulate continuous flow past the model extents, which is generally accepted practice in 2D flood modelling.

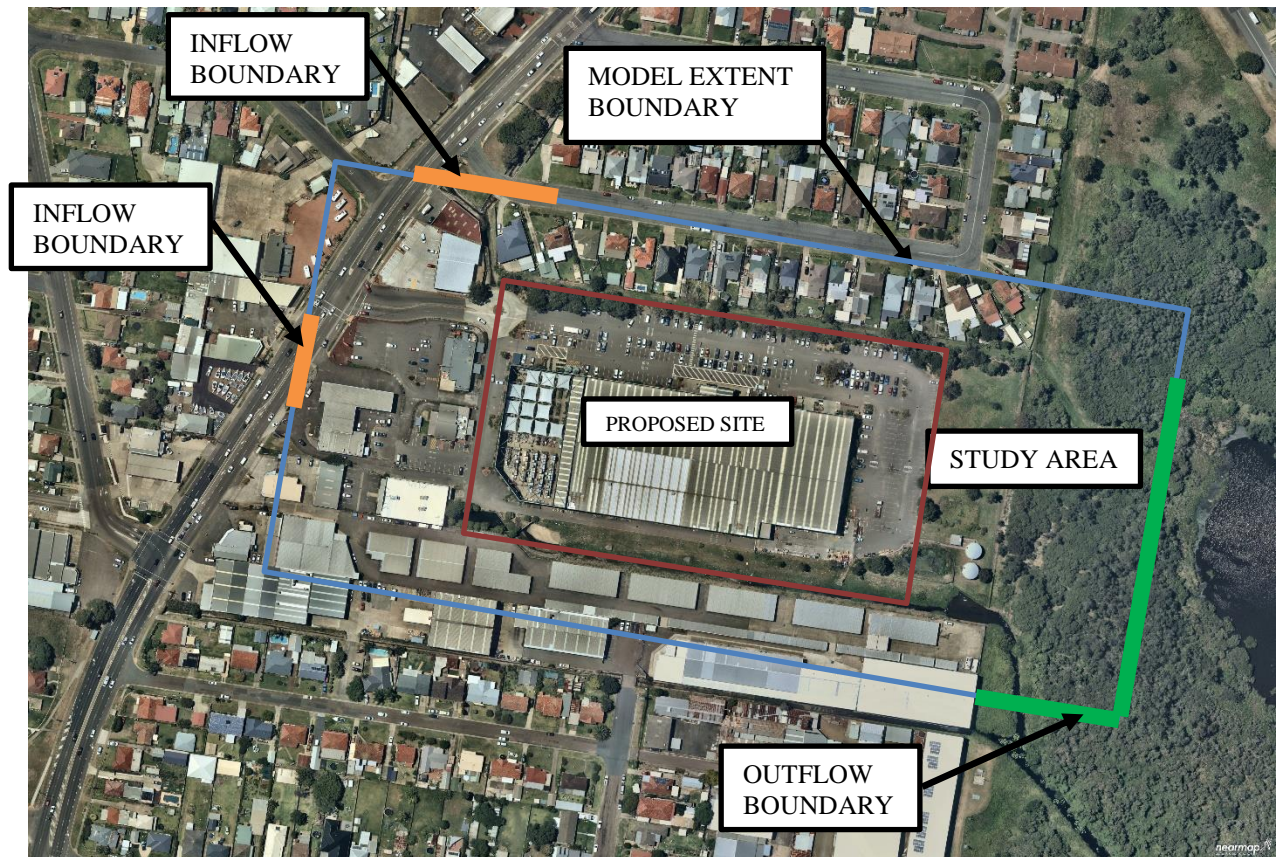


Figure 6.1. Model Extent and Model Boundary Locations

6.3. Channel and Floodplain Roughness

Roughness values adopted in the model are contained in **Table 6.1** below. These are consistent with typical Manning's 'n' values for respective land types.

Model Element	Description	Roughness Parameter Value
1	Grassed	0.040
2	Vegetated Channel	0.06
3	Roads	0.025
4	Dense Trees	0.080
5	Building	Inactive Area
6	Concrete Channel	0.012
7	Pond	0.001

Table 6.1. Adopted TUFLOW Element Roughness Values

A figurative representation of where the above roughness values are shown on **Figure 6.2** below.

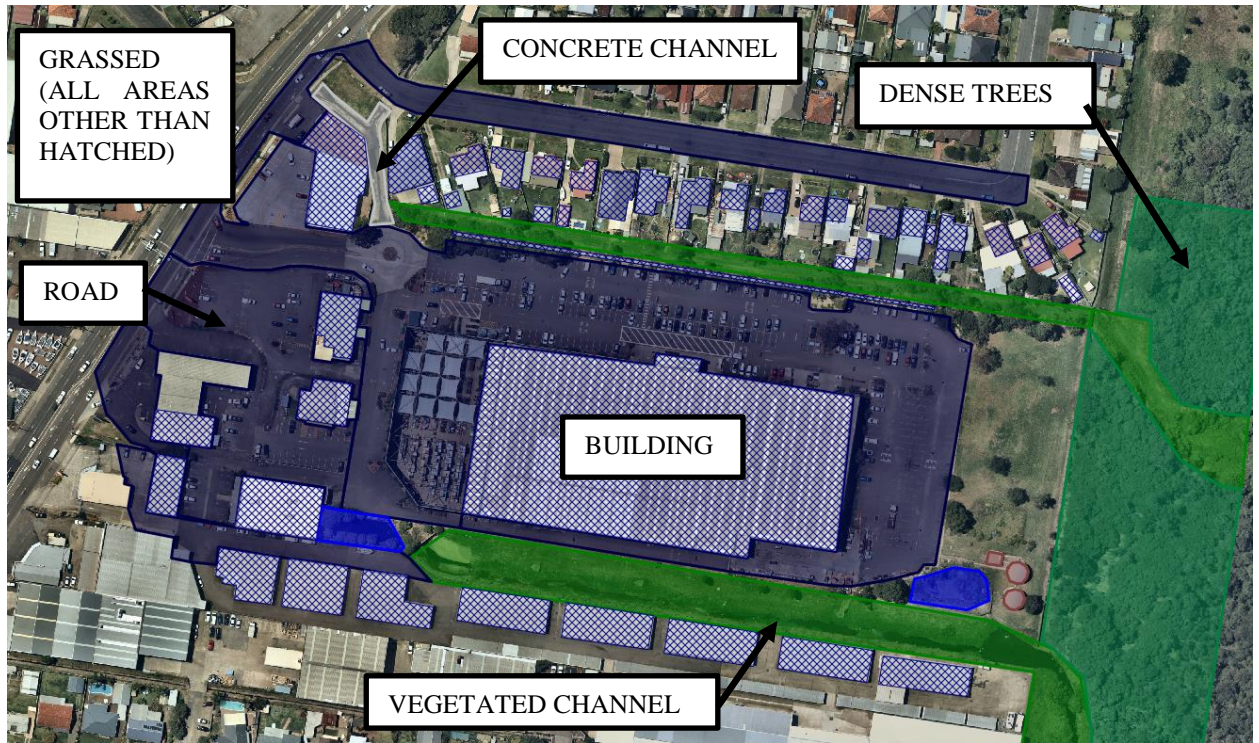


Figure 6.2. TUFLOW Element Roughness Locations

7. FLOOD MODELLING RESULTS

7.1. Pre Development Scenario Results

The predicted peak flood levels, depth and velocities were extracted from the hydrodynamic modelling and were used to generate water surface profiles and depth profiles for the 1% AEP storm event.

The predicted flood extent and depths for the 1% AEP event has been presented on drawing **CO13802.00-F01** and below as **Figure 7.1**. Reference to **Appendix A** should be made for water surface profiles and flood depth estimates for the 1% AEP storm event.

Drawing **Co13802.00-F03** shows the pre-developed velocity output.



Figure 7.1. 1% AEP Flood Extent and Levels (pre-developed)

The predicted flood inundation can be seen to be generally consistent with the intention of the design by *Michael Lockley & Associates* included in the 1999 Bunnings Development Approval. The majority of the upstream flows being conveyed within the box culvert system to the southern open channel. A smaller overflow at the inflow to the box culverts activates the northern overland flow path where flow depths of 250-500mm are experienced. The existing facility is seen to be clear of the flood affectation and achieved flood immunity requirements.

Water levels in the channel to the south vary from RL 7.4m AHD at the west to RL 6.6m AHD on the east. Water levels through the northern overland flow path vary from RL 8.8m AHD on the west to RL 6.8m AHD at the east. It is noted that these levels are higher than the existing building (at RL 7.15m) however bunding to the channel has been made which achieved flood planning requirements hence the building level is not subject to the flood levels within the northern flow path.

Shallow flood water can be seen downstream of the property as a result of the confluence of flows and flat downstream constriction. These flows do not affect the existing or future facility.

It is noted that activation of the northern flow path is expected to occur in smaller intensity storms, including the 5% ARI. These flows are noted to be less than 250mm and to have DV factors well under general accepted minimum of 0.4.

Additional output for the 5% & 1% AEP storm events can also be found in **Appendix A**.

7.2. Post Development Scenario Results

At the time of writing, the detailed design and level grading through the site has not been completed. As such, the *Post Developed Scenario* has been modelled based on a block-out through the proposed development zone and maintaining the key overland flow measures as included in the current Bunnings development (i.e. box culverts, southern channel and northern overland flow path).

With reference to drawing **Co13802.00-F02 and Figure 7.2**, the post development flood extent and levels have been shown. Water level afflux (i.e. the change in water surface levels) has been shown on drawing **Co13802.00-F03 and Figure 7.3**. Drawing **Co13802.00-F05** shows the pre-developed velocity output with velocity afflux on **Co13802.00-F06**.

The post-development flood output shows consistency between the pre and post development conditions. Minor afflux of 40-50mm is shown in an isolated area toward the north-east corner of the site within the easement on site and minor 10-20mm locally offsite. This minor increase is considered negligible in terms of affectation and generally within acceptable engineering change and modelling accuracy.

Overall the existing flow paths and flood management measures can be seen to effectively manage flows around the development and that the development has negligible impact on upstream downstream and adjoining properties.



Figure 7.2. 1% AEP Flood Extent and Levels (post-developed)

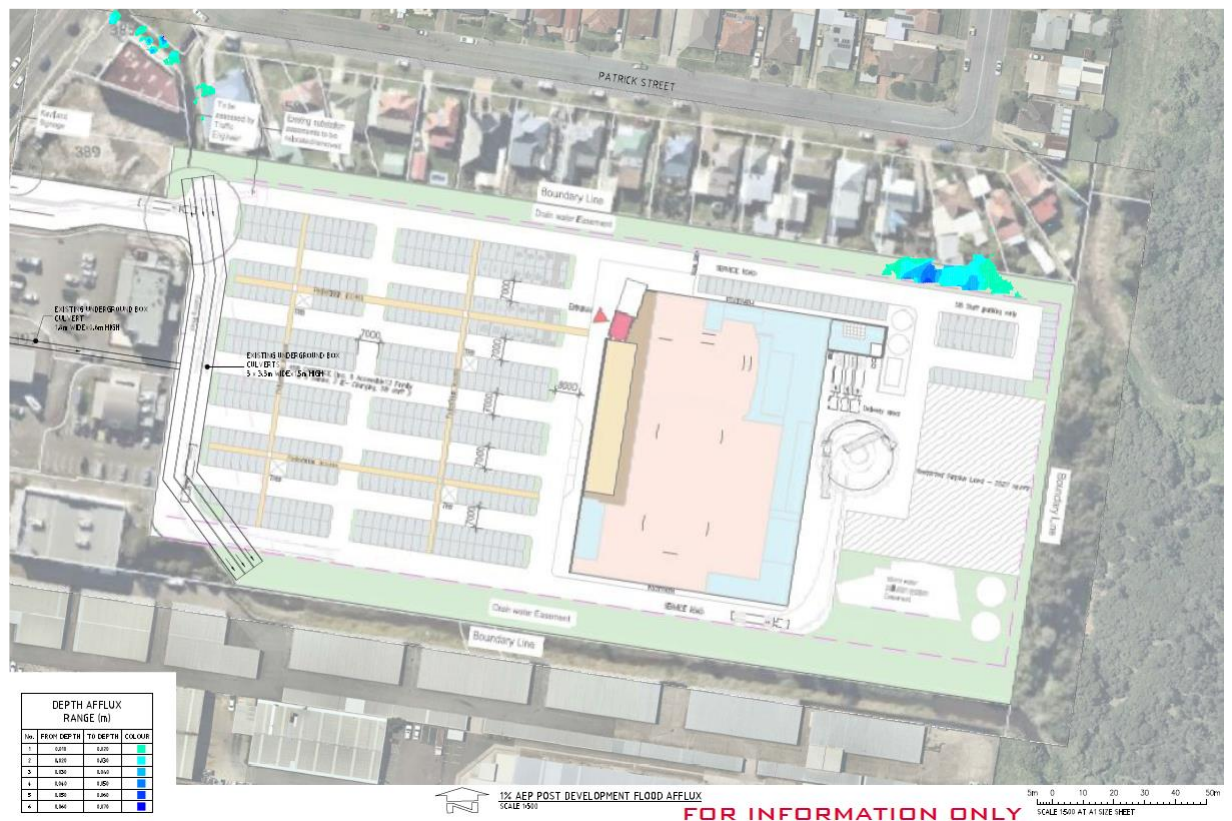


Figure 7.3. 1% AEP Flood Level Pre and Post development Afflux

Based on the current architectural layout, the floor level of the building will need to be set at a level of RL 7.5m to achieve 500mm freeboard to the 1% AEP flood level. Western parts of the site will need to be sited at RL 8.0m to achieve the required flood immunity or alternatively bunding to RL 8.0m could be provided.

As noted in previous sections of the report, a minimum bund or 400mm will be required on the north of the property to ensure the existing flow path achieved appropriate flood freeboard to the existing flow path post development.

Additional output for the 5% & 1% AEP storm events can also be found in **Appendix A**.

8. CONCLUSION

This *Overland Flow Report* has been prepared in support of a development at of 393 Pacific Highway Belmont North and associated planning application.

The Site has been identified by LMCC as being affected by flooding associated with overland flow from the upstream contributing catchments which total 237.8 Ha. Modelling has been undertaken to confirm that council's development control criteria has been met relating to the development of the land and the effect on the flooding as a result of the development. In particular the assessment focusses on the overflow at the existing culverts and surrounding flow paths.

A TUFLOW hydrodynamic flood model of the overland flow path was produced for the area surrounding the development for the purpose of scenario testing. The report provides a summary of the model build and results for the existing, pre-developed, and the proposed, post-developed condition over the land.

The development proposes to maintain existing flow management systems constructed as part of the Bunnings site in 1999. The report confirms these systems are able to convey the expected storm flows through and around the development site with negligible affectation to upstream, downstream and adjoining properties and meet LMCC DCP requirements.

Pre and post development flood elevation and flood depth plans have been produced to confirm the effect of the development on flooding. Comparison of the pre and post-development modelling (shown in the afflux plans) confirms that the development of the land can be made without adversely affecting upstream, downstream or adjacent properties.

Overall, the pre and post development flood scenario assessment provides favourable results which confirm there will be no effect on downstream or adjacent properties and the future development can move forward whilst achieving flood planning requirements and suitable freeboard to the expected 1% AEP flood level and extent.

9. REFERENCES

- Lake Macquarie City Council Development *Control Plan*.
- Landcom (2004). *Managing Urban Stormwater – Soils and Construction* – 4th Edition.
- NSW Government (2005). *Floodplain Development Manual*.

APPENDIX A

DRAWINGS AND FIGURES

(Figures represent predicted values at the peak of each event)



Figure A1 – 5% AEP Flood Depths (Pre-Development)



Figure A2 – 5% AEP Flood Levels (Pre-Development)

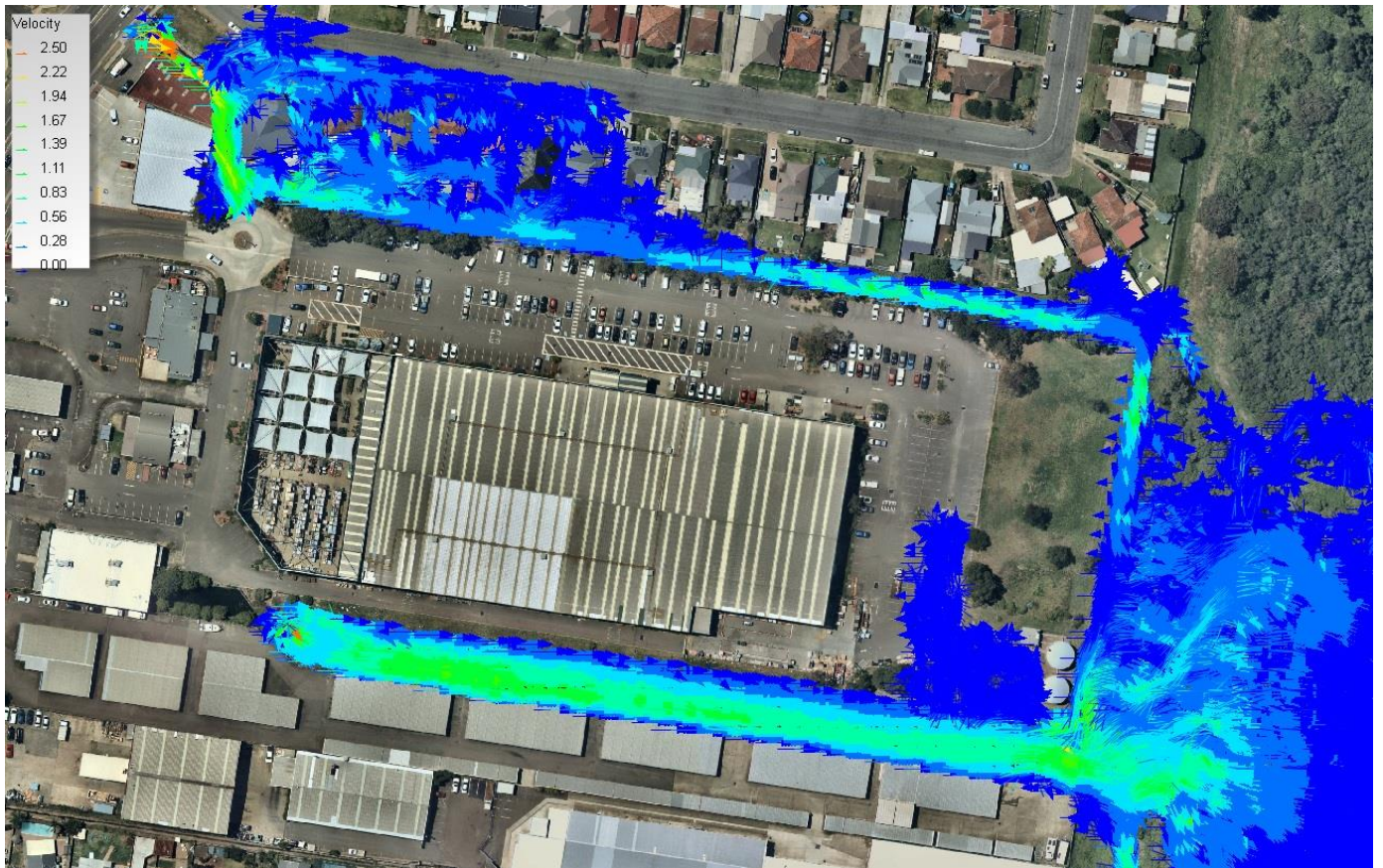


Figure A3 – 5% AEP Flood Velocity (Pre-Development)



Figure A4 – 5% AEP Flood Depth (Post Development)



Figure A5 – 5% AEP Flood Level (Post Development)

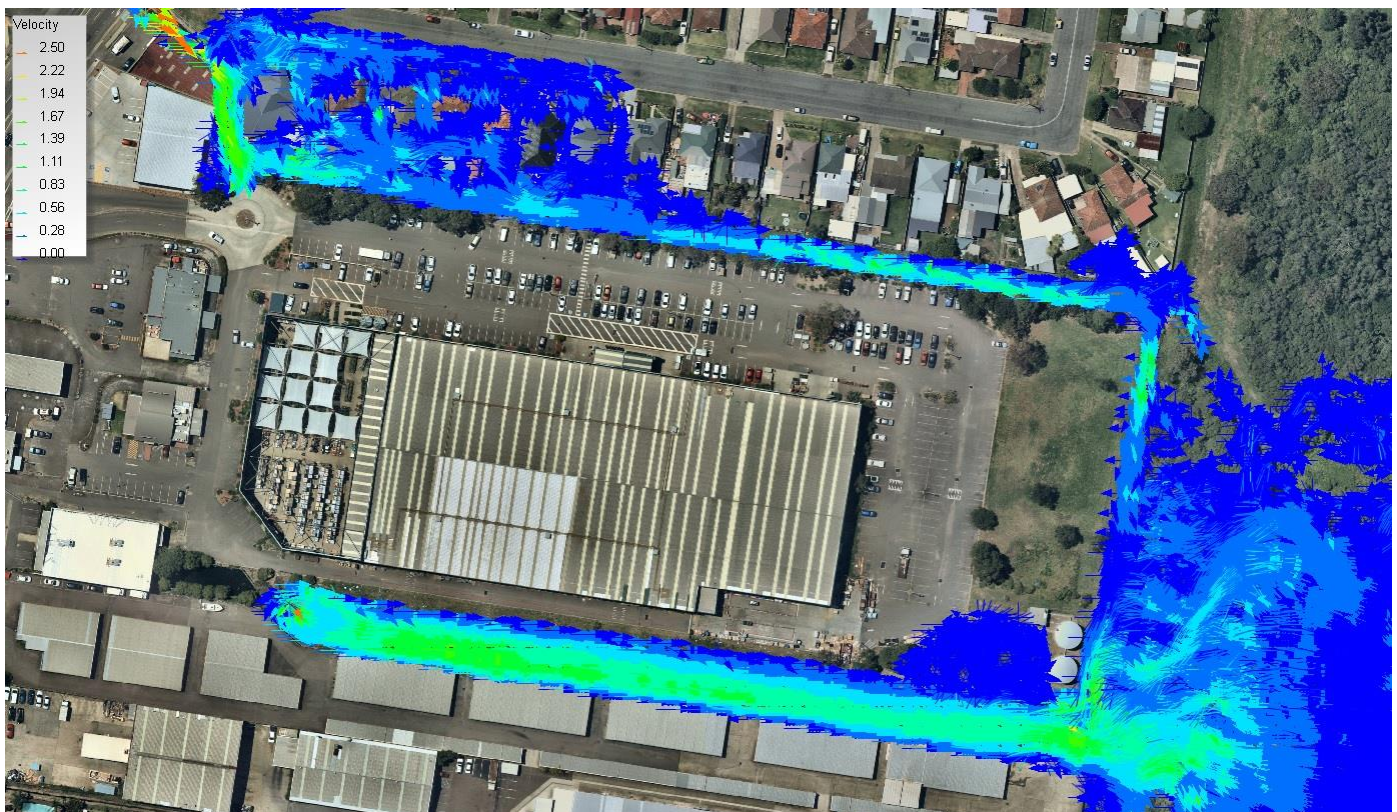


Figure A6 – 5% AEP Flood Velocity (Post Development)

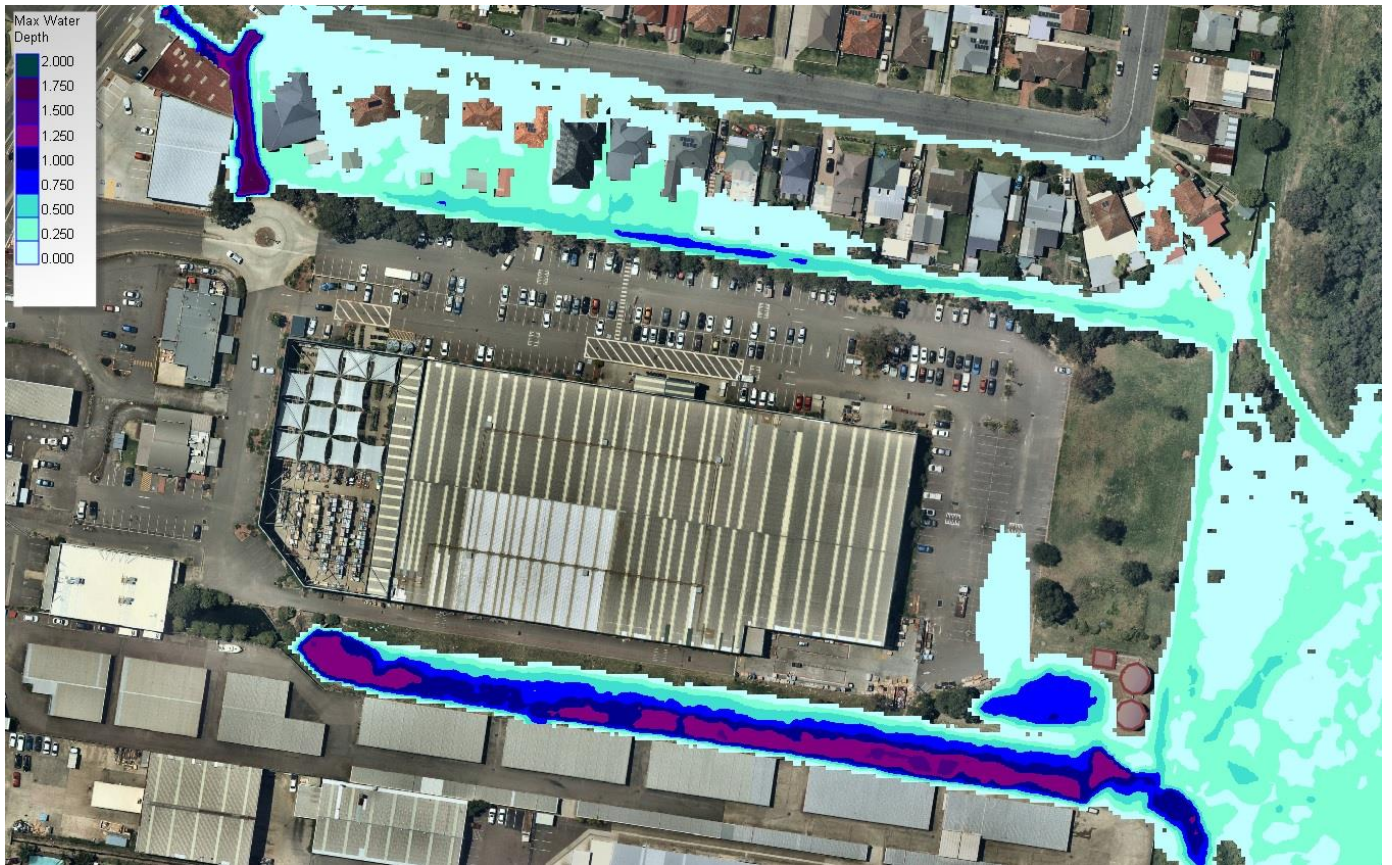


Figure A7 – 1% AEP Flood Depth (Pre-Development)



Figure A8 – 1% AEP Flood Level (Pre-Development)

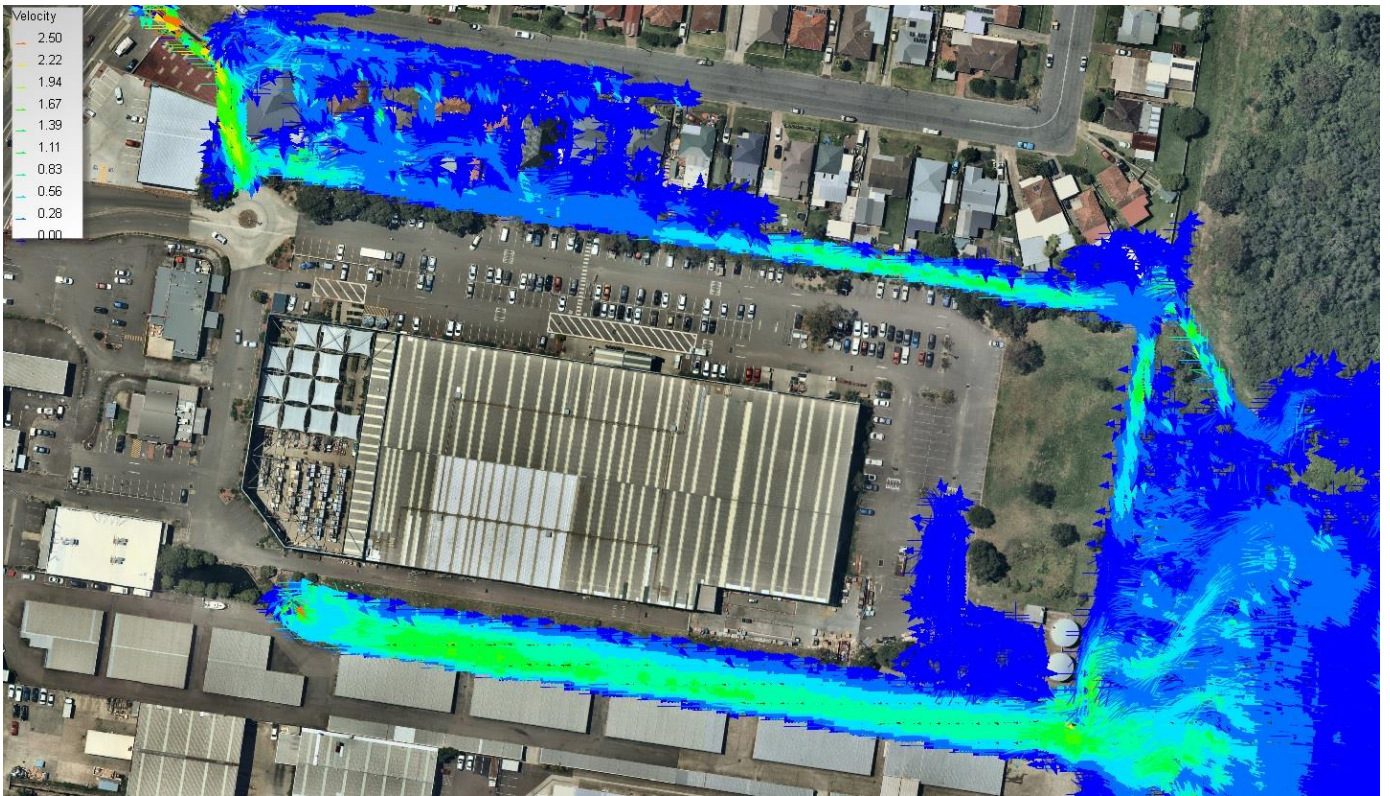


Figure A9 – 1% AEP Flood Velocity (Pre-Development)

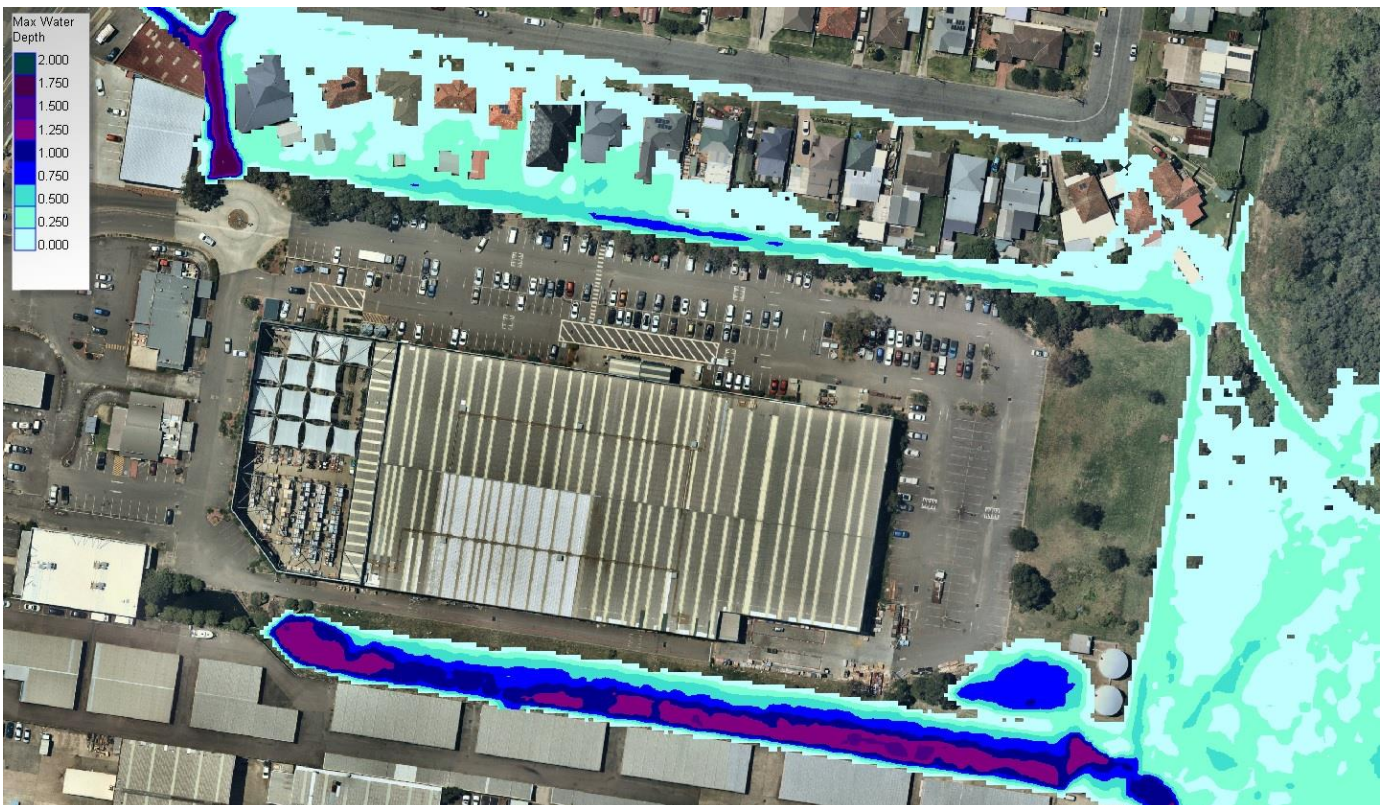


Figure A10 – 1% AEP Flood Depth (Post Development)



Figure A11 – 1% AEP Flood Level (Post Development)

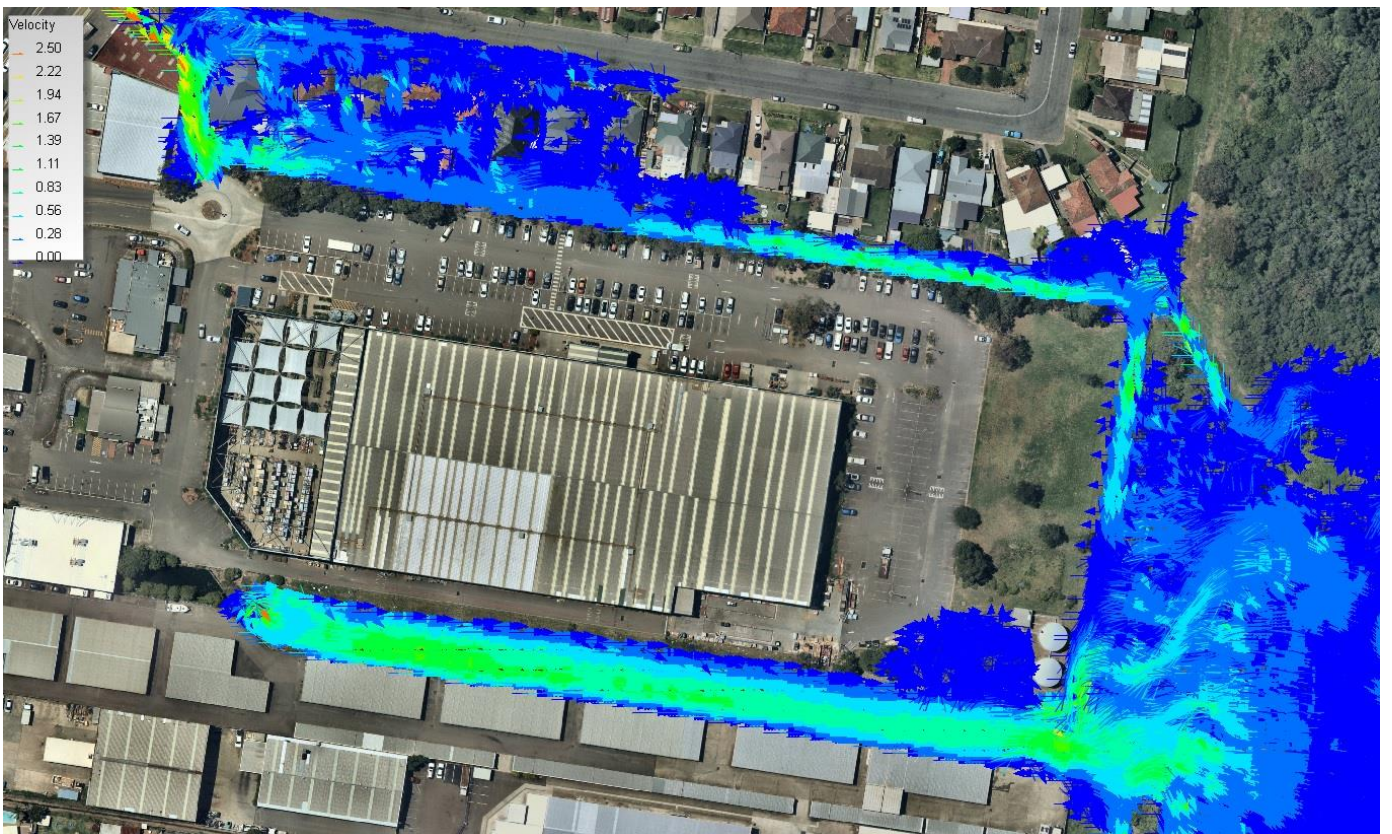


Figure A12 – 1% AEP Flood Velocity (Post Development)



LEGEND:

LEVELS DATUM IS AHD.

EXISTING SITE LEVELS AND DETAILS BASED ON ALS SURVEY INFORMATION

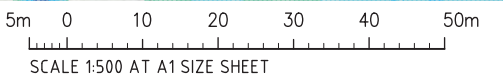
— 7.00 — - FLOOD LEVEL CONTOUR (MAJOR)
1.0m INTERVALS

— 6.80 — - FLOOD LEVEL CONTOUR (MINOR)
0.2m INTERVALS

DEPTH RANGE (m)			
No.	FROM DEPTH	TO DEPTH	COLOUR
1	0.010	0.250	
2	0.250	0.500	
3	0.500	0.750	
4	0.750	1.000	
5	1.000	1.500	
6	1.500	2.000	



1% AEP PRE DEVELOPMENT FLOOD DEPTH
SCALE 1:500



FOR INFORMATION ONLY

ISSUED FOR INFORMATION	13.03.19	A
AMENDMENTS	DATE	ISSUE

CLIENT	



PROJECT
PROPOSED DEVELOPMENT
393 PACIFIC HIGHWAY
BELMONT NSW

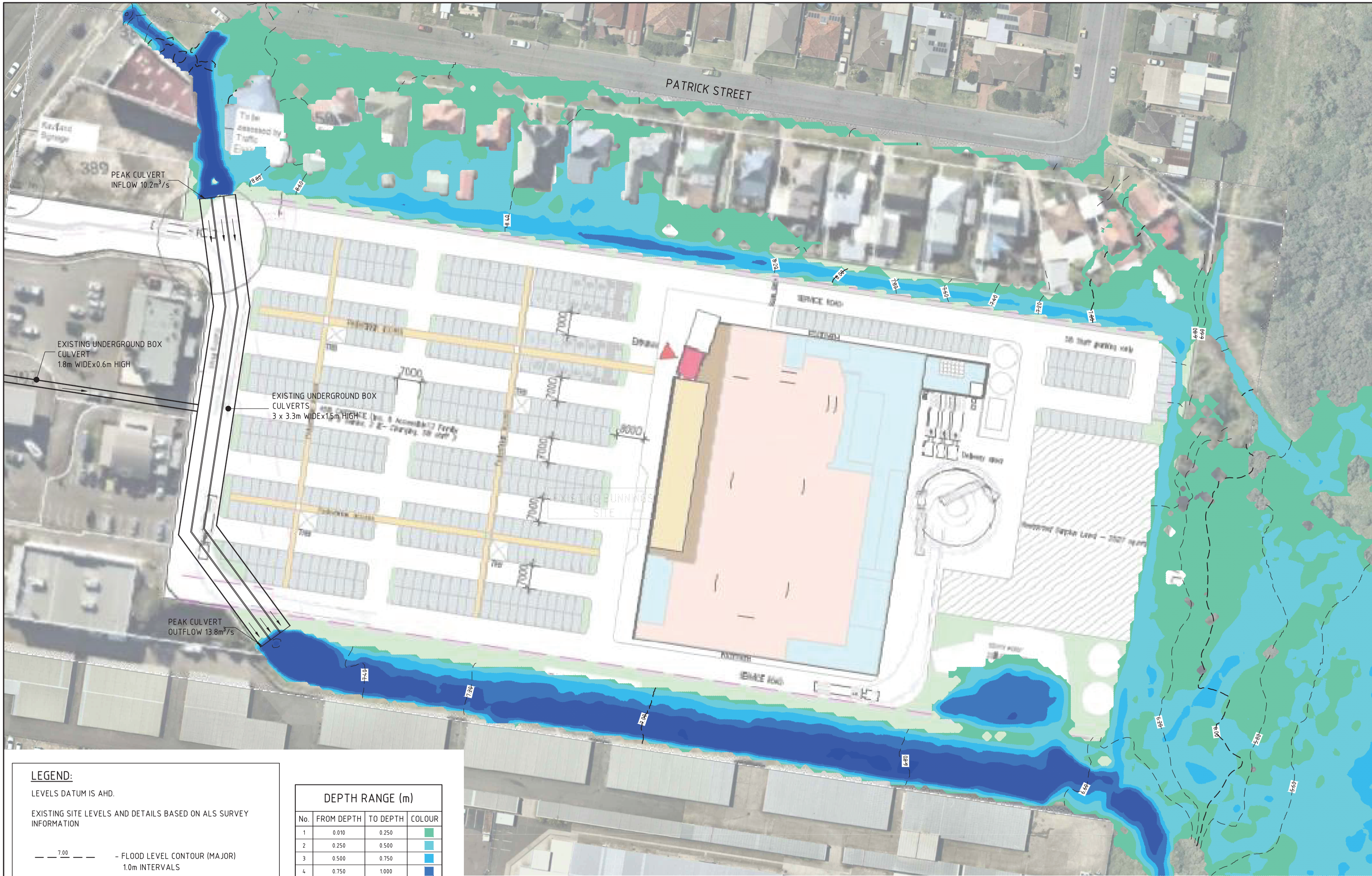


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Costin Roe Consulting

PRECISION | COMMUNICATION | ACCOUNTABILITY

DRAWING TITLE 1% AEP PRE DEVELOPMENT FLOOD DEPTH	DRAWING No C013802.00-F01	ISSUE A
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LEGEND:

LEVELS DATUM IS AHD.

EXISTING SITE LEVELS AND DETAILS BASED ON ALS SURVEY INFORMATION

- 7.00 — FLOOD LEVEL CONTOUR (MAJOR)
1.0m INTERVALS
- 6.80 — FLOOD LEVEL CONTOUR (MINOR)
0.2m INTERVALS

DEPTH RANGE (m)

No.	FROM DEPTH	TO DEPTH	COLOUR
1	0.010	0.250	Light Green
2	0.250	0.500	Light Blue
3	0.500	0.750	Medium Blue
4	0.750	1.000	Dark Blue
5	1.000	1.500	Very Dark Blue
6	1.500	2.000	Black

1% AEP POST DEVELOPMENT FLOOD DEPTH
SCALE 1:500

FOR INFORMATION ONLY

5m 0 10 20 30 40 50m
SCALE 1:500 AT A1 SIZE SHEET

ISSUED FOR INFORMATION	15.03.19	B
ISSUED FOR INFORMATION	13.03.19	A
AMENDMENTS	DATE	ISSUE



PROJECT
PROPOSED DEVELOPMENT
393 PACIFIC HIGHWAY
BELMONT NSW



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DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
MC	MC	08.03.19	MW	A1	AS SHOWN	CO13802.00-F02

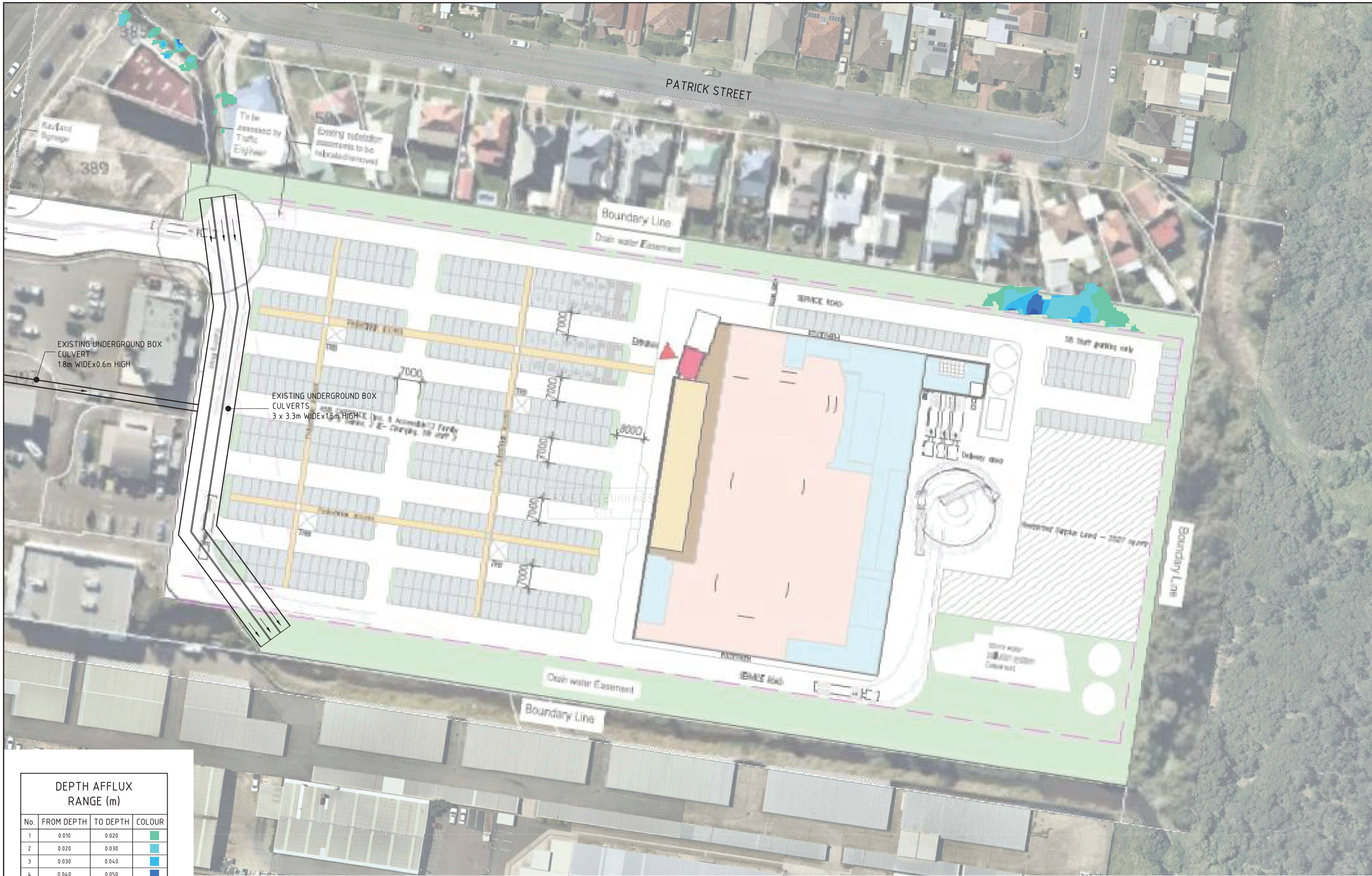
Costin Roe Consulting

PRECISION | COMMUNICATION | ACCOUNTABILITY

DRAWING TITLE
**1% AEP POST DEVELOPMENT
FLOOD DEPTH**

DRAWING No **CO13802.00-F02**

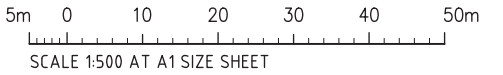
ISSUE
B



DEPTH AFFLUX RANGE (m)			
No.	FROM DEPTH	TO DEPTH	COLOUR
1	0.010	0.020	Green
2	0.020	0.030	Light Blue
3	0.030	0.040	Blue
4	0.040	0.050	Dark Blue
5	0.050	0.060	Dark Blue
6	0.060	0.070	Dark Blue



1% AEP POST DEVELOPMENT FLOOD AFFLUX
SCALE 1:500



FOR INFORMATION ONLY

ISSUED FOR INFORMATION	15.03.19	B
ISSUED FOR INFORMATION	13.03.19	A
AMENDMENTS	DATE	ISSUE

CLIENT	
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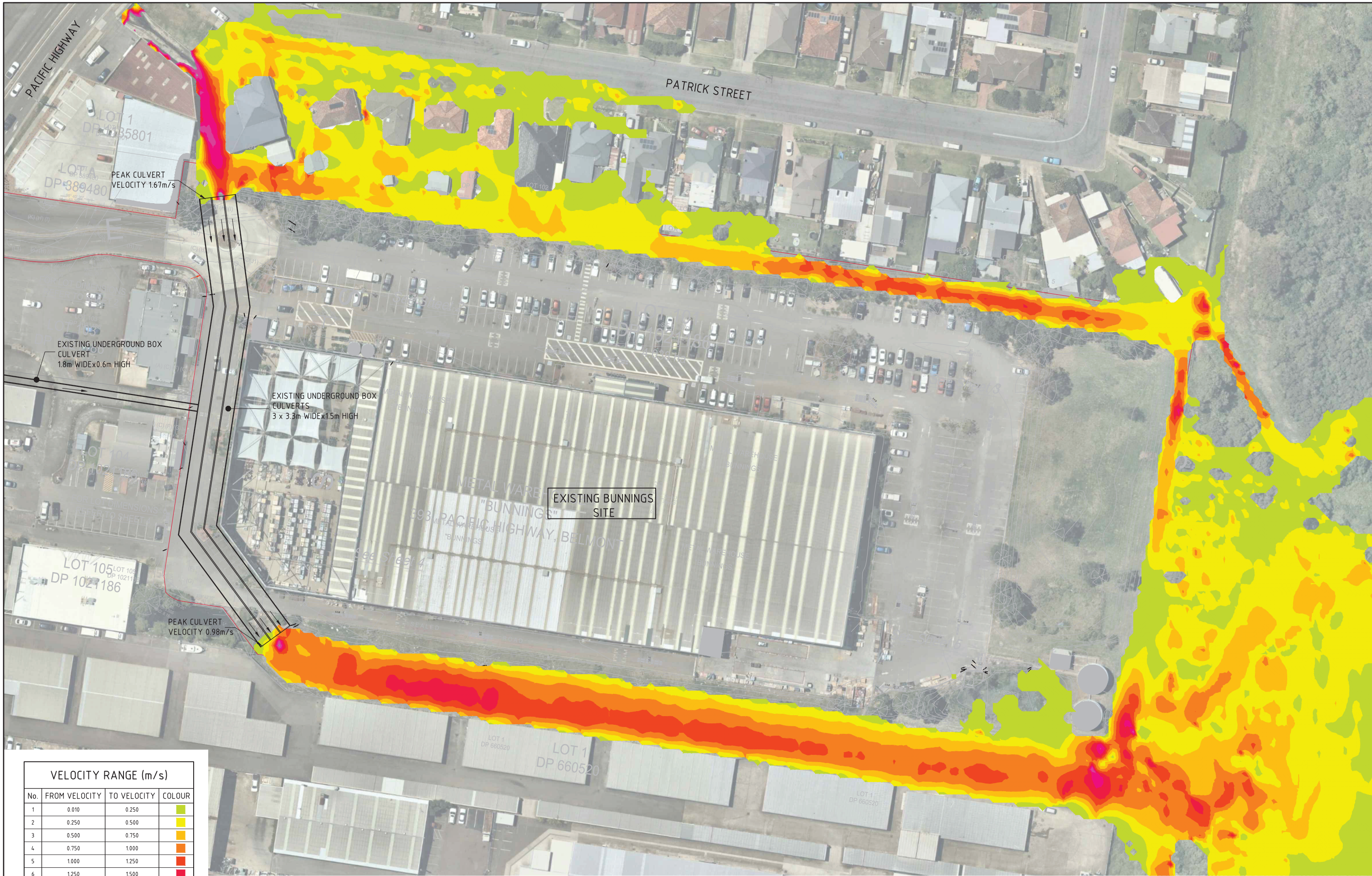
PROJECT	PROPOSED DEVELOPMENT
	393 PACIFIC HIGHWAY
	BELMONT NSW

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
MC	MC	08.03.19	MW	A1	AS SHOWN	CO13802.00-F03

	Costin Roe Consulting Pty Ltd.
	Consulting Engineers
	Level 1, 8 Windmill Street
	Walsh Bay, Sydney NSW 2000
	Tel: (02) 9251-7899 Fax: (02) 9241-3731
	email: mail@costinroe.com.au ©

PRECISION | COMMUNICATION | ACCOUNTABILITY

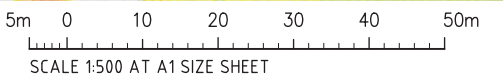
DRAWING TITLE	1% AEP POST DEVELOPMENT FLOOD AFFLUX
DRAWING No	CO13802.00-F03
ISSUE	B



VELOCITY RANGE (m/s)			
No.	FROM VELOCITY	TO VELOCITY	COLOUR
1	0.010	0.250	Green
2	0.250	0.500	Yellow
3	0.500	0.750	Orange
4	0.750	1.000	Red
5	1.000	1.250	Dark Red
6	1.250	1.500	Magenta
7	1.500	1.750	Pink
8	1.750	2.000	Light Pink



1% AEP PRE DEVELOPMENT FLOOD VELOCITY
SCALE 1:500



FOR INFORMATION ONLY

ISSUED FOR INFORMATION	15.03.19	B
ISSUED FOR INFORMATION	13.03.19	A
AMENDMENTS	DATE	ISSUE



PROJECT
PROPOSED DEVELOPMENT
393 PACIFIC HIGHWAY
BELMONT NSW



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Consulting Engineers
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Walsh Bay, Sydney NSW 2000
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email: mail@costinroe.com.au ©

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DRAWING TITLE
1% AEP PRE DEVELOPMENT
FLOOD VELOCITY

DRAWING No C013802.00-F04

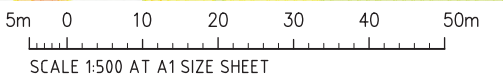
ISSUE
B



VELOCITY RANGE (m/s)			
No.	FROM VELOCITY	TO VELOCITY	COLOUR
1	0.010	0.250	Light Green
2	0.250	0.500	Yellow
3	0.500	0.750	Orange
4	0.750	1.000	Dark Orange
5	1.000	1.250	Red-Orange
6	1.250	1.500	Red
7	1.500	1.750	Dark Red
8	1.750	2.000	Magenta



1% AEP POST DEVELOPMENT FLOOD VELOCITY
SCALE 1:500



FOR INFORMATION ONLY

ISSUED FOR INFORMATION	15.03.19	B
ISSUED FOR INFORMATION	13.03.19	A
AMENDMENTS	DATE	ISSUE



PROJECT
PROPOSED DEVELOPMENT
393 PACIFIC HIGHWAY
BELMONT NSW



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Wah Bay, Sydney NSW 2000
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DESIGNED MC	DRAWN MC	DATE 08.03.19	CHECKED MW	SIZE A1	SCALE AS SHOWN	CAD REF: C013802.00-F05
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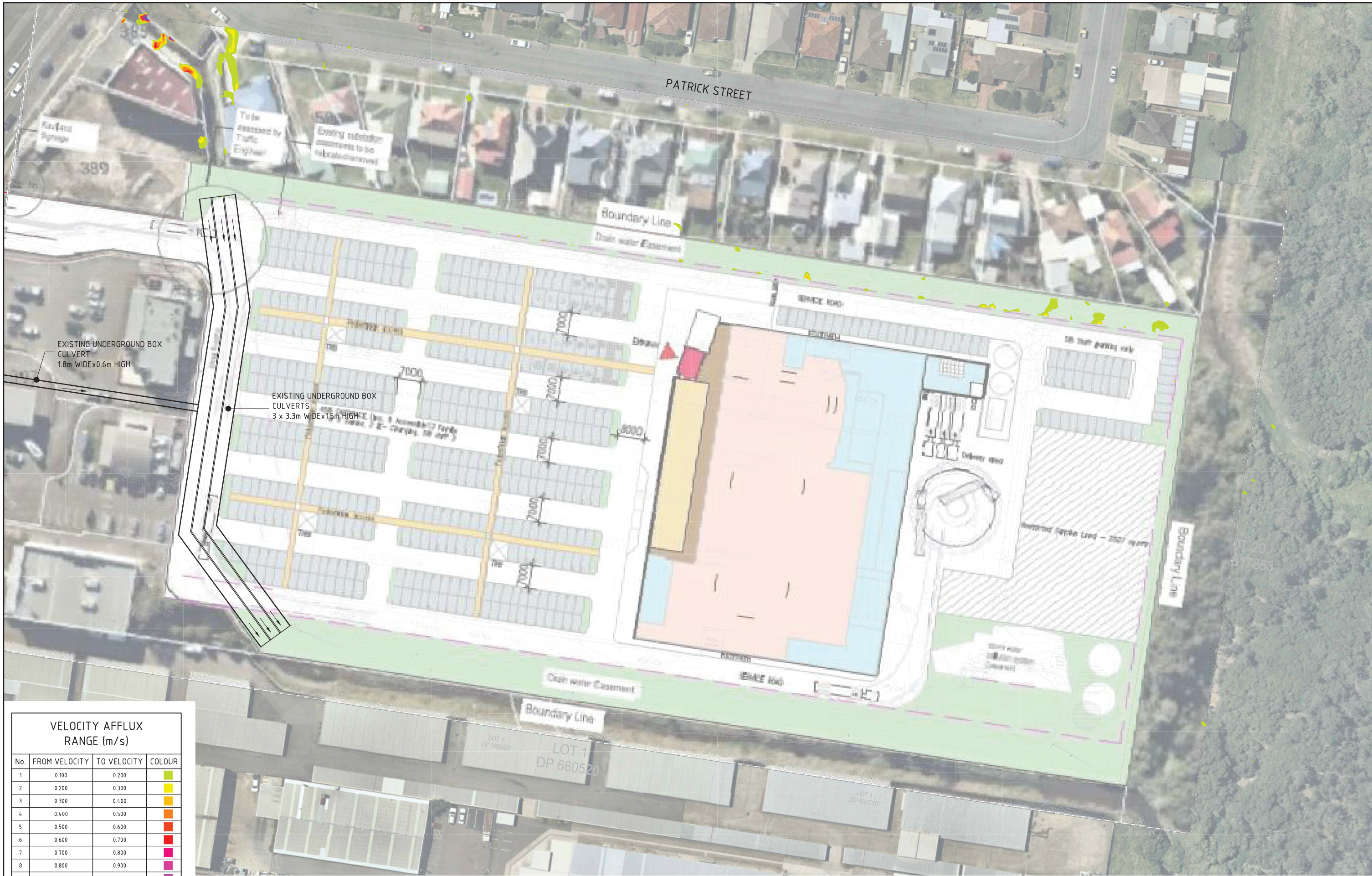
Costin Roe Consulting

PRECISION | COMMUNICATION | ACCOUNTABILITY

DRAWING TITLE
1% AEP POST DEVELOPMENT
FLOOD VELOCITY

DRAWING No C013802.00-F05

ISSUE
B



VELOCITY AFFLUX RANGE (m/s)			
No.	FROM VELOCITY	TO VELOCITY	COLOUR
1	0.100	0.200	Green
2	0.200	0.300	Yellow
3	0.300	0.400	Orange
4	0.400	0.500	Red-Orange
5	0.500	0.600	Red
6	0.600	0.700	Dark Red
7	0.700	0.800	Magenta
8	0.800	0.900	Pink
9	0.900	1.000	Purple
10	1.000	1.500	Dark Purple
11	1.500	2.000	Black

ISSUED FOR INFORMATION			15.03.19	B
ISSUED FOR INFORMATION			13.03.19	A
AMENDMENTS			DATE	ISSUE



PROJECT
PROPOSED DEVELOPMENT
393 PACIFIC HIGHWAY
BELMONT NSW

DESIGNED MC	DRAWN MC	DATE 08.03.19	CHECKED MW	SIZE A1	SCALE AS SHOWN	CAD REF: C013802.00-F06
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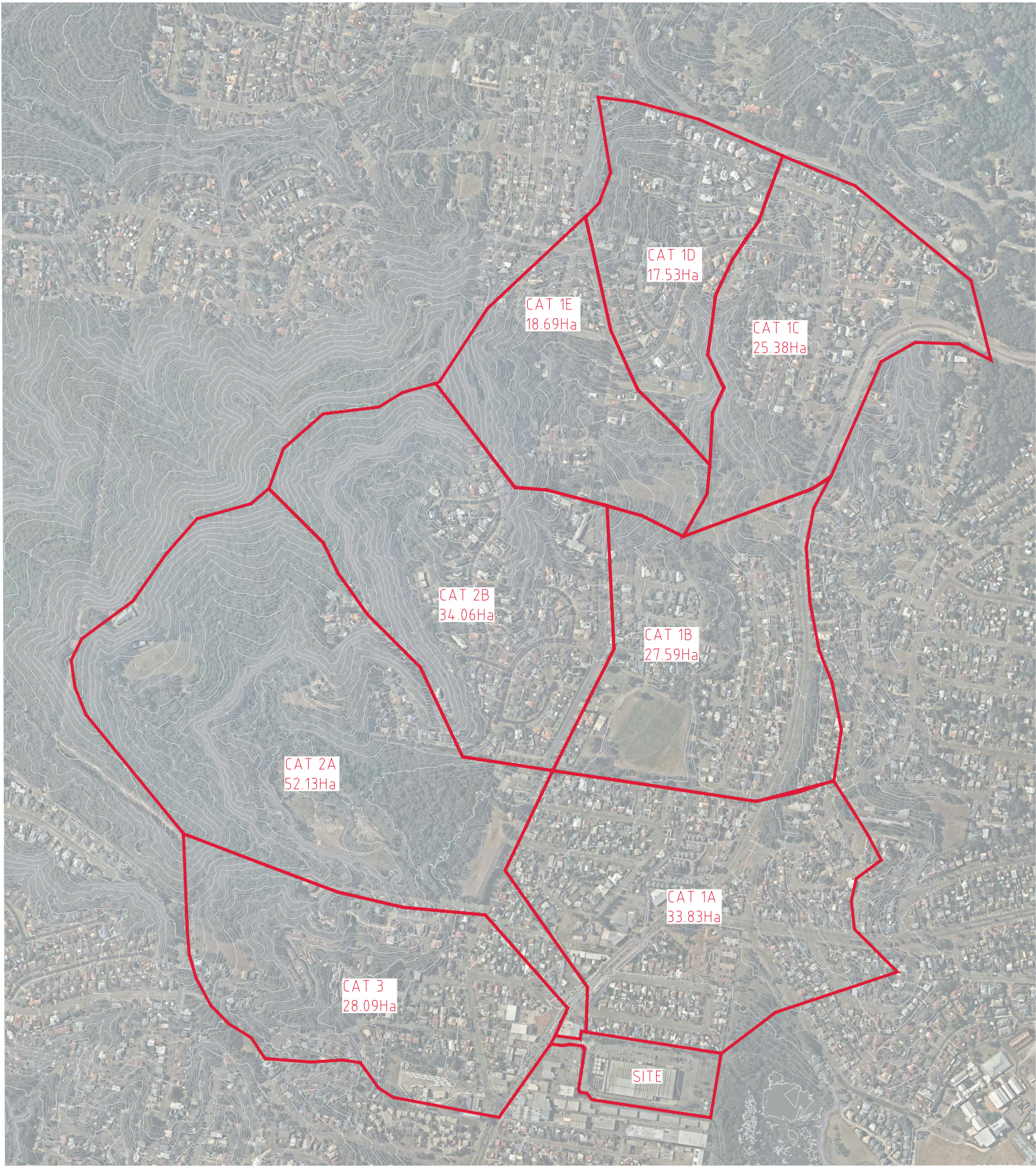
Costin Roe Consulting

PRECISION | COMMUNICATION | ACCOUNTABILITY

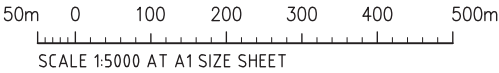
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1% AEP POST DEVELOPMENT
FLOOD VELOCITY AFFLUX

DRAWING No C013802.00-F06

ISSUE B



EXTERNAL CATCHMENT PLAN
SCALE 1:5000



FOR INFORMATION ONLY

ISSUED FOR INFORMATION		
13.03.19	A	
AMENDMENTS	DATE	ISSUE

CLIENT

PROJECT

PROPOSED DEVELOPMENT

393 PACIFIC HIGHWAY

BELMONT NSW

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
MC	MC	08.03.19	MW	A1	AS SHOWN	C013802.00-F07

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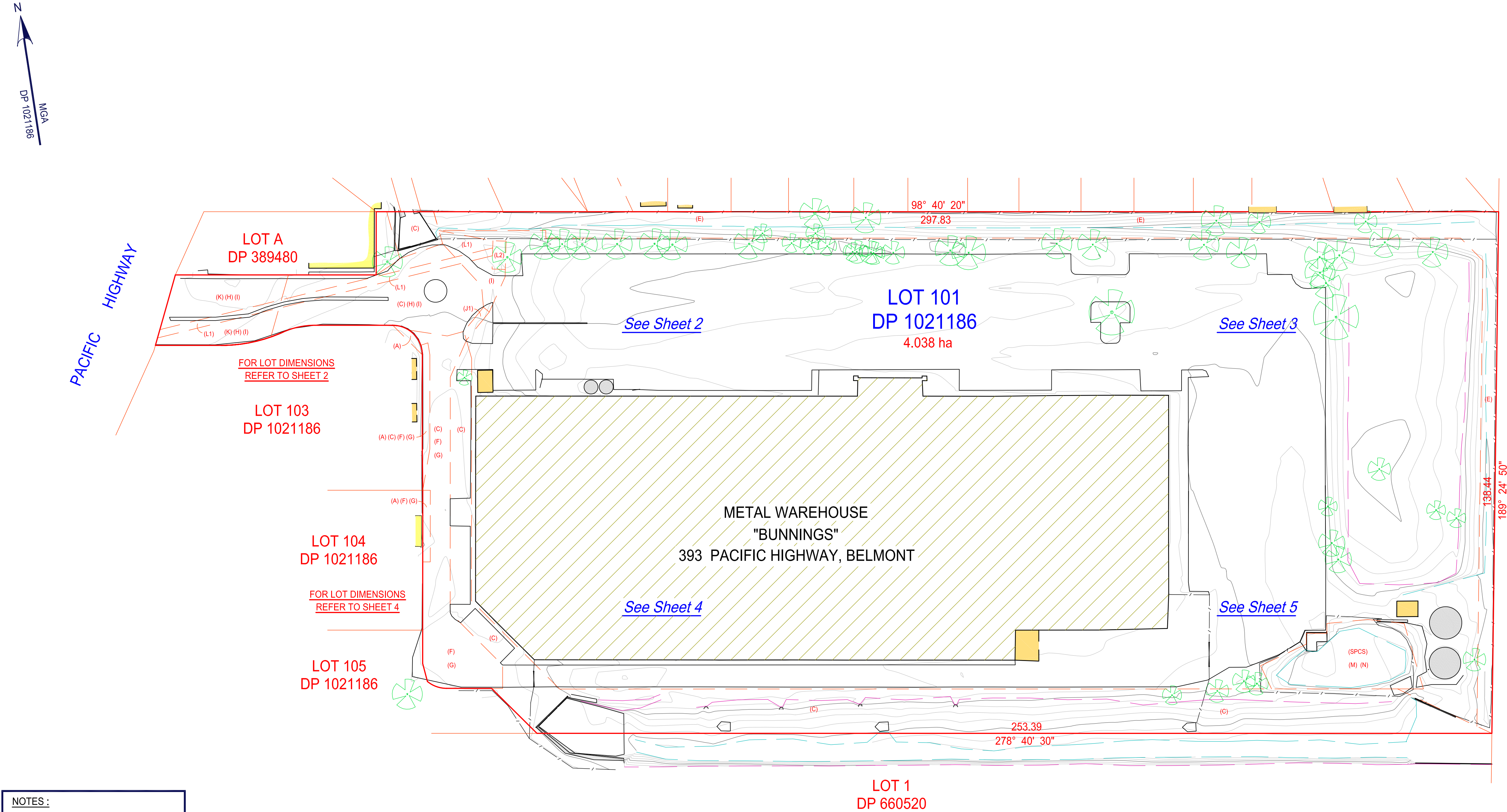
Costin Roe Consulting

PRECISION | COMMUNICATION | ACCOUNTABILITY

DRAWING TITLE		
EXTERNAL CATCHMENT PLAN		
DRAWING No	C013802.00-F07	ISSUE
		A

APPENDIX B

EXISTING SITE SURVEY



- NOTES :**
1. Only visible surface features have been surveyed and are shown to scale accuracy only.
 2. This plan displays information suitable for detailed planning and design at the scales stated only. The plan may not be used for any other purpose or at any scales other than those stated.
 3. The cadastre shown on this plan has been located to a standard of accuracy in accordance with Regulation 10 of the Surveying and Spatial Information Regulation 2017. The boundaries have not been marked by this survey.
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 8. These notes are an integral part of this plan. Reproduction of this plan, or any part of it, without these notes included in full will render the information invalid and not suitable for use.

- (A) - EASEMENT TO DRAIN WATER 1 AND 2 WIDE AND VARIABLE WIDTH (DP 1021186)
(B) - EASEMENT TO DRAIN WATER 6.15 WIDE AND VARIABLE WIDTH (DP 1021186)
(C) - EASEMENT TO DRAIN WATER 11.8, 12, 12.945 AND 13.08 WIDE AND VARIABLE WIDTH (DP 1021186)
(E) - EASEMENT TO DRAIN WATER 4, 5, AND 7 WIDE AND VARIABLE WIDTH (DP 1021186)
(F) - RIGHT OF CARRIAGEWAY 3.3, 6.65, 7.295 AND 7.43 WIDE AND VARIABLE WIDTH (DP 1021186)
(G) - EASEMENT FOR SERVICES 2.0, 3.3, 6.0, 6.65, 7.295 AND 7.43 WIDE AND VARIABLE WIDTH (DP 1021186)
(H) - RIGHT OF CARRIAGEWAY VARIABLE WIDTH (DP 1021186)
(I) - EASEMENT FOR SERVICES VARIABLE WIDTH (DP 1021186)
(J1) - EASEMENT FOR SIGNAGE AND ELECTRICITY CABLES 0.45, 1, 3 AND 5 WIDE AND VARIABLE WIDTH (DP 1021186)
(K) - EASEMENT FOR PASSAGEWAY CARRIAGEWAY AND SERVICES VARIABLE WIDTH (DP 1021186)
(L1) - EASEMENT FOR UNDERGROUND ELECTRICITY CABLES AND ACCESS THERETO 2 WIDE (DP 1021186)
(L2) - EASEMENT FOR ELECTRICITY SUBSTATION AND ACCESS THERETO 3.5 WIDE (DP 1021186)
(M) - RESTRICTION ON THE USE OF LAND (DP 1021186)
(N) - POSITIVE COVENANT (DP 1021186)
(SPCS) - STORMWATER POLLUTION CONTROL SYSTEM (DP 1021186)



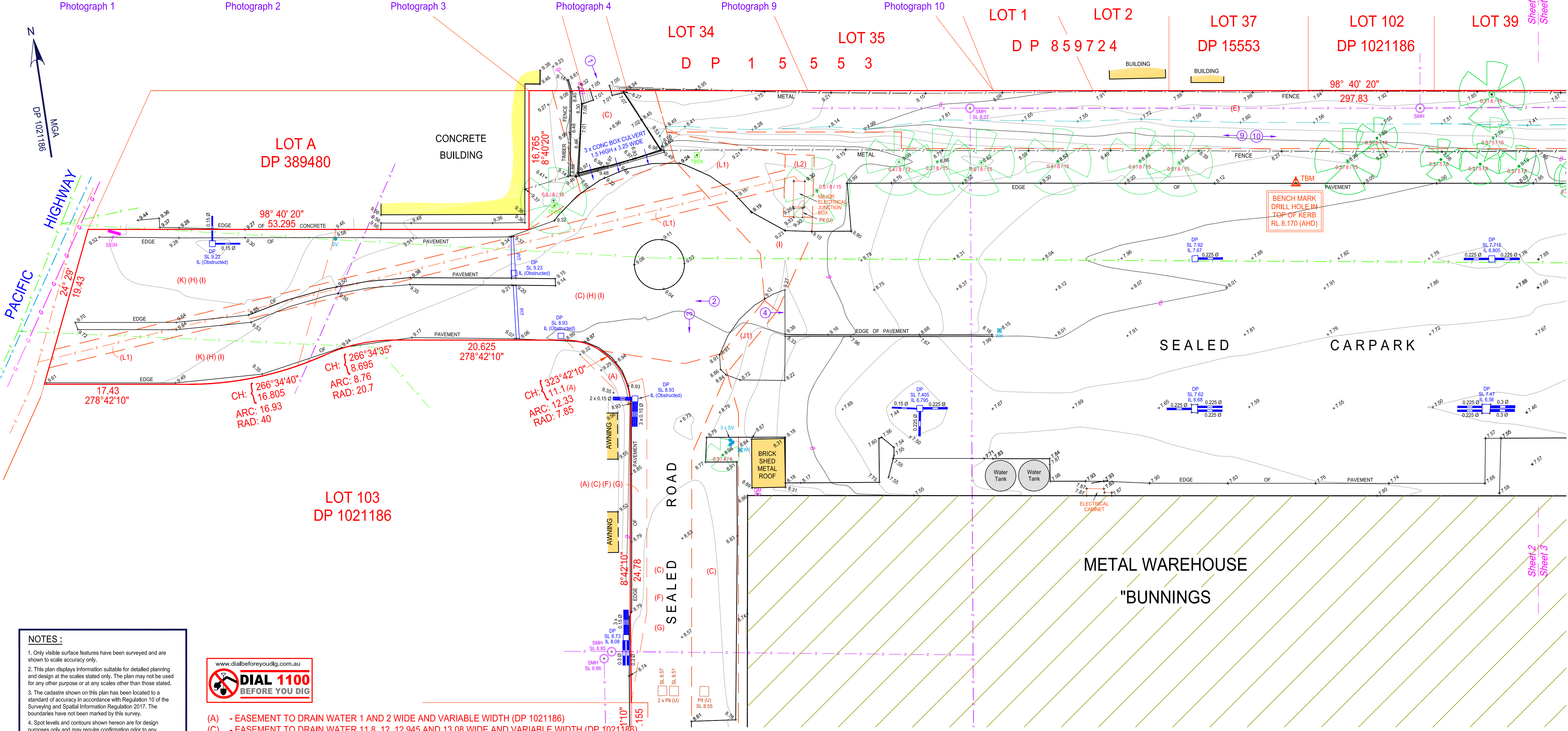
TITLE:	PLAN SHOWING DETAIL & LEVELS OVER LOT 101 IN DEPOSITED PLAN 1021186
LOCATION:	No.393 PACIFIC HIGHWAY, BELMONT
CLIENT:	Kaufland



Amendment	Description	Date	SCALE: 1 : 600 (A1) DATE: 25.02.2019 DATUM: A.H.D. ORIGIN: PM 22771 - RL 9.766 CONTOUR INTERVAL: 0.25 m SURVEYOR:LT DRAWN:SD DRAWING REF: 19113_DET_A REVISION: A	JOB No: 19113 SHEET 1 OF 5
A	INITIAL ISSUE	25.02.2019		
B				
C				
D				

PROJECT MANAGEMENT

SURVEYING

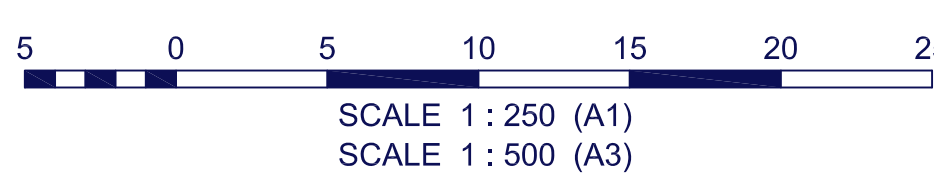


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- (A) - EASEMENT TO DRAIN WATER 1 AND 2 WIDE AND VARIABLE WIDTH (DP 1021186)
- (C) - EASEMENT TO DRAIN WATER 11.8, 12, 12.945 AND 13.08 WIDE AND VARIABLE WIDTH (DP 1021186)
- (E) - EASEMENT TO DRAIN WATER 4, 5, AND 7 WIDE AND VARIABLE WIDTH (DP 1021186)
- (F) - RIGHT OF CARRIAGEWAY 3.3, 6.65, 7.295 AND 7.43 WIDE AND VARIABLE WIDTH (DP 1021186)
- (G) - EASEMENT FOR SERVICES 2.0, 3.3, 6.0, 6.65, 7.295 AND 7.43 WIDE AND VARIABLE WIDTH (DP 1021186)
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- (I) - EASEMENT FOR SERVICES VARIABLE WIDTH (DP 1021186)
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- (L1) - EASEMENT FOR UNDERGROUND ELECTRICITY CABLES AND ACCESS THERETO 2 WIDE (DP 1021186)
- (L2) - EASEMENT FOR ELECTRICITY SUBSTATION AND ACCESS THERETO 3.5 WIDE (DP 1021186)



TREE DIAGRAM

LEGEND

UNDERGROUND SERVICES

NOT LOCATED BY SURVEY - APPROXIMATE LOCATION ONLY

SOURCE : DIAL BEFORE YOU DIG

- w - APPROXIMATE WATER MAIN LOCATION
- t - APPROXIMATE LOCATION OF UNDERGROUND TELSTRA AND NBN CABLES
- s - APPROXIMATE SEWER MAIN LOCATION
- e - APPROXIMATE LOCATION OF UNDERGROUND ELECTRICITY WIRES
- g - APPROXIMATE GAS MAIN LOCATION

- EJB - ELECTRICAL CABLE JUNCTION BOX
- SMH - SEWER MANHOLE
- PHOTO LOCATION & DIRECTION
- TOP OF BANK
- BOTTOM OF BANK
- FENCING
- CONTOUR
- WH - WATER HYDRANT
- SV - STOP VALVE
- GM - GAS METER
- DP - DRAINAGE PIT
- TBOX - TELSTRA BOX
- TPIT - TELSTRA PIT
- PIT (U) - PIT (UNKNOWN SERVICE TYPE)

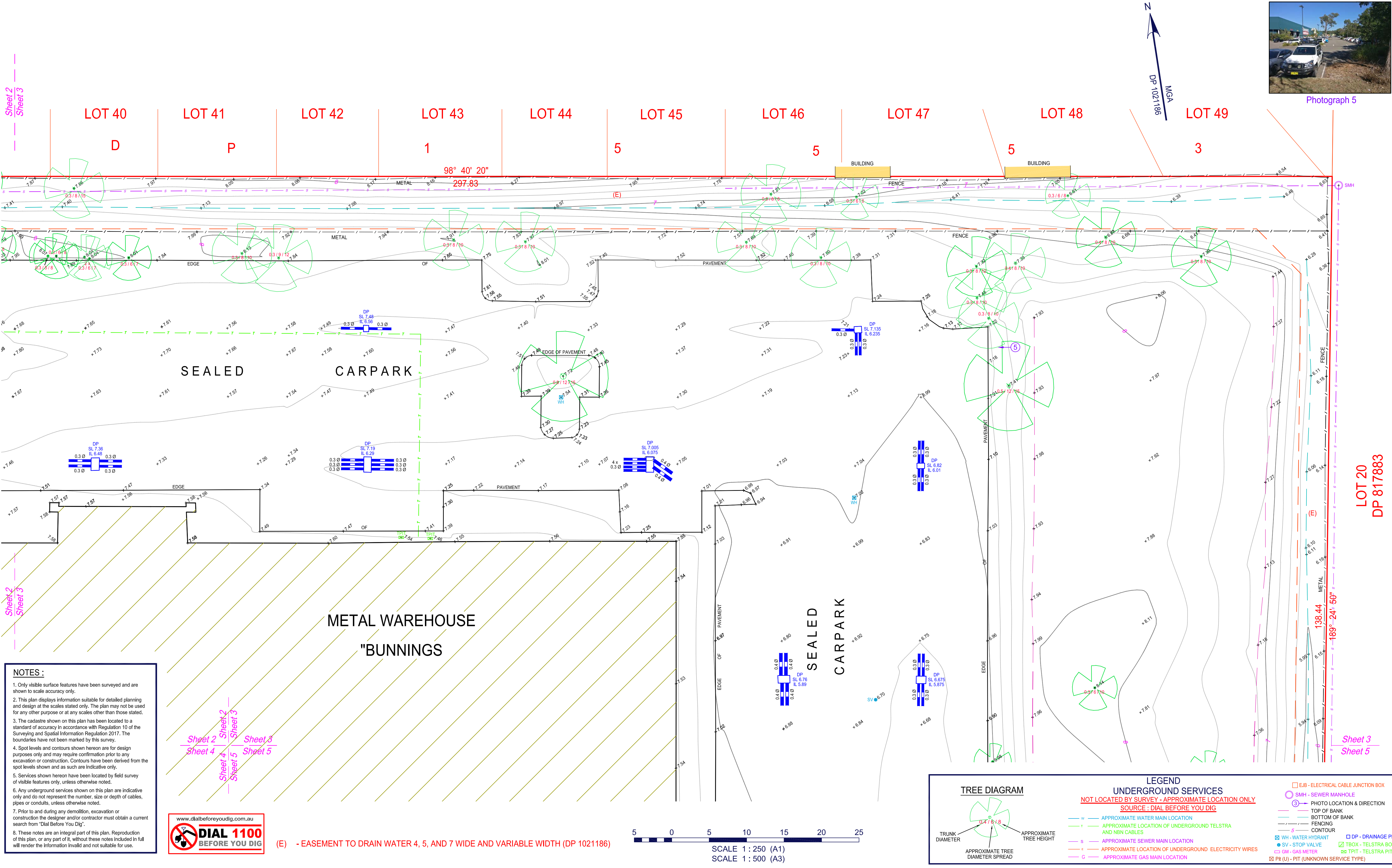
TITLE:	PLAN SHOWING DETAIL & LEVELS OVER LOT 101 IN DEPOSITED PLAN 1021186
LOCATION:	No.393 PACIFIC HIGHWAY, BELMONT
CLIENT:	Kaufland



Amendment	Description	Date	SCALE: 1 : 250 (A1) 1 : 500 (A3)	JOB No: 19113
A	INITIAL ISSUE	25.02.2019	DATE: 25.02.2019 DATUM: A.H.D. ORIGIN: PM 22771 - RL 9.766 CONTOUR INTERVAL: 0.25 m SURVEYOR: LT DRAWN: SD	SHEET 2 OF 5
B			DRAWING REF: 19113_DET_A REVISION: A	
C				
D				

PROJECT MANAGEMENT

SURVEYING

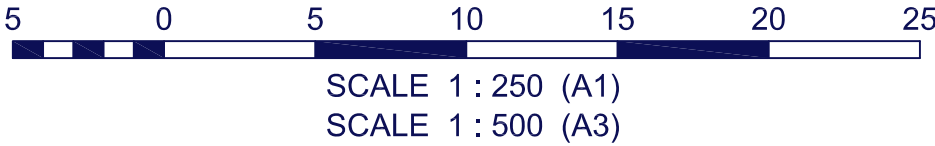


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(E) - EASEMENT TO DRAIN WATER 4, 5, AND 7 WIDE AND VARIABLE WIDTH (DP 1021186)



TREE DIAGRAM

LEGEND

UNDERGROUND SERVICES
NOT LOCATED BY SURVEY - APPROXIMATE LOCATION ONLY
SOURCE: DIAL BEFORE YOU DIG

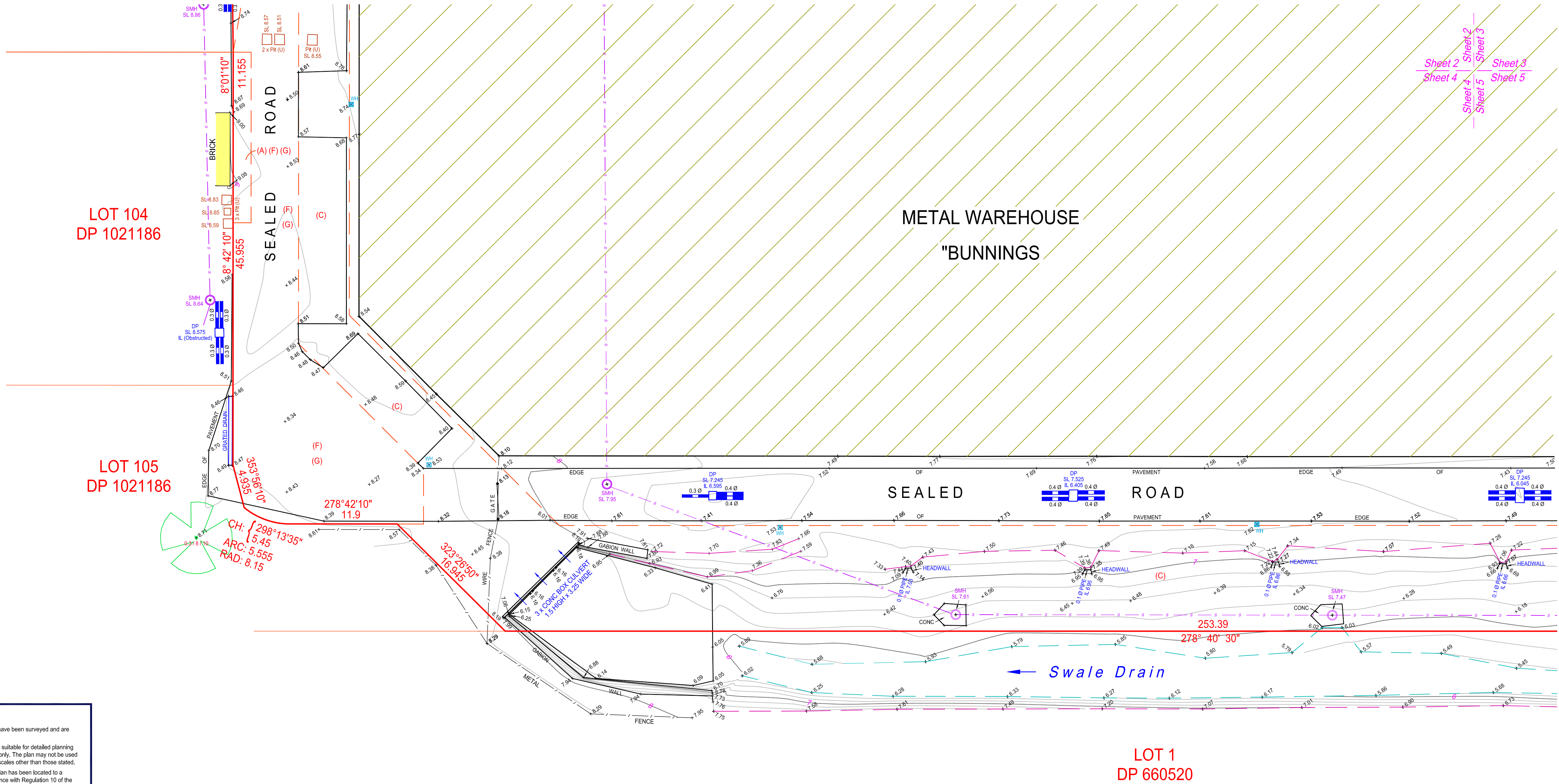
- w - APPROXIMATE WATER MAIN LOCATION
- y - APPROXIMATE LOCATION OF UNDERGROUND TELSTRA AND NBN CABLES
- s - APPROXIMATE SEWER MAIN LOCATION
- e - APPROXIMATE LOCATION OF UNDERGROUND ELECTRICITY WIRES
- g - APPROXIMATE GAS MAIN LOCATION

- EJB - ELECTRICAL CABLE JUNCTION BOX
- SMH - SEWER MANHOLE
- PHOTO LOCATION & DIRECTION
- TOP OF BANK
- BOTTOM OF BANK
- FENCING
- CONTOUR
- WH - WATER HYDRANT
- SV - STOP VALVE
- GM - GAS METER
- PI (U) - PIT (UNKNOWN SERVICE TYPE)
- DP - DRAINAGE PIT
- TBOX - TELSTRA BOX
- TPIT - TELSTRA PIT

TITLE:	PLAN SHOWING DETAIL & LEVELS OVER LOT 101 IN DEPOSITED PLAN 1021186
LOCATION:	No.393 PACIFIC HIGHWAY, BELMONT
CLIENT:	Kaufland



Amendment	Description	Date	SCALE: 1 : 250 (A1) 1 : 500 (A3)	JOB No: 19113
A	INITIAL ISSUE	25.02.2019	DATE: 25.02.2019 DATUM: A.H.D. ORIGIN: PM 22771 - RL 9.766 CONTOUR INTERVAL: 0.25 m SURVEYOR: LT DRAWN: SD	SHEET 3 OF 5
B			DRAWING REF: 19113_DET_A REVISION: A	
C				
D				

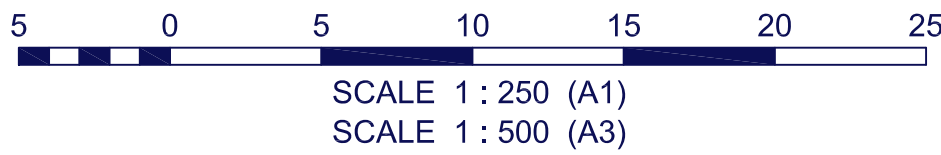


NOTES:

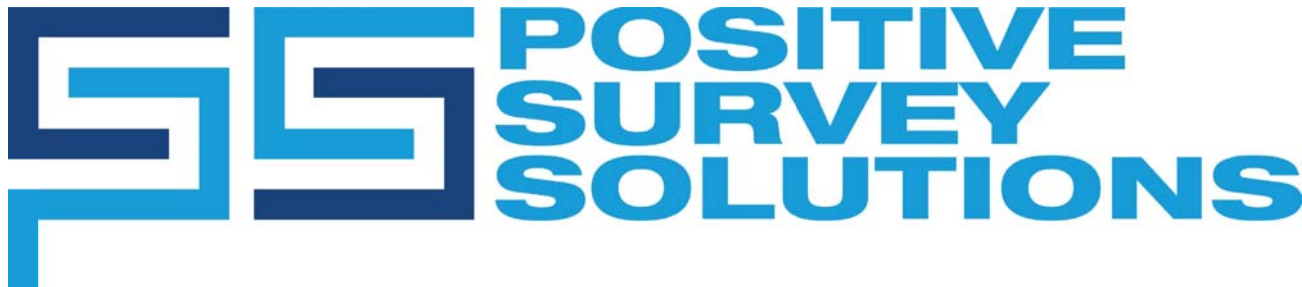
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- (A) - EASEMENT TO DRAIN WATER 1 AND 2 WIDE AND VARIABLE WIDTH (DP 1021186)
(C) - EASEMENT TO DRAIN WATER 11.8, 12, 12.945 AND 13.08 WIDE AND VARIABLE WIDTH (DP 1021186)
(F) - RIGHT OF CARRIAGEWAY 3.3, 6.65, 7.295 AND 7.43 WIDE AND VARIABLE WIDTH (DP 1021186)
(G) - EASEMENT FOR SERVICES 2.0, 3.3, 6.0, 6.65, 7.295 AND 7.43 WIDE AND VARIABLE WIDTH (DP 1021186)



TITLE: PLAN SHOWING DETAIL & LEVELS OVER LOT 101 IN DEPOSITED PLAN 1021186
LOCATION: No.393 PACIFIC HIGHWAY, BELMONT
CLIENT: Kaufland



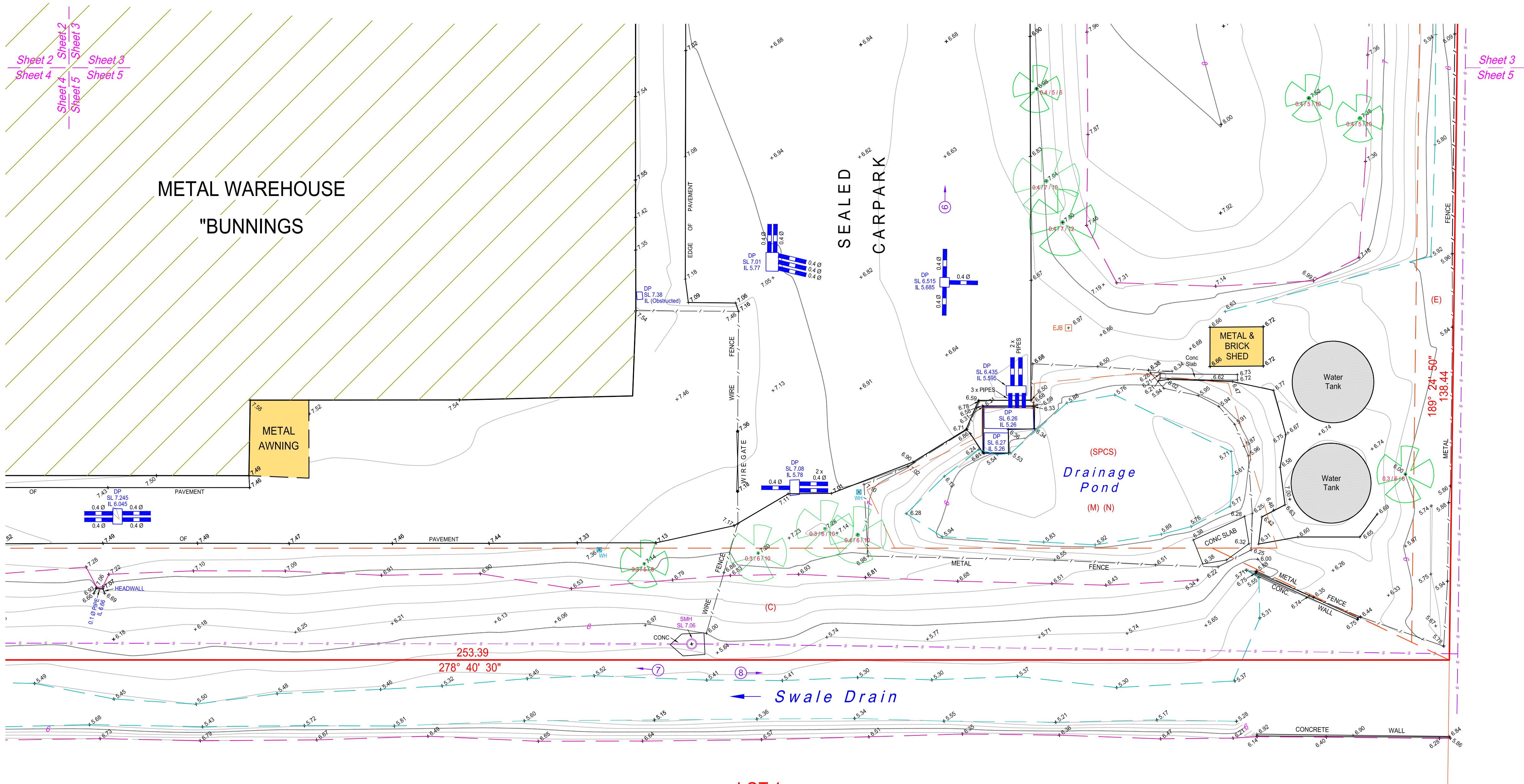
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A	INITIAL ISSUE	25.02.2019		
B				
C				
D				



Photograph 6

Photograph 7

Photograph 8

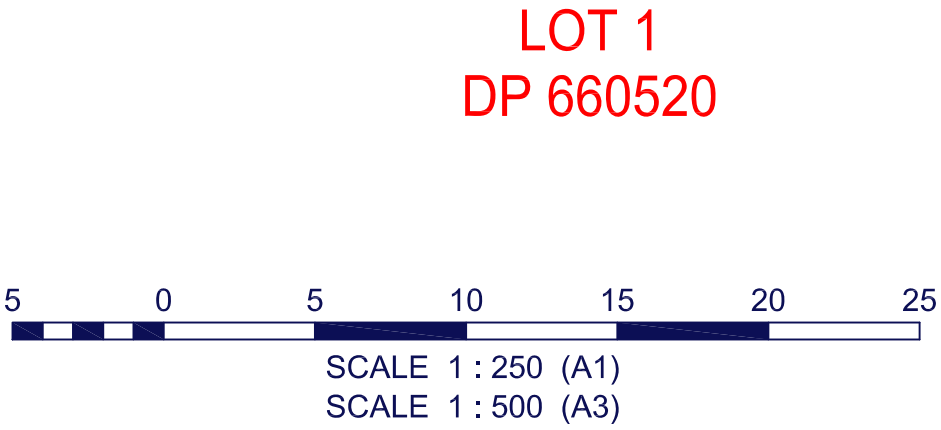


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(E) - EASEMENT TO DRAIN WATER 4, 5, AND 7 WIDE AND VARIABLE WIDTH (DP 1021186)
(M) - RESTRICTION ON THE USE OF LAND (DP 1021186)
(N) - POSITIVE COVENANT (DP 1021186)
(SPCS) - STORMWATER POLLUTION CONTROL SYSTEM (DP 1021186)



TREE DIAGRAM

LEGEND

UNDERGROUND SERVICES

NOT LOCATED BY SURVEY - APPROXIMATE LOCATION ONLY
SOURCE : DIAL BEFORE YOU DIG

- w - APPROXIMATE WATER MAIN LOCATION
- y - APPROXIMATE LOCATION OF UNDERGROUND TELSTRA AND NBN CABLES
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- SMH - SEWER MANHOLE
- PHOTO LOCATION & DIRECTION
- TOP OF BANK
- BOTTOM OF BANK
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- WH - WATER HYDRANT
- SV - STOP VALVE
- GM - GAS METER
- PR (U) - PIT (UNKNOWN SERVICE TYPE)
- DP - DRAINAGE PIT
- TBOX - TELSTRA BOX
- TPIT - TELSTRA PIT

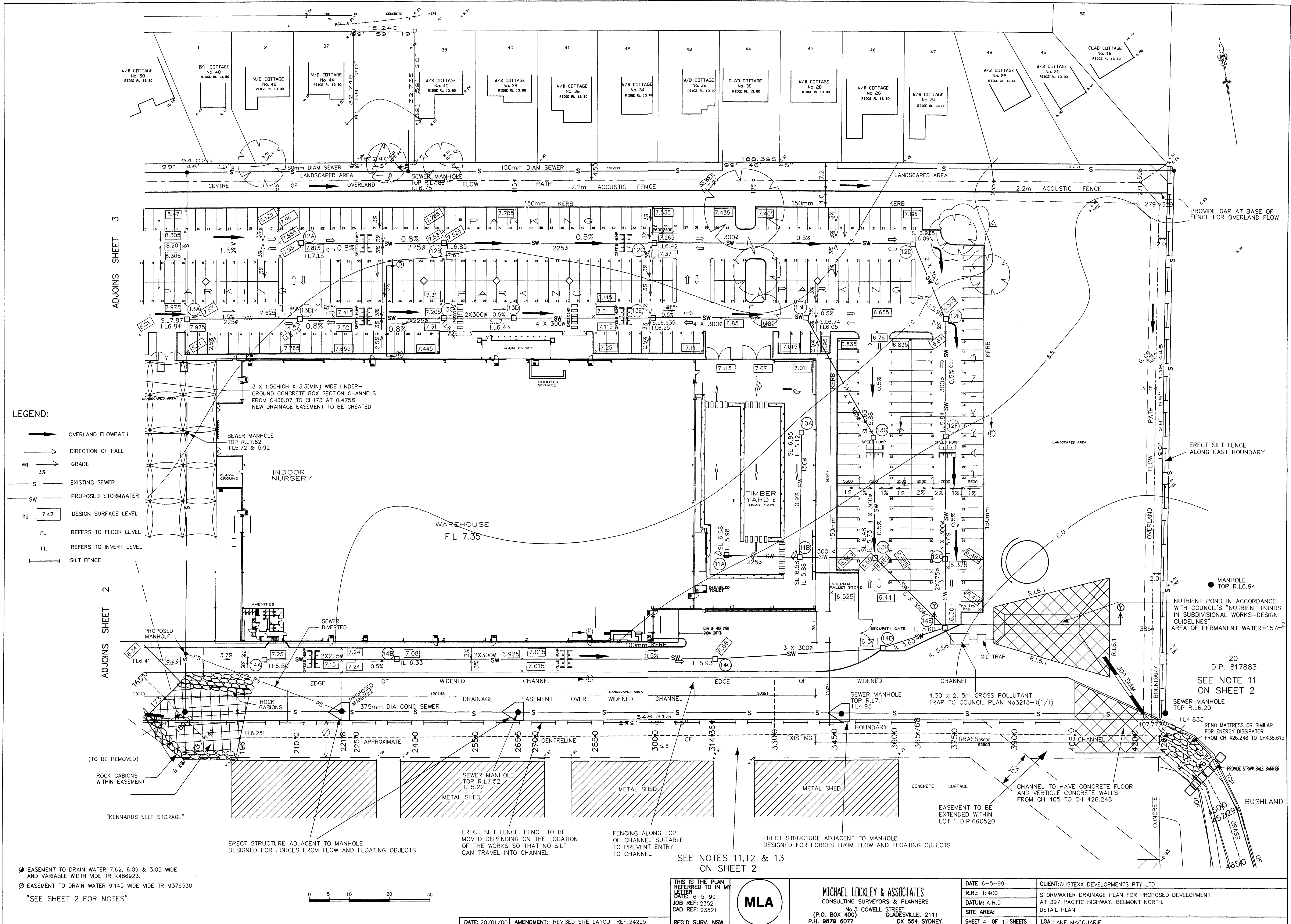
TITLE:	PLAN SHOWING DETAIL & LEVELS OVER LOT 101 IN DEPOSITED PLAN 1021186
LOCATION:	No.393 PACIFIC HIGHWAY, BELMONT
CLIENT:	Kaufland



Amendment	Description	Date	SCALE: 1 : 250 (A1) 1 : 500 (A3) DATE: 25.02.2019 DATUM: A.H.D. ORIGIN: PM 22771 - RL 9.766 CONTOUR INTERVAL: 0.25 m SURVEYOR:LT DRAWN:SD DRAWING REF: 19113_DET_A REVISION: A	JOB No: 19113 SHEET 5 OF 5
A	INITIAL ISSUE	25.02.2019		
B				
C				
D				

APPENDIX C

**CIVIL ENGINEERING DESIGN for DC/99/01634/1M-A
(MICHEAL LOCKLEY & ASSOCIATES SH1 to SH12)**



- LEGEND:
- OVERLAND FLOWPATH
 - DIRECTION OF FALL
 - eg 3% GRADE
 - S EXISTING SEWER
 - SW PROPOSED STORMWATER
 - eg 7.47 DESIGN SURFACE LEVEL
 - FL REFERS TO FLOOR LEVEL
 - IL REFERS TO INVERT LEVEL
 - SILT FENCE

◊ EASEMENT TO DRAIN WATER 7.62, 6.09 & 3.05 WIDE AND VARIABLE WIDTH WIDE TR K486923.

◊ EASEMENT TO DRAIN WATER 9.145 WIDE WIDE TR M376530

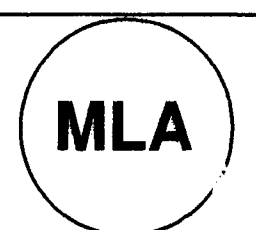
"SEE SHEET 2 FOR NOTES"



DATE: 20/01/00 AMENDMENT: REVISED SITE LAYOUT REF: 24225

SEE NOTES 11, 12 & 13 ON SHEET 2

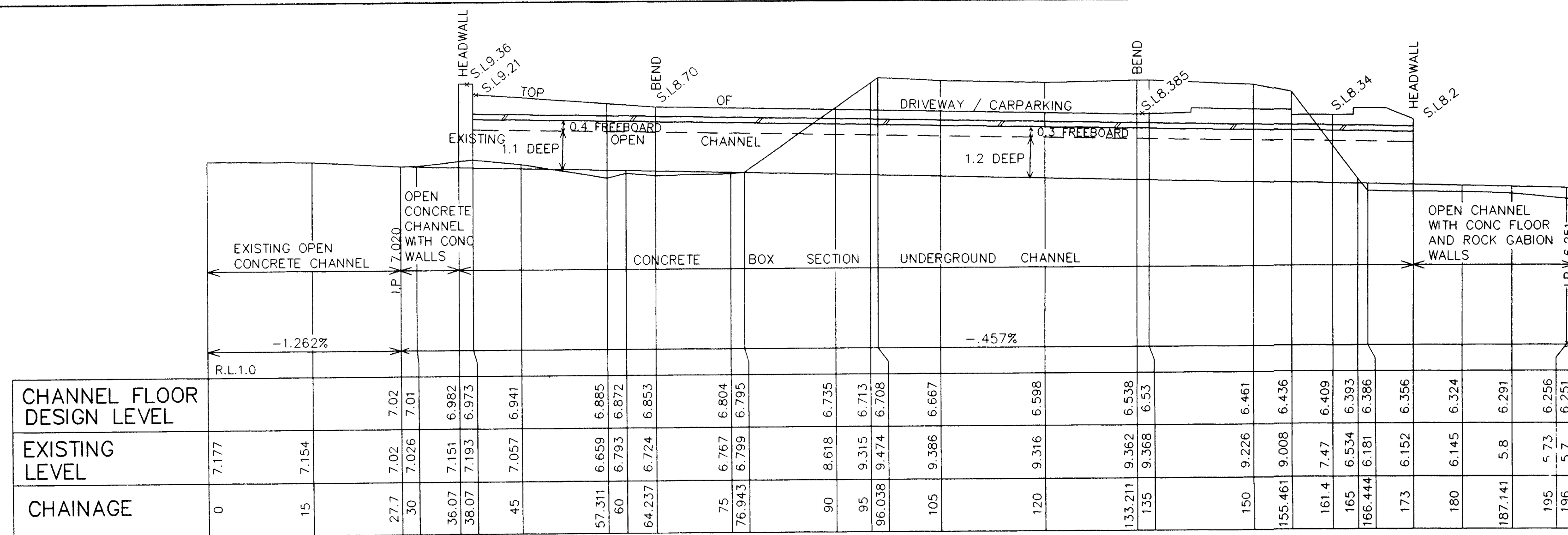
THIS IS THE PLAN REFERRED TO IN MY
DATE: 6-5-99
JOB REF: 23521
CAD REF: 23521



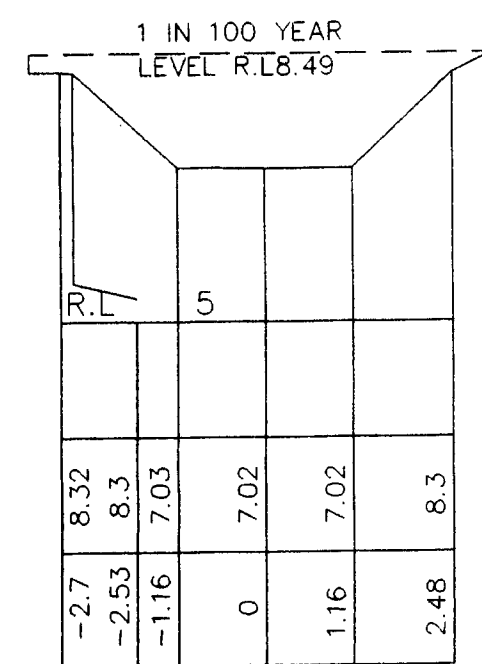
MICHAEL LOCKLEY & ASSOCIATES
CONSULTING SURVEYORS & PLANNERS
No. 3 COWELL STREET
GLADESVILLE, 2111
P.O. BOX 400
P.H. 9879 6077
DX 554 SYDNEY

DATE: 6-5-99
R.R.: 1:400
DATUM: A.H.D
SITE AREA:
SHEET 4 OF 12 SHEETS

CLIENT: AUSTEXX DEVELOPMENTS PTY LTD
STORMWATER DRAINAGE PLAN FOR PROPOSED DEVELOPMENT
AT 397 PACIFIC HIGHWAY, BELMONT NORTH.
DETAIL PLAN
LGA: LAKE MACQUARIE

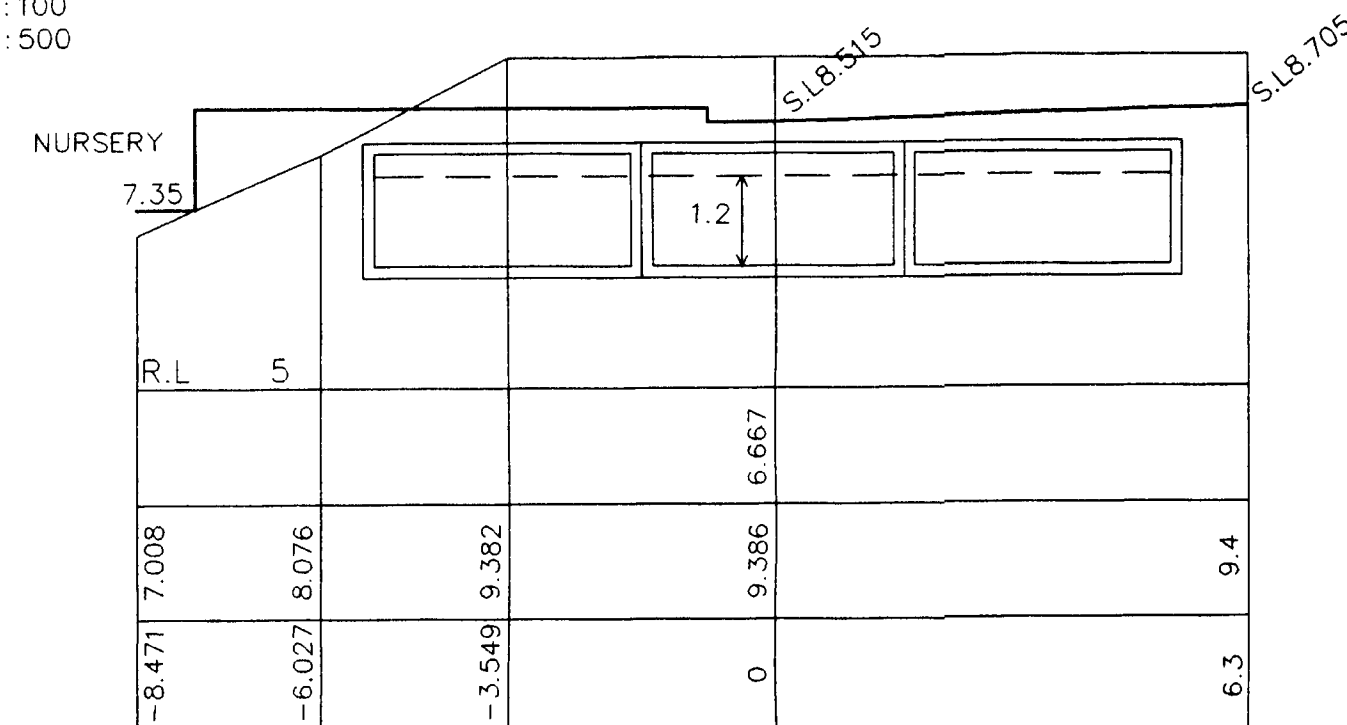


CHANNEL LONGSECTION
VERT 1:100
HORZ 1:500

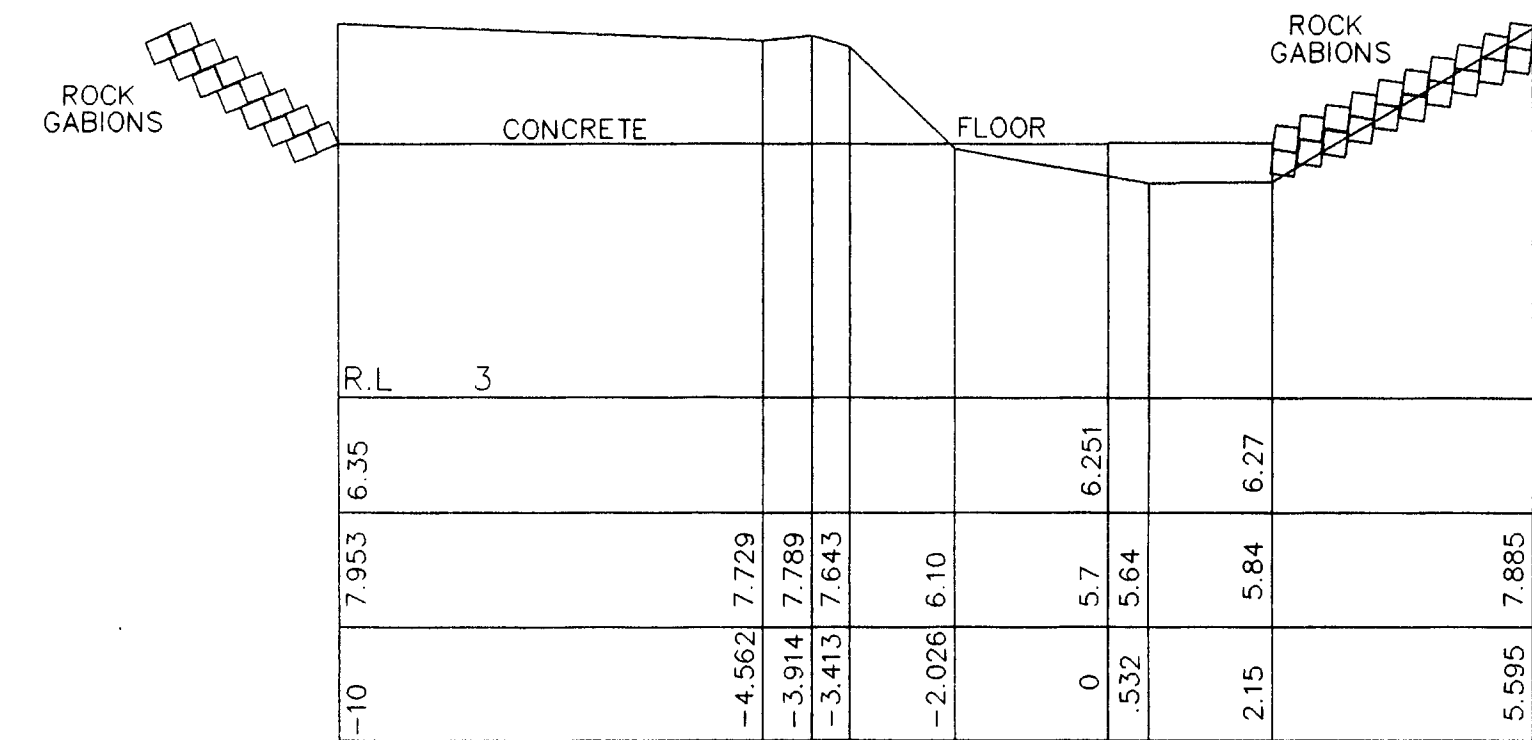


27.7

END OF CONC CHANNEL

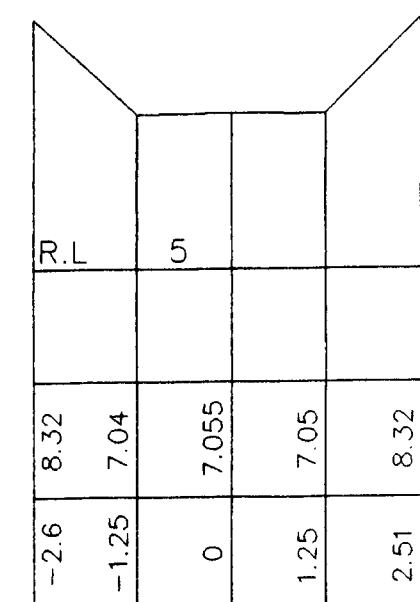


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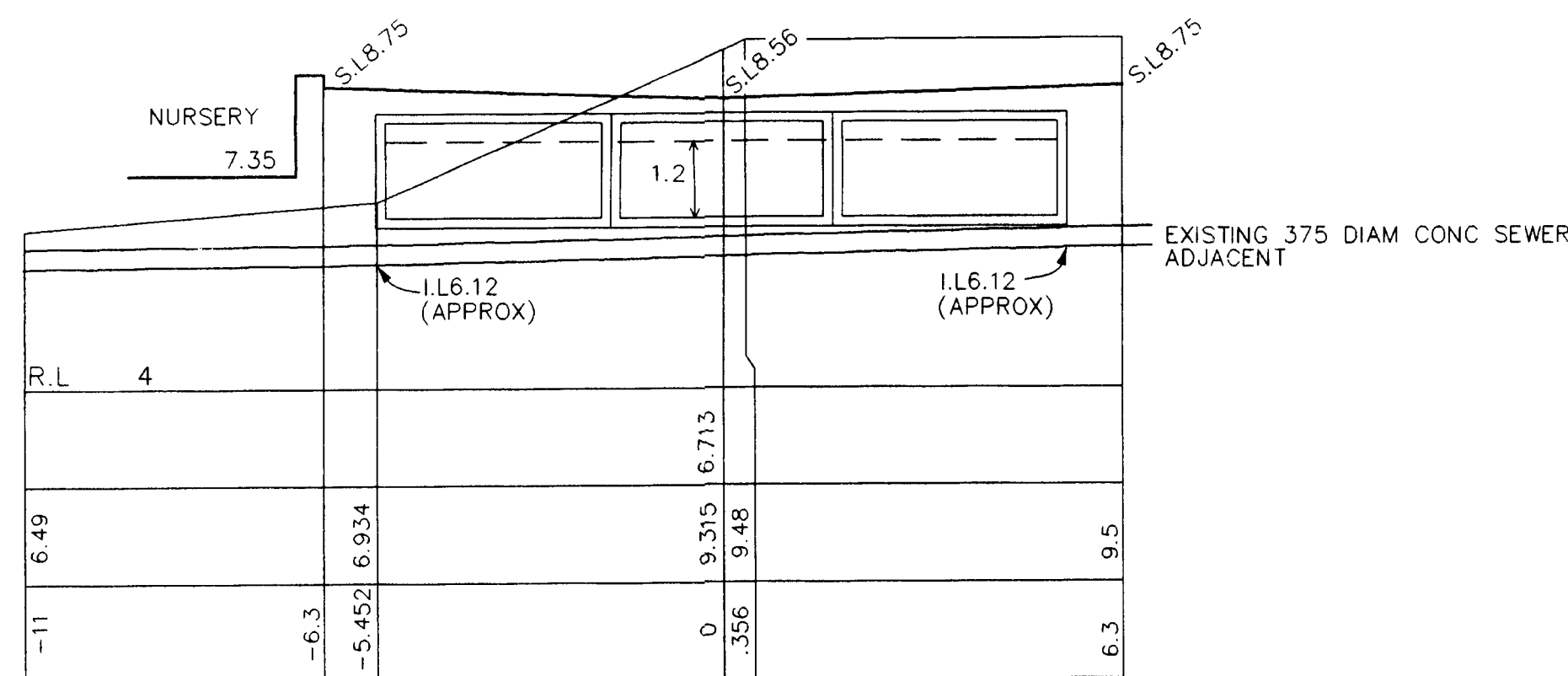
196

END OF OPEN CONCRETE CHANNEL

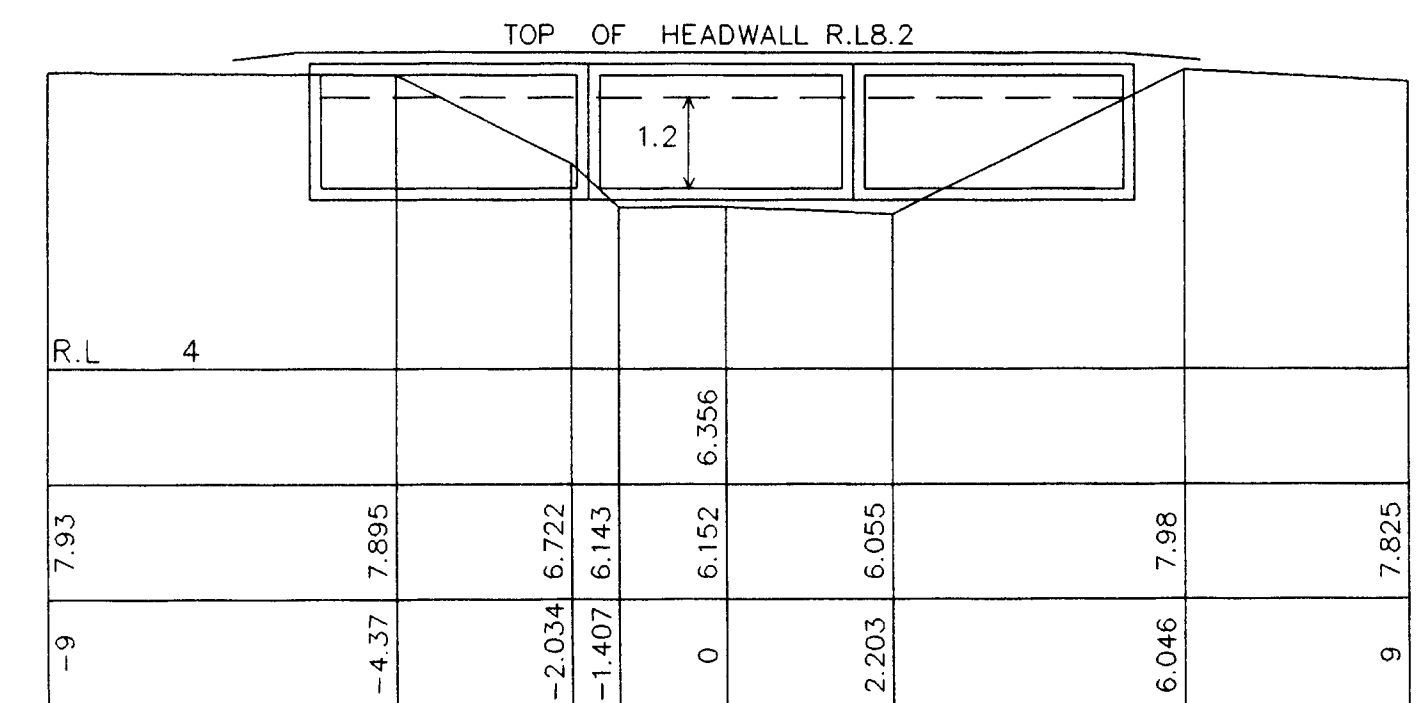


25

EXISTING CONC CHANNEL

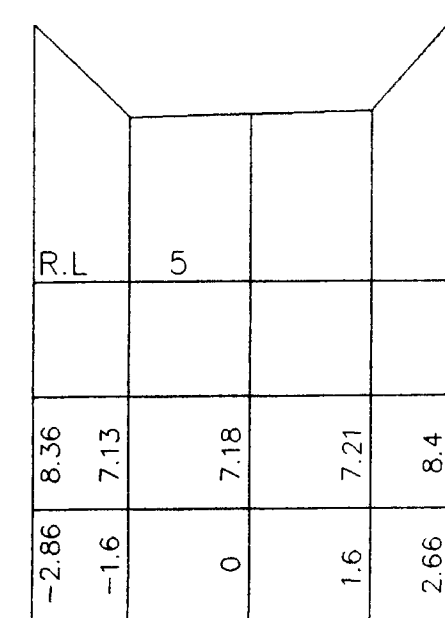


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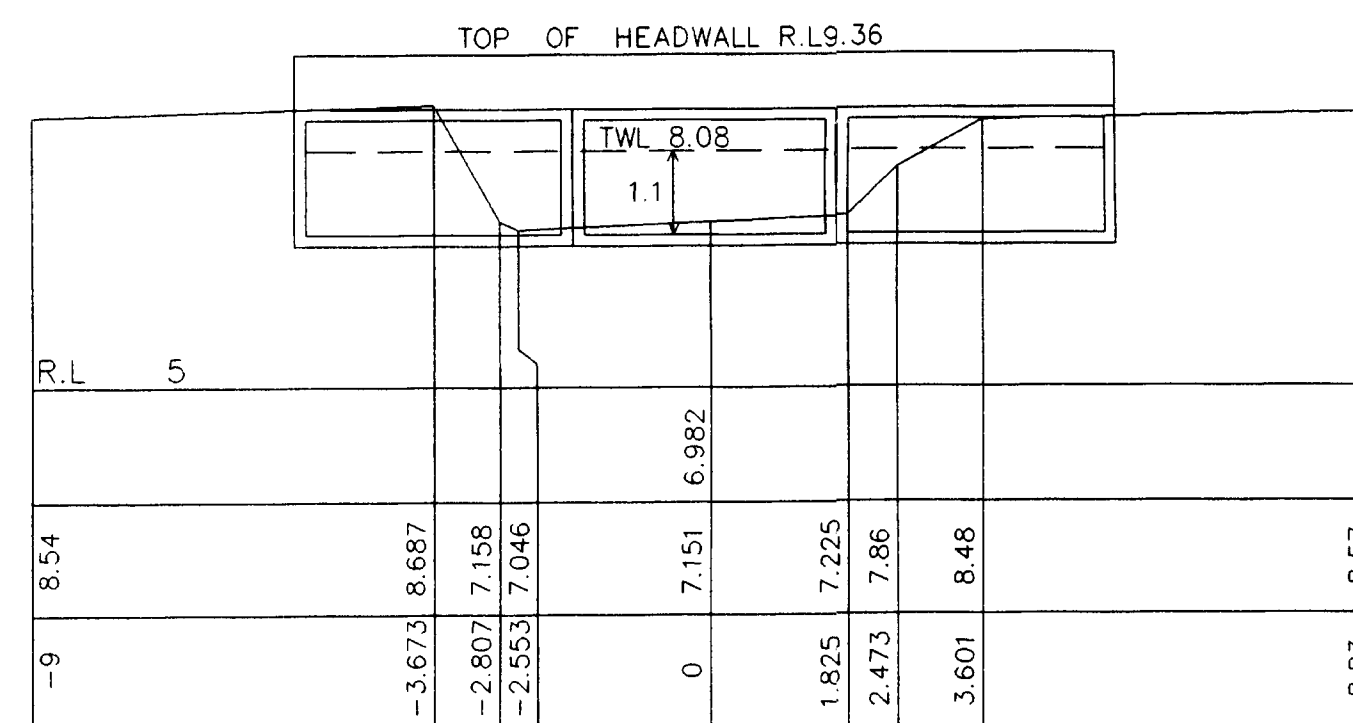
173

HEADWALL AT END OF UNDERGROUND CHANNEL



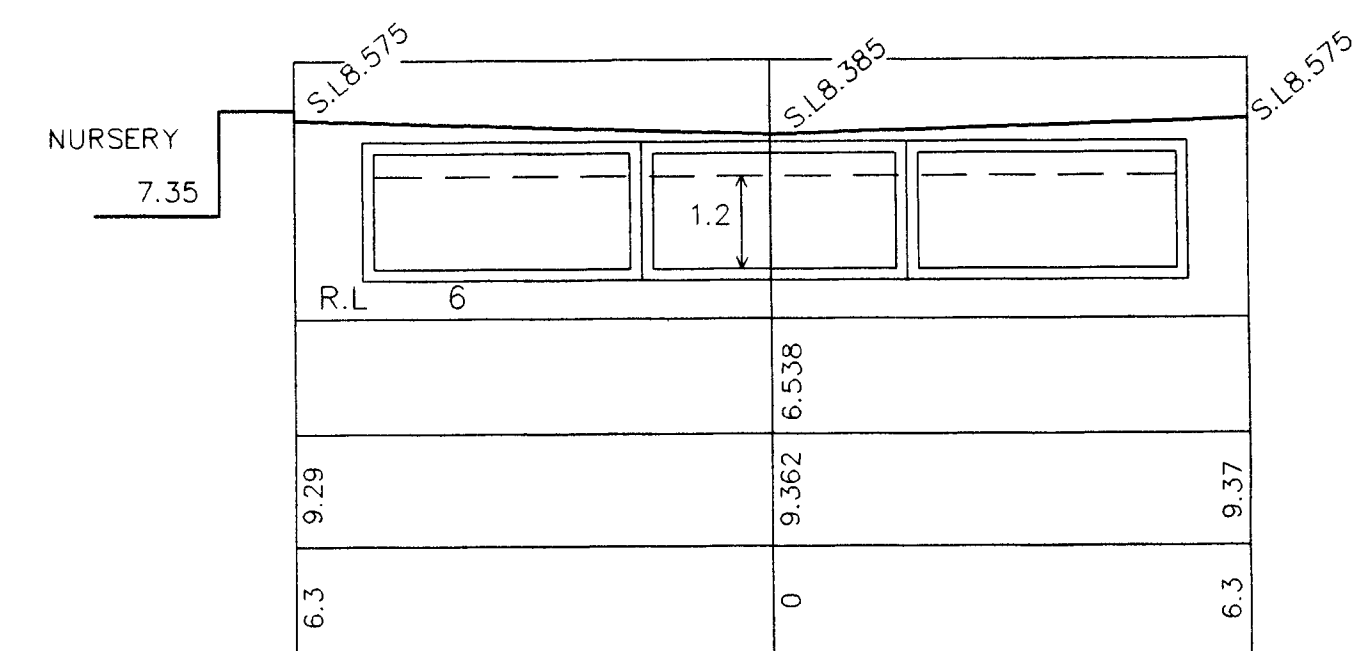
15

EXISTING CONC CHANNEL



36.07

HEADWALL AT START OF UNDERGROUND CHANNEL

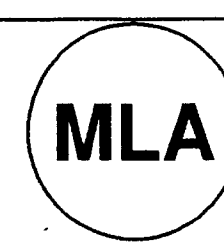


133.211
BEND

NOTE: EACH CONCRETE BOX SECTION IS 3.30m WIDE AND 1.5 DEEP

DATE: 20/01/00 AMENDMENT: REVISED SITE LAYOUT REF: 24225

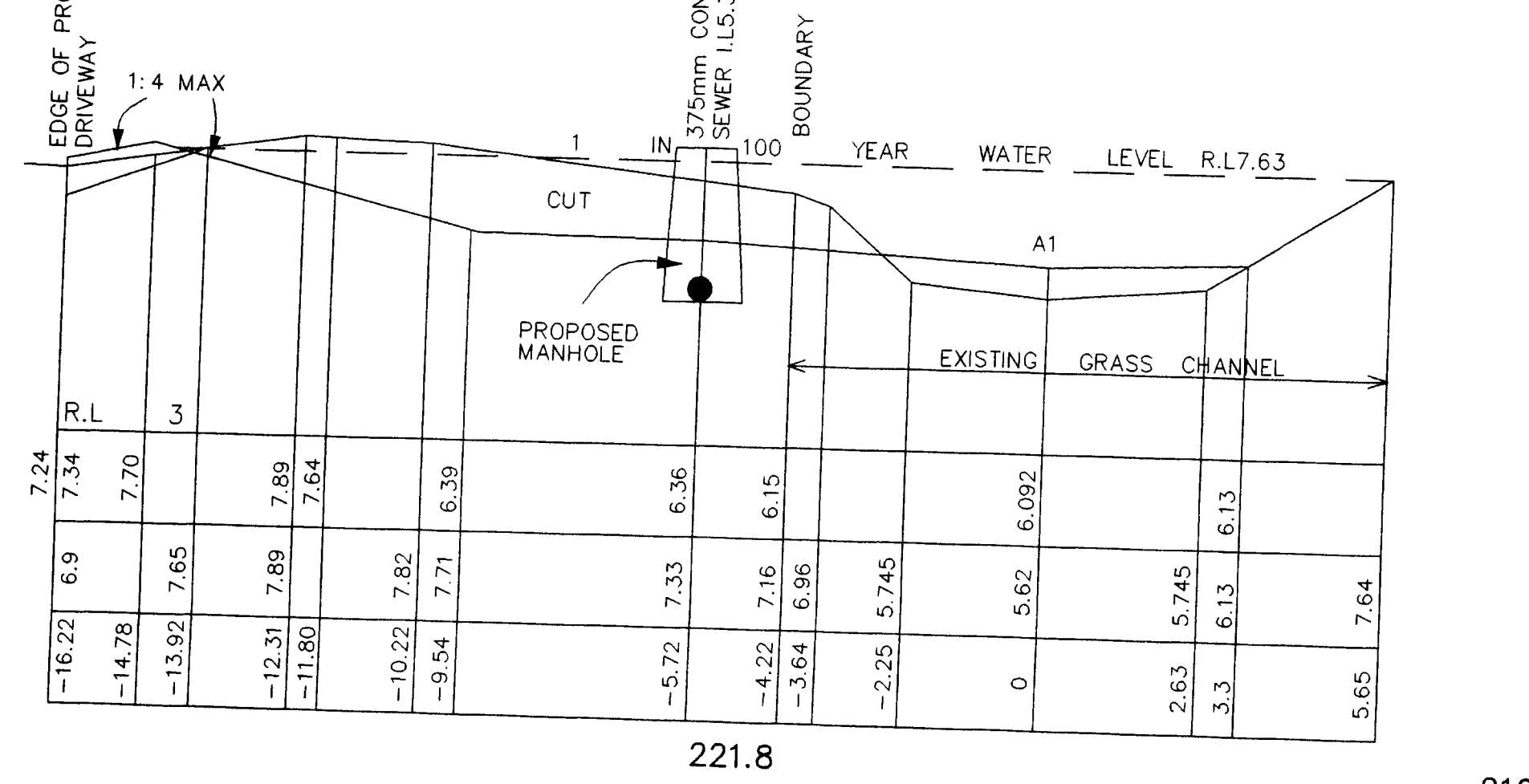
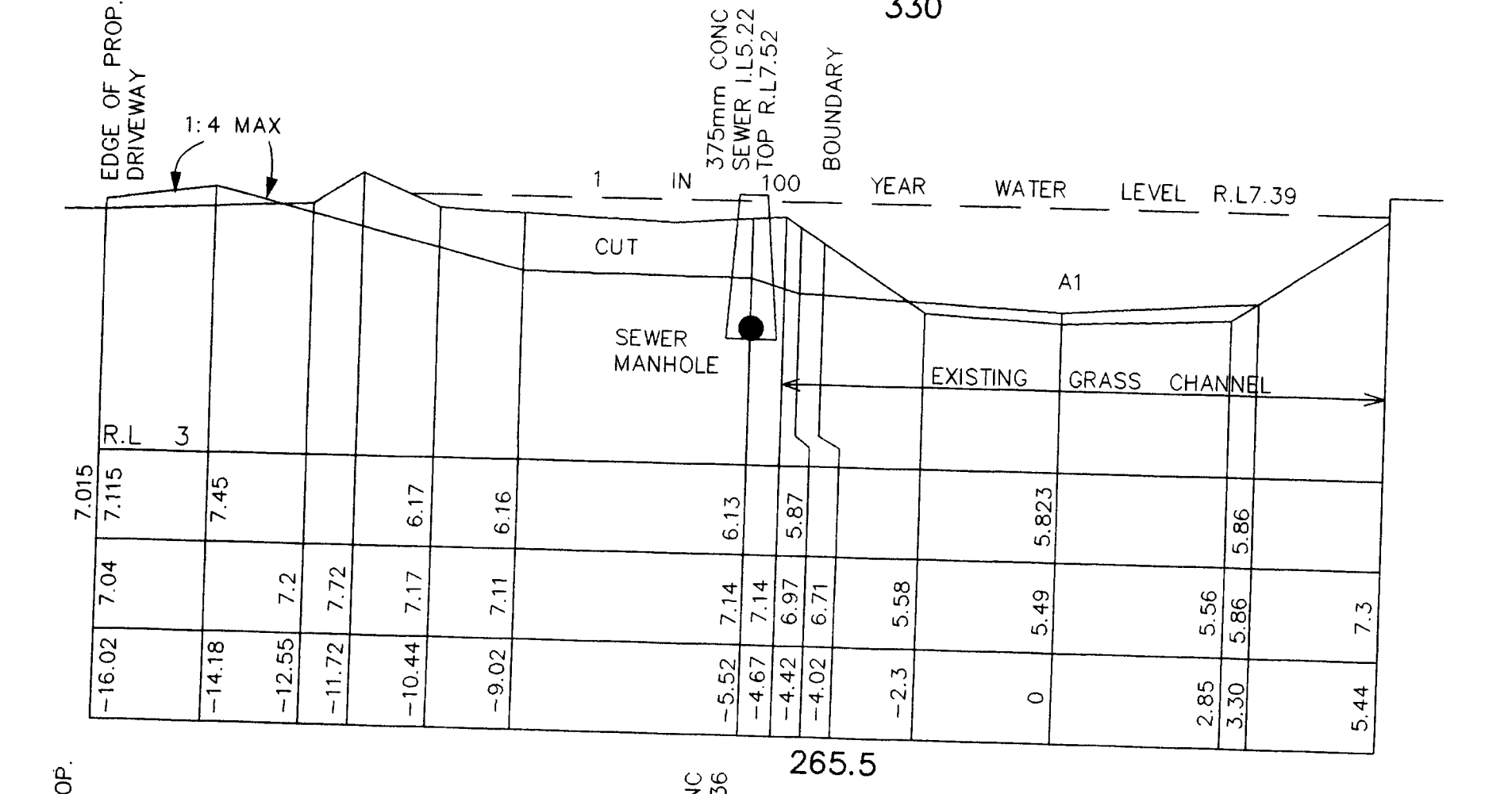
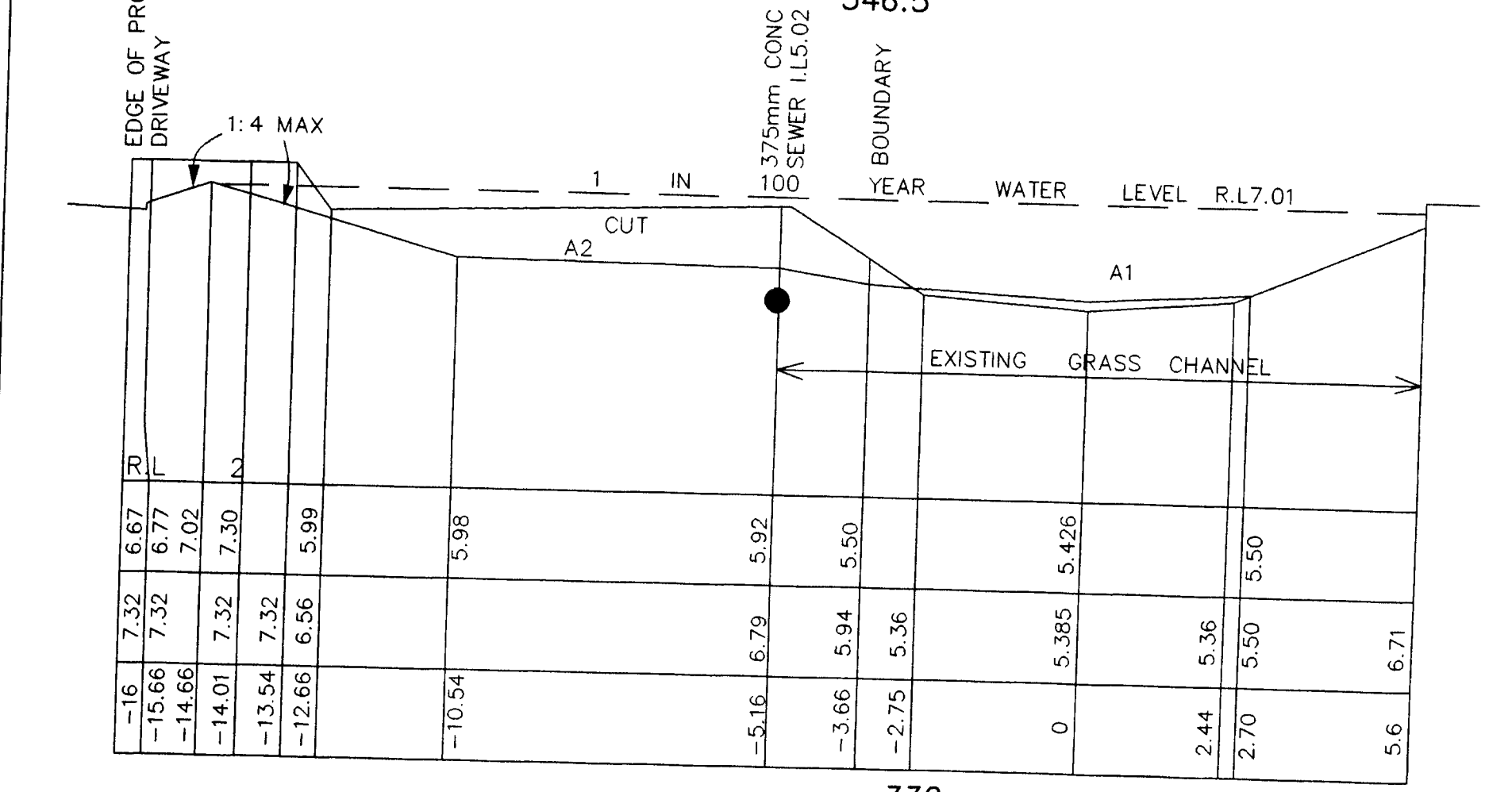
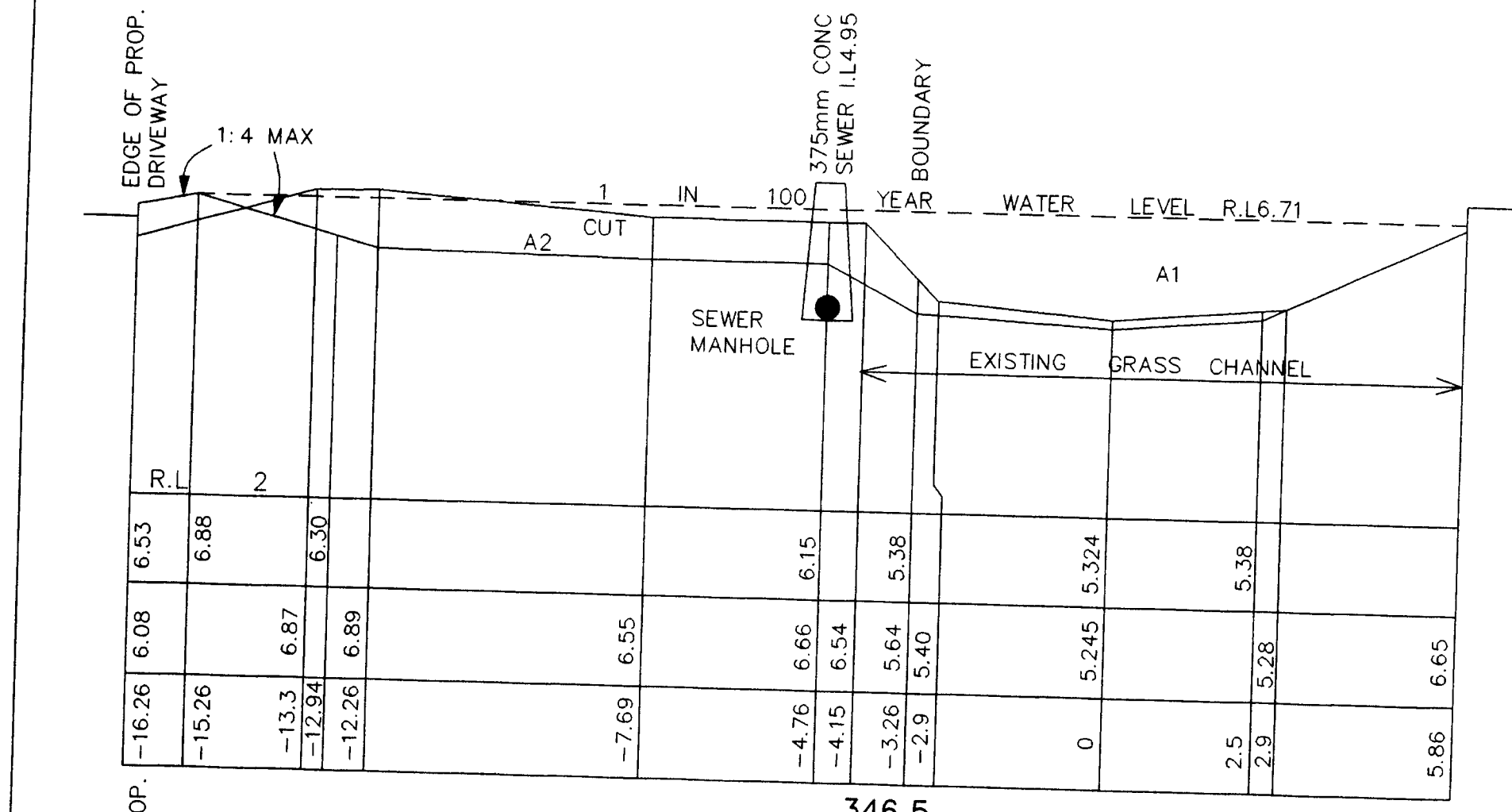
THIS IS THE PLAN REFERRED TO IN MY LETTER
DATE: 6-5-99
JOB REF: 23521
CAD REF: 23521
REC'D SURV. NSW



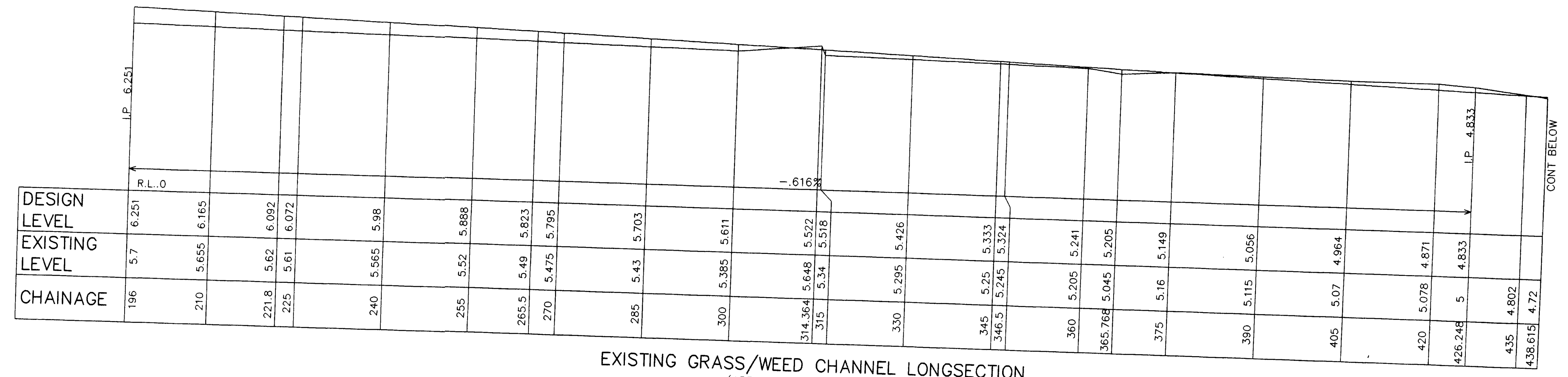
MICHAEL LOCKLEY & ASSOCIATES
CONSULTING SURVEYORS & PLANNERS
No.3 COWELL STREET
GLADESVILLE, 2111
P.H. 9878 6077 DX 554 SYDNEY

DATE: 6-5-99
R.R.: AS SHOWN
DATUM: A.H.D
SITE AREA:
SHEET 5 OF 12 SHEETS

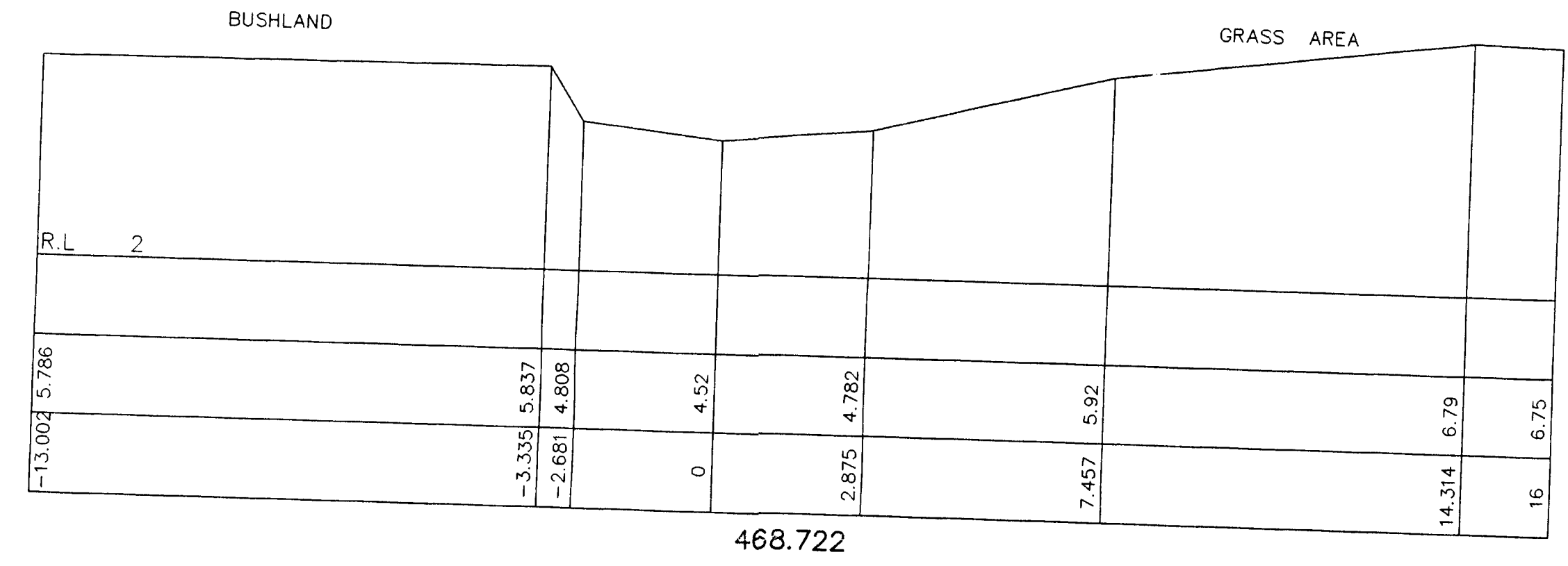
CLIENT: AUSTEXX DEVELOPMENTS PTY LTD
EXISTING & PROPOSED CONCRETE CHANNELS
AT 397 PACIFIC HIGHWAY, BELMONT NORTH.
LGA: LAKE MACQUARIE



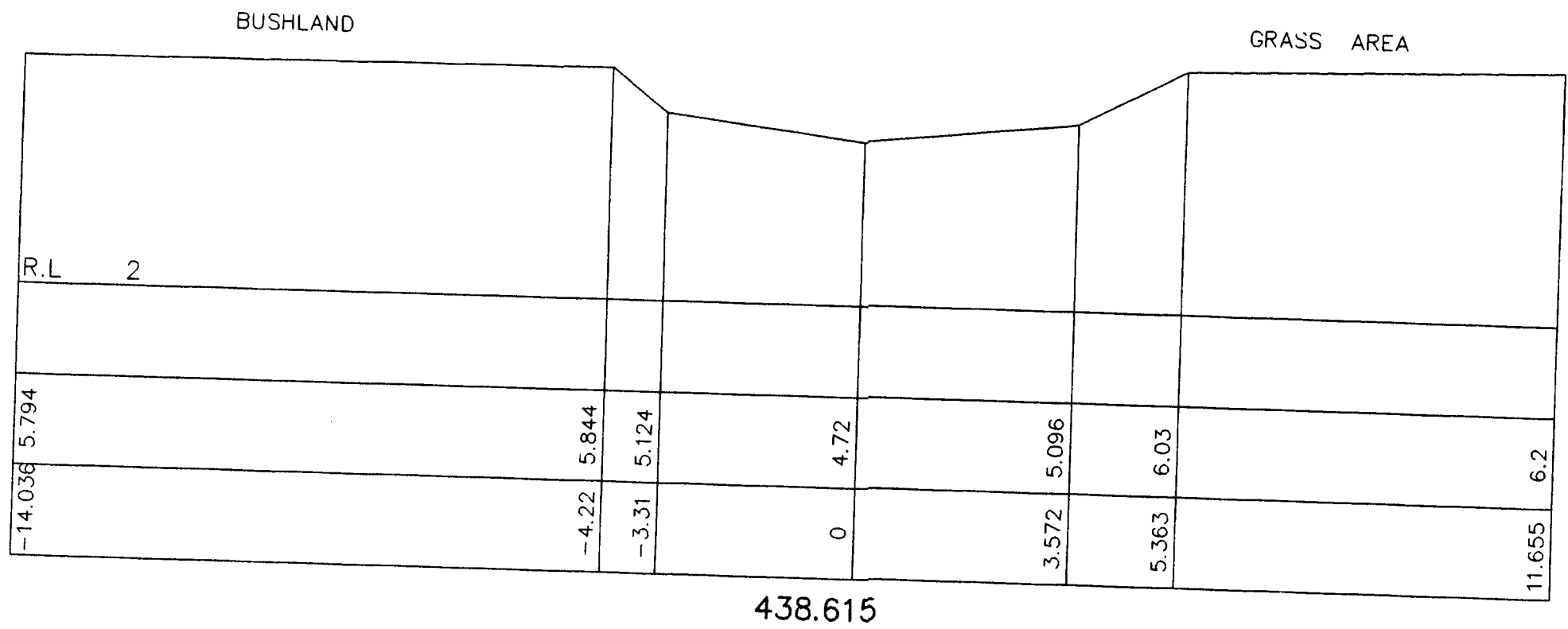
210
CROSS SECTIONS
RR 1:100 NATURAL



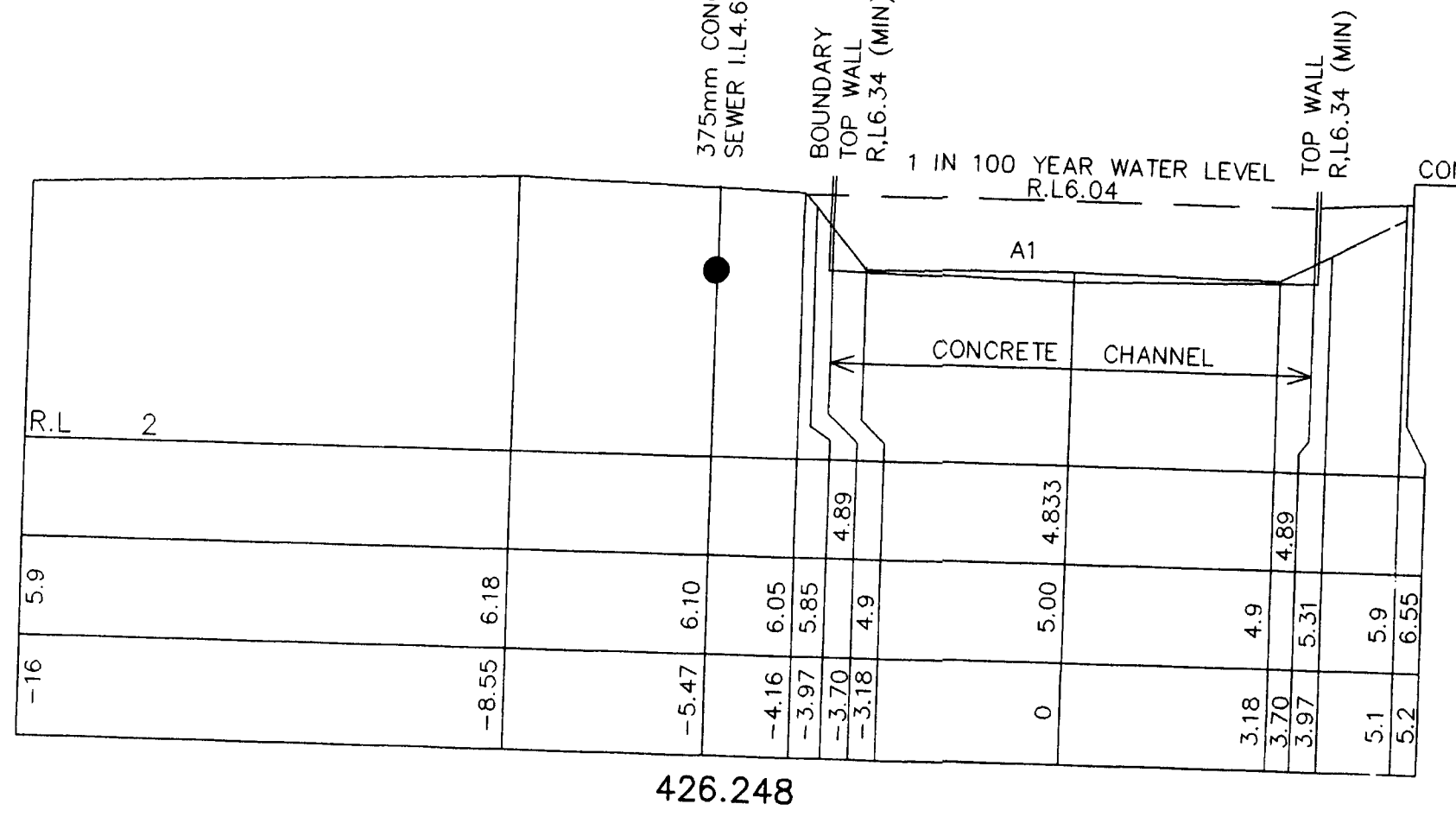
EXISTING GRASS/WEED CHANNEL LONGSECTION
(APPROXIMATE CENTRELINE)
1:100 VERT
1:500 HORZ



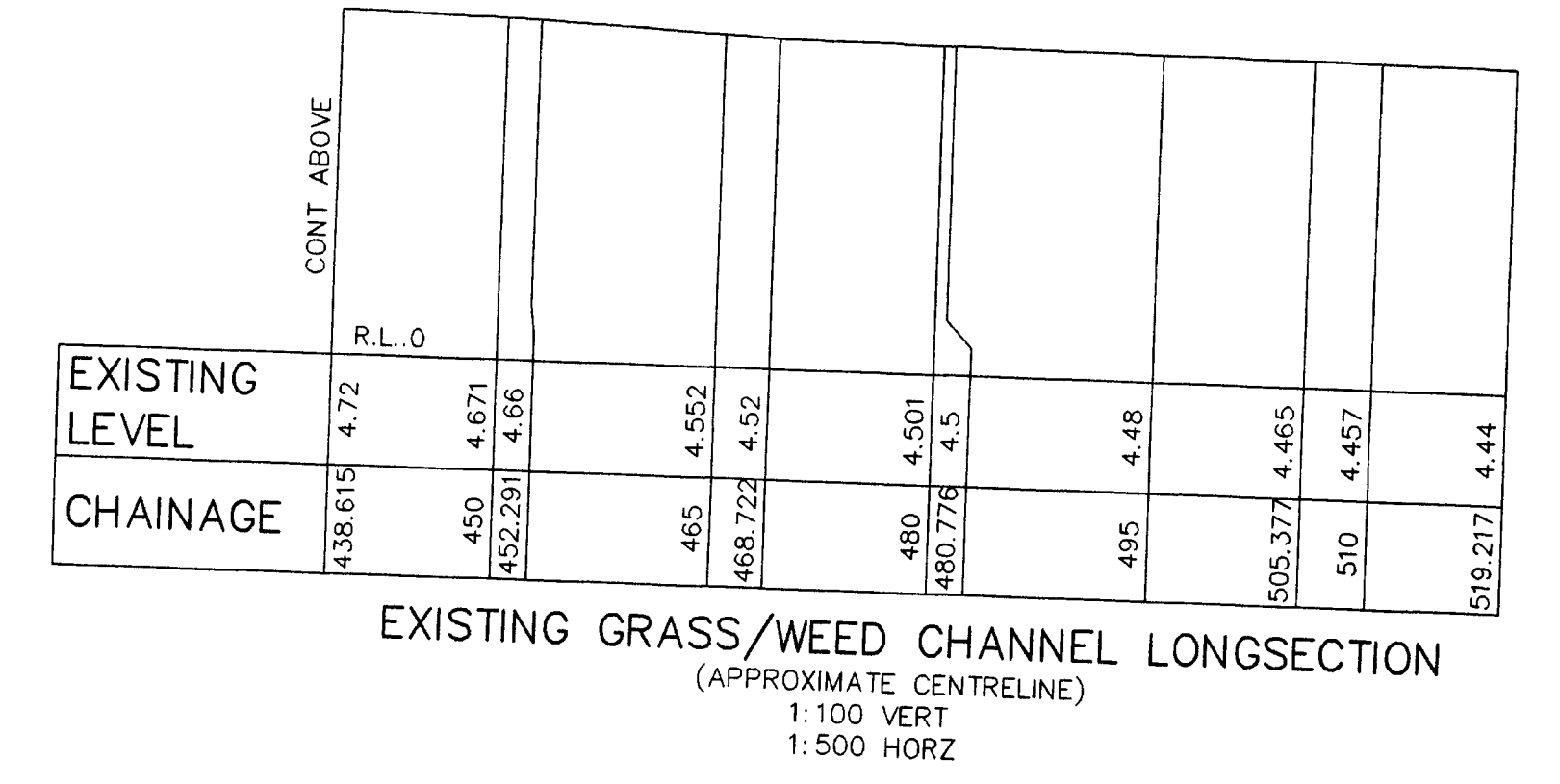
468.722



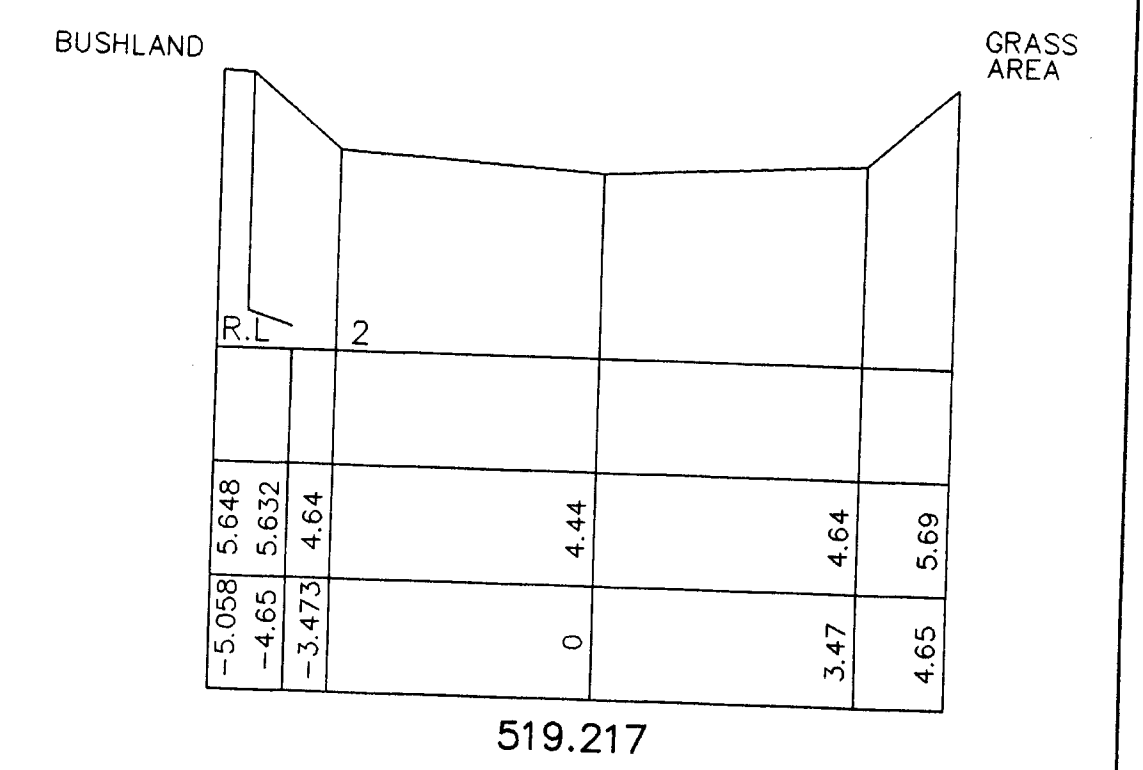
438.615



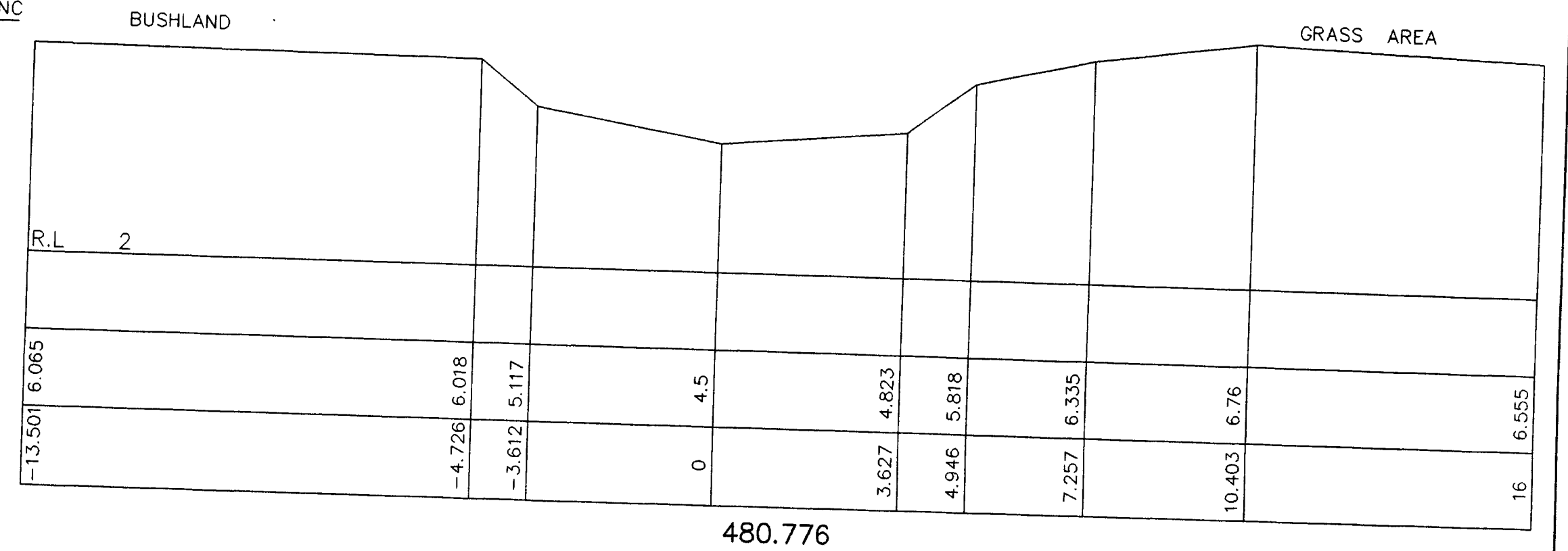
426.248



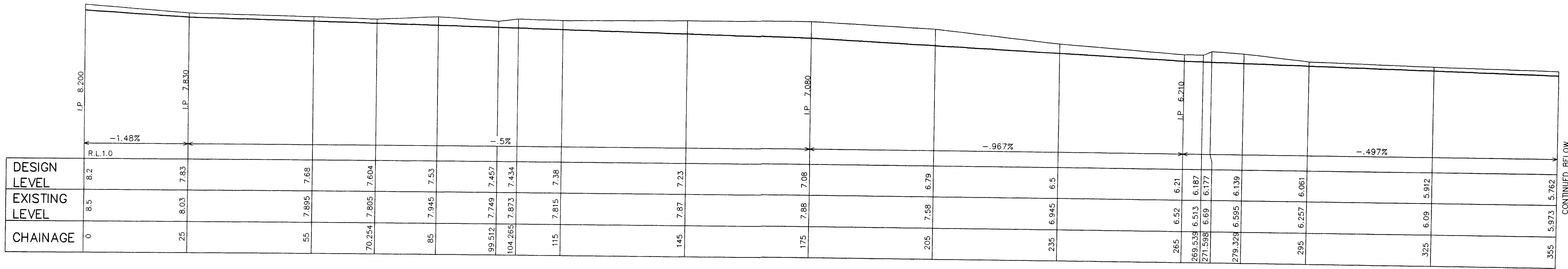
EXISTING GRASS/WEED CHANNEL LONGSECTION
(APPROXIMATE CENTRELINE)
1:100 VERT
1:500 HORZ



519.217

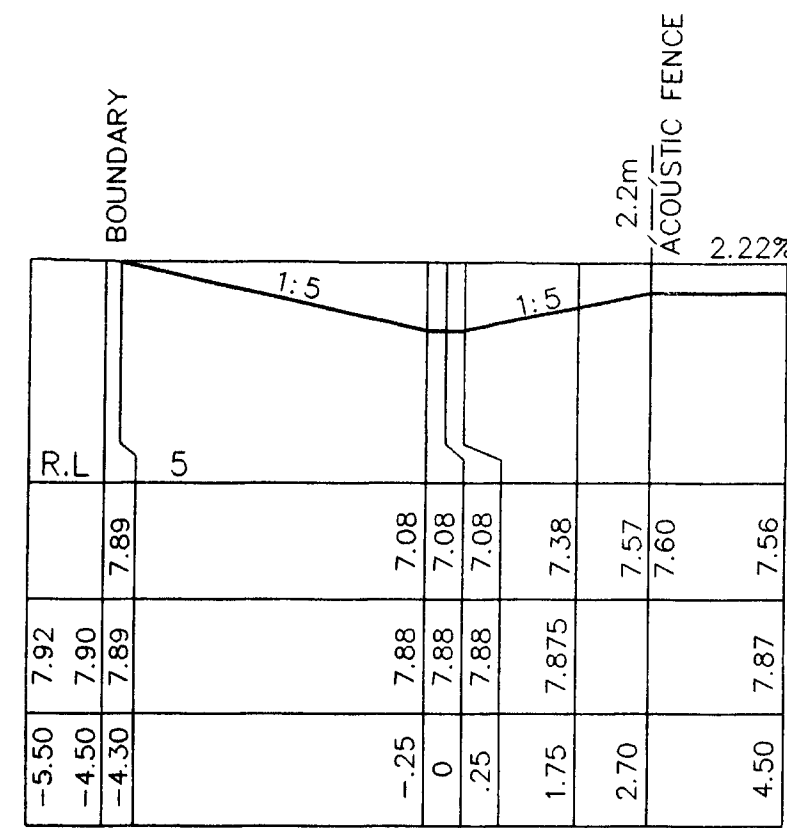


480.776

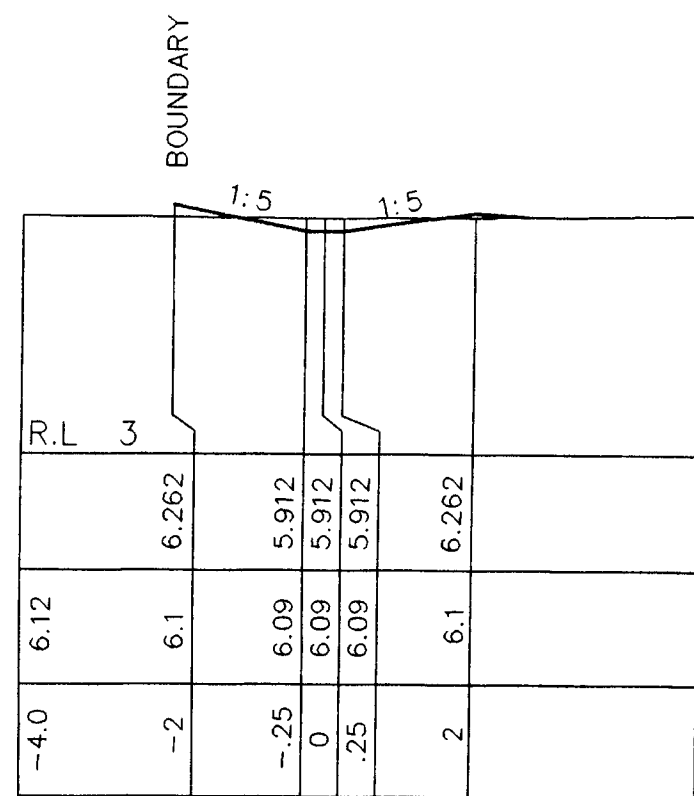


1 IN 100 YEAR OVERLAND FLOWPATH LONGSECTION

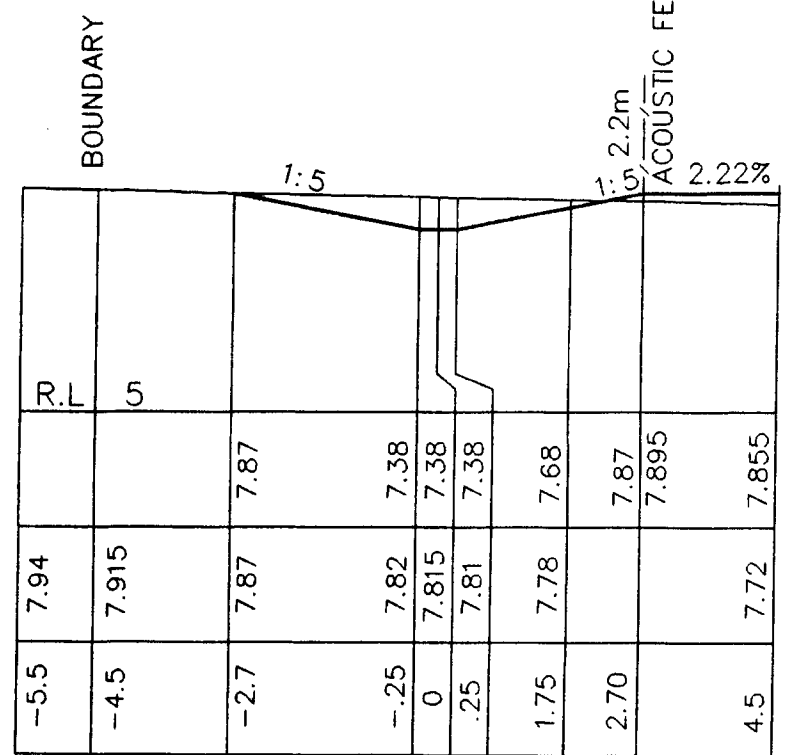
VERT 1:100
HORZ 1:500



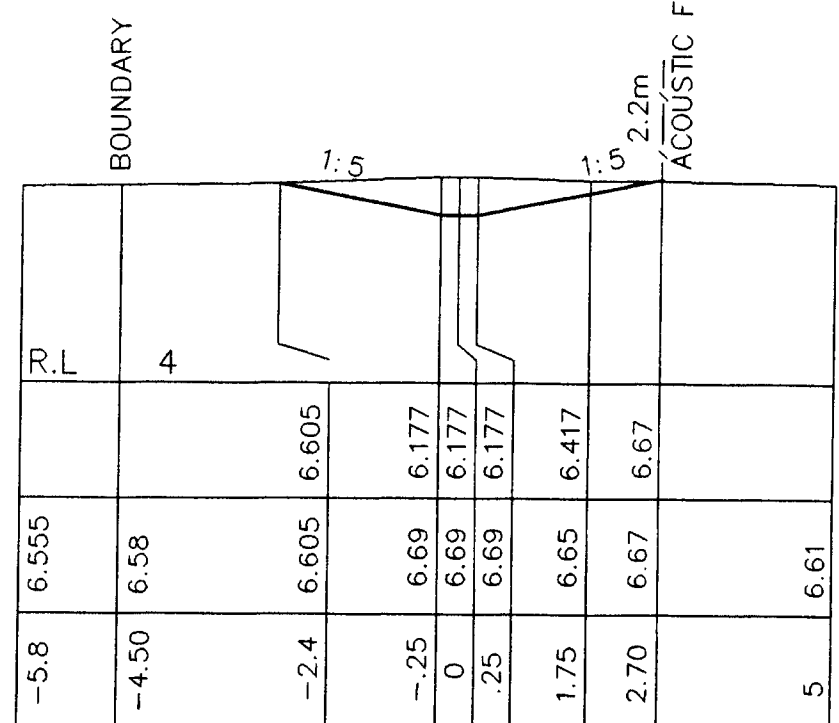
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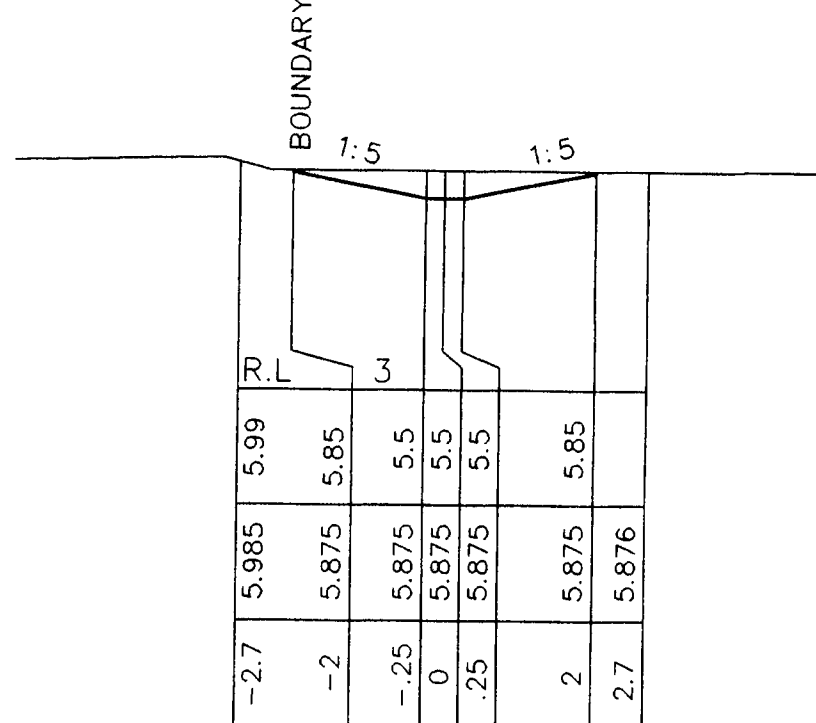
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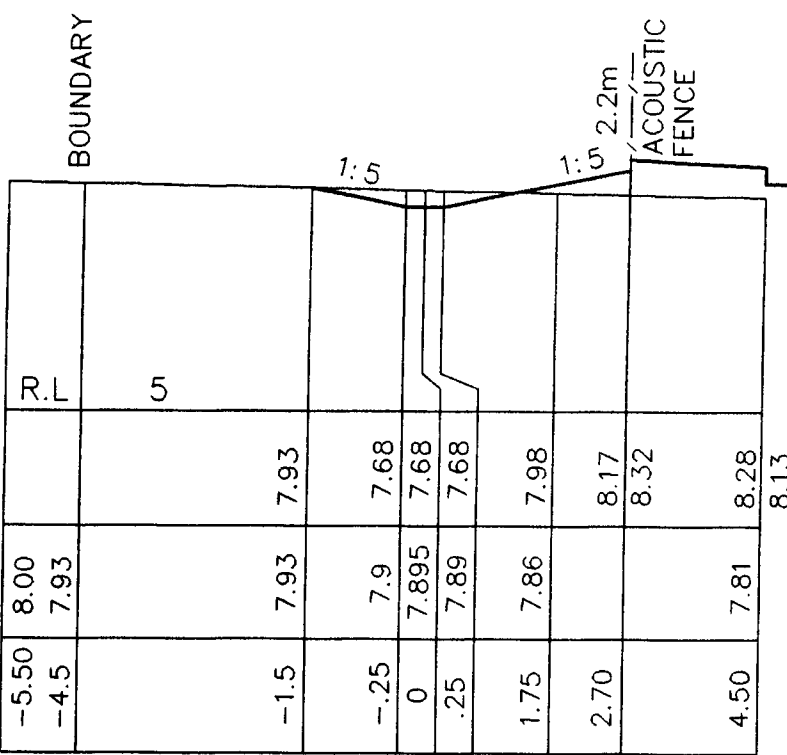
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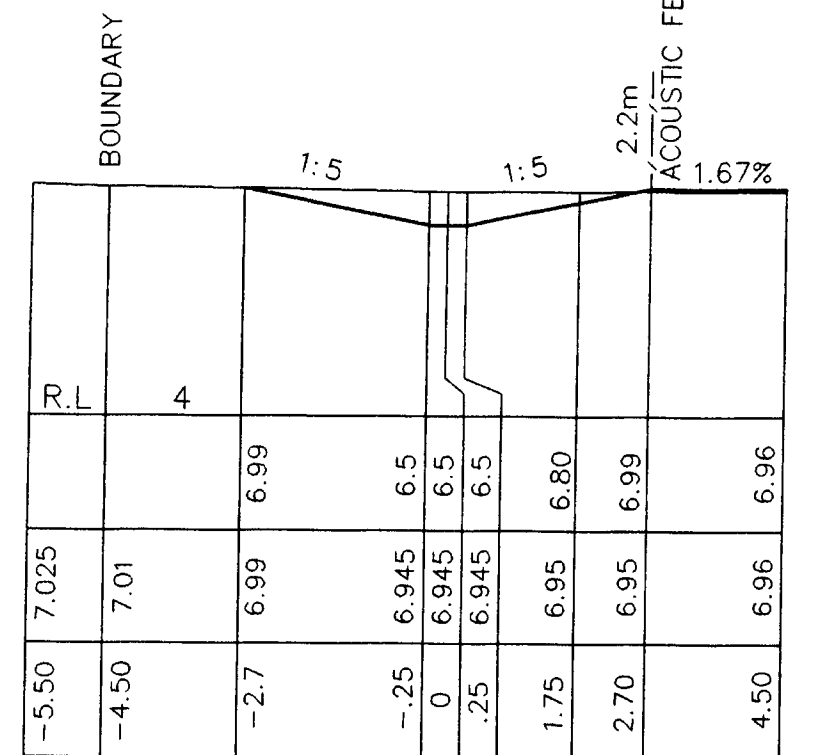
271.598
BEND



407.777

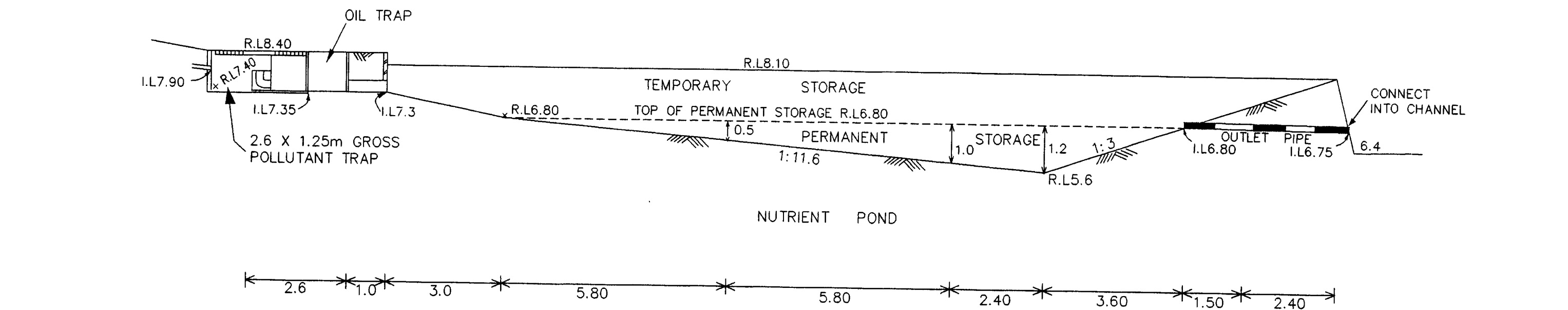


55



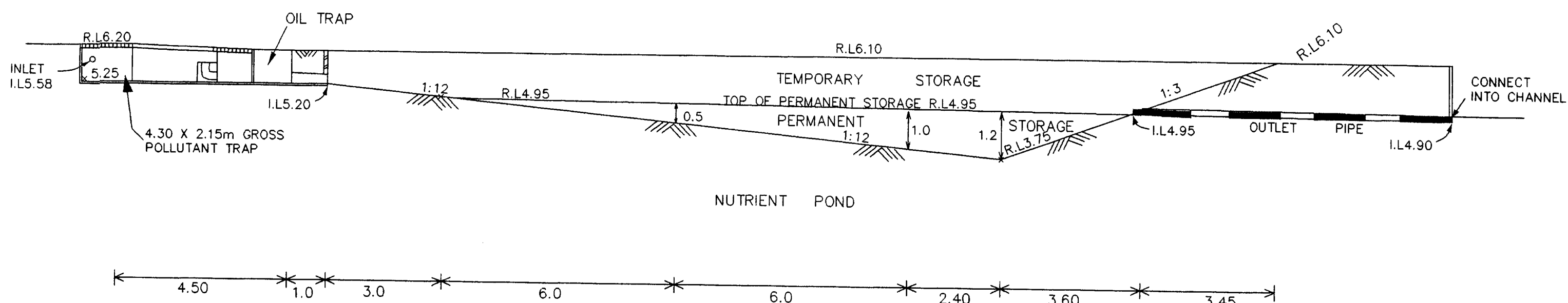
235

CROSS SECTIONS
1:100 NATURAL



GROSS POLLUTANT TRAP AND NUTRIENT POND (No1)

SECTION X - X



GROSS POLLUTANT TRAP AND NUTRIENT POND (No2)

SECTION Y - Y

THIS IS THE PLAN
REFERRED TO IN MY
LETTER
DATE 6-5-99
JOB REF: 23521
CAD REF: 23521

MLA

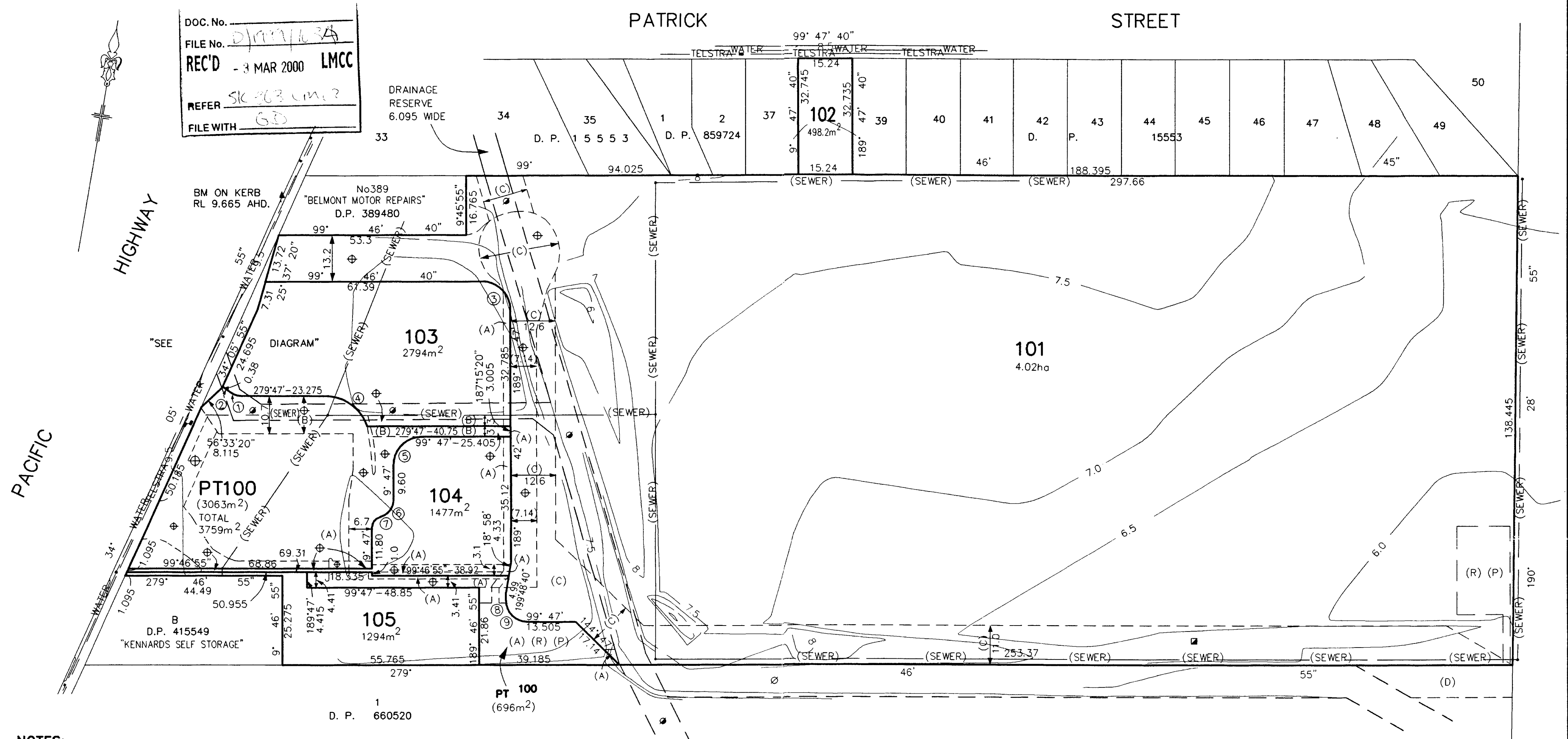
MICHAEL LOCKLEY & ASSOCIATES
CONSULTING SURVEYORS & PLANNERS
No.3 COWELL STREET
GLADESVILLE, 2111
P.O. BOX 400
P.H. 9879 6077
DX 554 SYDNEY

DATE: 6-5-99
R.R.: AS SHOWN
DATUM: A.H.D.
SITE AREA: 2
SHEET 7 OF 12 SHEETS

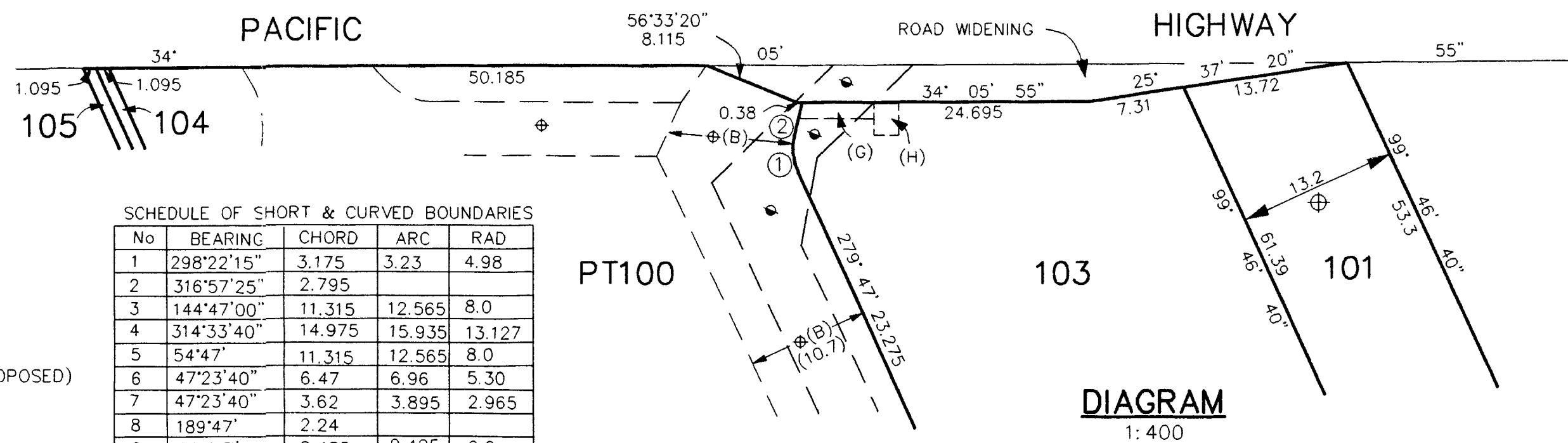
CLIENT: AUSTEXX DEVELOPMENTS PTY LTD
FLOWPATH LONGSECTION AND CROSS SECTIONS
GROSS POLLUTANT TRAP AND NUTRIENT POND DETAILS.
LGA: LAKE MACQUARIE

DATE: 20/01/00 AMENDMENT: REVISED SITE LAYOUT REF: 24225

REG'D SURV. NSW

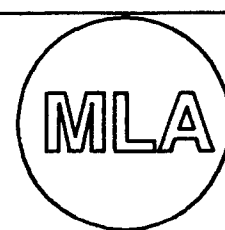


- NOTES:**
- 1) NO BOUNDARIES HAVE BEEN MARKED OR SURVEYED.
 - 2) ALL AREAS AND DIMENSIONS HAVE BEEN COMPILED FROM PLANS MADE AVAILABLE AT THE LAND TITLES OFFICE AND ARE SUBJECT TO FINAL SURVEY.
 - 3) ORIGIN OF LEVELS ON AHD IS TAKEN FROM PM 22771 RL 9.766
 - 4) CONTOUR INTERVAL 0.5 METRE.
 - 5) CONTOURS ARE INDICATIVE OF GROUND FORM ONLY. ONLY SPOT LEVELS SHOULD BE USED FOR CALCULATIONS OF QUANTITIES WITH CAUTION.
 - 6) EASEMENT TO DRAIN WATER 7.62, 6.09, & 3.05 WIDE & VARIABLE WIDTH VIDE TR K486923. (TO BE RELEASED THROUGH SUBJECT PROPERTY)
 - 7) EASEMENT TO DRAIN WATER 9.145 WIDE VIDE TR M376530.
 - 8) (A) EASEMENT TO DRAIN WATER 1 WIDE, 2 WIDE AND VARIABLE WIDTH (PROPOSED)
 - 9) (B) EASEMENT TO DRAIN WATER 3 WIDE, 10.7 WIDE AND VARIABLE WIDTH (PROPOSED)
 - 10) (C) EASEMENT TO DRAIN WATER 11 WIDE, 12.6 WIDE AND VARIABLE WIDTH (PROPOSED)
 - 11) (D) EASEMENT TO DRAIN WATER 9.15 WIDE AND VARIABLE WIDTH (PROPOSED IN LOT 1 IN D.P.660520)
 - 12) (E) RIGHT OF CARRIAGEWAY 1, 3, 3.1, 3.41, 4.41, 6.7, 7.14, 10.7 AND 13.2 WIDE AND VARIABLE WIDTH (PROPOSED)
 - 13) (F) EASEMENT FOR SERVICES 1, 3, 3.1, 3.41, 4.41, 6.7, 7.14, 10.7 AND 13.2 WIDE AND VARIABLE WIDTH (PROPOSED)
 - 14) (G) EASEMENT FOR ELECTRICITY CABLES 1 WIDE (PROPOSED)
 - 15) (H) EASEMENT FOR SIGNAGE AND ELECTRICITY CABLES 2 WIDE (PROPOSED)
 - 16) (P) POSITIVE COVENANT
 - 17) (R) RESTRICTION ON USE OF LAND



No	BEARING	CHORD	ARC	RAD
1	298°22'15"	3.175	3.23	4.98
2	316°57'25"	2.795		
3	144°47'00"	11.315	12.565	8.0
4	314°33'40"	14.975	15.935	13.127
5	54°47'	11.315	12.565	8.0
6	47°23'40"	6.47	6.96	5.30
7	47°23'40"	3.62	3.895	2.965
8	189°47'	2.24		
9	144°47'	8.485	9.425	6.0

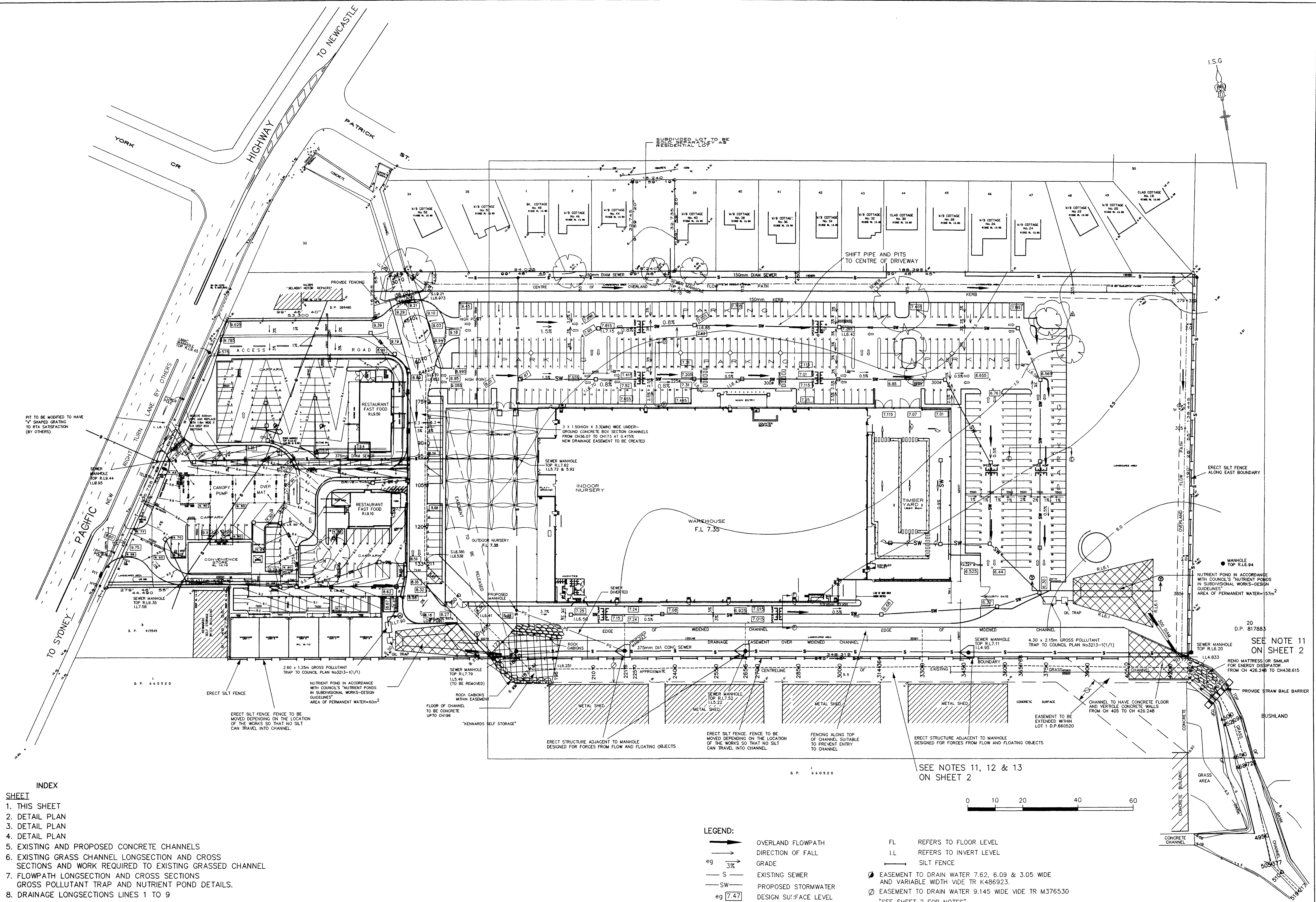
THIS IS THE PLAN
REFERRED TO IN MY
LETTER
DATE 10-2-00
JOB REF: 24227
CAD REF: 24227PS
REG'D SURV. NSW



MICHAEL LOCKLEY & ASSOCIATES
CONSULTING SURVEYORS & PLANNERS
No.3 COWELL STREET
GLADESVILLE, 2111
(P.O. BOX 400) P.H. 9879 6077 DX 554 SYDNEY

DATE: 10-2-00
R.R.: 1:800
DATUM: AHD
SITE AREA: AS SHOWN
SHEET 1 OF 1 SHEETS

CLIENT: AUSTEXX PTY LTD.
PLAN SHOWING PROPOSED SUBDIVISION OF LOTS 1 & 2
IN D.P. 534081 BEING No.397 PACIFIC HIGHWAY, BELMONT NORTH.
LGA: LAKE MACQUARIE



- INDEX
- SHEET
1. THIS SHEET
 2. DETAIL PLAN
 3. DETAIL PLAN
 4. DETAIL PLAN
 5. EXISTING AND PROPOSED CONCRETE CHANNELS
 6. EXISTING GRASS CHANNEL LONGSECTION AND CROSS SECTIONS AND WORK REQUIRED TO EXISTING GRASSED CHANNEL
 7. FLOWPATH LONGSECTION AND CROSS SECTIONS
 8. GROSS POLLUTANT TRAP AND NUTRIENT POND DETAILS.
 9. DRAINAGE LONGSECTIONS LINES 1 TO 9
 10. DRAINAGE LONGSECTIONS LINES 10 TO 14
 11. SOIL AND WATER MANAGEMENT DETAILS
 12. CATCHMENT PLAN

LEGEND:

- | | | | |
|---------|----------------------|----|--|
| → | OVERLAND FLOWPATH | FL | REFERS TO FLOOR LEVEL |
| → | DIRECTION OF FALL | IL | REFERS TO INVERT LEVEL |
| eg 3% | GRADE | — | SILT FENCE |
| —S— | EXISTING SEWER | ○ | EASEMENT TO DRAIN WATER 7.62, 6.09 & 3.05 WIDE AND VARIABLE WIDTH VIDE TR K486923. |
| —SW— | PROPOSED STORMWATER | ○ | EASEMENT TO DRAIN WATER 9.145 WIDE VIDE TR M376530 |
| eg 7.47 | DESIGN SURFACE LEVEL | | "SEE SHEET 2 FOR NOTES" |

THIS IS THE PLAN REFERRED TO IN MY LETTER DATE: 6-5-99 JOB REF: 23521 CAD REF: 23521 REC'D SURV. NSW	MLA CONSULTING SURVEYORS & PLANNERS No.3 COWELL STREET (P.O. BOX 400) GLADESVILLE, 2111 P.H. 9879 8077 DX 554 SYDNEY	DATE: 6-5-99 R.R.: 1:600 DATUM: A.H.D. SITE AREA: SHEET 1 OF 12 SHEETS	CLIENT: AUSTEXX DEVELOPMENTS PTY LTD STORMWATER DRAINAGE PLAN FOR PROPOSED DEVELOPMENT AT 397 PACIFIC HIGHWAY, BELMONT NORTH. OVERALL SITE PLAN LGA: LAKE MACQUARIE
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DATE: 20-1-2000 AMENDMENT: REVISED SITE LAYOUT REF: 24225

NOTES

1. ALL WORK SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE APPROVED PLANS AND CONTRACT PLANS FOR EACH SITE AND TO COUNCIL SPECIFICATIONS AND REQUIREMENTS.
2. ORIGIN OF LEVELS ON A.H.D IS TAKEN FROM PM 22771 R.L 9.766 A.H.D.
3. ALL LEVELS ARE TO BE TAKEN FROM ESTABLISHED BENCH MARKS.
4. MAKE SMOOTH JOINS WITH EXISTING FORMATIONS.
5. SERVICES HAVE BEEN PLOTTED FROM SURFACE INVESTIGATION AND FROM PLANS SUPPLIED BY SERVICE AUTHORITIES. LARGE TELSTRA CABLES AND LARGE AND SMALL WATERMAINS ARE LOCATED UNDERGROUND IN PACIFIC HIGHWAY ADJACENT TO THE SITE. THE CONTRACTOR IS TO ASCERTAIN THE EXACT POSITION AND LEVEL OF ALL SERVICES PRIOR TO COMMENCEMENT OF WORK AND ANY CONFLICT WITH THE DESIGN SHOULD BE NOTIFIED TO MICHAEL LOCKLEY & ASSOCIATES IMMEDIATELY.
6. SERVICES ARE TO BE ADJUSTED OR RELOCATED AS REQUIRED. ADJUSTMENTS TO SERVICES SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF THE RELEVANT AUTHORITIES.
7. ALL WORK SHALL BE UNDERTAKEN IN ACCORDANCE WITH ACCEPTABLE SAFETY STANDARDS AND APPROPRIATE SAFETY SIGNS ARE TO BE INSTALLED AT ALL TIMES DURING THE PROGRESS OF THE WORK. A SIGN MUST BE ERECTED IN A PROMINENT POSITION STATING THAT UNAUTHORISED ENTRY TO THE WORK SITE IS PROHIBITED AND SHOWING THE NAME OF THE PERSON IN CHARGE OF THE WORK SITE AND A TELEPHONE NUMBER AT WHICH THAT PERSON MAY BE CONTACTED OUTSIDE WORKING HOURS.
8. TRAFFIC MANAGEMENT MUST BE COMPLIANCE WITH AS 1742.3 1985 (TRAFFIC CONTROL DEVICES FOR WORKS ON ROADS AND RTA "TRAFFIC CONTROL AT WORK SITES").
9. SOIL AND WATER MANAGEMENT PRACTICES MUST BE EMPLOYED IN ACCORDANCE WITH THIS PLAN AND AS DIRECTED BY THE SITE SUPERINTENDENT.

BUNDING AREA UNDER CANOPY ONLY. FILLING AREA TO BE BUNDED TO PREVENT CONTAMINATION OF CLEAN RUNOFF. WATER FROM THIS AREA MUST BE DIRECTED TO AN OIL/GRIIT SEPARATOR (TO BE DESIGNED BY OTHERS) PRIOR TO DISCHARGE FROM SITE.

NO STORMWATER TO FLOW UNDER CANOPY MAT

10. THE AREA IS COVERED BY LAKE MACQUARIE CITY COUNCIL TREE PRESERVATION POLICY.

11. NO WORK WITHIN ADJOINING PROPERTIES AND EASEMENTS TO BE UNDERTAKEN WITHOUT WRITTEN PERMISSION FROM THE OWNERS OR RESPONSIBLE AUTHORITY AND AT LEAST 7 DAYS NOTICE OF INTENTION TO COMMENCE WORK MUST BE MADE.

12. WHERE EXCAVATION IS BELOW THE LEVEL OF THE BASE OF THE FOOTINGS OF A BUILDING ON AN ADJOINING ALLOTMENT OF LAND AND WITHIN 10 METRES OF THE BUILDING, THE OWNERS OF THE ADJOINING ALLOTMENT OF LAND MUST BE GIVEN AT LEAST 7 DAYS NOTICE OF INTENTION TO DO SO AND FURNISHED WITH PARTICULARS OF THE EXCAVATION WORK.

13. A DILAPIDATION REPORT MUST BE SUBMITTED TO THE SUPERINTENDENT AT LEAST 7 DAYS PRIOR TO INTENTION TO COMMENCE WORK. THE REPORT MUST INCLUDE DETAILS OF WORK TO BE DONE, METHOD OF CONSTRUCTION, METHODS OF SUPPORT, ETC.

14. CONSTRUCTION OF ALL MAJOR STRUCTURES TO BE SUPERVISED BY A PRACTISING QUALIFIED STRUCTURAL ENGINEER AND CERTIFIED UPON COMPLETION. COPIES OF REPORTS TO BE PROVIDED TO COUNCIL.

15. SUBSURFACE DRAINAGE IS TO BE PLACED UNDER KERB AND GUTTER AS DIRECTED BY THE ENGINEER SUPERVISING THE WORKS.

16. ALL KERB INLET PITS TO BE TO COUNCIL'S STANDARD.

17. ALL PITS OVER 1.2 METRES IN DEPTH ARE TO BE DESIGNED BY A STRUCTURAL ENGINEER AND CERTIFIED TO COUNCIL'S SATISFACTION.

18. PITS GREATER THAN 1.2 METRES DEEP TO HAVE STEP IRONS.

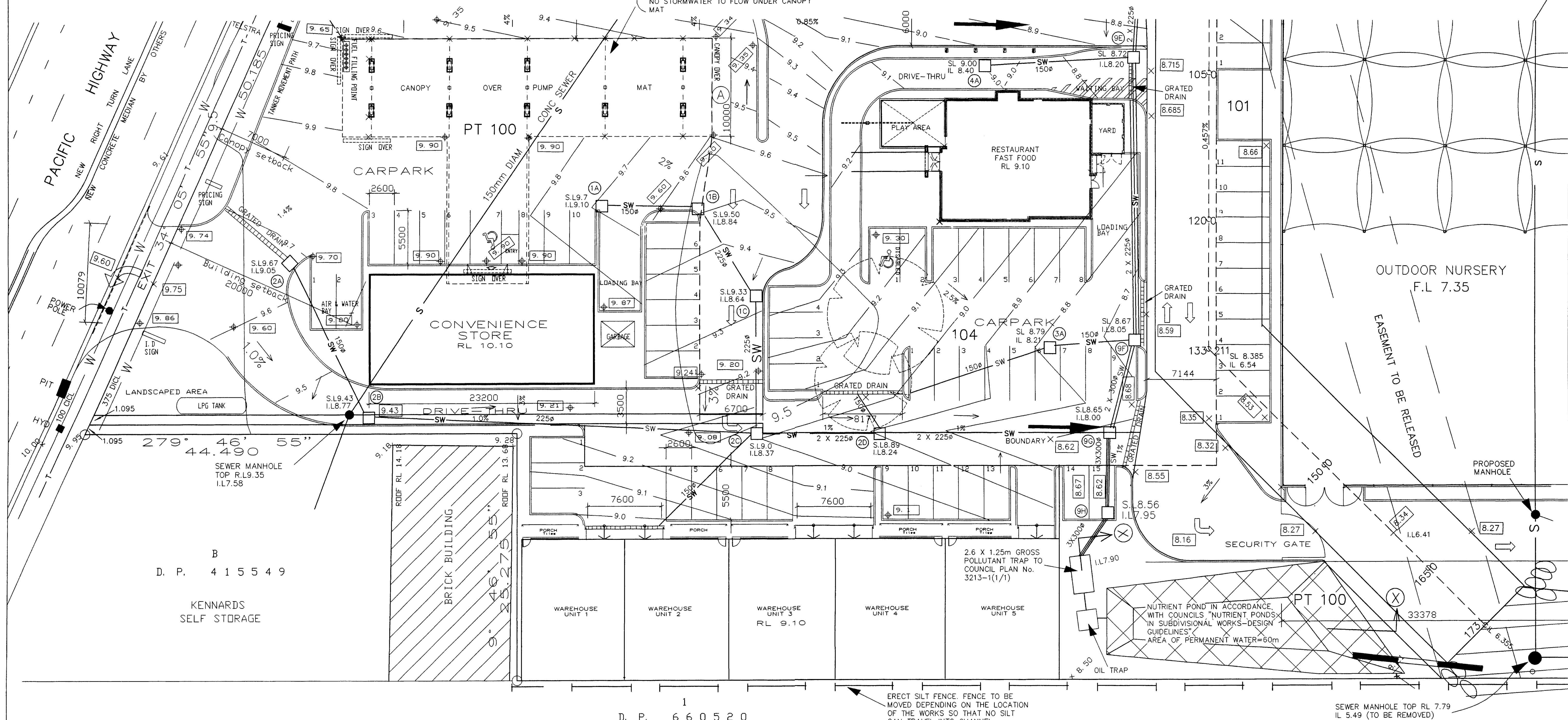
19. STORMWATER DRAINAGE PITS TO BE PRECAST CONCRETE COMPLETE WITH HEAVY DUTY COVERS OR GRATES TO SUIT INCLUDING PRECAST SURROUNDS.

20. STORMWATER DRAINAGE PIPES TO BE U.P.V.C SEWER QUALITY WITH SOLVENT WELDED JOINTS UNLESS NOTED OTHERWISE.

21. ALL ON-SITE CAR PARKING TO BE SUITABLY LINEMARKED TO THE SATISFACTION OF COUNCIL.

22. BOX GUTTERS : 600 X 150 d
DOWNPIPES : 120 X 120 galv

23. PAVEMENT:
PAVEMENT TO BE TO THE REQUIREMENTS OF THE CONTRACT PLAN FOR EACH SITE.



DATE: 20-1-2000 AMENDMENT: REVISED SITE LAYOUT REF:24225

THIS IS THE PLAN
REFERRED TO IN MY
LETTER
DATE: 6-5-99
JOB REF: 23521
CAD REF: 23521

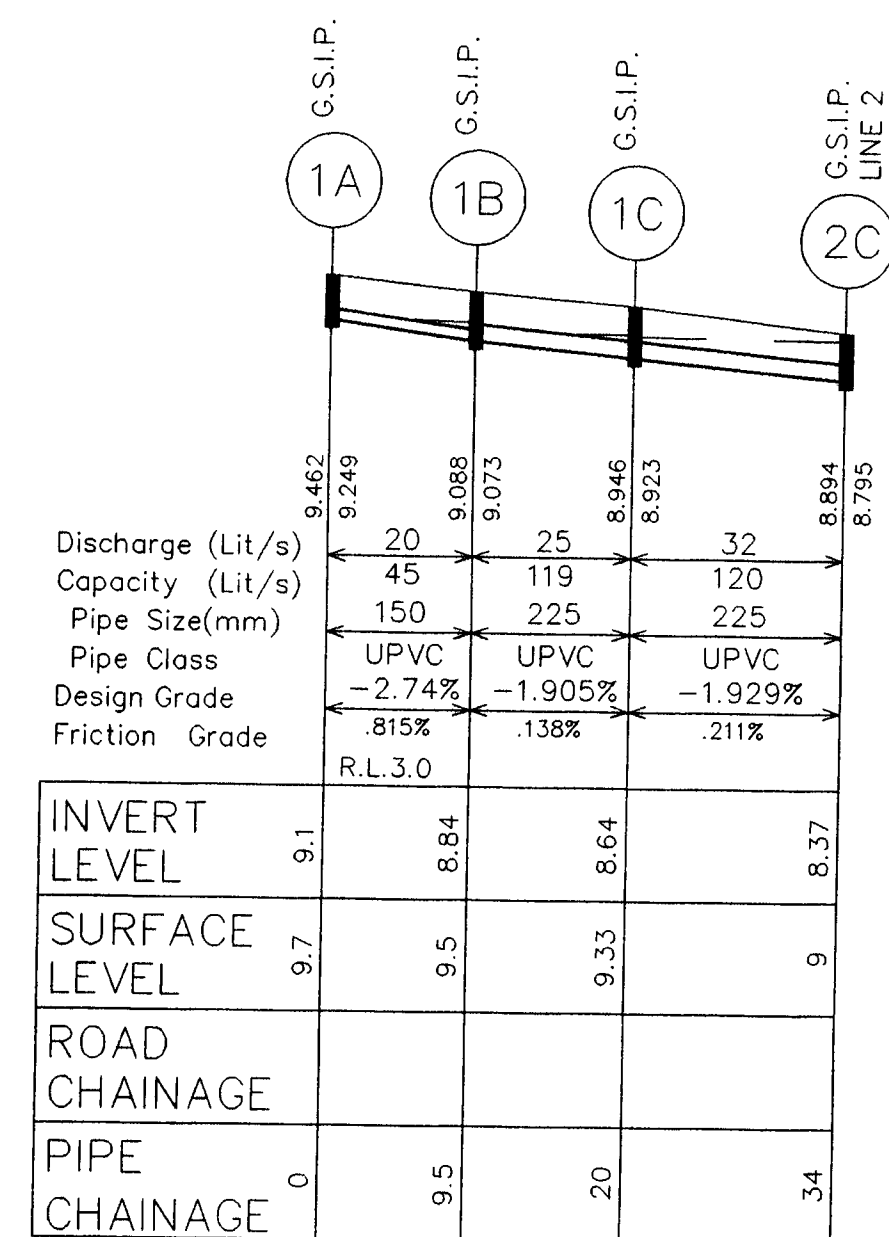
REG'D SURV. NSW



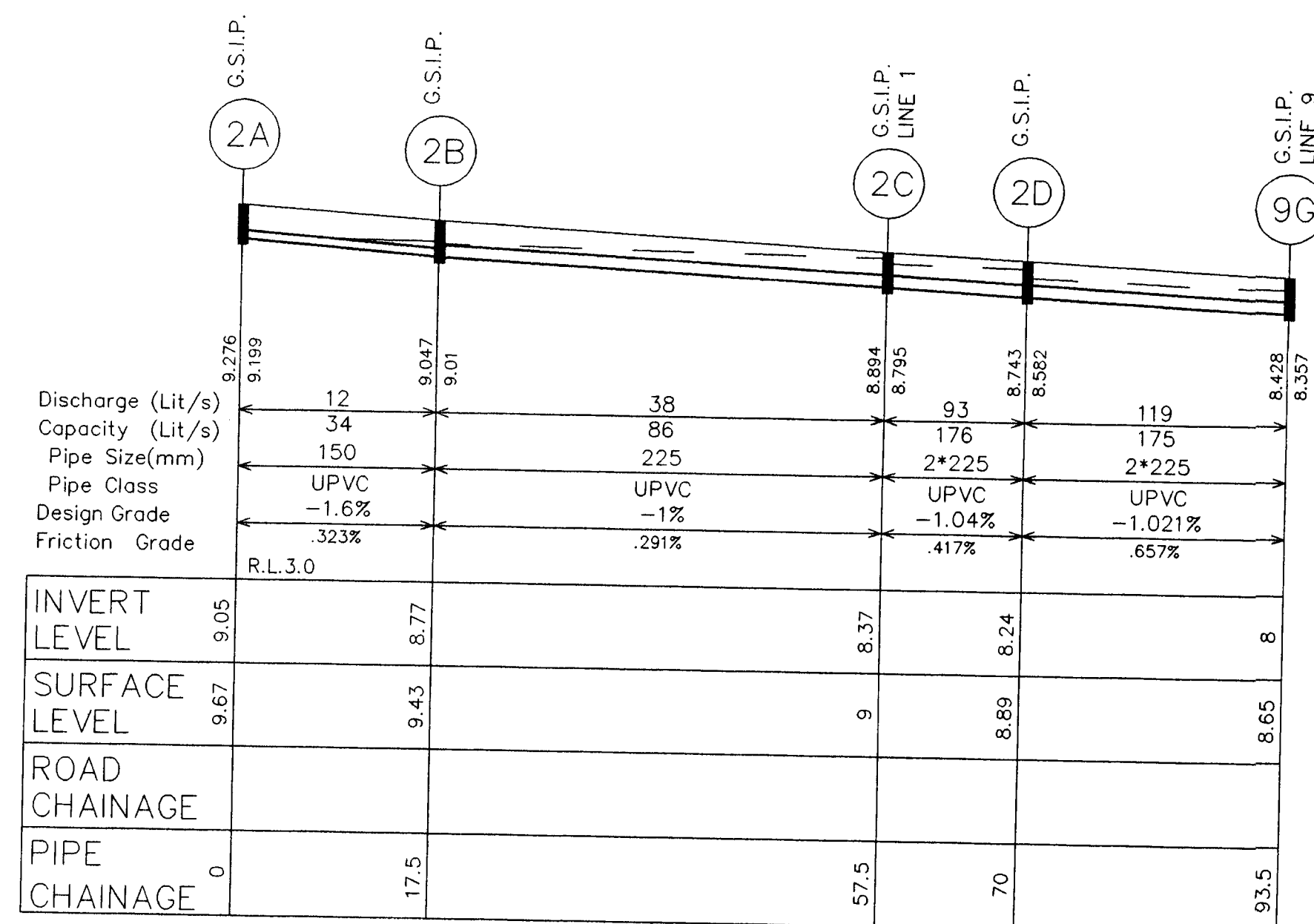
MICHAEL LOCKLEY & ASSOCIATES
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No.3 COWELL STREET
GLADESVILLE, 2111
P.O. BOX 400
P.H. 9879 6077
DX 554 SYDNEY

DATE: 6-5-99
R.R.: 1:200
DATUM: A.H.D
SITE AREA:
SHEET 2 OF 12 SHEETS

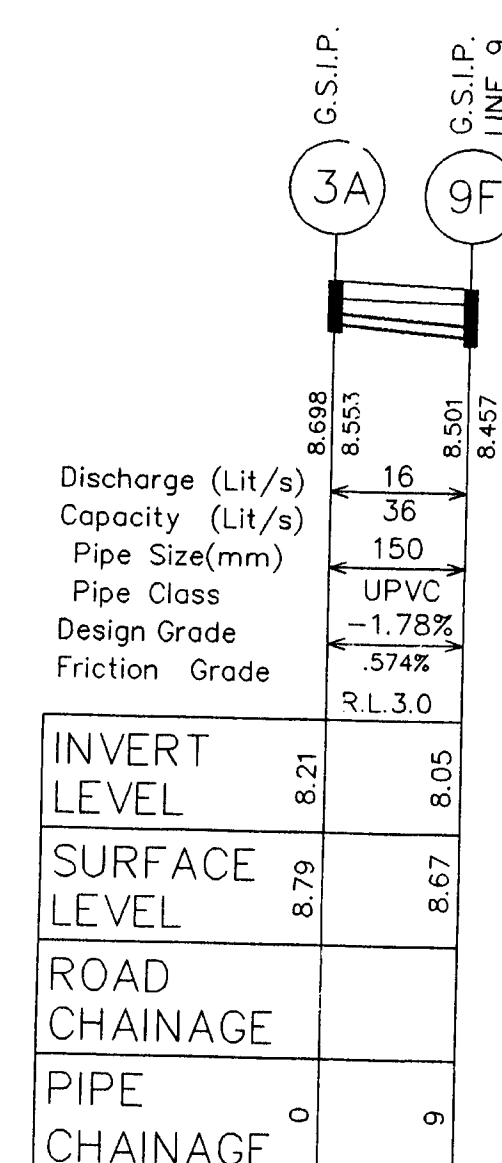
CLIENT: AUSTEXX DEVELOPMENTS PTY LTD
STORMWATER DRAINAGE PLAN FOR PROPOSED DEVELOPMENT
AT 397 PACIFIC HIGHWAY, BELMONT NORTH.
DETAIL PLAN
LGA: LAKE MACQUARIE



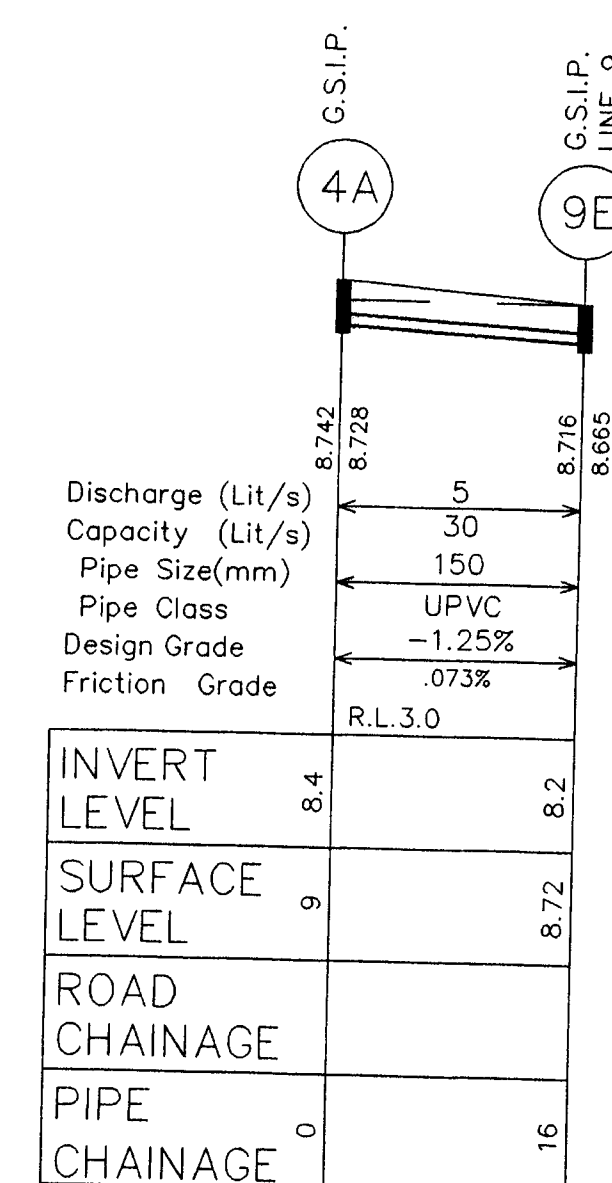
LINE.1



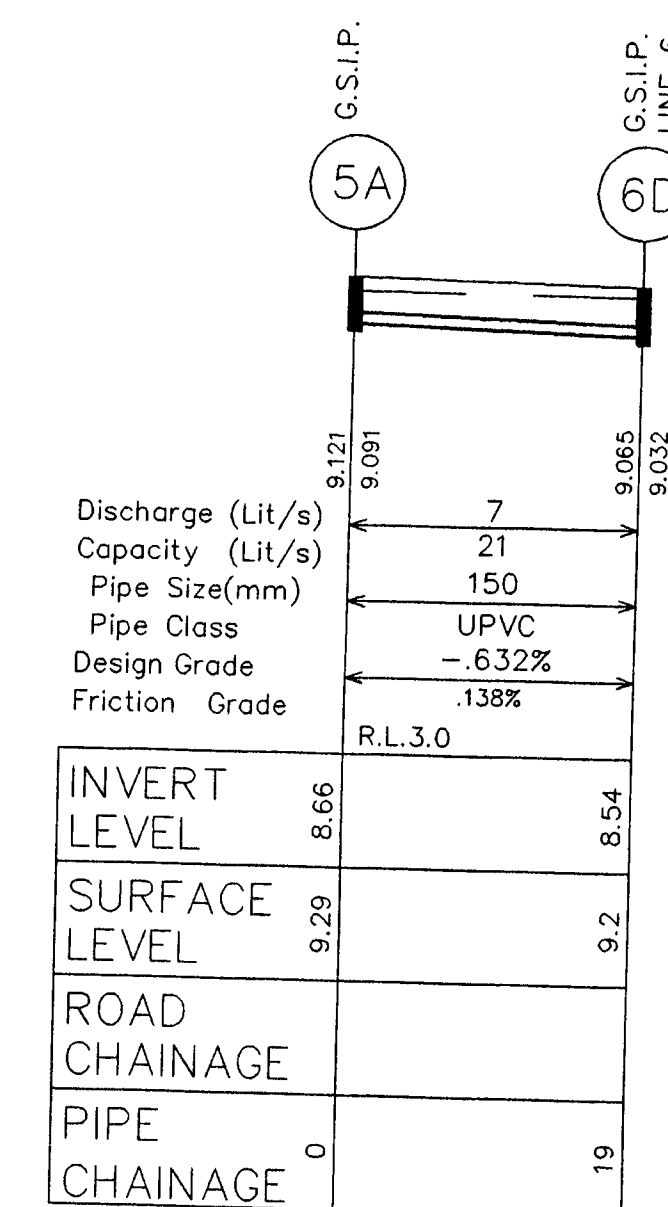
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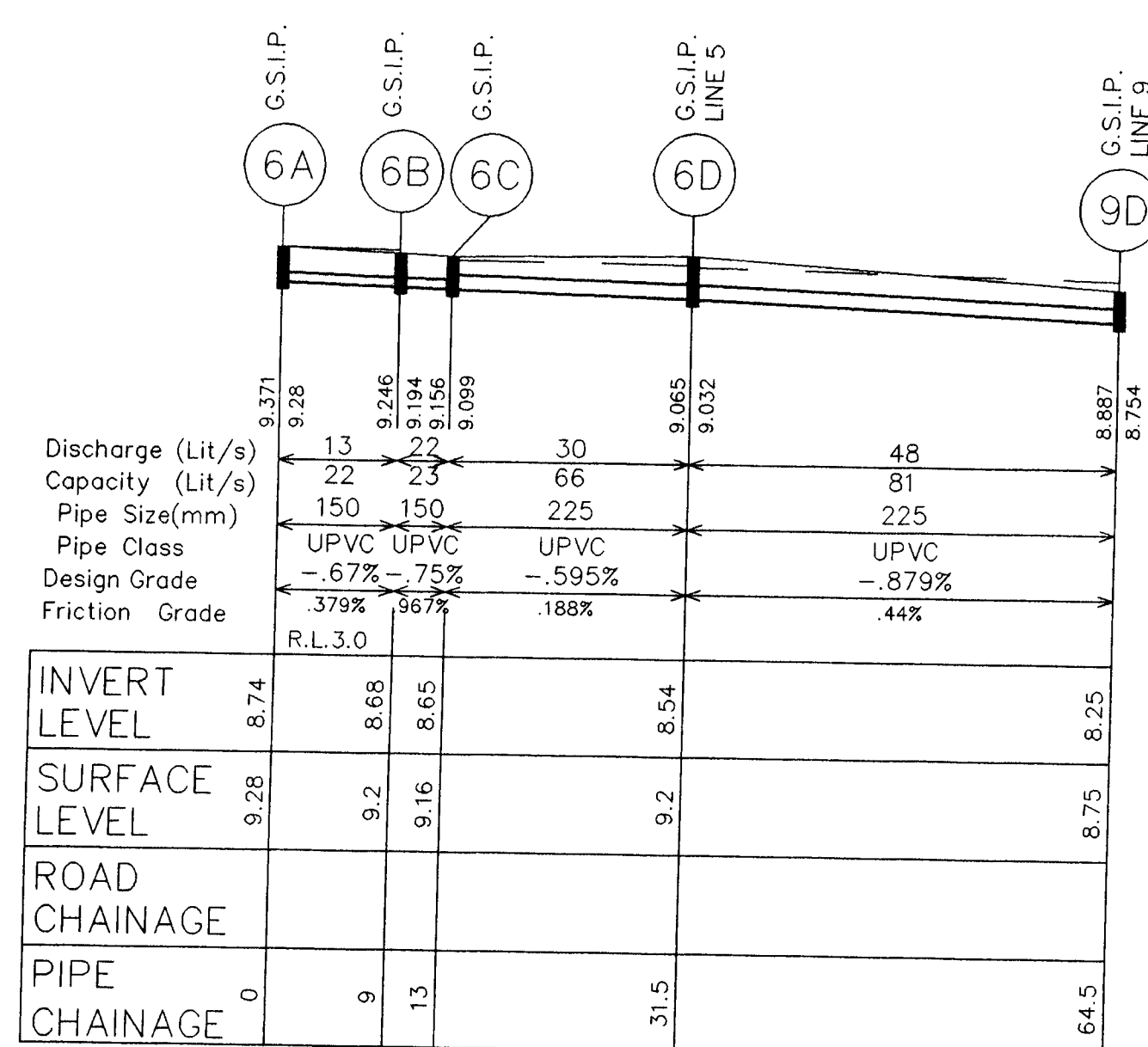
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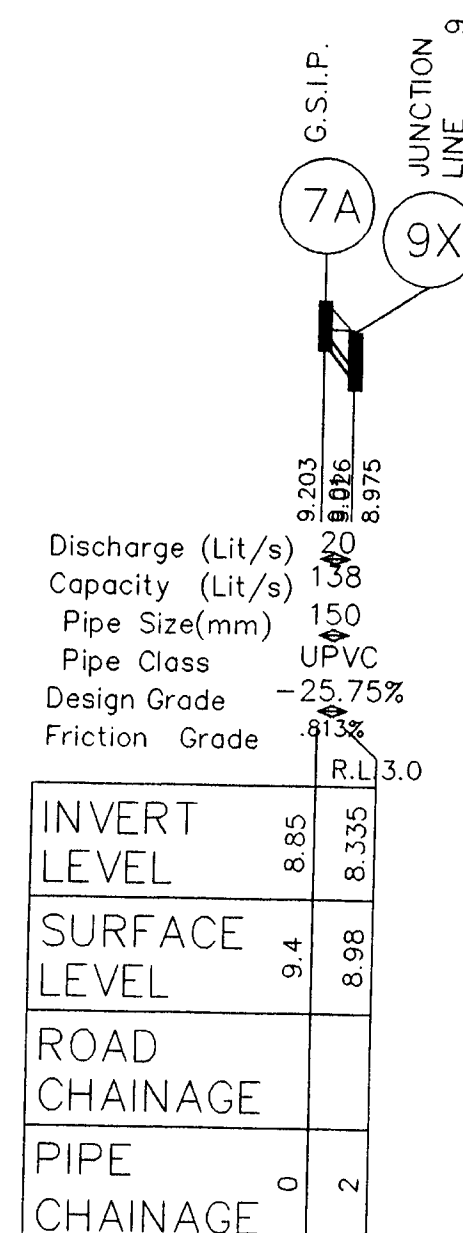
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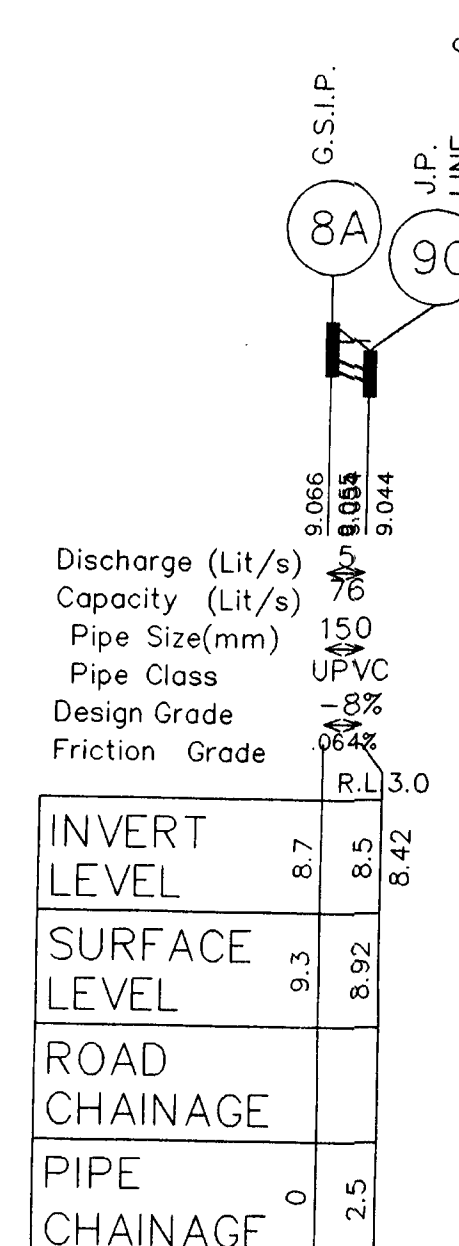
LINE.5



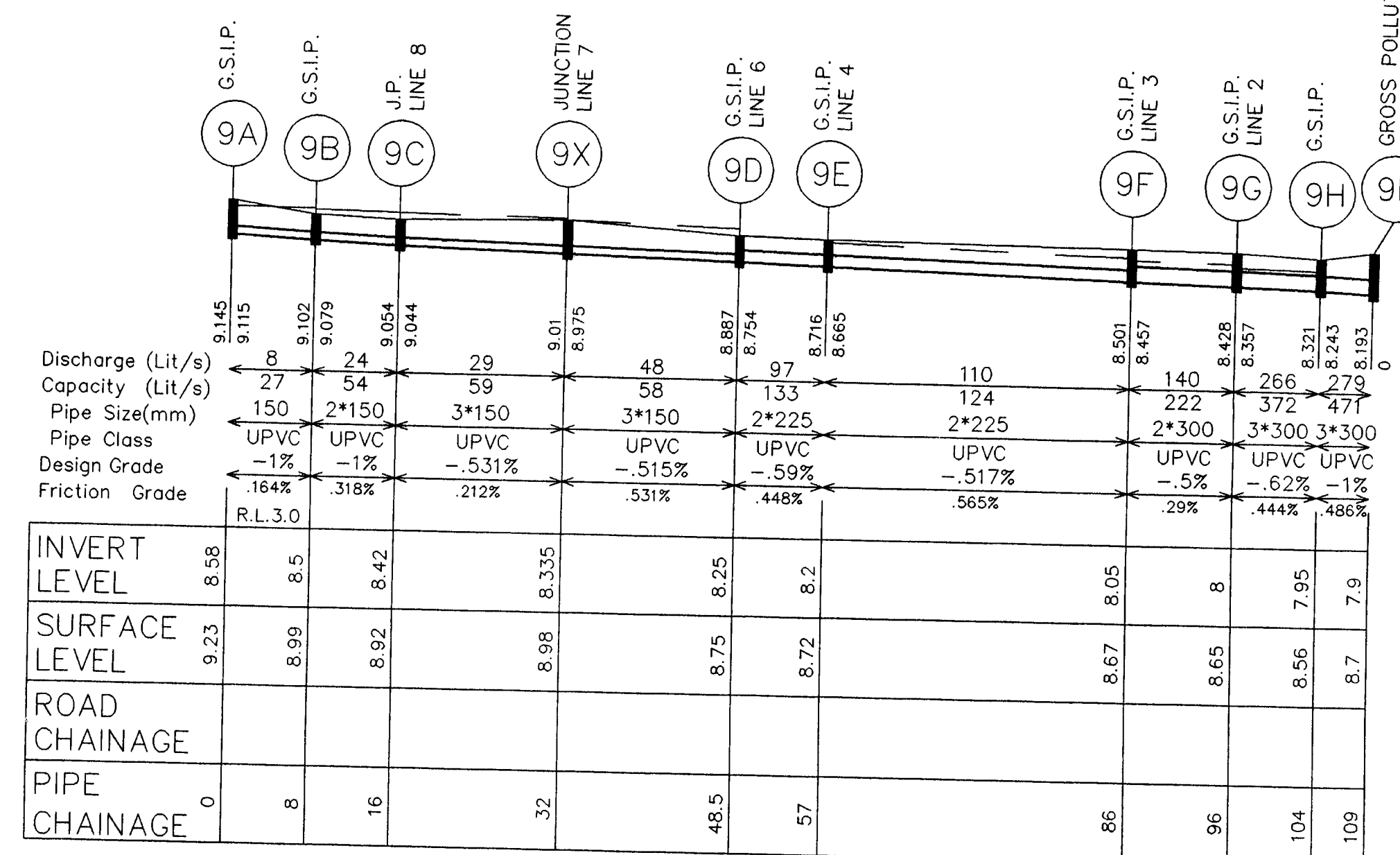
LINE.6



LINE.7



LINE.8



LINE.9

DRAINAGE LONG SECTIONS

VERT 1:100
HORIZ 1:500

UPVC DENOTES SEWER GRADE EXTRA HEAVY PVC PIPE
RCP DENOTES REINFORCED CONCRETE PIPE
G.S.I.P. DENOTES GRATED SURFACE INLET PIT
J.P. DENOTES JUNCTION PIT
NOTE: ALL PITS IN DRIVEWAYS TO HAVE HEAVY DUTY GRATE OR COVER
EG. 3 X 150 DENOTES THREE (3) 150mm DIAMETER PIPES

MINIMUM PIT SIZE DIMENSIONS

MINIMUM DIMENSIONS (mm)	PIT NUMBERS
450 X 450	1A 2A 3A 4A 5A 6A 6B 6C 7A 8A 9A 9B
600 X 600	1B 1C 2B 2C 6D 9C
900 X 600	2D 9D 9E 9F
1200 X 900	9G 9H

THIS IS THE PLAN REFERRED TO IN MY LETTER
DATE: 6-5-99
JOB REF: 23521
CAD REF: 23521
REC'D SURV. NSW

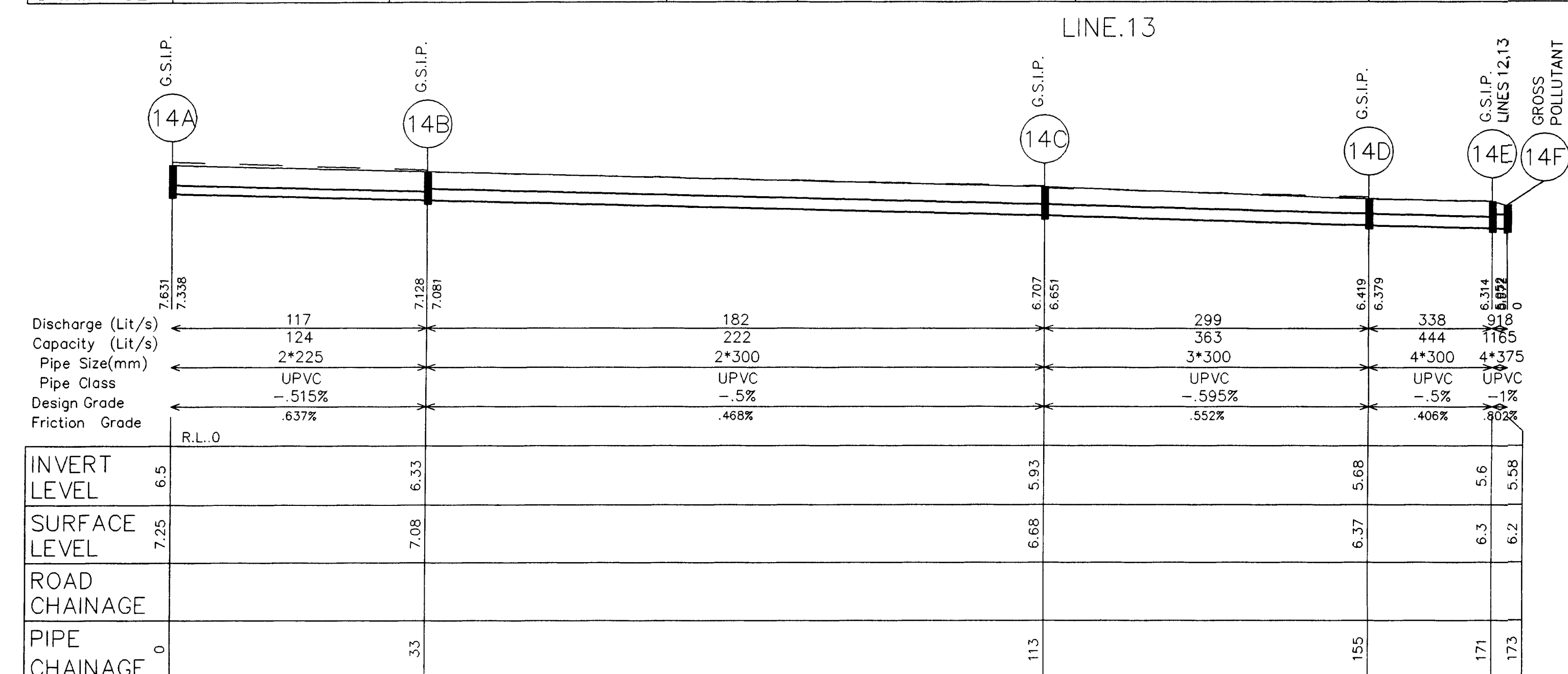
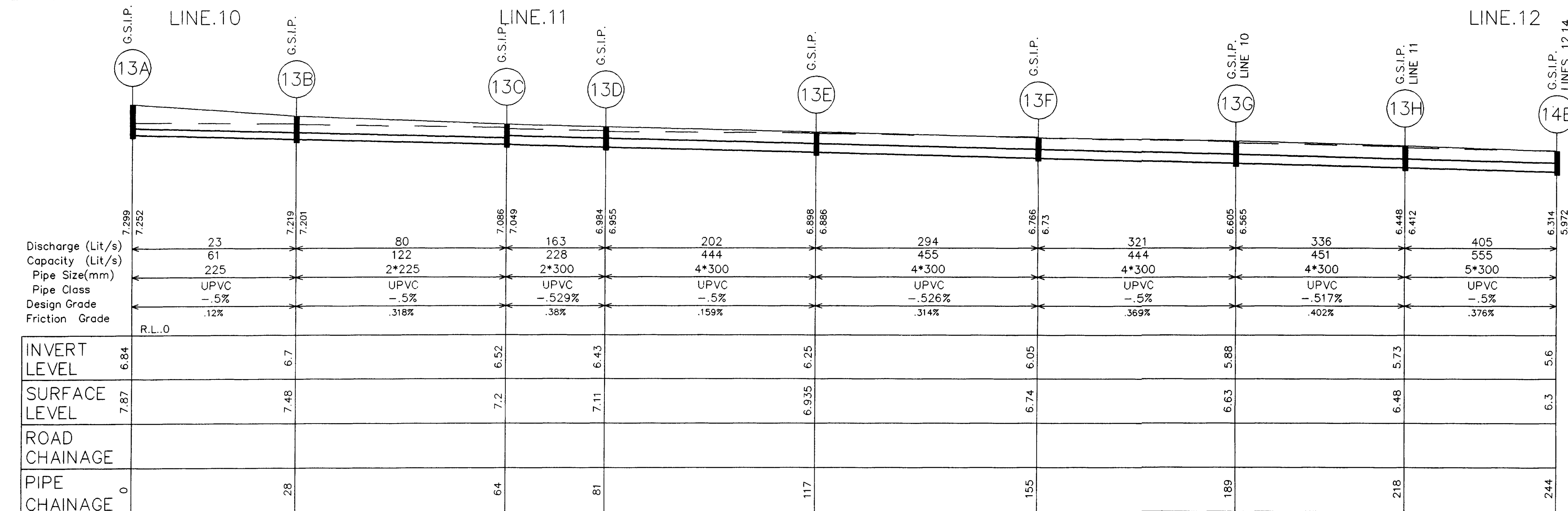
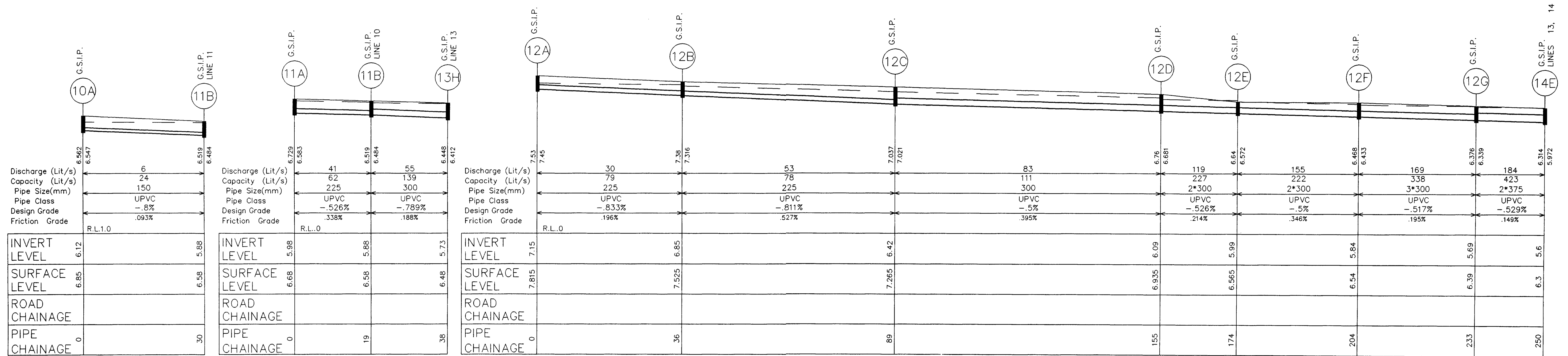


MICHAEL LOCKLEY & ASSOCIATES
CONSULTING SURVEYORS & PLANNERS
No.19 MASSEY STREET, GLADESVILLE 2111
P.O. BOX 400 GLADESVILLE, 1675
P.H. (02)9879 6077 FAX (02)9879 7143

DATE: 6-5-99
R.R.: N/A
DATUM: AHD
SITE AREA: N/A²
SHEET 8 OF 12 SHEETS

CLIENT: AUSTEXX DEVELOPMENTS PTY LTD
DRAINAGE LONG SECTIONS
LGA: LAKE MACQUARIE

DATE: 20/01/00 AMENDMENT: REVISED SITE LAYOUT REF:24225



UPVC DENOTES SEWER GRADE EXTRA HEAVY PVC PIPE
RCP DENOTES REINFORCED CONCRETE PIPE
G.S.I.P. DENOTES GRATED SURFACE INLET PIT
J.P. DENOTES JUNCTION PIT
NOTE: ALL PITS IN DRIVEWAYS TO HAVE HEAVY DUTY GRATE OR COVER
EG. 3 X 150 DENOTES THREE (3) 150mm DIAMTER PIPES

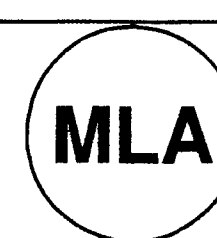
MINIMUM DIMENSIONS (mm)	PIT NUMBERS
600 X 600	10A 11A 11B 12A 12B 12C 13A 13B
900 X 600	12D 12E 13C 14A
1200 X 900	12F 12G 14B
1500 X 900	13D 13E 13F 13G 13H 14C 14D
2000 X 900	14E

DRAINAGE LONG SECTIONS

VERT 1:100
HORIZ 1:500

LINE.14

THIS IS THE PLAN REFERRED TO IN MY LETTER
DATE: 6-5-99
JOB REF: 23521
CAD REF: 23521
REG'D SURV. NSW



MICHAEL LOCKLEY & ASSOCIATES
CONSULTING SURVEYORS & PLANNERS
No.19 MASSEY STREET, GLADESVILLE 2111
P.O. BOX 400, GLADESVILLE, 1675
P.H. (02)9879 6077 FAX (02)9879 7143

DATE: 6-5-99	CLIENT: AUSTEXX DEVELOPMENTS PTY LTD
R.R.: AS SHOWN	DRAINAGE LONGSECTION LINES 10 TO 14
DATUM: AHD	
SITE AREA: N/A ²	
SHEET 9 OF 12 SHEETS	LGA: LAKE MACQUARIE

DATE: 20/01/00 AMENDMENT: REVISED SITE LAYOUT REF:24225

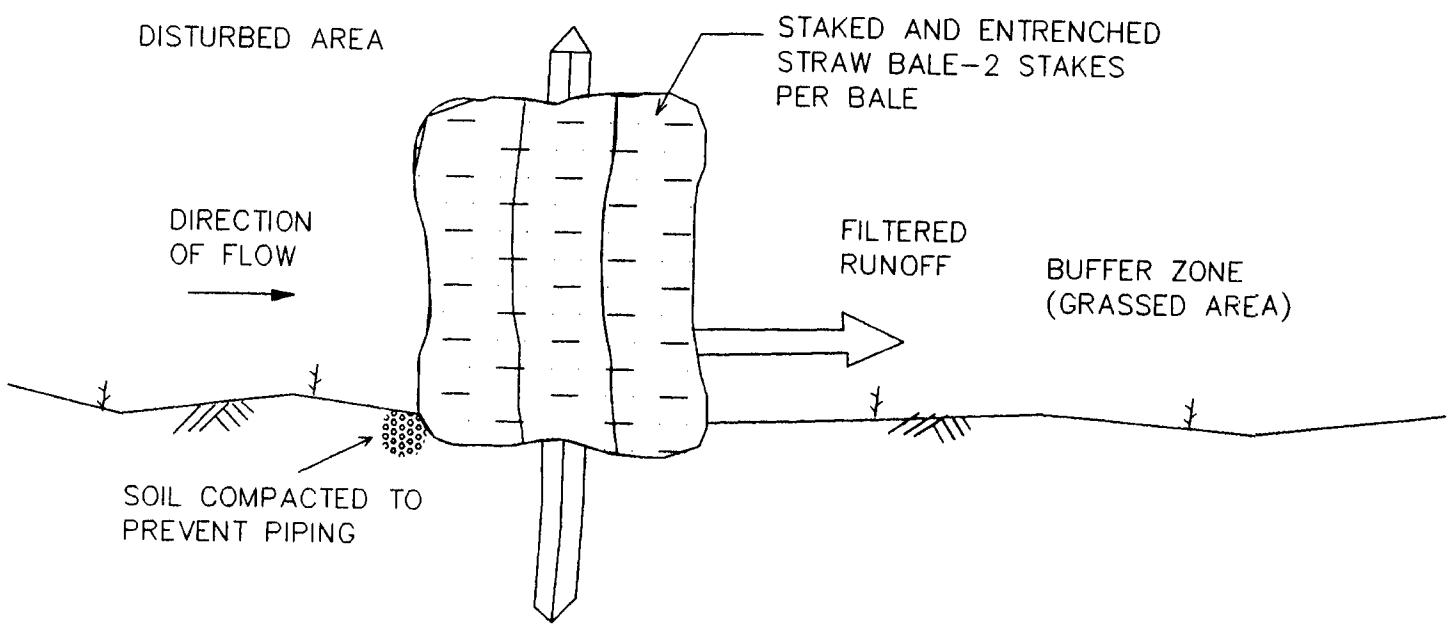
SOIL AND WATER MANAGEMENT

GENERAL NOTES

- 1 THIS PLAN IS TO BE READ IN CONJUNCTION WITH OTHER ENGINEERING PLANS AND ANY WRITTEN INSTRUCTIONS THAT MAY BE ISSUED
- 2 ALL SEDIMENT AND EROSION CONTROL DEVICES ARE TO BE INSTALLED AS SHOWN AND AS DIRECTED BY THE SITE SUPERVISOR. THEY ARE TO BE INSTALLED PRIOR TO COMMENCEMENT OF CONSTRUCTION, ARE TO BE EFFECTIVELY MAINTAINED IN GOOD WORKING ORDER AND ARE TO BE REMOVED ONLY AFTER THE AREA HAS BEEN SATISFACTORILY REHABILITATED
- 3 THE POSITION AND EXTENT OF SOIL AND WATER MANAGEMENT DEVICES AS SHOWN IS INDICATIVE ONLY AND THE FINAL LOCATIONS SHALL BE DECIDED ON SITE. VARIATIONS ARE PERMITTED IN ORDER TO BEST SUIT THE CIRCUMSTANCES
- 4 TOPSOIL FROM CONSTRUCTION AREAS IS TO BE STRIPPED AND STOCK-PILED FOR LATER REUSE IN SITE RESTORATION
- 5 ALL STOCKPILES OF ERODABLE MATERIAL ARE TO BE SURROUNDED BY STRAWBALES STAKED INTO THE GROUND
- 6 THE EXTENT OF CLEARING OF VEGETATION IS TO BE KEPT TO AN ABSOLUTE MINIMUM NECESSARY TO EFFECT THE WORKS
- 7 AREAS BEYOND WHICH DISTURBANCE WILL NOT BE PERMITTED SHALL BE SECURED WITH EXCLUSION FENCING
- 8 REVEGETATION MUST BE APPLIED TO ALL DISTURBED AREAS AS SOON AS PRACTICAL AFTER COMPLETION OF EARTHWORKS OR AS DIRECTED BY COUNCIL
- 9 ALL EXCAVATED TRENCH MATERIAL IS TO BE STOCKPILED ON THE UPHILL SIDE OF THE TRENCH
- 10 PROVIDE SEDIMENT BARRIERS (ie SANDBAGS OR STRAW BALES) UPSTREAM OF STORMWATER INLET PITS PRIOR TO THE ROAD SURFACE BEING PAVED AND THE LAND UPSLOPE BEING REHABILITATED. PROVIDE KERB INLET SEDIMENT TRAPS AROUND ALL KERB INLET PITS ON FORMED ROADS
- 11 THE CONSTRUCTION ACCESS MUST BE KEPT FREE OF DEBRIS AND SPOIL
- 12 CONFORMITY WITH THIS PLAN WILL IN NO WAY REDUCE THE RESPONSIBILITY OF THE CONTRACTOR TO PROTECT AGAINST WATER DAMAGE DURING THE COURSE OF CONSTRUCTION
- 13 PROVIDE A STRIP OF TURF BEHIND ALL KERBS ONCE CONSTRUCTED
- 14 REASONABLE STEPS ARE TO BE TAKEN TO ABATE ANY DUST NUISANCE CAUSED BY CONSTRUCTION. ALL HAUL ROADS AND CONSTRUCTION AREAS SHALL BE REGULARLY WATERED

STRAW BALE CONSTRUCTION DETAILS

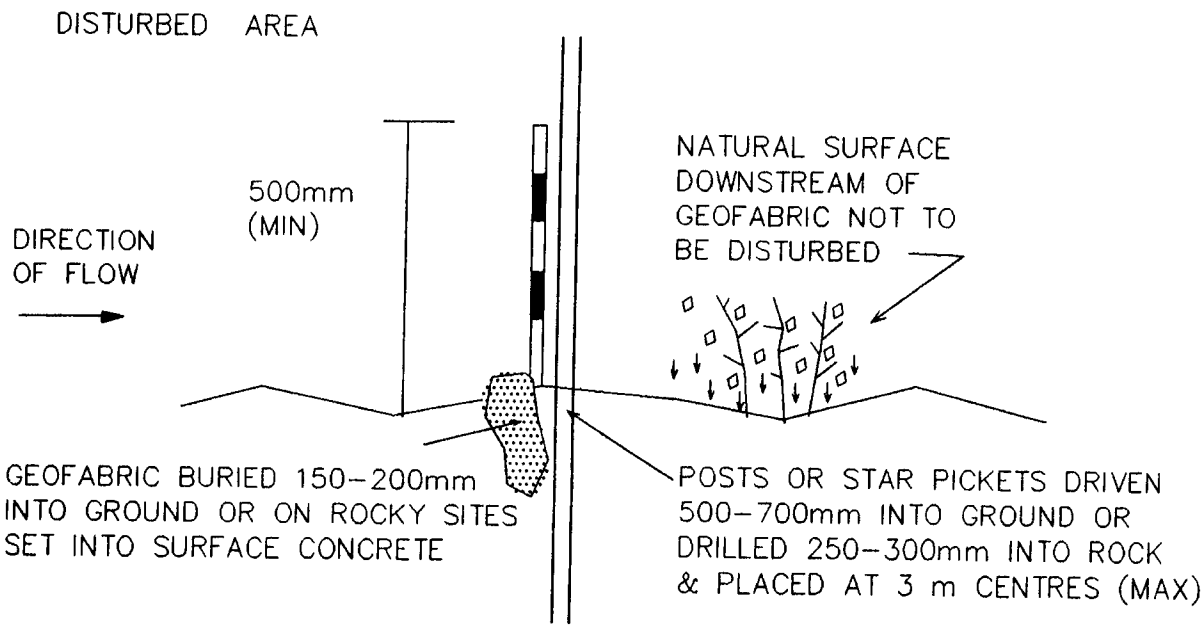
WHERE USED ENSURE THEY ARE:
BOUND WITH WIRE OR PLASTIC RATHER THAN TWINE
PLACED LENGTHWISE IN ROWS, SINGLE OR TWIN, WITH STRAWS PARALLEL TO THE GROUND SURFACE
EMBEDDED INTO THE SOIL TO A DEPTH ON THE UPSLOPE SIDE OF AT LEAST 0.1 METRES
ANCHORED SECURELY TO THE GROUND BY TWO STAKES OR PICKETS DRIVEN THROUGH THE CENTRE



NOTE:
SEE DETAIL PLANS AND SITE PLAN FOR LOCATION OF DEVICES

SILT FENCE CONSTRUCTION DETAILS

SILT FENCES ARE TO BE CONSTRUCTED AS FOLLOWS:
EXCAVATE A SMALL (150 TO 200 mm DEEP) TRENCH ALONG THE LINE OF THE FENCE, ENSURING ANY LOOSE SPOIL IS DEPOSITED ON THE UPSLOPE SIDE
INSTALL A PLAIN WIRE FENCE DOWNSLOPE OF THE TRENCH, WITH POSTS (OR STAR PICKETS) A MAXIMUM OF 2 METRES APART AND DRIVEN AT LEAST 500 TO 700 mm INTO THE GROUND
WHERE NECESSARY FOR ADDITIONAL FABRIC SUPPORT, STAPLE WIRE MESH TO THE FENCE
ATTACH GEOFABRIC TO THE FENCE ENSURING:
-THE BASE IS BURIED AT LEAST 200 mm IN THE GROUND ON THE UPSLOPE SIDE
-HEIGHT ABOVE THE GROUND LESS THAN 700 mm
-ANY JOINTS OVERLAP A MINIMUM 300 mm AND ARE EITHER SEWN OR SECURELY ATTACHED TO A POST (OR STAR PICKET), AND
-THE ENDS ARE SECURELY FASTENED TO A POST (OR STAR PICKET)
SUITABLE GEOFABRIC:
TYPAP 3207
TERRAM 500 NON-WOVEN (FELT)
BIDIM U14
PRO-PEX 4545
POLYWEAVE F - WOVEN



DATE: 20/01/00 AMENMENT: REVISED SITE LAYOUT REF:24225

THIS IS THE PLAN
REFERRED TO IN MY
LETTER
DATE: 6-5-99
JOB REF: 23521
CAD REF: 23521
REG'D SURV. NSW



MICHAEL LOCKLEY & ASSOCIATES
CONSULTING SURVEYORS & PLANNERS
No.3 COWELL STREET
GLADESVILLE, 2111
P.O. BOX 400
P.H. 9879 6077
DX 554 SYDNEY

DATE: 6-5-99	CLIENT: AUSTEXX DEVELOPMENTS PTY LTD
R.R.: AS SHOWN	SOIL & WATER MANAGEMENT DETAILS
DATUM: A.H.D	
SITE AREA: 2	
SHEET 10 OF 12 SHEETS	LGA: LAKE MACQUARIE

HYDROLOGICAL DESIGN SHEET

PIT	LAND USE	FLOW LENGTH	SLOPE	"n"	TIME	INTENSITY	FRACTION IMPERVIOUS	COEFF	AREA	C.A	SUM AREA	Q	BY PASS	TOTAL FLOW	GUTTER SLOPE	FLOW WIDTH	PIT TYPE	INTEL	INFLOW	BY FLOW	BY PIT	KINEMATIC MIN TIME 5 MAX TIME 20 LAKE MACQUARIE	REMARKS
1A	1	10	2	.011	.637	5	158 10Yr	-.950	.876	.006	.006	.006	3		3		4	3			1B		
1B	1	18	2	.011	.929	5	158 10Yr	-.950	.876	.013	.011	.011	5		5		4	5			1C		
1C	1	15	2	.011	.825	5	158 10Yr	-.950	.876	.018	.016	.016	7		7		4	7			2C		
2A	1	20	1	.011	1.247	5	158 10Yr	-.950	.876	.032	.028	.028	12		12		4	12			2B		
2B	1	25	1	.011	2.272	5	158 10Yr	-.950	.876	.023	.020	.020	11		11		4	11			2C		
2C	1	40	1	.011	1.982	5	158 10Yr	-.950	.876	.068	.058	.058	25		25		4	19	7		2D		
2D	1	15	3	.011	.725	5	158 10Yr	-.950	.876	.019	.017	.017	7	7	14		4	14			9G		
3A	1	28	2	.011	1.239	5	158 10Yr	-.950	.876	.044	.039	.039	17		17		4	17			9F		
4A	1	25	1	.011	1.446	5	158 10Yr	-.950	.876	.014	.012	.012	5		5		4	5			9E		
5A	1	16	2	.011	.860	5	158 10Yr	-.950	.876	.020	.018	.018	8		8		4	8			6D		
6A	1	23	2	.011	1.089	5	158 10Yr	-.950	.876	.035	.031	.031	13		13		4	13			6B		
6B	1	23	2	.011	1.089	5	158 10Yr	-.950	.876	.024	.021	.021	9		9		4	9			6C		
6C	1	23	2	.020	1.618	5	158 10Yr	-.950	.876	.020	.018	.018	8		8		4	8			6D		
6D	1	23	2	.011	1.089	5	158 10Yr	-.950	.876	.029	.025	.025	11		11		4	11			9D		
7A	1	9	1	.011	.743	5	158 10Yr	-.950	.876	.003	.003	.003	1		1		4	1			9D		
8A	1	19	1	.011	1.206	5	158 10Yr	-.950	.876	.013	.011	.011	5		5		4	5			9B		
9A	1	43	1	.011	2.081	5	158 10Yr	-.950	.876	.022	.019	.019	8		8		4	8			9B		
9B	1	50	1	.011	2.305	5	158 10Yr	-.950	.876	.042	.037	.037	16		16		4	16			9D		
9C						5	158 10Yr										5						
9X						5	158 10Yr										5						
9D	1	10	5	.011	.479	5	158 10Yr	-.950	.876	.005	.004	.004	2		2		4	2			9E		
9E	1	15	2	.011	.825	5	158 10Yr	-.950	.876	.006	.005	.005	2		2		4	2			9F		
9F	1	24	2	.011	1.119	5	158 10Yr	-.950	.876	.034	.030	.03	13		13		4	13			9G		
9G	1	25	1	.011	1.446	5	158 10Yr	-.950	.876	.030	.026	.026	12		12		4	12			9H		
9H	1	6	1	.011	.575	5	158 10Yr	-.950	.876	.003	.003	.003	1		1		4	1			9I		

HYDROLOGICAL DESIGN SHEET

PIT	LAND USE	FLOW LENGTH	SLOPE	"n"	TIME	INTENSITY	FRACTION IMPERVIOUS	COEFF	AREA	C.A	SUM AREA	Q	BY PASS	TOTAL FLOW	GUTTER SLOPE	FLOW WIDTH	PIT TYPE	INTEL	INFLOW	BY FLOW	BY PIT	KINEMATIC MIN TIME 5 MAX TIME 20 LAKE MACQUARIE	REMARKS
10A	1	20	1	.011	1.247	5	158 10Yr	-.950	.876	.016	.014	.014	6		6		4	6			11B		
11A	1	50	1	.011	2.305	5	158 10Yr	-.950	.876	.108	.095	.095	42		42		4	19	23		11B		
11B	1	30	1	.011	1.633	5	158 10Yr	-.950	.876	.024	.021	.021	9	23	32		4	19	13		13H		
12A	1	50	1	.011	2.305	5	158 10Yr	-.950	.876	.080	.070	.07	31		31		4	19	12		12B		
12B	1	36	.8	.011	1.990	5	158 10Yr	-.950	.876	.061	.053	.053	24	12	36		4	19	17		12C		
12C	1	53	.5	.011	3.037	5	158 10Yr	-.950	.876	.087	.076	.076	34	17	50		4	19	32		12D		
12D	1	65	.5	.011	3.494	5	158 10Yr	-.950	.876	.110	.096	.096	42	32	74		4	19	55		12E		
12E	1	35	.5	.011	2.289	5	158 10Yr	-.950	.876	.107	.094	.094	41	116	157		4	19	138		12F		
12F	1	27	.5	.011	1.921	5	158 10Yr	-.950	.876	.049	.043	.043	19	138	157		4	19	138		12G		
12G	1	30	.5	.011	2.062	5	158 10Yr	-.950	.876	.052	.046	.046	20	138	158		4	19	140		14E		
13A	1	24	5	.011	.832	5	158 10Yr	-.950	.876	.061	.053	.053	24		24		4	19	5		13B		
13B	1	28	1.5	.011	1.363	5	158 10Yr	-.950	.876	.070	.061	.061	27	5	32		4	19	13		13C		
13C	1	36	.8	.011	1.990	5	158 10Yr	-.950	.876	.090	.079	.079	35	13	48		4	19	29		13D		
13D	1	17	.5	.011	1.409	5	158 10Yr	-.950	.876	.043	.038	.038	17	29	45		4	19	27		13E		
13E	1	36	.5	.011	2.333	5	158 10Yr	-.950	.876	.090	.079	.079	35	27	61		4	19	43		13F		
13F	1	38	.5	.011	2.420	5	158 10Yr	-.950	.876	.095	.083	.083	37	43	79		4	19	60		12E		
13G	1	28	.5	.011	1.968	5	158 10Yr	-.950	.876	.061	.053	.053	24		24		4	19	5		13H		
13H	1	30	.5	.011	2.062	5	158 10Yr	-.950	.876	.070	.061	.061	27	18	45		4	19	26		14E		
14A	1	34	3.5	.011	1.171	5	158 10Yr	-.950	.876	.027	.024	.024	10		10		4	10			14B		
14B	1	33	.5	.011	2.199	5	158 10Yr	-.950	.876	.023	.020	.02	9		9		4	9			14C		
14C	1	80	.5	.011	4.035	5	158 10Yr	-.950	.876	.056	.049	.049	22		22		4	19	3		14D		
14D	1	42	.5	.011	2.591	5	158 10Yr	-.950	.876	.127	.111	.111	49	3	52		4	19	33		14E		
14E	1	23	.5	.011	1.724	5	158 10Yr	-.950	.876	.051	.045	.045	20	199	219		4	19	200		14F		

HYDRAULIC DESIGN SHEET

PIT	TIME	INTENSITY	AREAS	FLOW	LENGTH	DIAMETER	GRADE	H.C.L.GRADE	VEL Q/A	K	HEAD LOSS	VEL CAP	PIPE VEL	PIPE CAP	PIPE TIME	C.W = .0000 MAX TIME = 20 LAKE MACQUARIE BY PASS=Q AREA=SUM.CA REMARKS
	min	mm/hr	ha	L/s	m	mm	%	%	m/s		m	m/s	m/s	L/s	min	
LINE 1 1A-1B	5	158 10Yr	.047 X.041	21	9.5	149	2.737	.815	1.179	3	.213	2.582	2.52	45	.06	
1B-1C	5.1	157 10Yr	.058	25	10.5	233	1.905	.138	.597	.8	.015	2.808	2.22	120	.08	
1C-2C	5.1	156 10Yr	.074	32	14	233	1.929	.211	.755	.8	.023	2.825	2.39	120	.1	
LINE 2 2A-2B	5	158 10Yr	.028	12	17.5	149	1.6	.323	.708	3	.077	1.974	1.81	34	.16	
2B-2C	5.2	156 10Yr	.088 X.035	38	40	233	1	.291	.9	.9	.037	2.034	1.97	87	.34	
2C-2D	5.5	153 10Yr	.22	94	12.5	233 X2	1.04	.417	1.097	1.6	.098	2.075	2.1	177	.1	
2D-9G	5.6	152 10Yr	.283 X.047	120	23.5	233 X2	1.021	.657	1.405	1.6	.161	2.056	2.21	175	.18	
LINE 3 3A-9F	5	158 10Yr	.039	17	9	149	1.778	.574	.973	3	.145	2.081	2.04	36	.07	
LINE 4 4A-9E	5	158 10Yr	.012	5	16	149	1.25	.073	.31	3	.015	1.745	1.31	30	.2	
LINE 5 5A-6D	5	158 10Yr	.018	8	19	149	.632	.138	.442	3	.03	1.24	1.13	22	.28	
LINE 6 6A-6B	5	158 10Yr	.031	13	9	149	.667	.379	.774	3	.092	1.274	1.33	22	.11	
6B-6C	5.1	157 10Yr	.052	23	4	149	.75	.967	1.295	.6	.051	1.352	1.53	24	.04	
6C-6D	5.2	156 10Yr	.069	30	18.5	233	.595	.188	.707	2.2	.056	1.569	1.52	67	.2	
6D-9D	5.4	154 10Yr	.112	48	33	233	.879	.44	1.13	.5	.033	1.907	1.98	81	.28	
LINE 7 7A-9X	5	158 10Yr	.047 X.044	21	2	149	25.75	.813	1.177	2.5	.177	7.919	5.68	138	.01	
LINE 8 8A-9C	5	158 10Yr	.011	5	2.5	149	8	.064	.288	2.5	.011	4.414	2.49	77	.02	
LINE 9 9A-9B	5	158 10Yr	.019	8	8	149	1	.164	.487	2.5	.03	1.561	1.37	27	.1	
9B-9C	5.1	157 10Yr	.056	25	8	149 X2	1	.318	.703	.9	.023	1.561	1.52	54	.09	
9C-9X	5.2	156 10Yr	.067	29	16	149 X3	.531	.212	.561	.6	.01	1.137	1.13	60	.24	
9X-9D	5.4	153 10Yr	.114	49	16.5	149 X3	.515	.531	.933	.8	.036	1.12	1.25	59	.22	
9D-9E	5.6	151 10Yr	.231	97	8.5	233 X2	.588	.448	1.14	2	.133	1.56	1.7	133	.08	
9E-9F	5.7	151 10Yr	.263 X.015	110	29	233 X2	.517	.565	1.294	.6	.051	1.463	1.65	125	.29	
9F-9G	6	148 10Yr	.341 X.01	141	10	293 X2	.5	.29	1.043	.8	.044	1.647	1.74	222	.1	
9G-9H	6.1	147 10Yr	.651	267	8	293 X3	.625	.444	1.318	.8	.071	1.841	2	372	.07	
9H-9I	6.2	146 10Yr	.686 X.032	280	5	293 X3	1	.486	1.383	.8	.078	2.329	2.42	471	.03	

APPENDIX D

COUNCIL FLOOD CERTIFICATE

Ref: 1352, Dated: 19 December 2018

19 December 2018

Maria Sereti
c/- COSTIN ROE CONSULTING PTY LTD
Level 1, 8 Windmill St
WALSH BAY NSW 2000


Our Ref: 1352
Your Ref:
ABN 81 065 027 868

FLOOD CERTIFICATE

Fee Paid: 520.00
Receipt No: 10157920

DESCRIPTION OF LAND

Address: Bunnings Hardware, 393 Pacific Highway, BELMONT
NORTH NSW 2280
Lot Details: Lot 101 DP 1021186
County: Northumberland



G D Jones
Senior Sustainability Officer (Natural Disaster Management)

For: MORVEN CAMERON
CHIEF EXECUTIVE OFFICER

The following information is provided from the records of the Council pursuant to the Local Government Act 1993 in response to your request for details relating to affectation of the above land by flooding.

Levels shown are in metres on Australian Height Datum (AHD). Refer to attached Flood Information Sheet attached for information on the AHD.

Likelihood of land being flooded

The likelihood of the land and buildings thereon being flooded can be assessed from the following information:-

1. Highest observed flood over or adjacent to the land:

Not applicable

NOTE: Applicants are advised that where highest observed historic flood levels are stated, this data may not have been observed by Council, but may be the result of local information and, therefore applicants may consider it advisable to carry out their own investigations.

2. Information derived from Flood Study (where available):

Note: Site development was controlled by an approved Stormwater Management Plan for the site via development application consent No. 1634/1999

Council Reference: Old TCS/Legacy Document TCS1722612 D 99/1634 Prop Subdivision & Site Fill & Drainage Plans Psrt 2 - 23/02/2000

1 in 100 year probable flood level ...	See above
--	-----------

1 in 20 year probable flood level ...	N/A
---------------------------------------	-----

Probable Maximum Flood level (PMF)	N/A
------------------------------------	-----

3. Existing ground levels at site:

See Detail Survey Plan on page 7 below.

4. Existing Bunnings Warehouse building floor level: ... 7.56m AHD

5. Existing Garden Centre floor level: ... 7.47m AHD

Flood Planning Levels

Flood Planning Levels and floor height requirements in areas affected by flooding (Council resolution dated 20 August, 1984) excluding those properties shown affected in the *Lake Macquarie Waterway Flood Study and Flood Risk Management Study and Plan (June 2012)*.

Development Type (including extensions)	Minimum Height Requirements
Dwellings	
Habitable rooms	1 in 100 year probable flood level plus 500mm freeboard or 500mm above the highest observed flood level if no probable flood level is available.
Non-habitable rooms and garages	1 in 20 year probable flood level or at the highest observed flood level if no probable flood level is available.
Carports, boat sheds, garden sheds, and other ancillary structures (excluding garages)	No requirement.
Unsealed electrical installations	1 in 100 year probable flood level plus 500mm freeboard or 500mm above the highest observed flood level if no probable flood level is available.
Medium and High Density residential development	
Habitable rooms	1 in 100 year probable flood level plus 500mm freeboard or 500mm above the highest observed flood level if no probable flood level is available.
Non-habitable rooms and garages	1 in 20 year probable flood level or at the highest observed flood level if no probable flood level is available.
Carports, boat sheds, garden sheds, and other ancillary structures (excluding garages)	No requirement.
Basement car parking	Constructed to preclude entry of floodwater at levels up to the 1 in 100 year probable flood level plus 500mm freeboard. Additional requirement for basement levels to implement a failsafe means of evacuation, and a pump-out system to remove floodwaters.
Unsealed electrical installations	1 in 100 year probable flood level plus 500mm freeboard or 500mm above the highest observed flood level if no probable flood level is available.

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Development Type (including extensions)	Minimum Height Requirements
Sensitive Uses (Residential care facilities, hospitals, etc.)	
Internal floor height	Probable maximum flood level.
Unsealed electrical installations	Probable maximum flood level.

6. Applications for approval of/consent to major additions, or relocation of existing buildings, will be required to observe the relevant floor height (Flood Planning Level) adopted by Council at the time the development proposal is considered by Council.

Applications for minor additions or alterations to existing development will be assessed on the merits of the situation, having regard to meeting an acceptable level of risk of flood damage.

7. Filling

Filling the subject land would require Council's consent.

Filling of flood affected land may have an impact on the nature and extent of flooding downstream or on neighbouring land and generally is not favoured as a planning response on flood prone land.

Any use of fill associated with development must not substantially impede flow of floodwaters and must not contribute to flooding or ponding of water on any other property.

8. Exempt and complying development in the Flood Planning Area

Development on a flood control lot would need to comply with conditions as defined in SEPP (Exempt and Complying Development) 2008.

9. Other development conditions and approvals

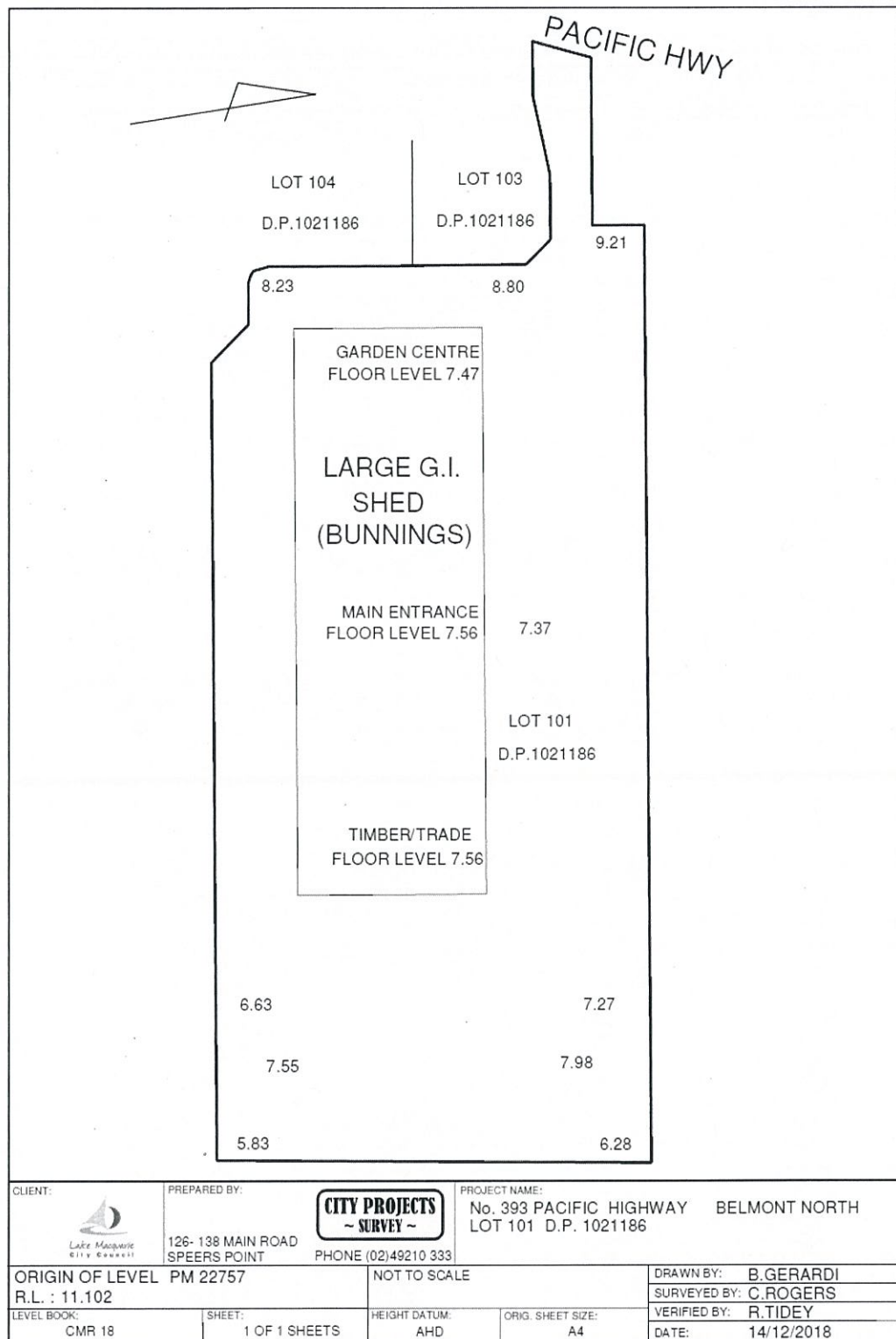
Development approval/consent for this property is dependent on a range of issues, including compliance with all relevant provisions of Lake Macquarie Local Environmental Plan 2014 (LMLEP 2014), Lake Macquarie Development Control Plan (LMDCP) 2014, as well as Lake Macquarie Development Control Plan 2014 – Revision 19, adopted by Council 25 June 2018.

Copies of these documents and further information in regard to development on this property can be obtained from Council's website. Compliance with these flood requirements does not guarantee Council will approve development on this property.

10. Development where 100 year probable ARI levels are not available, and which could be flood liable, must be designed to meet an acceptable level of risk from flood damage. This may require the preparation of a Local Flood Study that considers cumulative impact issues, and demonstrates negligible impacts on other lands.

Further Information

11. This certificate considers the relevant flood and flood planning levels for the specific property. There may be other issues to do with flooding, sea level rise, filling, and emergency access and egress that are not addressed in this document.



Attachment to Certificate - Flood Explanation Sheet

1 in 100 year Probable Flood Level

The 1 in 100 year flood is one that has a 1% chance of occurring in any year, or has the chance of occurring once every 100 years. The term "100-year flood" is a statistical probability designation stating there is a 1-in-100 chance that a flood this size will happen during any year. Another interpretation could be the "1-in-100 chance flood". The 1 in 100 year flood does not mean that if a location floods one year, it will definitely not flood for the next 99 years. Nor, if it has not flooded for 99 years, will it necessarily flood this year. Some parts of Australia have received more than one 1 in 100 year flood in one decade. Lake Macquarie waterway (the Lake) has not experienced a 1 in 100 year flood since written records began 150 years ago.

The 1 in 100 year flood is a serious but infrequent event, and is used widely as the risk threshold for flood planning.

1 in 20 year Probable Flood Level

The 1 in 20 year flood is one that has a 5% chance of occurring in any year, or has the chance of occurring once every 20 years. This is a statistical probability, and does not mean that if a location floods one year, it will definitely not flood for the next 19 years.

The 1 in 20 year flood is less serious but more frequent than the 1 in 100 year flood.

Flood Planning Level (FPL)

The Flood Planning Level is the risk threshold set for new buildings in flood-affected areas, and is usually applied as a minimum floor level. It is commonly based on the 1% (1-in-100 year) flood level plus 'freeboard' (see below).

Freeboard

Freeboard is included in the Flood Planning Level to allow a safety margin for unpredictable factors such as waves, localised hydraulic effects, blockages, flood debris, and uncertainties in the computer flood modelling. A freeboard of 500mm is typically applied to the 1-in-100 year flood for residential / commercial developments (see page 3 – Flood Planning Levels).

Probable Maximum Flood (PMF)

The Probable Maximum Flood is the largest flood that could feasibly occur. However, it is an extremely rare event. Despite this, some floods in Australia have approached the PMF. Council provides the PMF level on this Flood Certificate, if it is available, to indicate the full extent of risk, even if the chance is very small. Essential services (such as hospitals) and retirement housing, are required to locate above the PMF to avoid any risk from flooding.

Australian Height Datum (AHD)

Australian Height Datum refers to the elevation relative to a reference point. In Australia this reference point approximates mean sea level, which is taken as 0.00metres AHD. Flood levels, ground levels, floor levels, and flood planning levels are shown in metres AHD.

Attachment 8: Transport Impact Assessment

Transport Impact Assessment

Planning Proposal
393 Pacific Highway, Belmont North

Ref: 0781r01v3
21/03/2019

Document Control

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1 Introduction

1.1 Overview

Ason Group has been engaged by BWP Trust to prepare a Transport Impact Assessment (TIA) in support of a Planning Proposal (the Proposal) to rezone land at 393 Pacific Highway, Belmont North (the Site) to provide for retail development. The Proposal provides for:

- An amendment to Lake Macquarie Local Environmental Plan 2014 (LEP 2014) for an Additional Permitted Use (APU) within the B7: Business Park zone (in which the Site lies) that provides for 'Shops' as currently provided for in other zones under LEP 2014.
- In turn, the APU would provide for the development of:
 - A Kaufland supermarket with a gross floor area (GFA) of 3,921m²;
 - An additional retail tenancy with a GFA of 525m²;
 - A 'Shopping Street' with a GFA of 330m²;
 - Kaufland offices with a GFA of 1,825m²; and
 - At-grade parking and servicing areas.

From the outset, it is important to state that the Proposal would entirely replace the Bunnings Warehouse (Bunnings) which currently occupies the Site.

1.2 Transport Impact Assessment Tasks

This TIA provides an assessment of the relevant access, traffic and parking characteristics of the Proposal, and the potential impacts of the Proposal on the local road and parking environment. This has included a detailed assessment of:

- Existing Site and local road network conditions, including the trip generation and distribution of the existing Bunnings, and the operation of key local intersections providing access to the Site;
- Parking requirements;
- The peak period trip generation and distribution of the Site further to the Proposal, and the potential impact of those trips on the key local intersections; and
- The design of access driveways, parking aisles and spaces, and servicing areas.

1.3 Reference Documents

In preparing this TIA, Ason Group has referenced Lake Macquarie Council's planning documents, noting that the Site lies within the Lake Macquarie LGA, and as such is subject to that Council's planning controls. Key Council references include:

- LEP 2014
- Lake Macquarie Development Control Plan 2014 (DCP 2014)
- Lake Macquarie Cycling Strategy 2012 (Cycling Strategy)
- Lake Macquarie Council Traffic Impact Statement & Access Guidelines (TIS Guidelines)

This TIA also references general access, traffic and parking guidelines, including:

- Roads and Maritime Services (RMS) Guide to Traffic Generating Developments (RMS Guide)
- RMS Guide to Traffic Generating Developments – Updated Traffic Surveys TDT 2013/04a (RMS Guide Update)
- Australian Standard 2890.1: Parking Facilities – Off-Street Car Parking (AS 2890.1)
- Australian Standard 2890.2: Parking Facilities – Off-Street Commercial Vehicle Facilities (AS 2890.2)
- Australian Standard 2890.6: Parking Facilities – Off-Street Parking for People with a Disability (AS 2890.6)

1.4 Consultation

In the preparation of the TIA, Ason Group has had the opportunity to discuss the current and future operation of the Pacific Highway in the vicinity of the Site with officers from Council and the RMS; Ason Group acknowledges the insights provided by these officers in regard to local and sub-regional traffic and transport operations.

1.5 Report Structure

This TIA is structured as follows:

- Section 2 provides an Executive Summary.
- Section 3 provides a summary of the Proposal.
- Section 4 describes the existing Site.
- Section 5 describes existing local road network conditions.
- Section 6 describes available public and active transport service and infrastructure.
- Section 7 outlines the parking requirements applicable to the Proposal.
- Section 8 assesses the potential traffic impacts of the Proposal.
- Section 9 provides a summary of the key TIA conclusions.

2 Executive Summary

Further to a detailed assessment of the Planning Proposal, Ason Group provides the following conclusions:

- While the local road network currently operates at an appropriate Level of Service (LoS) – assisted by the coordination of the key Pacific Highway signalised intersections from Wommara Avenue through Floraville Road - there are existing capacity constraints; the most significant of these constraints is the provision of only 2 Pacific Highway southbound lanes through these key intersections.
- By 2029, the Ason Group assessment indicates that background traffic increases are such that a poor LoS is reported at the Pacific Highway & Wommara Avenue intersection (in the weekday PM and Saturday peak hour); and at the Pacific Highway & Floraville Road intersection (in the weekday AM peak hour). **These conditions will occur regardless of the Proposal.**
- Further to the addition of the Proposal's traffic to the Base 2029 traffic flows, the Pacific Highway & Wommara Avenue intersection remains at a LoS F, but generally with increased average vehicle delay (AVD); while the Pacific Highway & Floraville Road intersection retains the same LoS E during the weekday AM peak hour with no significant increase in average delay.
- At the Pacific Highway & Site intersection, average delay increases marginally, resulting in a LoS change from LoS C to LoS D; however, it should be noted that the Base 2029 AVD is on the cusp of a LoS D (reporting AVD of 42.0 seconds, where LoS D is reported from 42.5 seconds). Notwithstanding, a LoS D is acceptable on a major highway (particularly given a 10-year forecast).
- Based on our discussions with Council and the RMS, it has been determined that there are no current plans to upgrade this section of the Pacific Highway to cater for the forecast base flows (per the Base 2029 traffic flows), though Ason Group understand that the RMS is currently (2019) developing a scope of work for a Lake Macquarie wide traffic study; the timeframe (and indeed final scope) of this study is unknown.
- Ason Group has undertaken preliminary testing of a number of potential upgrades of the Pacific Highway (between Wommara Avenue and Floraville Road) designed to increase capacity such as to accommodate both Base 2029 traffic increases and the Proposal. **This testing indicates that key upgrades – and perhaps most significantly additional southbound capacity in the Pacific Highway - will be required by 2029 regardless of the Proposal, while relatively moderate additional works (compatible with the key upgrades) would provide for the additional traffic generation of the Proposal.**

- There is no question that further detailed investigations and consultation with Council and the RMS will be required to finalise any future upgrades. Notwithstanding, **it is the conclusion of Ason Group that essential upgrades which appropriately accommodate both the Base 2029 demand; and additional upgrades which would accommodate the Proposal; can be determined further to these additional investigations and consultation.**
- The Proposal will provide a level of car parking which meets the requirements of DCP 2014, as well as an appropriate allocation of bicycle, accessible and motorcycle parking. All access, parking and servicing areas would necessarily be designed to provide compliance with the relevant Australian Standards.

4 Existing Site Conditions

4.1 Site Location

The Site is legally described as Lot 101 in DP 1021186, with a street address of 393 Pacific Highway, Belmont North, approximately 20km south of the Newcastle CBD. It is bordered by residential dwellings to the north; industrial (storage) lots to the south; the Belmont Wetlands State Park to the east; and a retail services centre to the west. The Site has an area of some 40,380m² and is currently zoned B7: Business Park.

The Site is shown in its local context in **Figure 2**.



Figure 2: Site Location

4.2 Existing Site Characteristics

As stated, the Site is currently occupied by Bunnings which has a GFA of approximately 10,000m² plus an outdoor garden area of approximately 2,000m².

4.3 Access

Site access is provided directly from the Pacific Highway via a signalised T intersection with the on-site access road (termed Access Road 1 for ease of reference). A small internal roundabout then provides access to car parking and service areas in the northern and southern part of the Site respectively.

While Access Road 1 is located entirely within the Site, the southern leg of the internal roundabout (termed Access Road 2 for ease of reference) also provides access to a service station, Hungry Jacks and Coffee Shop (termed the Service Centre for ease of reference) to the immediate west of the Site (i.e. between the Site and the Pacific Highway). In practice – given that there are No Right Turn restriction to/from the Pacific Highway from/to the Service Centre - Access Road 2 provides for arrival trips to the Service Centre from the south; and departure trips from the Service Centre to the north.

4.4 Traffic Generation

4.4.1 Traffic Surveys

In order to determine the existing traffic generation of the Site, Ason Group commissioned traffic surveys of the Site and key adjacent Pacific Highway intersections on Friday 8th February 2019 and Saturday 9th February 2019, noting that Fridays and Saturdays represent the days of peak retail traffic generation. The survey data is provided in **Appendix A**.

4.4.2 Existing Site Trip Generation

With reference to the traffic surveys, the existing traffic generation of the Site (Bunnings) is summarised in **Table 1** below, noting that the Saturday network peak hour was between 11:45am and 12:45pm.

Table 1: Existing Site Trip Generation

Existing Site Trip Generation	AM Peak	PM Peak	Saturday
Surveyed Traffic Generation	219	245	626
Trip Rate (per 100m ²)	2.19	2.45	6.26

5 Local Road Network

The key roads and intersections in the vicinity of the Site are shown in **Figure 3**, and described further in sections below.

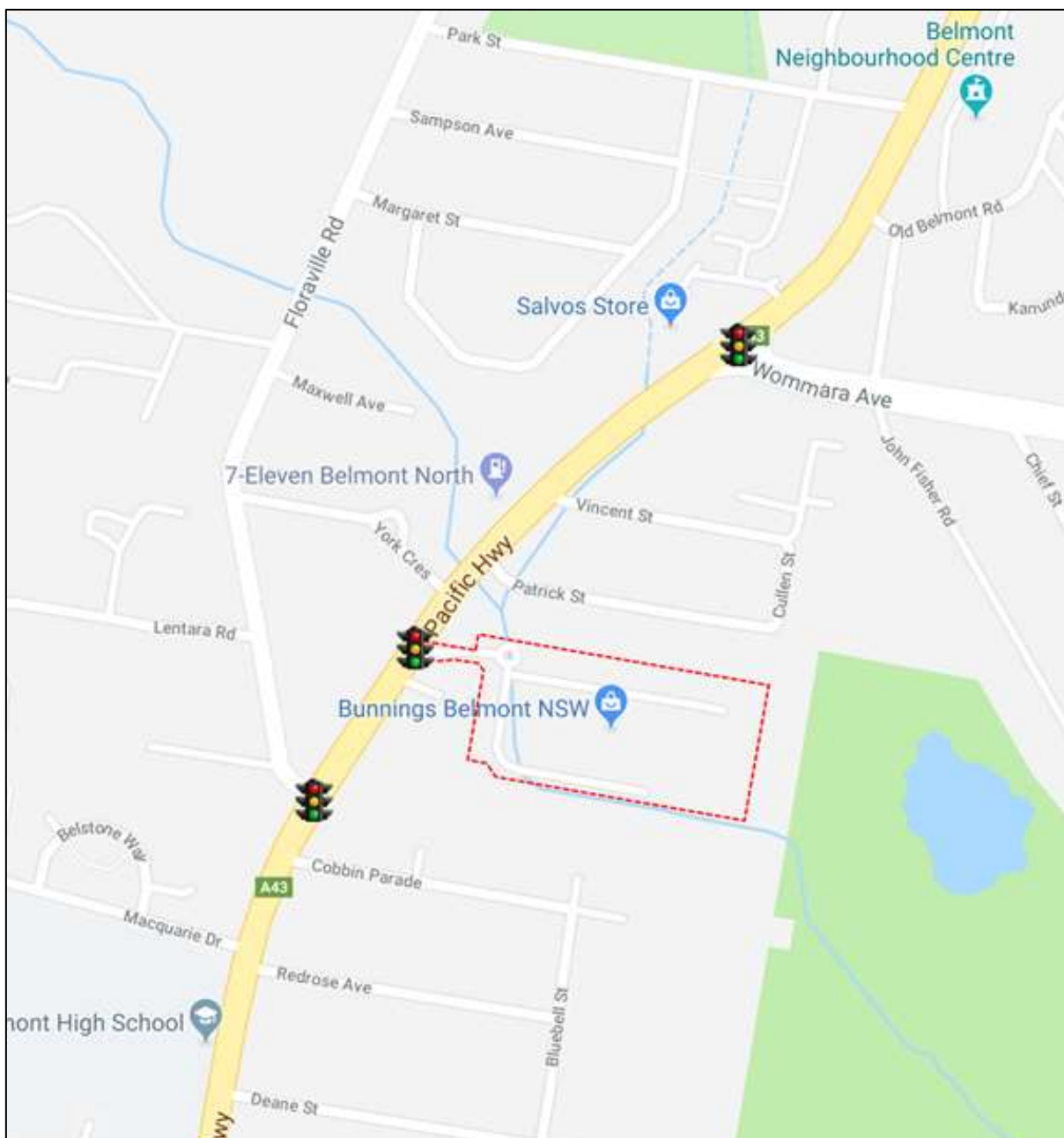


Figure 3: Local Road Network

5.1 Key Roads

5.1.1 Pacific Highway

The Pacific Highway is a Regional Highway (Route A43) which runs between the Hexham Bridge in the north (north of which it becomes National Route A1) to Gosford in the south. In the vicinity of the Site, the Pacific Highway provides 4 traffic lanes for two-way traffic (2 lanes per direction) with additional lane infrastructure at key intersections. The Pacific Highway has a posted speed limit of 60km/h.

5.1.2 Floraville Road

Floraville Road is a residential collector road which runs between Violet Town Road in the north and the Pacific Highway in the south. Floraville Road generally provides 2 traffic lanes for two-way traffic (1 lane per direction) and parking lanes on both sides of the road. Floraville Road has a posted speed limit of 60km/h.

5.1.3 Wommara Avenue

Wommara Avenue (and then Kalaroo Road) is a local collector road which runs between Redhead in the north, through the Redhead industrial estate to Pacific Highway in the south. Wommara Road generally provides 2 traffic lanes for two-way traffic (1 lane per direction) and parking lanes on both sides of the road. Wommara Avenue has a posted speed limit of 60km/h.

5.2 Key Intersections

5.2.1 Pacific Highway & Access Road 1

The intersection of Pacific Highway & Access Road 1 provides a signalised T intersection with auxiliary lane infrastructure and is shown below in **Figure 4**.

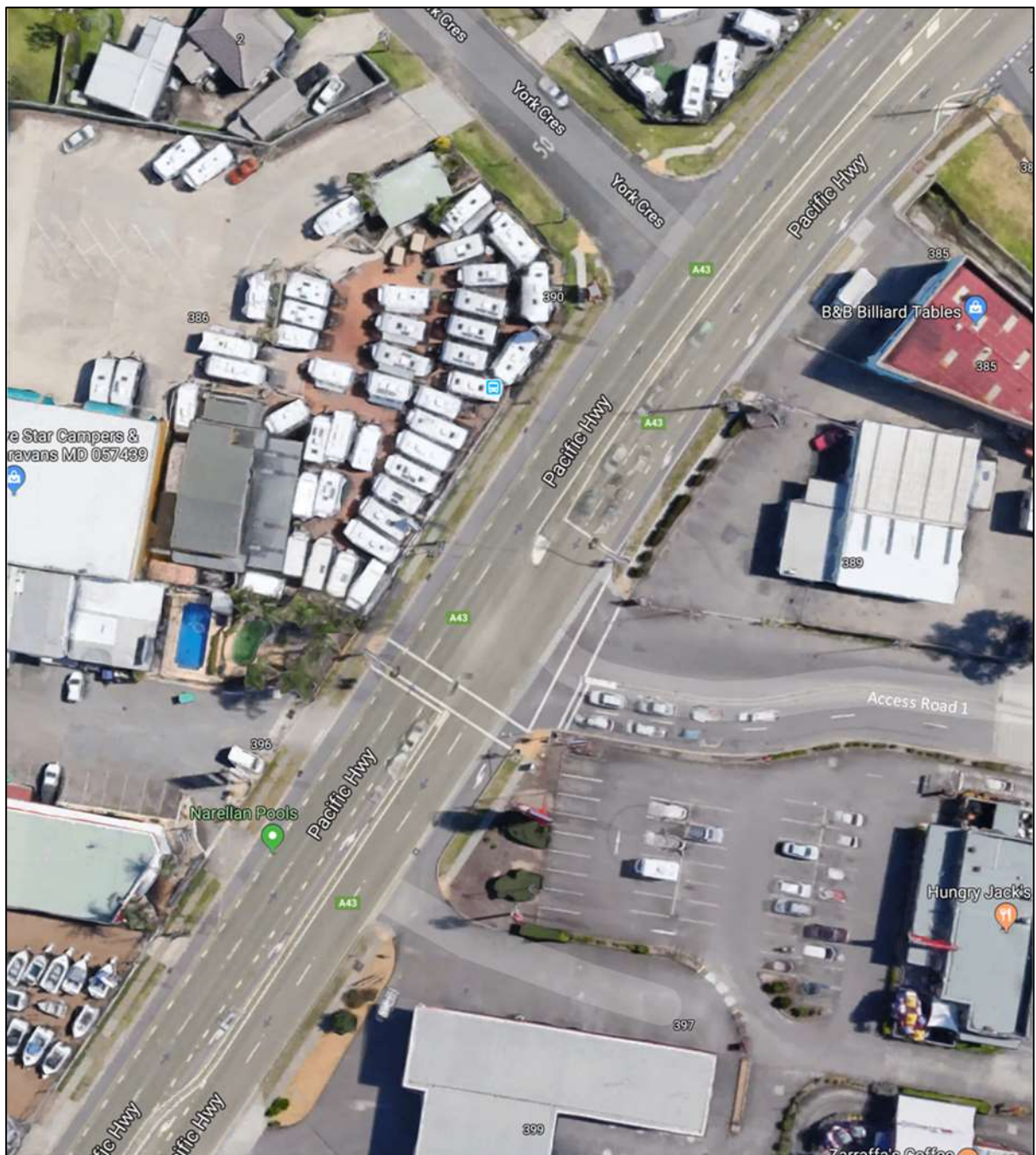


Figure 4: Intersection Pacific Highway & Access Road 1

5.2.2 Internal Site Roundabout

As discussed, the internal Site roundabout acts as a distributor for internal trips to and from the different parking and servicing areas of the Site, as well as providing for trips to/from the Service Centre to the north and south respectively. The internal Site roundabout is shown in **Figure 5**.

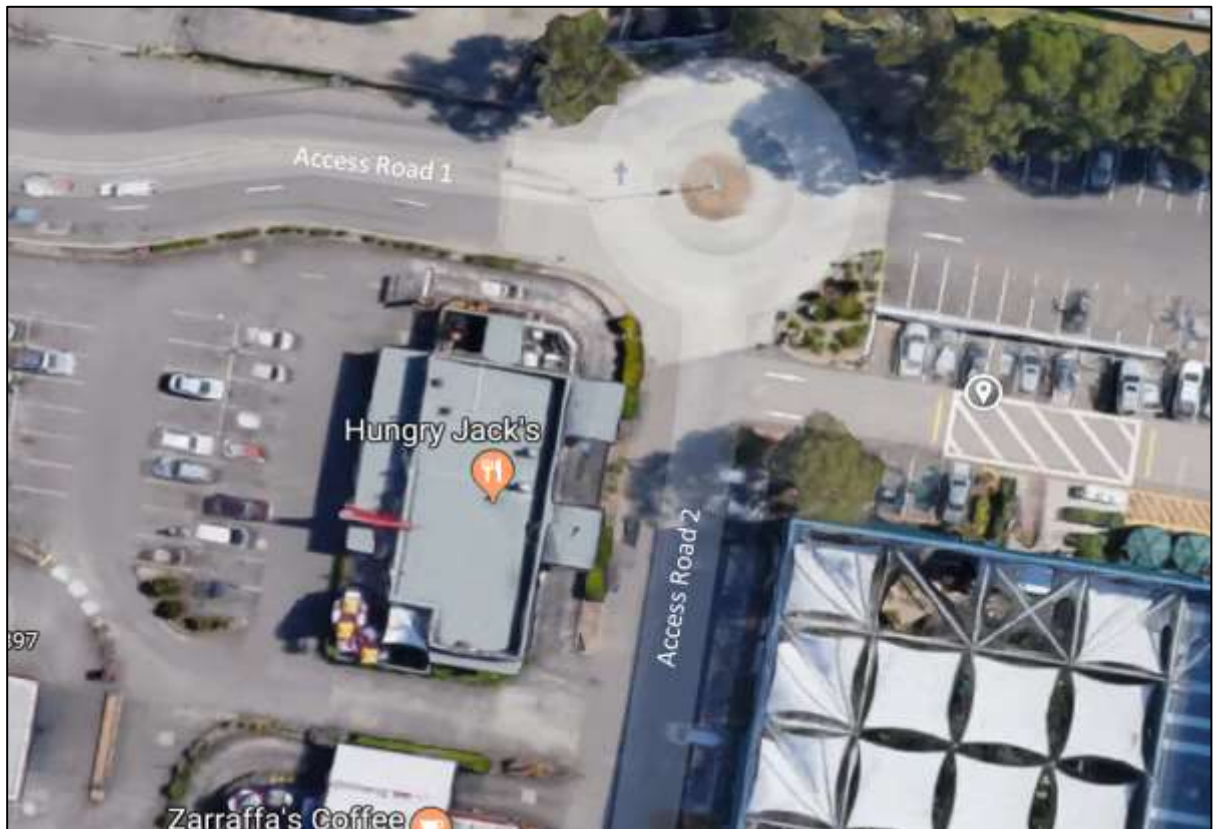


Figure 5: Internal Site Roundabout

5.2.3 Pacific Highway & Wommara Avenue

The intersection of Pacific Highway & Wommara Avenue provides a signalised T intersection with auxiliary lane infrastructure and is shown in **Figure 6**.

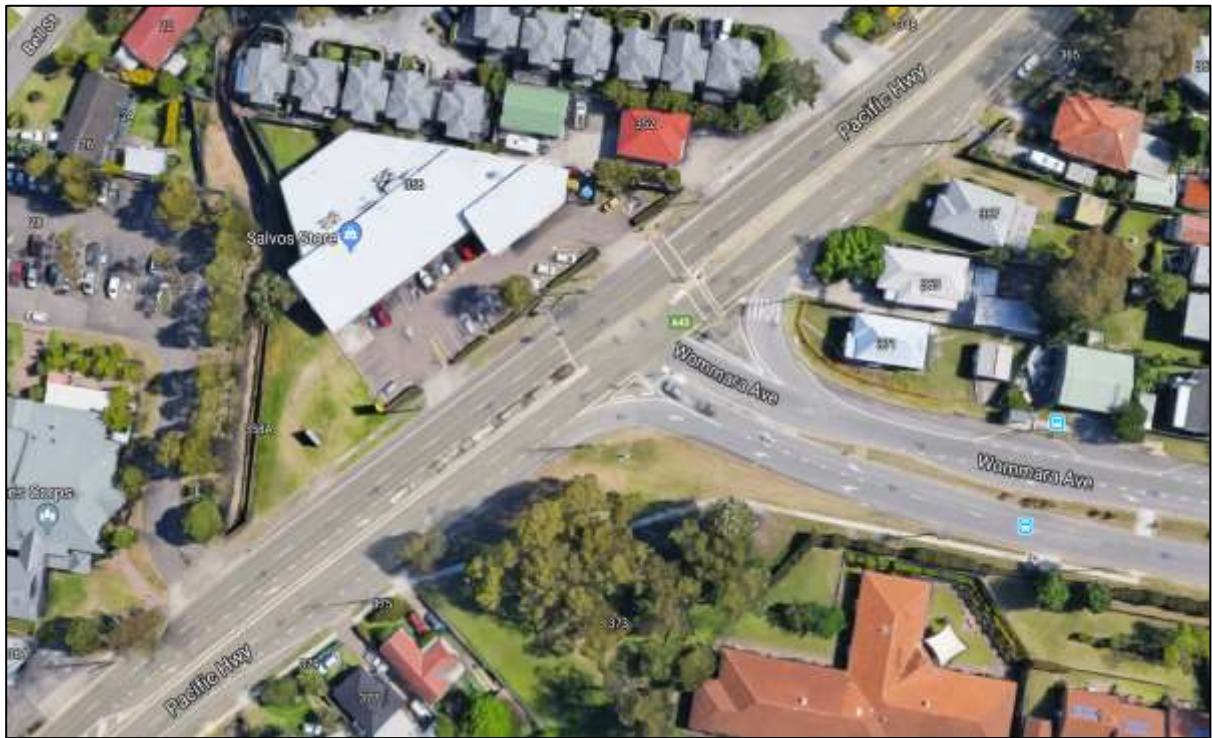


Figure 6: Intersection Pacific Highway & Wommara Avenue

5.2.4 Pacific Highway & Floraville Road

The intersection of Pacific Highway & Floraville Road provides a signalised T intersection with auxiliary lane infrastructure and is shown in **Figure 7**.



Figure 7: Intersection Pacific Highway & Floraville Road

5.3 Existing Traffic Flows

5.3.1 Traffic Surveys

As stated, traffic surveys were undertaken at the key intersections as detailed above in February 2019 and summarised in sections below.

5.3.2 Friday Peak Period Traffic Flows

Friday AM and PM peak hour traffic flows at the key intersections are shown in **Figure 8** and **Figure 9** respectively.

5.3.3 Saturday Peak Period Traffic Flows

Saturday peak hour traffic flows at the key intersections are shown in **Figure 10**.

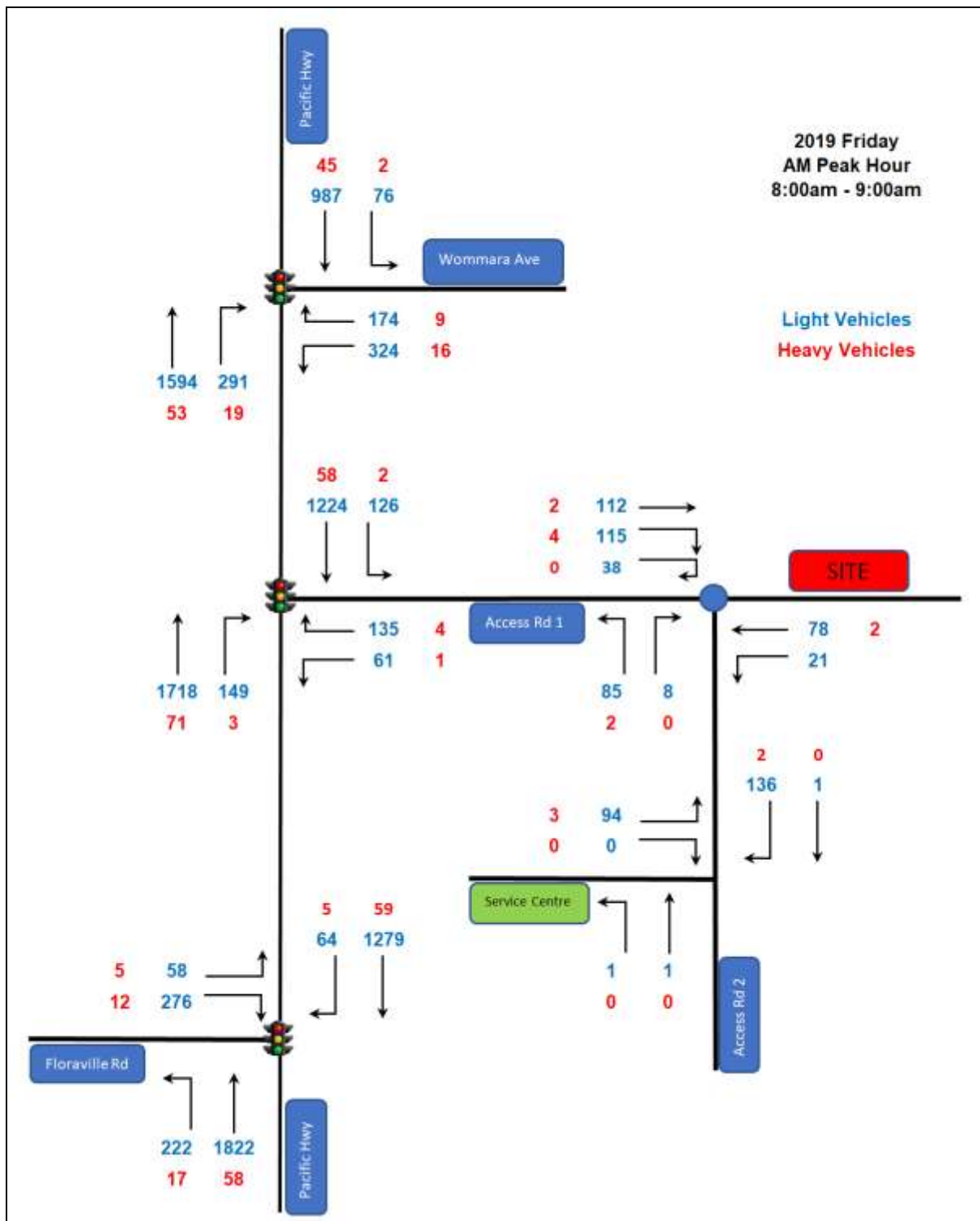


Figure 8: 2019 Friday AM Peak Hour (8:00am – 9:00am) Traffic Flows

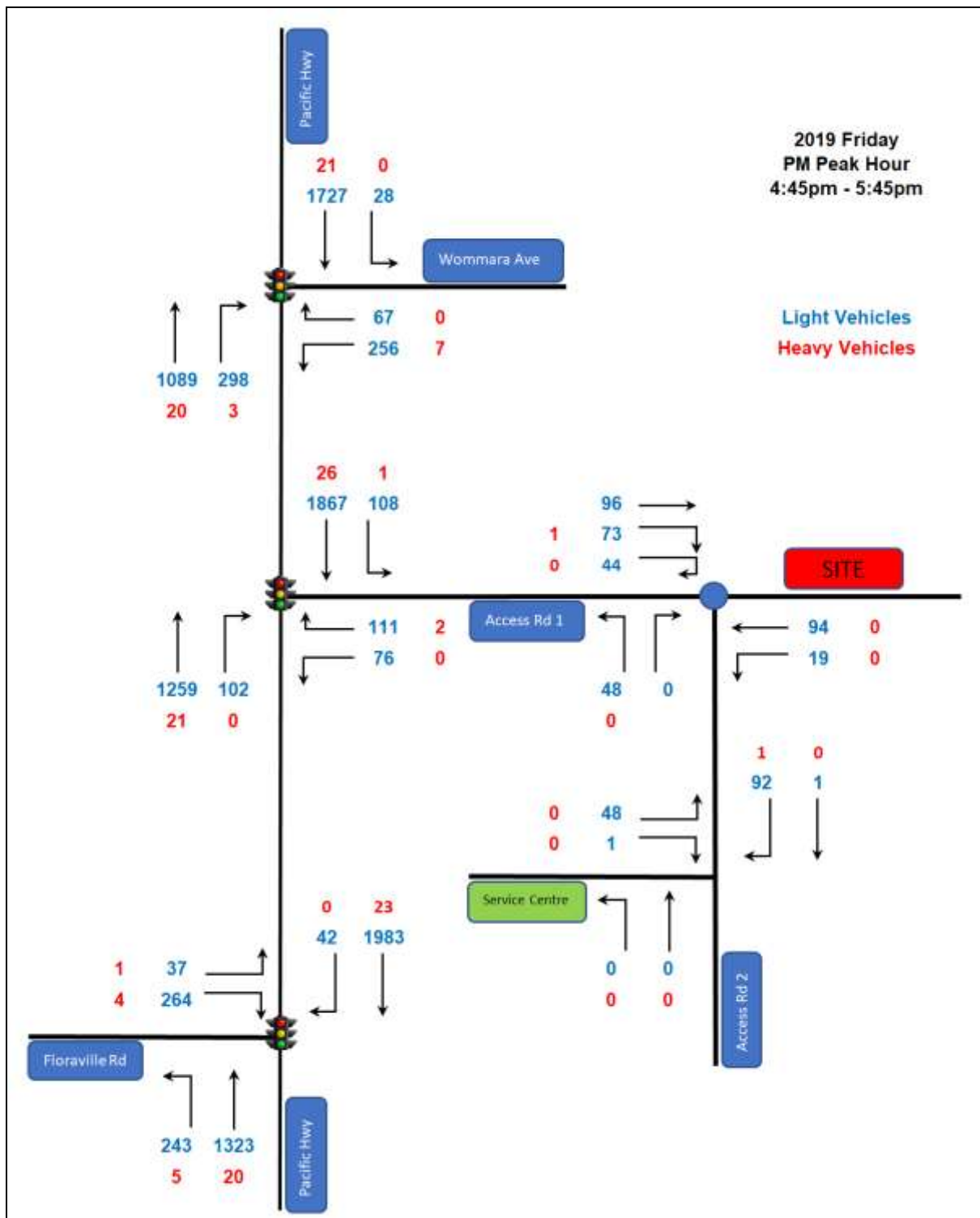


Figure 9: 2019 Friday PM Peak Hour (4:45pm – 5:45pm) Traffic Flows

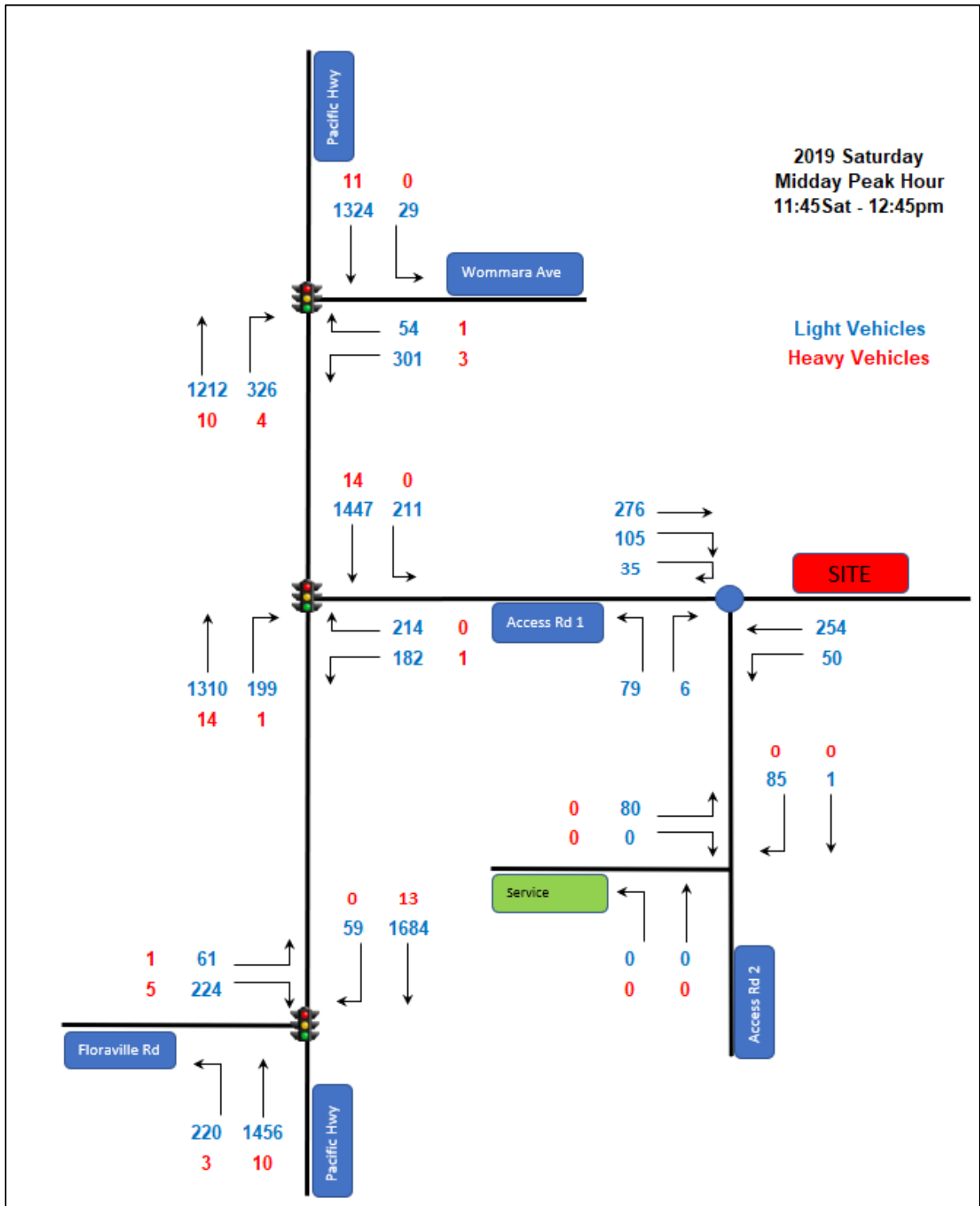


Figure 10: 2019 Saturday Peak Hour (11:45am – 12:45pm) Traffic Flows

5.4 Intersection Analysis

5.4.1 SIDRA

The performance of the key intersections has been analysed using the RMS approved SIDRA modelling software. SIDRA modelling outputs a range of performance measures, in particular:

- *Degree of Saturation (DOS)* – The DOS is defined as the ratio of demand (arrival) flow to capacity. The DOS is used to measure the performance of intersections where a value of 1.0 represents an intersection at theoretical capacity, above 1.0 represent over-saturated conditions (demand flows exceed capacity) and degrees of saturation below 1.0 represent under-saturated conditions (demand flows are below capacity). As the performance of an intersection approaches DOS of 1.0, queue lengths and delays increase rapidly. It is usual to attempt to keep DOS to less than 0.9, with satisfactory intersection operation generally achieved with a DOS below 0.8.
- *Average Vehicle Delay (AVD)* – Delay represents the difference between interrupted and uninterrupted travel times through an intersection and is measured in seconds per vehicle. Delays include queued vehicles accelerating and decelerating from/to the intersection stop lines, as well as general delays to all vehicles travelling through the intersection. The AVD (or average delay per vehicle in seconds) for intersections also provides a measure of the operational performance of an intersection and is used to determine an intersection's Level of Service (see below). For signalised intersections, the AVD reported relates to the average of all vehicle movements through the intersection. For priority (Give Way, Stop & Roundabout controlled) intersections, the AVD reported is that for the movement with the highest AVD.
- *Level of Service (LOS)* – This is a comparative measure that provides an indication of the operating performance, based on AVD. For signalised and roundabout intersections, LOS is based on the average delay to all vehicles, while at priority-controlled intersections LOS is based on the worst approach delay.

Table 2 outlines the relevant performance criteria in accordance with the RMS Guide.

Table 2: Intersection Assessment Criteria

Level of Service	Average Delay per Vehicle (sec/veh)	Traffic Signals, Roundabout	Give Way and Stop Signs
A	Less than 14	Good operation	Good operation
B	15 to 28	Good with acceptable delays & spare capacity	Acceptable delays & spare capacity
C	29 to 42	Satisfactory	Satisfactory, but accident study required
D	43 to 56	Operating near capacity	Near capacity & accident study required
E	57 to 70	At capacity; at signals, incidents will cause excessive delays. Roundabouts require other control mode	At capacity, requires other control mode
F	More than 70	Unsatisfactory and requires additional capacity.	Unsatisfactory and requires other control mode or major treatment.

5.4.2 Existing Intersection Operations

With reference to sections above, the existing performance of the key intersections is summarised in **Table 3**.

Table 3: Existing Intersection Operations

2019 Existing Intersection Operations	Peak Period	Delay	LoS
Pacific Hwy & Wommara Ave	AM	19	B
	PM	19	B
	Sat	17	B
Pacific Hwy & Site Access	AM	12	A
	PM	6	A
	Sat	21	B
Pacific Hwy & Floraville Rd	AM	16	B
	PM	11	A
	Sat	13	A
Internal Site Roundabout	AM	24	B
	PM	24	B
	Sat	24	B

With reference to Table 3:

- All intersections operate at a good LoS in both the AM and PM peak periods, with only minor delays and no significant queueing on any approaches.
- It is noted that the signal coordination - which controls all three Pacific Highway intersections - is observed to provide good efficiency through Belmont North.

5.5 Future Base Intersection Operations

5.5.1 2029 Forecast Year

A future baseline traffic scenario has been assessed to provide a 'benchmark' from which to appropriately assess the impacts of the Proposal compared to a long term 'do nothing' scenario, i.e. future conditions without the Proposal (but with the Bunnings retained).

Average annual growth has been determined with reference to available RMS Count Station data north and south of the Site, including:

- Count Station 05201: Pacific Highway south of Smart Street;
- Count Station 05213: Croudace Bay Road north of Belmont Crescent;
- Count Station 05210: Red Head Road south of White Cap Close; and
- Count Station 05002: Pacific Highway south of Nioka Place.

Further to a review of this data, an annual growth rate of 2% has been applied to the existing traffic flows in the Pacific Highway. The resulting Base 2029 traffic flows are shown in the figures below.

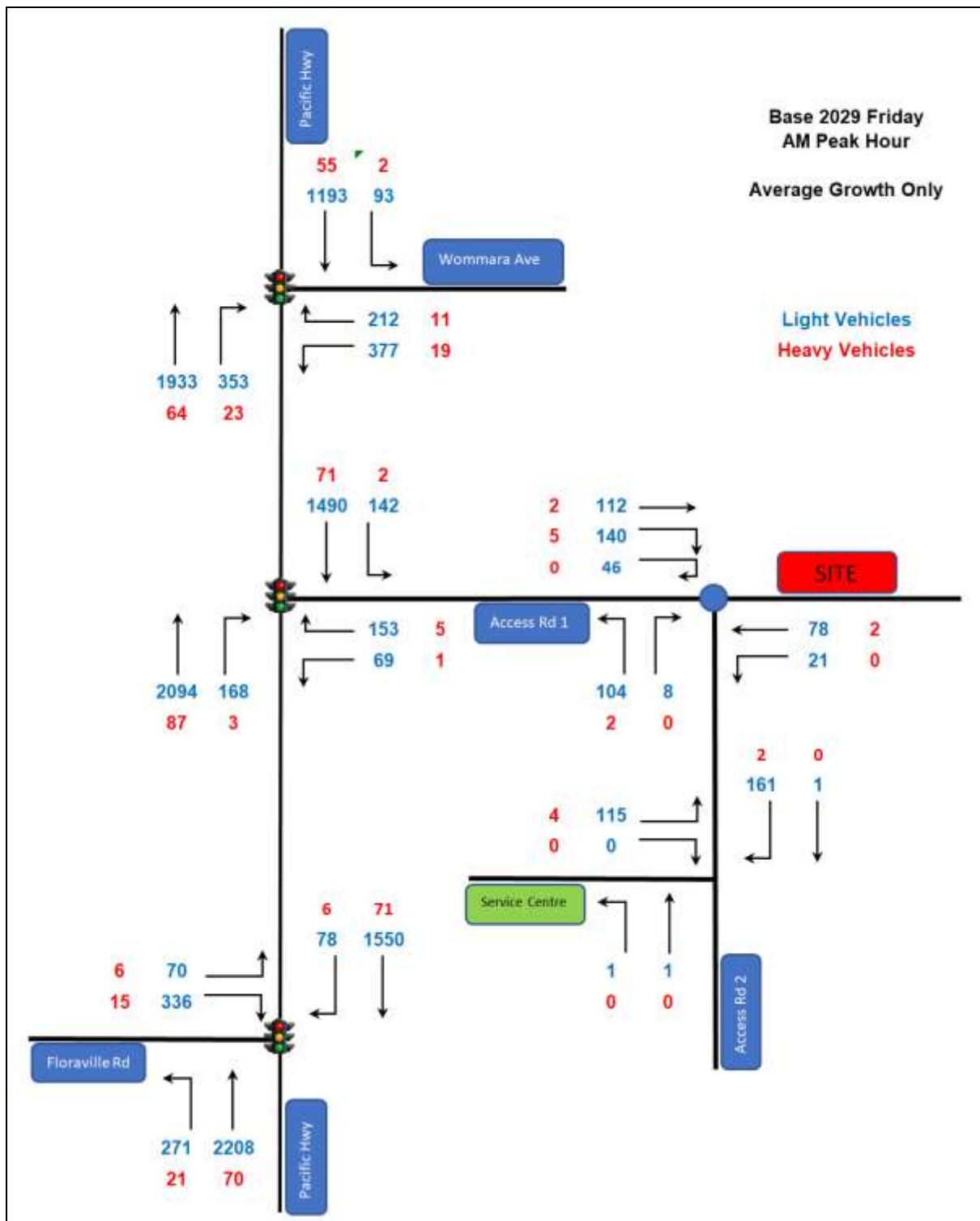


Figure 11: Base 2029 Friday AM Peak Hour Traffic Flows

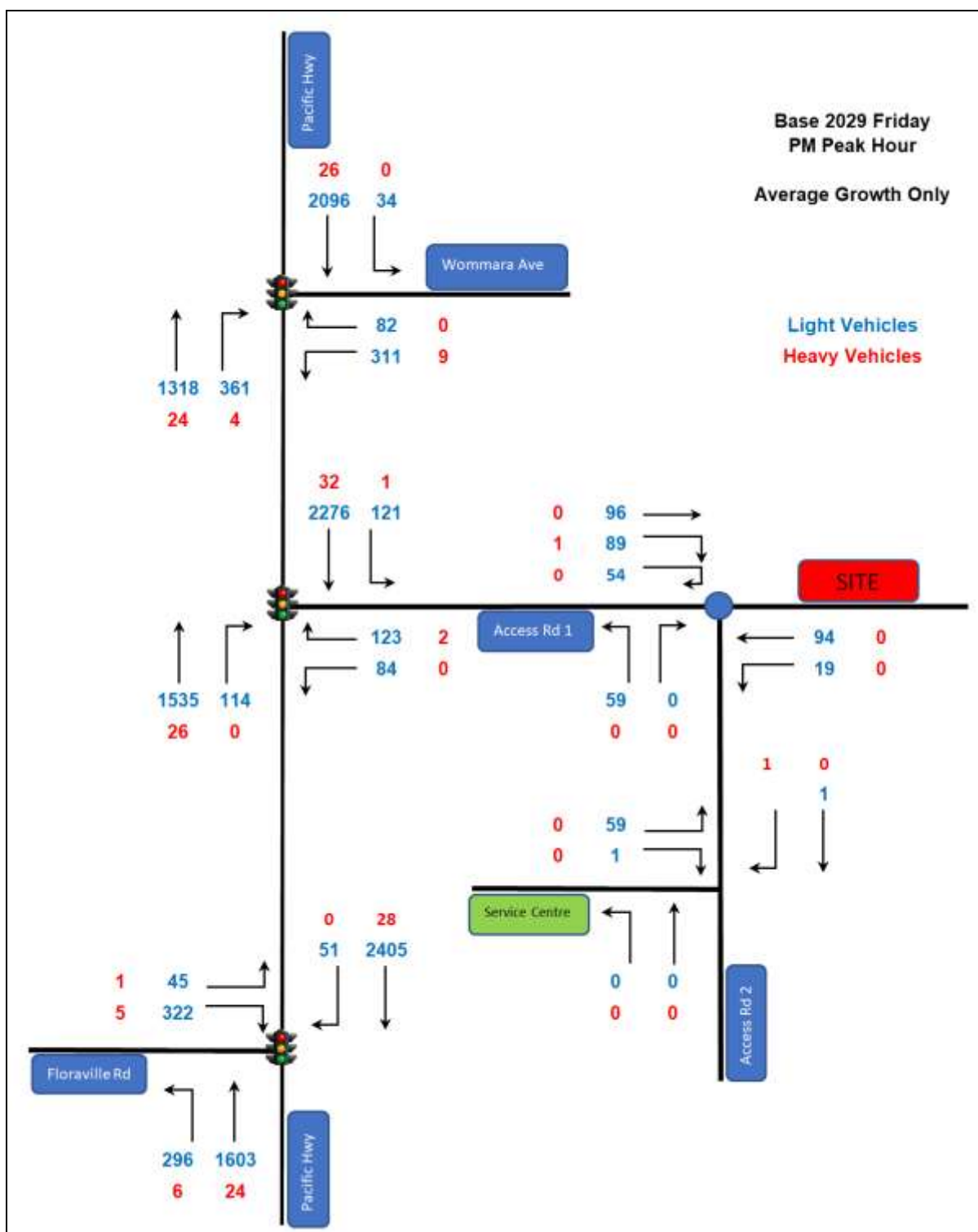


Figure 12: Base 2029 Friday PM Peak Hour Traffic Flows

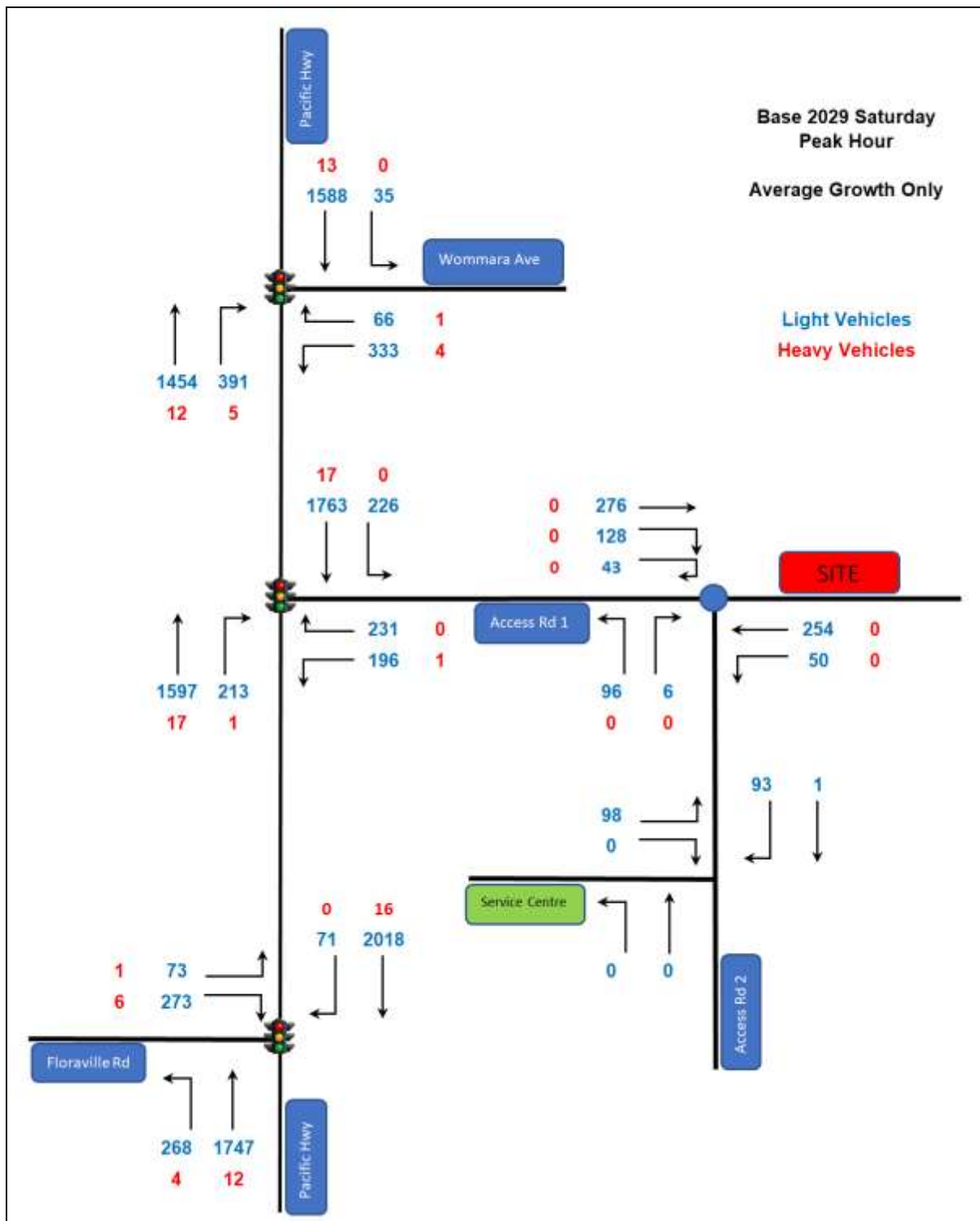


Figure 13: Base 2029 Saturday Peak Hour Traffic Flows

5.5.2 Base 2029 Base Intersection Operations

SIDRA has again been used to assess the future performance of the key intersections under Base 2029 traffic flow conditions. The results of this analysis are summarised in **Table 4**.

Table 4: Base 2029 Intersection Operations

Base 2029 Intersection Operations	Peak Period	Delay	LoS
Pacific Hwy & Wommara Ave	AM	23	B
	PM	126	F
	Sat	115	F
Pacific Hwy & Site Access	AM	13	A
	PM	21	B
	Sat	42	C
Pacific Hwy & Floraville Rd	AM	58	E
	PM	15	B
	Sat	16	B
Internal Site Roundabout	AM	24	B
	PM	24	B
	Sat	24	B

With reference to Table 4:

- The intersection of Pacific Highway & Wommara Avenue operates at a LoS F in both the Friday PM and Saturday peak hours, with the primary delay during both peaks is to the Pacific Highway southbound approach to Wommara Avenue.
- The intersection of Pacific Highway & Floraville Road operates at a LoS E in the AM peak hour, with the primary delay being to the Pacific Highway northbound approach to Floraville Road.
- Both the intersections of Pacific Highway & Site, and the internal Site roundabout, operate at a good LoS during all peak periods.

5.6 Base Traffic Conditions Summary

With reference to sections above, by 2029 a number of the key Pacific Highway intersections will operate at a poor LoS and with little spare capacity. The major constraint observed on-site is the provision of only 2 southbound lanes in the Pacific Highway servicing a significant demand flow, particularly in the PM peak hour.

Based on our recent discussions with Council and the RMS, the congestion in the Pacific Highway through Belmont North (and indeed from Bennetts Green in the north through to Swansea in the south) has been an issue for some time. The issue was specifically addressed in August 2015 in the NSW Parliament, with the Minister for Transport & Infrastructure asked the following questions:

- 1. What steps have been taken to ease traffic congestion along the Pacific Highway at Belmont to alleviate the frustrations of local commuters?*
- 2. Does the Government have any plans to address the growing traffic congestion along the Pacific Highway at Belmont, considering the amount of growth the local area has experienced in recent years?.*

In response, the Minister stated the following:

I am advised that:

Roads and Maritime Services will start work on a Lake Macquarie traffic study later this year, which will assess current traffic performance.

This study will help determine priorities for future upgrade of the Lake Macquarie road network and is expected to be completed by the end of 2016. The study will include a community consultation process where the community can have their say.

Both Council and the RMS have confirmed that this study was not undertaken at the time. Moreover, both Council and the RMS have confirmed to Ason Group that there are currently no proposals to upgrade this section of the Pacific Highway.

Notwithstanding, Ason Group understands that an RMS study of the Lake Macquarie traffic and transport network is currently being discussed (between the RMS, Council and other stakeholders). The scope and timeframe for the study is unknown at this time, though based on our discussions there is an expectation that the operation of the Pacific Highway will be an issue for investigation.

6 Public Transport, Cycling and Pedestrian Access

6.1 Bus Services

Transport for NSW guidelines state that bus services influence the travel mode choices of sites within 400 metres (approximately 5 minutes) of a bus stop.

In this regard, the Site is well serviced by buses operated by Newcastle Transport, including the following routes:

- Route 14: Newcastle to Swansea via Charlestown (20-minute headway);
- Route 29: Glendale to Swansea via Cardiff and Warners Bay (60-minute headway);
- Route 43: Charlestown to Belmont (60-minute headway); and
- Route 48: Warners Bay to Belmont via Charlestown and Redhead (60-minute headway).

These bus routes are shown in Figure 14.

6.2 Pedestrian Accessibility

Formal pedestrian footpaths are provided on both sides of the road in each of the key roads in the vicinity of the Site, other than at the intersection of Pacific Highway & Wommara Avenue, where no crossing of Wommara Avenue is available.

6.3 Cycle Routes

There are currently limited cycling facilities and routes provided within the proximity of the Site. However, with reference to **Figure 15** below, Council's Cycling Strategy provides for the introduction of on road cycleways in the Pacific Highway directly past the Site, which would link to both existing and proposed on and off road cycleway to the north and south of the Site.



Figure 14: Bus Network



Figure 15: Lake Macquarie Council Cycling Strategy - East Ward

7 Parking & Servicing Requirements

7.1 DCP 2014 Car Parking Rates

7.1.1 Retail Parking Rates

Part 5, Table 7 of DCP 2014 provides the following parking rates for Neighbourhood Shops within a B7 zone, noting that these same rates apply to cafes such as proposed within the Shopping Street:

- 1 space per 25m² for development under 5,000m²
- 1 space per 40m² for development over 5,000m²

These parking rates are the same rates as applied to shops within local centres per Part 4, Table 7 of DCP 2014. It is noted that the rate of 1 space per 25m² for retail development under 5,000m² GFA has been applied in the assessment.

7.1.2 Office Parking Rates

As the B7 zoning of the Site does not currently permit office use, Part 5, Table 7 of DCP 2014 does not provide parking rates for office floorspace. As such Ason Group has referenced Part 4 (Business Parks), Table 7 of DCP 2014, which provides the following parking rates for office and commercial floorspace:

- 1 space per 40m² GFA.

7.1.3 Total Parking Requirement

Table 5 below provides a summary of the parking requirements of the Site further to the application of the DCP 2014 parking rates.

Table 5: Parking Requirement: DCP 2014 Rates

Site Component	GFA	Parking Rate (spaces per 100m ² GFA)	Parking Required
Supermarket	3,921	4	157
Retail	525	4	21
Shopping Street	330	4	13
Office	1,825	2.5	46
Total			237

7.1.4 RMS Parking Rates

Section 5.7 of the RMS Guide provides the following summary parking rates for Shopping Centres with Gross Leasable Floor Area (GLFA) under 10,000m²:

- 6.1 spaces per 100m² GLFA

While this rate includes office space within a shopping centre, it is our opinion more appropriate to consider the RMS Guide office parking rate (2.5 spaces per 100m² GFA, i.e. as per DCP 2014) for the office component.

Table 6 below provides a summary of the parking requirements of the Site further to the application of the RMS Guide parking rates

Table 6: Parking Requirement: RMS Guide Summary Rates

Site Component	GFA	Parking Rate(spaces per 100m ² GFA)	Parking Required
Supermarket	3,921	6.1	239
Retail	525	6.1	32
Shopping Street	330	6.1	20
Office	1,825	2.5	111
Total			337

7.2 Proposed Car Parking

The Proposal provides for a total of 458 parking spaces across the Site, which meets the requirements of DCP 2014 and RMS Guide suggested provisions.

7.3 Additional Parking Considerations

7.3.1 Bus Shelters

Part 5, Table 7 of DCP 2014 requires the provision of bus shelter where more than 20 car spaces are required for office development, and the Site is within 400m of a designated bus route. The provision of a bus shelter is in lieu of 1 car space in every 40 spaces, or part thereof, of the onsite parking requirement.

In this regard, the most readily available northbound bus stop is located in the Pacific Highway south of Floraville Road; and the most readily available southbound bus stop is located in the Pacific Highway immediate north of Patrick Street. It is note that a southbound bus stop is also provided in the Pacific Highway south of Floraville Road.

Both of the bus stops south of Floraville Road already provide a bus shelter, while the bus stop north of Patrick Street provides only a bench seat. As such, it is proposed that BWP Trust consult with Council at the appropriate time during the approval process to determine the means by which a bus shelter can be provided at the bus stop to provide compliance with DCP 2014.

7.3.2 Accessible Parking

Part 5, Table 7 of DCP 2014 provides the following parking rates for accessible parking:

- 1 accessible parking space per 50 car parking spaces

The application of this rate to the proposed 458 parking spaces suggests a requirement for 10 accessible parking spaces. The Proposal will provide a minimum of 10 accessible parking spaces so as to provide compliance with DCP 2014, and all accessible parking spaces will be designed with reference to AS 2890.6.

7.3.3 Motor Bike Parking

Section 3.14 of Part 5 of DCP 2014 provides the following parking rates for motor bike parking:

- 1 motor bike parking space per 20 car parking spaces

The application of this rate to the proposed 458 parking spaces suggests a requirement for 23 motor bike parking spaces. The Proposal will provide a minimum of 23 motor bike parking spaces so as to provide compliance with DCP 2014, and all bike parking spaces will be designed with reference to AS 2890.1.

7.3.4 Bicycle Parking

Section 3.13 of Part 5 of DCP 2014 provides the following parking rates for bicycle parking:

- 3 bicycle parking spaces or 1 bicycle parking space per 20 car parking spaces, whichever is greater, for customers and short-term users.
- 1 bicycle parking space per 20 employees or part thereof.

The application of the customer/short-term user rate to the proposed 458 parking spaces suggests a requirement for 23 bicycle parking spaces. The Proposal will provide a minimum of 23 bicycle parking spaces so as to provide compliance with DCP 2014.

The number of office employees is unknown at the time; however, the Proposal will provide employee bicycle parking spaces such as to provide compliance with DCP 2014.

With regard to bicycle parking, it is noted that DCP 2014 provides additional controls in regard to:

- The provision of customer/short-term users' bicycle spaces in close proximity to pedestrian entrances, with a minimum of 50% of spaces being covered; and
- The provision of lockers, changerooms and showers for employees, with all bicycle parking spaces provided in secure covered areas.

It is proposed that the final design will provide full compliance with these additional DCP 2014 requirements, and that all bicycle parking spaces will be designed with reference to AS 2890.6.

7.4 Servicing

While DCP 2014 does not provide any specific requirements in regard to the provision of service/loading bays, the TIS Guidelines provide the following:

A Traffic Impact Statement should address:

- *The suitable location and adequate provision of loading, unloading, manoeuvring and parking of vehicles within that development or on the land.*
- *Movements of freight carrying vehicles associated with the proposal and how (the negative impact of) these movements are to be minimised – e.g. Limiting movements during busier working hours.*

The proposed provision of 3 loading bays at the rear of the Site is based on the experience of loading/servicing requirements at other Kaufland supermarkets, and is expected to provide more than adequate capacity to meet peak loading/servicing demands. In addition:

- The loading areas are entirely separated from the public parking areas.
- Service vehicle will use a dedicated service road along the southern boundary of the Site to access the service area, noting that this is a similar servicing proposal to that currently provided at Bunnings.

More broadly, all service areas will be designed to provide compliance with AS 2890.2.

8 Traffic Assessment

8.1 Trip Generation

8.1.1 RMS Trip Rates – Supermarket

The traffic generation of the supermarket component of the proposed development has been assessed with reference to trip rates provided in the RMS Guide:

- Weekday PM Peak Hour:
 - Supermarket: 13.8 veh/hr per 100m² GLFA
 - Department / Discount Department Store: 5.1 veh/hr per 100m² GLFA
- Saturday Midday Peak Hour:
 - Supermarket: 14.7 veh/hr per 100m² GLFA
 - Department / Discount Department Store: 3.8 veh/hr per 100m² GLFA

It is noted that, according to the information provided by the Kaufland, Kaufland supermarkets generally include approximately 80:20 split of food/non-food items in their product offering, compared to a typical 95:5 split of food/non-food items offered in a standard major supermarket in Australia (Coles/Woolworths). Therefore, a refined trip generation rate for the Kaufland supermarket is effectively an 85:15 split of supermarket/discount department store rates to account for the 5% non-food offering that are already contained in standard major supermarkets (and therefore reflected in the base RMS Guide generation rate).

Additionally, the RMS Guide do not provide trips rates for the weekday AM peak period; based on our past experience of similar sites, the weekday AM peak period trip rates generally represent approximately 30% of the weekday PM peak period trip rate.

Accordingly, the following blended trip generation rates are adopted for the supermarket component of the proposed development:

- Weekday AM Peak Hour: 3.8 veh/hr per 100m² GLFA
- Weekday PM Peak Hour: 12.5 veh/hr per 100m² GLFA
- Saturday Midday Peak Hour: 13.1 veh/hr per 100m² GLFA

8.1.2 RMS Trip Rates – Retail and Shopping Street

For the general retail and ‘shopping street’ component of the proposed development, the trip generation has been also been assessed with reference to trip rates provided in the RMS Guide.

Similar to the supermarket component, the weekday AM peak period trip rates is adopted as 30% of the weekday PM peak period trip rate in the absence of specific rates provided in RMS Guide and RMS Update:

- Weekday AM Peak Hour: 1.7 veh/hr per 100m² GLFA
- Weekday PM Peak Hour: 5.6 veh/hr per 100m² GLFA
- Saturday Midday Peak Hour: 10.7 veh/hr per 100m² GLFA

8.1.3 RMS Trip Rates - Office

The RMS Guide provides the following summary trip rates for office floorspace:

- 2 vph per 100m² GFA during the PM peak hour.

It is noted that this rate has historically been adopted for the AM peak hour also.

The RMS Guide Update provides the following summary trip rates for office floorspace:

- 1.6 vph per 100m² GFA in the AM peak hour; and
- 1.2 vph per 100m² GFA in the PM peak hour.

To provide a conservative assessment, specifically noting the availability of on-site staff parking, the assessment has adopted the RMS Guide trip rates.

8.1.4 Trip Generation Summary

With reference to section above, Table 7 below provides a summary of the trip generation of the Site further to the application of the RMS trip rates.

Table 7: Site Trip Generation Summary

Land use	GFA (m ²)	AM Trip Rate (100m ²)	AM Trips (veh/hr)	PM Trip Rate (100m ²)	PM Trips (veh/hr)	Sat Trip Rate (100m ²)	Sat Trips (veh/hr)
Supermarket	3921	3.8	147	12.5	490	13.1	514
Retail	525	1.7	9	5.6	29	10.7	56
Shopping Street	330	1.7	6	5.6	18	10.7	35
Office	1825	2.0	37	2.0	37	0.0	0
Total			198		575		605

8.1.5 Passing Trade

The RMS Guide states that for retail centres under 10,000m² GLFA, approximately 25% of trips are 'linked trips', for example someone diverting to the centre on the way to/from work. As such, the *additional* traffic generated by the Site further to the Proposal would actually represent 75% of the total traffic generation of the Site per **Table 7** above.

8.2 Trip Distribution & Assignment

8.2.1 Directional Distribution

There is no information available to suggest that the directional distribution of trips currently observed as the Site would be significantly altered further to the change in Site usage.

8.2.2 Arrival & Departure Distribution

Based on our past assessments of retail and commercial developments, **Table 8** provides a summary of the assigned arrival and departure distribution of trips for the different components of the Site.

Table 8: Arrival & Departure Distribution

Trip Distribution	AM Arrival	AM Departure	PM Arrival	PM Departure	Sat Arrival	Sat Departure
Supermarket	60%	40%	40%	60%	50%	50%
Retail	60%	40%	40%	60%	50%	50%
Shopping Street	60%	40%	40%	60%	50%	50%
Office	80%	20%	20%	80%	50%	50%

8.2.3 Trip Assignment

With reference to sections above, the peak hour trip generation of the Site has been assigned to the key local intersections for the forecast year 2029, as shown in the figures below.

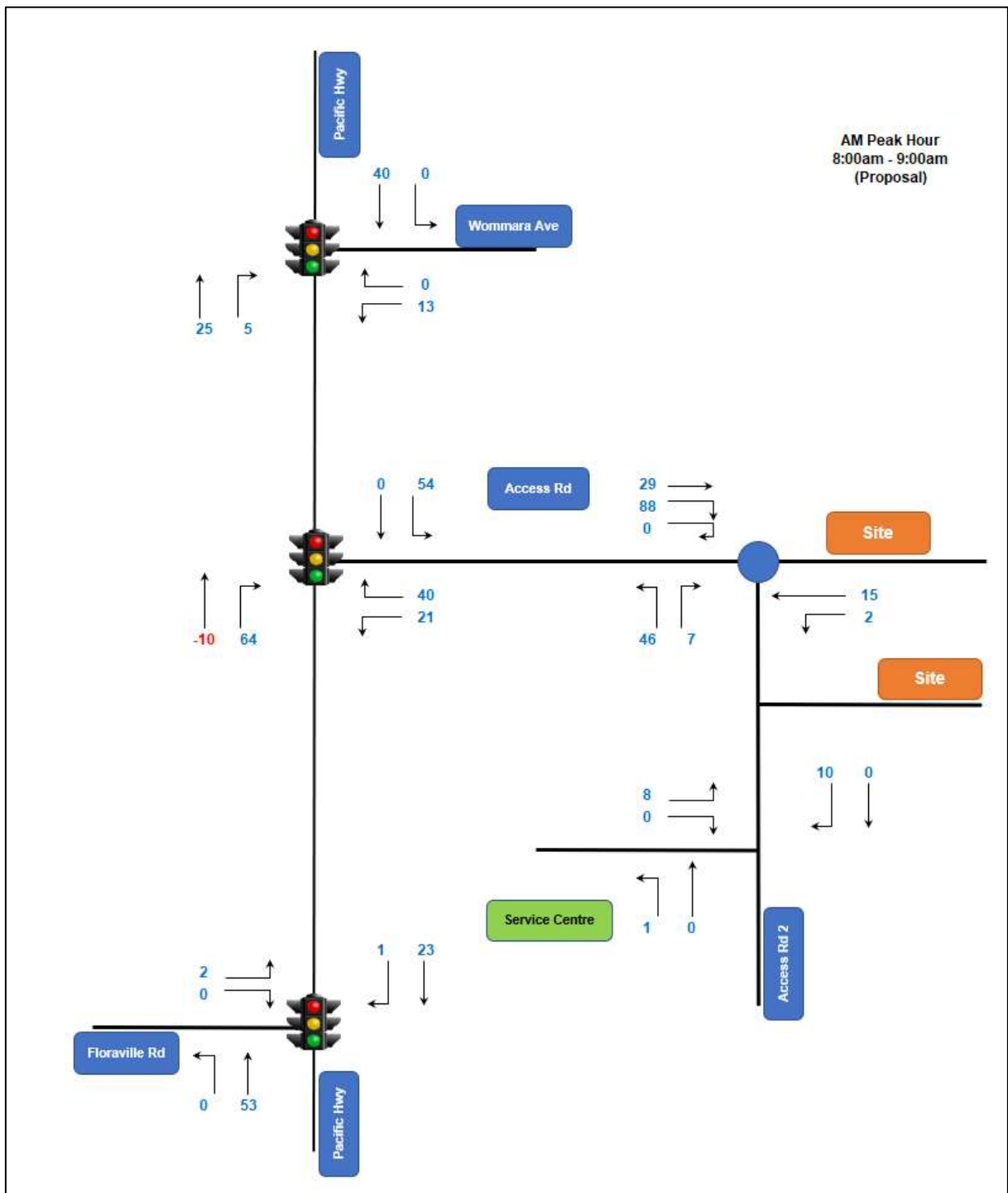


Figure 16: Proposal Friday AM Peak Hour Traffic Flows

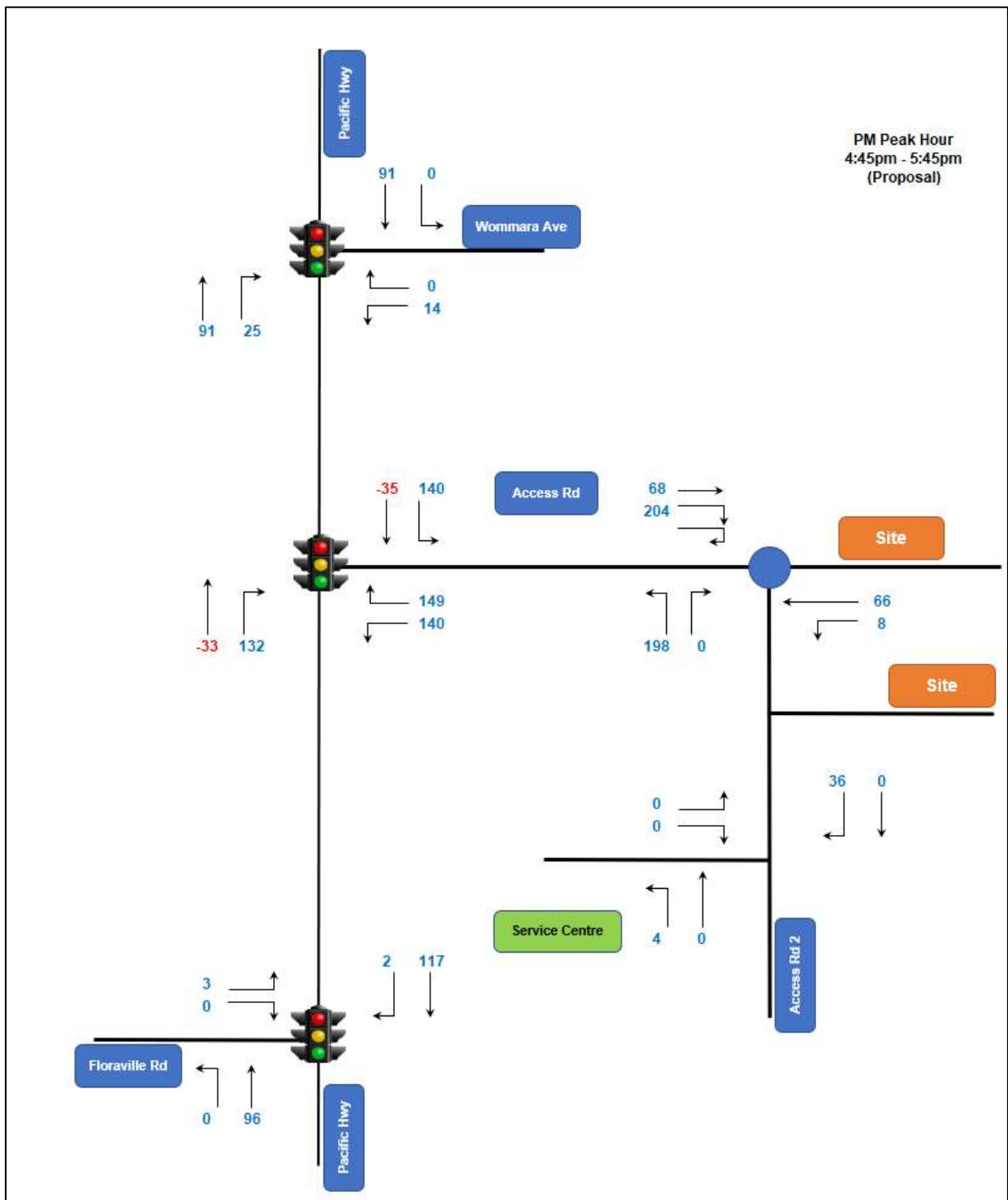


Figure 17: Proposal Friday PM Peak Hour Traffic Flows

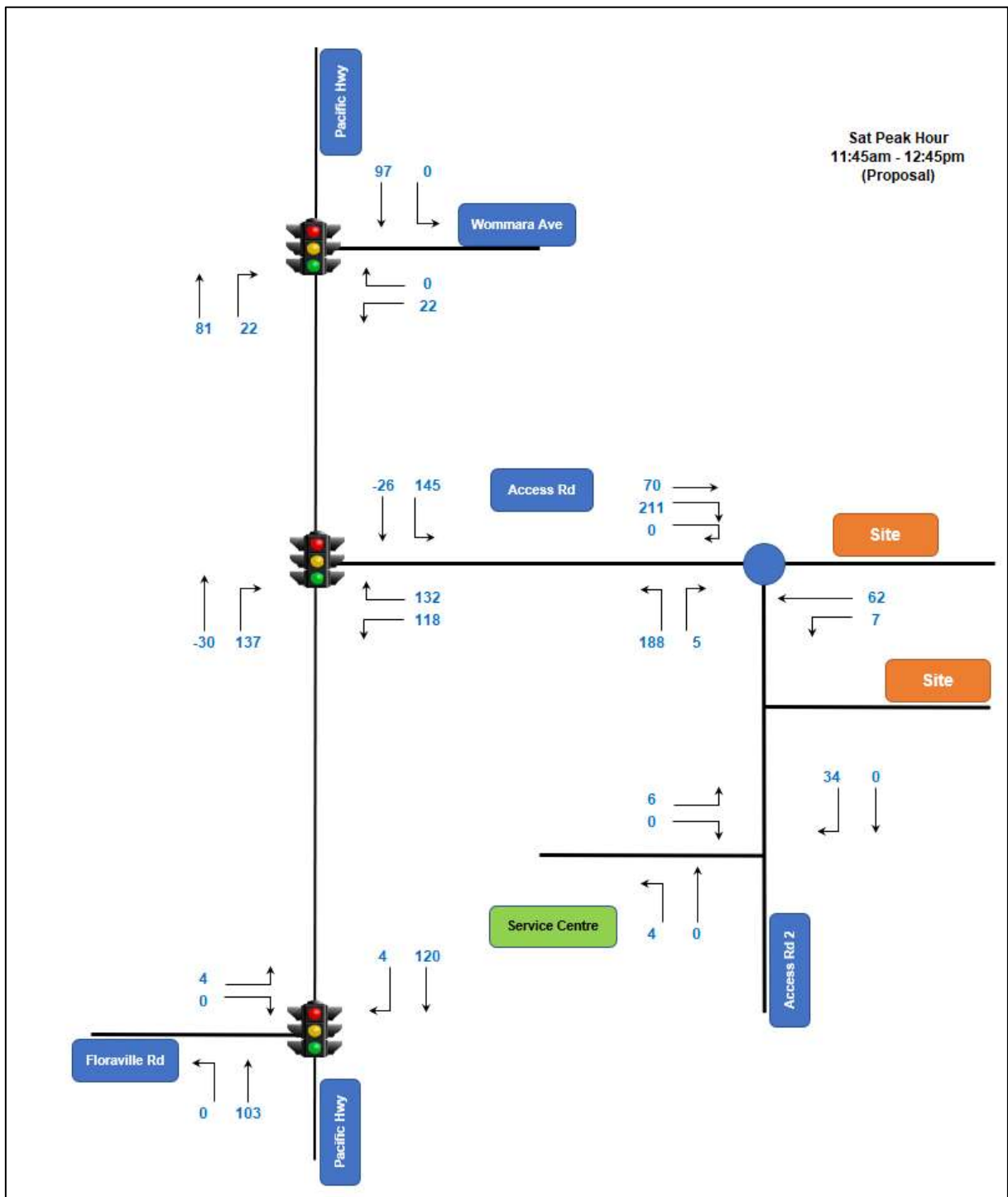


Figure 18: Proposal Friday Saturday Peak Hour Traffic Flows

8.3 Traffic Impacts

8.3.1 Comparative Trip Generation

An initial means of examining the relative impacts of the Proposal is a comparison of the traffic generation of the Site further to the Proposal with the existing Bunnings traffic generation. With reference to sections above, the comparative traffic generation of the Site during the key peak periods is summarised in **Table 9**.

Table 9: Trip Generation – Comparison (veh/hr)

Period	Existing	Proposed	Net Increase
Weekday AM Peak Hour	219	198	- 21
Weekday PM Peak Hour	245	575	+ 330
Saturday Midday Peak Hour	626	605	- 21

Table 9 indicates that the Proposal will result in a higher number of trips being generated by the Site during weekday evening peak hours when compared to existing operations; however, it will generate slightly less trips during weekday morning and Saturday midday peak hours.

8.3.2 Future Intersection Operations

The operation of the key intersections in the forecast year 2029 further to the Proposal has again be assessed using the SIDRA model. The results of the analysis are provided in **Table 10** below, while **Table 11** provides a summary of the Existing 2019, Base 2029 and Base 2029 + Proposal SIDRA results.

Table 10: Base 2029 + Proposal Intersection Operations

Base 2029 + Proposal Intersection Operations	Peak Period	Delay	LoS
Pacific Hwy & Wommara Ave	AM	22	B
	PM	150	F
	Sat	130	F
Pacific Hwy & Site Access	AM	12	A
	PM	22	B
	Sat	49	D
Pacific Hwy & Floraville Rd	AM	58	E
	PM	13	A
	Sat	15	B
Internal Site Roundabout	AM	29	C
	PM	29	C
	Sat	29	C

Table 11: SIDRA Intersection Operations Summary

Intersection Operations Summary	Peak Periods	2019 (Existing)		Base 2029		Base 2029 + Proposal	
		Delay	LoS	Delay	LoS	Delay	LoS
Pacific Hwy & Wommara Ave	AM	19	B	23	B	22	B
	PM	19	B	126	F	150	F
	SAT	17	B	115	F	130	F
Pacific Hwy & Site Access	AM	12	A	13	A	12	A
	PM	6	A	21	B	22	B
	SAT	21	B	42	C	49	D
Pacific Hwy & Floraville Rd	AM	16	B	58	E	58	E
	PM	11	A	15	B	13	A
	SAT	13	A	16	B	15	B
Internal Site Roundabout	AM	24	B	24	B	29	C
	PM	24	B	24	B	29	C
	SAT	24	B	24	B	29	C

With reference to the tables above:

- AVD at the intersection of Pacific Highway & Wommara Avenue increases in the weekday PM and Saturday peak hours. Again, the primary delay relates to the southbound Pacific Highway approach to Wommara Avenue.
- The AVD and LoS - whilst nearing capacity in both future year (within and without development) scenarios - remain unchanged at the intersection of Pacific Hwy & Floraville Rd during weekday AM peak hours. Again, the primary delay relates to the northbound Pacific Highway approach to Floraville Road.
- A minor increase in AVD is reported at the Pacific Highway & Site intersection in the Saturday peak hour (7 seconds), which results in LoS being reduced to LoS D. However, a LoS D is considered acceptable on a regional route during the peak hour.

8.4 Impact Minimisation

While the Proposal in and of itself generates only a moderate number of additional vehicle trips to the key intersections north and south of the Site, the impact of those additional trips disproportionately impacts future levels of service given the poor background (Base 2029) intersection operations.

As such, Ason Group has examined the benefits arising from a number of different upgrade options for the Pacific Highway, again noting that upgrades will be required regardless of the Proposal to accommodate base traffic flows by 2029. These potential upgrades are described below.

8.4.1 Pacific Highway Upgrade: 3 Southbound Lanes Site to Floraville Road

This upgrade (termed Option 1) would provide for an additional Pacific Highway southbound through lane from north of the Site through Floraville Road, as shown in **Figure 19** below.

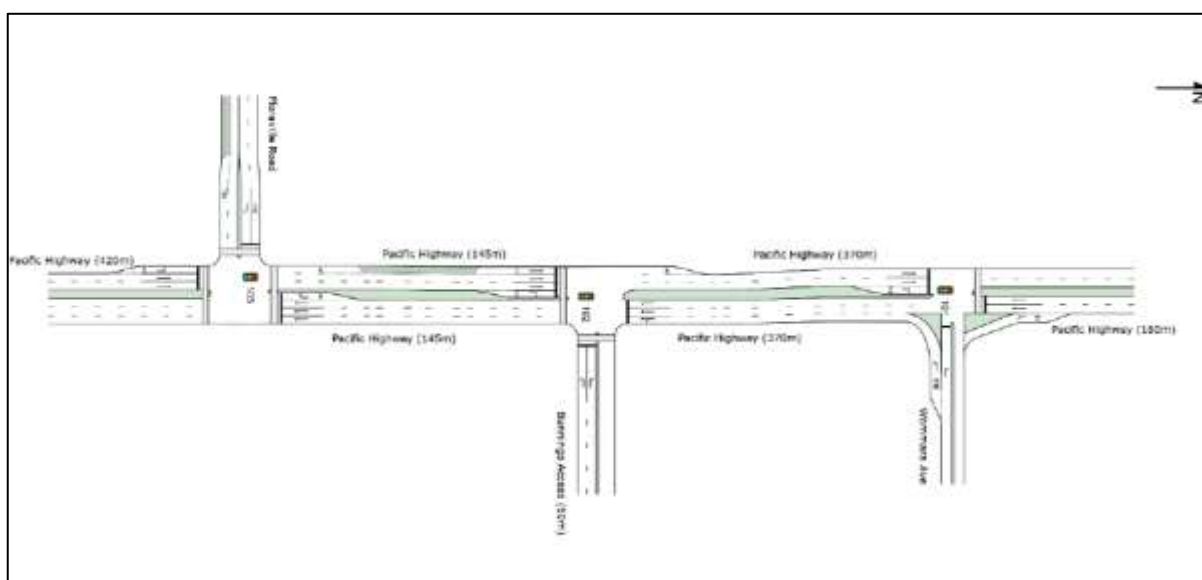


Figure 19: Pacific Highway Upgrade: 3 Southbound Lanes Site to Floraville Road

Intersection operations further to this upgrade are detailed in **Table 12**.

Table 12: Intersection Operations, Pacific Highway Upgrade Option 1

Intersection Operations Upgrade Option 1	Peak Periods	Base 2029		Base 2029 + Proposal	
		Delay	LoS	Delay	LoS
Pacific Hwy & Wommara Ave	AM	23	B	22	B
	PM	45	D	59	E
	SAT	20	B	20	B
Pacific Hwy & Bunnings Access	AM	13	A	14	A
	PM	7	A	18	B
	SAT	24	B	24	B
Pacific Hwy & Floraville Rd	AM	58	E	58	E
	PM	12	A	12	A
	SAT	14	A	14	A

This standard of upgrade would be required to accommodate the Base 2029 traffic flows, regardless of the Proposal.

8.4.2 Pacific Highway Upgrade: 3 Southbound Lanes, Wommara Avenue to Floraville Road

This upgrade (termed Option 2) would provide for an additional Pacific Highway southbound through lane from just north of Wommara Avenue (generally utilising the existing left turn lane length) through Floraville Road, as shown in **Figure 20** below.

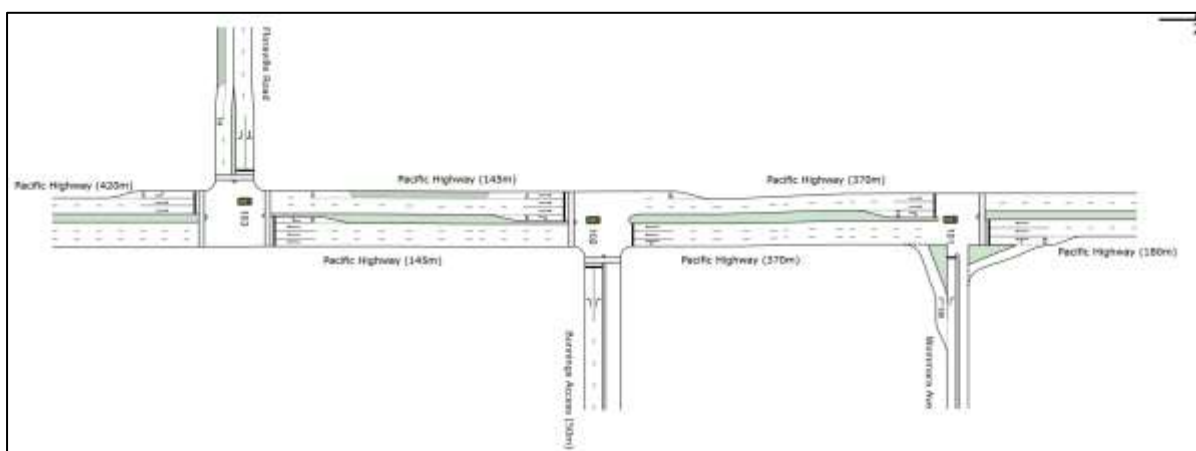


Figure 20: Pacific Highway Upgrade: 3 Southbound Lanes Wommara Avenue to Floraville Road

Intersection operations further to this upgrade are detailed in **Table 13**.

Table 13: Intersection Operations, Pacific Highway Upgrade Option 2

Intersection Operations Upgrade Option 2	Peak Periods	Base 2029		Base 2029 + Proposal	
		Delay	LoS	Delay	LoS
Pacific Hwy & Wommara Ave	AM	23	B	23	B
	PM	28	B	33	C
	SAT	19	B	19	B
Pacific Hwy & Bunnings Access	AM	14	A	14	A
	PM	7	A	13	A
	SAT	23	B	23	B
Pacific Hwy & Floraville Rd	AM	58	E	58	E
	PM	12	A	12	A
	SAT	14	A	14	A

This additional upgrade would therefore accommodate both Base 2029 and Base 2029 + Proposal conditions.

8.4.3 Additional Upgrade Options

Additional upgrade options have been examined which would further improve the operation of the Pacific Highway & Wommara Avenue intersection (under both Base 2029 and Base 2029 + Proposal conditions). These include:

- The removal of the on-street parking currently available in the Pacific Highway northbound kerbside lane (all day) between Floraville Road and the Narellan Pools driveway (south of Access Road 1).
- Further to the above, at the Pacific Highway & Floraville Road intersection, the introduction of a new (likely unsignalised) left turn slip lane, Pacific Highway to Floraville Road; this would in turn allow the existing left turn lane to be provided as an additional Pacific Highway northbound approach lane linking with the existing Pacific Highway northbound kerbside lane. With reference to the removal of on-street parking (as discussed above), the Pacific Highway would therefore provide three northbound lanes from south of Floraville Road to north of York Crescent.

- Further to the above, the additional extension of the Pacific Highway kerbside northbound lane from its current terminus north of York Crescent to a point north of Wommara Avenue. With reference to the options list above, the Pacific Highway would therefore provide three northbound lanes from south of Floraville Road to north of Wommara Avenue.

Additional detailed investigations of the future operation of the Pacific Highway through Belmont North will need to be undertaken in consultation with Council and the RMS so as to determine upgrades that would appropriately accommodate the Base 2029 traffic flows and the Proposal.

Notwithstanding, based on our analysis it is the view of Ason Group that upgrades which would accommodate the Base 2029 traffic flows must be determined simply to maintain efficient movements through this section of the Pacific Highway; and that the additional traffic generated by the Proposal could also be provided for through the introduction of additional upgrades which could be agreed with Council and the RMS.

9 Conclusions

Further to a detailed assessment of the Planning Proposal, Ason Group provides the following conclusions:

- The Site is currently a relatively high traffic generator (Bunnings) particularly during the weekday PM and Saturday peak hours. As such, the additional traffic generation of the Site is proportionally less than would generally be the case further to the introduction of retail development as proposed.
- While the local road network currently operates at an appropriate Level of Service (LoS) – particularly further to the coordination of the key Pacific Highway intersections from Wommara Avenue through Floraville Road - there are existing capacity constraints; the most significant of these constraints is the provision of only 2 Pacific Highway southbound lanes through the study area.
- By 2029, background traffic increases – assessed with reference to historical RMS count data – are such that a poor LoS F is reported at the Pacific Highway & Wommara Avenue intersection (in the weekday PM and Saturday peak hours); and LoS E at the Pacific Highway & Floraville Road intersection (in the weekday AM peak hour). **These conditions will occur regardless of the Proposal.**
- Further to the addition of the Proposal's traffic to the Base 2029 traffic flows:
 - The Pacific Highway & Wommara Avenue intersection continues to operate at a LoS F in the weekday PM and Saturday peak hours, but with generally increased average vehicle delay (AVD).
 - The Pacific Highway & Floraville Road intersection also retains the same LoS E during the weekday AM peak hour. The intersection is generally unaffected by the Proposal.
 - The Pacific Highway & Site intersection AVD increases by 7 seconds in the Saturday peak hour, resulting in a LoS change from LoS C to LoS D; however, it should be noted that the Base 2029 AVD is on the cusp of a LoS D (reporting AVD of 42.0 seconds, where LoS D is reported from 42.5 seconds). Notwithstanding, a LoS D is acceptable on a major highway (particularly given a 10-year forecast).
- Based on our discussions with Council and the RMS, it has been determined that **there are no current plans to upgrade this section of the Pacific Highway to cater for future traffic flows** (i.e. the Base 2029 traffic flows). While commitments have been made in the past to examine the existing constraints, Ason Group understands that the RMS is only now (2019) developing a scope of work for a Lake Macquarie wide traffic study; the timeframe (and indeed final scope) of this study is unknown.

- Notwithstanding, Ason Group has undertaken preliminary testing of a number of potential upgrades of the Pacific Highway (between Wommara Avenue and Floraville Road) designed to increase capacity to accommodate both Base 2029 traffic flows and the Proposal.
- The primary constraint identified in the SIDRA modelling is the southbound capacity in the Pacific Highway, particularly during the weekday AM and Saturday peak hours. **The provision of an additional Pacific Highway southbound lane from south of Wommara Avenue through to south of Floraville Road has been determined as an essential upgrade requirement to appropriately cater for Base 2029 traffic flows.** Further to this upgrade, both the Pacific Highway & Wommara Avenue and Pacific Highway & Access Road 1 intersections operate at LoS C or better through all key peak periods.
- **To appropriately accommodate the Proposal's traffic generation (and further improve Base 2029 conditions) an additional short southbound lane north of Wommara Avenue (i.e. a third approach lane in the Pacific Highway) would be required.** Further to this additional upgrade, both the Pacific Highway & Wommara Avenue and Pacific Highway & Access Road 1 intersections operate at LoS C or better through all key peak periods for Base 2029 + Proposal traffic flows.
- The intersection of Pacific Highway & Floraville Road operates at a LoS E in the AM peak hour under both Base 2029 and Base 2029 + Proposal conditions even further to the upgrades discussed above, with the primary constraint being the capacity of the Pacific Highway southern approach. Background testing by Ason Group indicates that AVD could be further reduced at this intersection (and through all the key intersections) further to the following additional upgrades:
 - The removal of the existing on-street parking available in the Pacific Highway northbound kerbside lane between Floraville Road and the Narellan Pools driveway;
 - Further to the above, the provision of a new left turn slip lane, Pacific Highway south to Floraville Road, which in turn would provide for 3 northbound through lanes from south to Floraville Road to north of York Crescent; and
 - Further to the above, the extension of this third northbound through lane from its current terminus north of York Crescent to a location north of Wommara Avenue.
- There is no question that further detailed investigations and consultation with Council and the RMS will be required to finalise any future upgrades. Notwithstanding, **it is the conclusion of Ason Group that essential upgrades which appropriately accommodate the Base 2029 demand, and additional upgrades which would accommodate the Proposal, can be determined further to these investigations and consultation.**
- Finally, the Proposal will provide a level of car parking which meets the requirements of DCP 2014, as well as an appropriate allocation of bicycle, accessible and motorcycle parking. All access, parking and servicing areas would necessarily be designed to provide compliance with the relevant Australian Standards.

[end]

Attachment 9: Economic Impact Assessment

Kaufland Belmont North

Economic Impact Assessment

Prepared for BWP Trust
24 January 2019



Deep End Services

Deep End Services is an economic research and property consulting firm based in Melbourne. It provides a range of services to local and international retailers, property owners and developers including due diligence and market scoping studies, store benchmarking and network planning, site analysis and sales forecasting, market assessments for a variety of land uses, and highest and best use studies.

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Document Name

BWP Trust report - Kaufland Belmont North EIA - 24 Jan 2019

Assumptions and data sources

All spending data includes GST and is expressed in future dollars.

Sources include:

Australian Bureau of Statistics

- 2016 Census
- Dwelling approvals, 2011/12-2016/17
- Estimated resident population updates, 2012-2017

Deloitte Access Economics

- Spend per capita estimates and forecasts by category, 2012-2028

Market Data Systems

- MarketInfo retail spending propensity by category, 2011/12

NSW Government – Department Planning & Environment

- Transport for NSW - Population Projections by Travel Zone 2016
- Local planning zones

Property Council of Australia

- Shopping Centre Directory, 2017

Disclaimer

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This report contains forecasts of future events that are based on numerous sources of information as referenced in the text and supporting material. It is not always possible to verify that this information is accurate or complete. It should be noted that information inputs and the factors influencing the findings in this report may change hence Deep End Services Pty Ltd cannot accept responsibility for reliance upon such findings beyond six months from the date of this report. Beyond that date, a review of the findings contained in this report may be necessary.

This report should be read in its entirety, as reference to part only may be misleading.

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1

Introduction



1.1 Site context

The subject site is located at 393 Pacific Highway, Belmont North, approximately 18 km southwest of the Newcastle CBD.

The 4.04-hectare site is currently occupied by a 12,640 sqm Bunnings Warehouse. However, Bunnings has announced plans to relocate to a new 30,000 sqm homemaker centre development at Bennetts Green, 4 km north, on a site that previously had approval for a Masters home improvement store.

The subject site is situated behind several premises fronting Pacific Highway and is accessed via a two-way access road off Pacific Highway, leading onto a large at-grade car park. The access road is signalised, allowing movement in all directions from Pacific Highway, which is the main north-south regional arterial linking Newcastle to the Central Coast.

Residential housing adjoins the site to the north while the Belmont Wetlands abuts the site to the east. Light industrial, service stations, fast food outlets and large format retailing are the predominant uses along the immediate Pacific Highway corridor, with residential dwellings abutting these uses slightly further east and south. Belmont High School is located 400 metres south on the Pacific Highway.

Figure 1—Aerial image and site context



Source: Deep End Services; Nearmap

1.2 Development proposal

The subject site is currently zoned B7, with the exception of part of the access road which is zoned B4. The owners of the site, BWP Trust, are seeking to have an Additional Permitted Use ("APU") applied to the planning controls for the site to enable the development of a Kaufland supermarket and a small number of specialty shops to replace Bunnings.

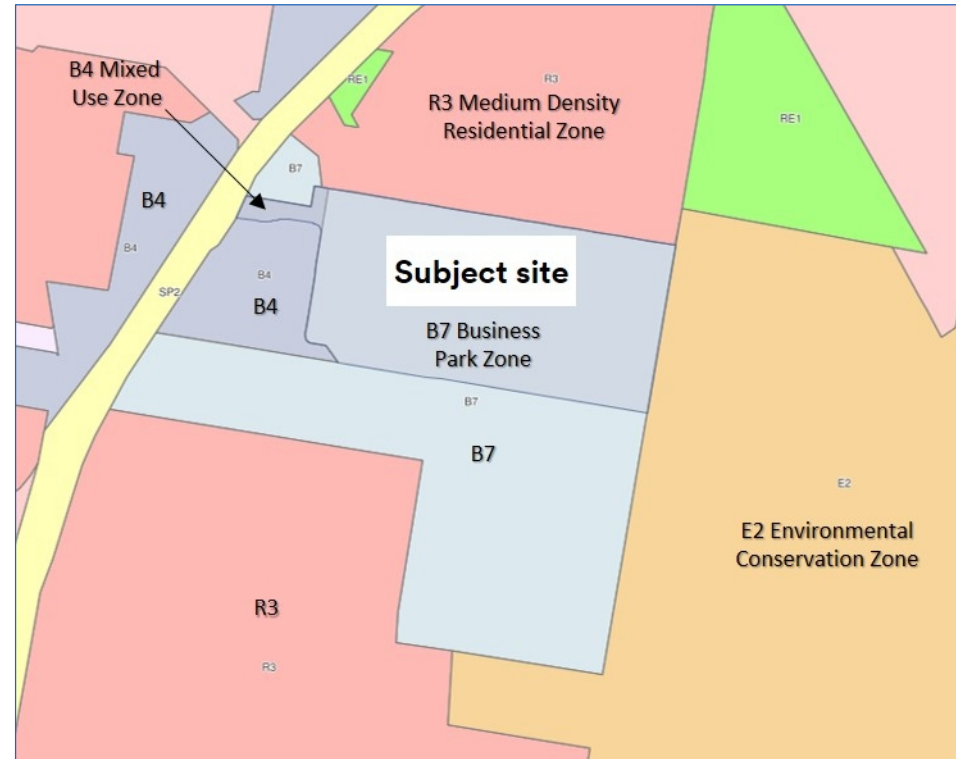
A redevelopment plan is not available at this stage however we have been told to assume that the retail floorspace to be occupied by the tenants will be as follows:

- 4,000 sqm Kaufland supermarket; and
- 500 sqm specialty tenancies.

An adequate level of on-grade parking will be provided at the front of the facility, with access continuing from the all ways signalised intersection at the Pacific Highway.

With the existing Bunnings store having 3 years left on its lease, it is assumed the Kaufland supermarket and associated specialties will be open at Belmont North in late 2021 or early 2022, with the first full financial year of trading therefore being 2022/23.

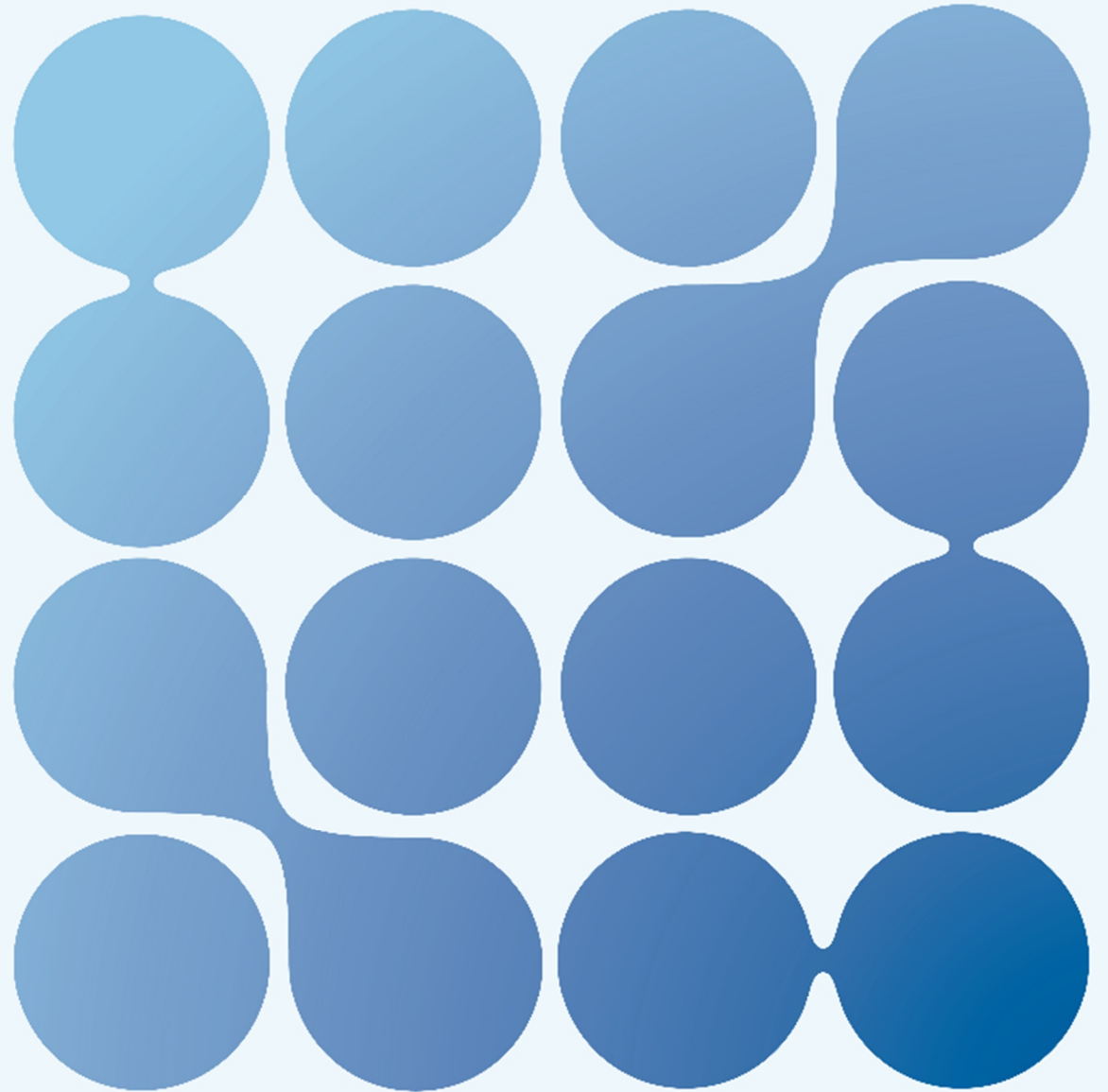
Figure 2—Zoning map



Source: Deep End Services; NSW Government, Planning & Environment

2

Supermarket catchment analysis



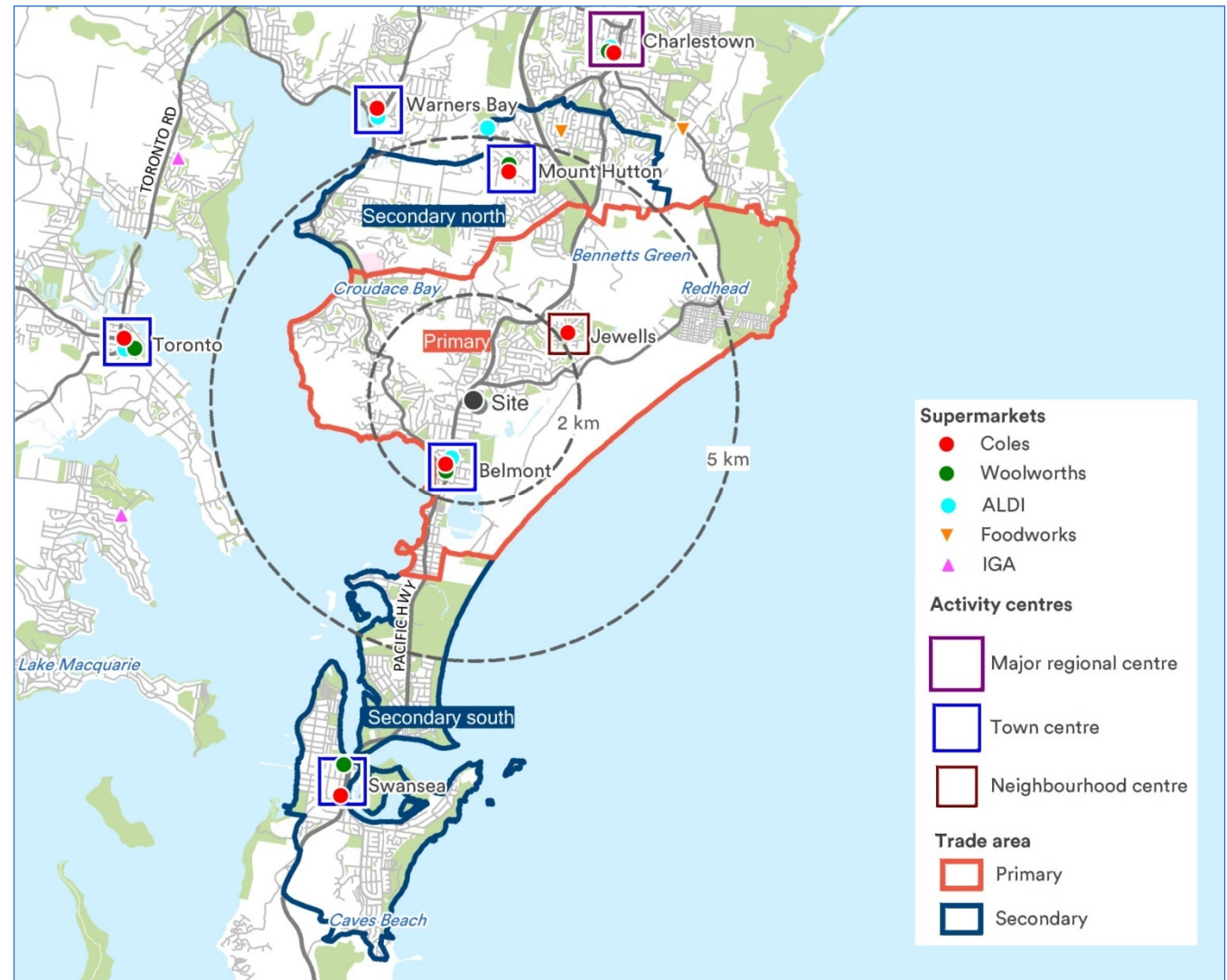
2.1 Catchment definition

The catchment area for the proposed Kaufland supermarket at Belmont North is influenced by a range of factors including the regional and local road network and the location of other supermarkets, noting that Kaufland's offer means that it will draw customers from a wider area than a typical supermarket.

The catchment is elongated north-south along the major arterial Pacific Highway and comprises a Primary and two Secondary sectors as follows:

- The Pacific Highway bisects the key Primary sector, with the Pacific Ocean to the east and Lake Macquarie to the west providing natural barriers in these directions. This sector includes the suburbs of Belmont, Belmont North, Jewells, Redhead, Bennetts Green, Croudace Bay and Valentine.
- The Secondary north sector extends up to 6 km north of the site to Warners Bay Road and Heshbon Street, incorporating the suburbs of Eleebana and Gateshead and parts of Mount Hutton and Windale.
- The Secondary south sector extends up to 11 km south to Old Pacific Highway and Scenic Drive to encompass the suburbs of Caves Beach, Swansea, Pelican, Blacksmiths and Marks Point.

Figure 3—Catchment area



Source: Deep End Services; Mapinfo

2.2 Demographics

The key demographic features of the catchment area (compared to Regional NSW) are as follows:

- Slightly larger household sizes due to a higher proportion of 'couple with children' households in the Primary and Secondary north
- Lower proportion of residents aged 20-34 years
- Above average proportion of tertiary educated residents and white-collar workers in the Primary and Secondary north sectors
- Hence, above average individual and household income levels
- Less ethnically diverse
- Skew away from rented dwellings

Overall, there is considerable variation between the catchment sector profiles. The Primary and Secondary north sectors reflect a more affluent and family-based community with a higher proportion of mortgaged homes. The Secondary south sector is oriented towards older residents more likely to be retired and with generally lower levels of education and income. This sector also has a higher proportion of higher-density and unoccupied dwellings, indicative of a coastal holiday market.

Table 1—Catchment area characteristics, 2016

Demographic characteristic (2016 Census)	Primary	Secondary north	Secondary south	Total catchment	Regional NSW
Persons and dwellings					
Usual resident population	30,149	16,995	14,176	61,320	2,656,237
Total private dwellings	12,459	6,786	6,611	25,856	1,203,937
- % unoccupied	7%	7%	10%	8%	12%
Average household size ⁽⁵⁾⁽⁷⁾	2.52	2.61	2.34	2.50	2.44
At same address: ⁽¹⁾					
- 1 year ago	88%	89%	88%	89%	85%
- 5 years ago	67%	68%	66%	67%	60%
Economic indicators					
Participation rate ⁽²⁾	57%	56%	50%	55%	55%
Unemployment rate ⁽²⁾	6.7%	7.3%	7.7%	7.1%	6.7%
White collar workers ⁽²⁾	47%	46%	39%	45%	44%
Bachelor degree or higher ⁽²⁾⁽³⁾	16%	16%	11%	15%	14%
Age group					
0-9	12%	12%	10%	12%	12%
10-19	13%	14%	11%	13%	12%
20-34	15%	16%	13%	15%	17%
35-49	19%	19%	17%	18%	18%
50-64	20%	20%	23%	21%	21%
65+	21%	19%	26%	21%	21%
Average age	41.6	40.4	45.3	42.1	41.5
Annual individual income ⁽⁵⁾					
<\$15,600	20%	21%	21%	21%	21%
\$15,600 - \$41,700	40%	41%	45%	42%	42%
\$41,700 - \$78,200	23%	22%	21%	22%	23%
\$78,200 - \$104,200	9%	8%	7%	8%	7%
>\$104,200	8%	8%	6%	7%	6%
Average individual income	\$46,646	\$44,967	\$41,049	\$44,587	\$42,778
Variation from Regional NSW average	9%	5%	-4%	4%	-
Annual household income ⁽⁵⁾⁽⁶⁾⁽⁷⁾					
<\$33,800	23%	22%	29%	24%	25%
\$33,800 - \$78,200	33%	34%	36%	34%	37%
\$78,200 - \$130,300	22%	22%	19%	21%	22%
\$130,300 - \$182,400	12%	12%	10%	12%	9%
>\$182,400	10%	10%	6%	9%	7%
Average household income	\$88,470	\$88,534	\$74,501	\$85,100	\$79,157
Variation from Regional NSW average	12%	12%	-6%	8%	-
Average household loan repayment	\$24,238	\$22,762	\$22,150	\$23,418	\$20,950
% of household income	18%	17%	18%	18%	18%
Average household rent payment	\$15,980	\$13,357	\$15,505	\$15,080	\$14,721
% of household income	28%	27%	29%	28%	24%

Source: Deep End Services; ABS

Demographic characteristic (2016 Census)	Primary	Secondary north	Secondary south	Total catchment	Regional NSW
Country of birth ⁽¹⁾					
Australia	92%	91%	93%	92%	88%
England	3%	3%	3%	3%	3%
New Zealand	1%	1%	1%	1%	1%
Scotland	0%	1%	0%	0%	0%
Germany	0%	0%	0%	0%	0%
South Africa	0%	0%	0%	0%	0%
Other	3%	4%	3%	3%	7%
Occupied private dwelling tenure ⁽⁵⁾⁽⁴⁾⁽⁵⁾⁽⁶⁾					
Fully owned	41%	35%	45%	41%	39%
Being purchased	36%	36%	28%	34%	32%
Rented	23%	30%	27%	26%	29%
Dwelling type ⁽⁴⁾⁽⁷⁾					
Separate house	82%	88%	77%	82%	84%
Townhouse/semi-detached	14%	9%	9%	11%	9%
Apartment	4%	3%	14%	6%	7%
Household composition ⁽⁴⁾⁽⁵⁾					
Couples with children	33%	34%	26%	31%	28%
Couples without children	29%	26%	30%	28%	29%
One parent family	12%	15%	12%	12%	12%
Lone person	25%	23%	30%	26%	28%
Group	2%	2%	2%	2%	3%
Motor vehicle ownership per dwelling ⁽⁵⁾⁽³⁾					
None	7%	7%	8%	7%	6%
One	34%	33%	38%	35%	37%
Two	40%	39%	35%	38%	38%
Three or more	20%	21%	18%	20%	19%

Notes:

- (1) Excludes not stated
- (2) 15 years and over and excludes not stated
- (3) Excludes inadequately described and/or partially stated
- (4) Excludes other
- (5) Occupied private dwellings
- (6) Includes visitor only households
- (7) Excludes visitor only households

2.3 Population

The catchment area is estimated to have contained 63,135 people at June 2018, with 31,061 people (or 49%) residing in the Primary sector.

The catchment area covers well-established urban areas along the main transport corridors and surrounding coastal communities and consequently, the majority of future population growth will occur as a result of infill development.

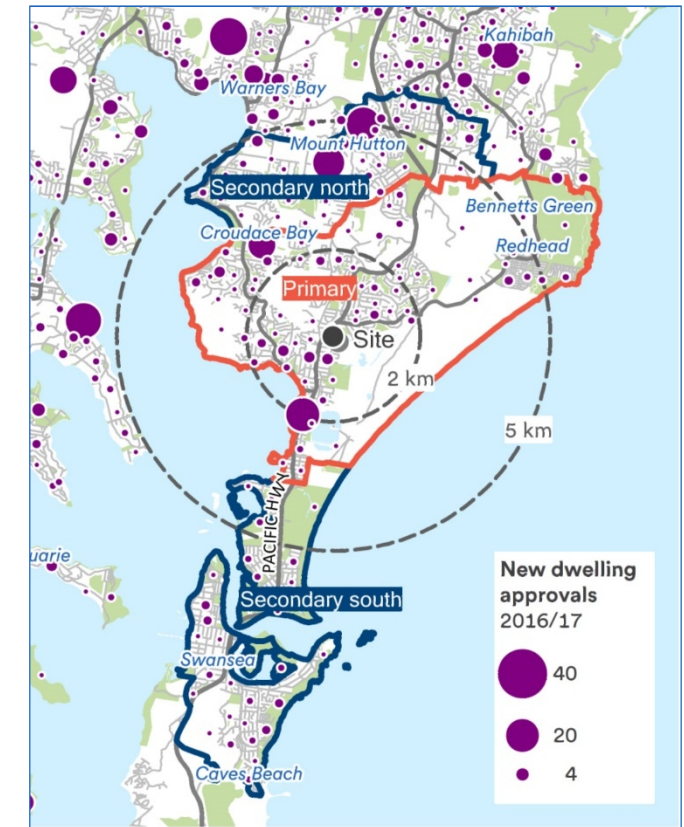
By 2028, the catchment area is forecast to contain a population of 64,545 people, an increase of 1,410 over the next 10-year period, at an average rate of 0.2% per annum.

Table 2—Catchment area population, 2011 - 2028

Catchment area sector	2011	2016	2018	2023	2028
<u>Population</u>					
Primary	30,764	30,991	31,061	31,396	31,666
Secondary north	17,616	17,456	17,492	17,637	17,762
Secondary south	14,410	14,493	14,582	14,877	15,117
Total	62,790	62,940	63,135	63,910	64,545
<u>Population growth (No. per annum)</u>					
Primary	-	45	35	67	54
Secondary north	-	-32	18	29	25
Secondary south	-	17	45	59	48
Total	-	30	98	155	127
<u>Population growth (% per annum)</u>					
Primary	-	0.1%	0.1%	0.2%	0.2%
Secondary north	-	-0.2%	0.1%	0.2%	0.1%
Secondary south	-	0.1%	0.3%	0.4%	0.3%
Total	-	0.0%	0.2%	0.2%	0.2%

Source: Deep End Services; ABS; Transport for NSW – NSW Population Projections by Travel Zone 2016

Figure 4—New dwelling approvals, 2016/17



Source: Deep End Services, ABS, MapInfo

2.4 Retail spending

Per capita spending levels for the catchment area are modelled by Market Data Systems and take into account demographic variables such as income, ethnicity, age and education level, as well as regional factors, on a household's propensity to purchase products and services. As a result, catchment area retail spend per capita is 3.4% higher than the Regional NSW average.

Combining population estimates and forecasts with per capita spending levels in the catchment area generates the retail spending market for each of the major product groups as shown in Table 3.

The market of most relevance to a Kaufland supermarket is the Food, Liquor & Groceries ("FL&G") market. Annual spending on FL&G by catchment area residents is estimated to have been \$419.1 million in 2018, having grown from \$339.1 million in 2011 at an average rate of 3.1% per annum.

Looking further ahead, the annual spending market on FL&G is forecast to reach \$533.6 million by 2028, equivalent to an average growth rate of 2.4% over the next 10 years. This also represents an increase of \$114.5 million from the current annual spending market.

Table 3—Catchment area retail spending, 2011-2028

Spending category	Spending market (\$m)					Average change (%pa)			
	2011	2016	2018	2023	2028	2011-16	2016-18	2018-23	2023-28
<u>Food, Liquor & Groceries</u>									
Primary	167.1	193.5	207.1	228.9	263.7	3.0%	3.4%	2.0%	2.9%
Secondary north	94.0	107.2	114.9	126.2	144.9	2.6%	3.5%	1.9%	2.8%
Secondary south	78.0	90.2	97.1	107.9	124.9	3.0%	3.7%	2.1%	3.0%
Total	339.1	391.0	419.1	463.0	533.6	2.9%	3.5%	2.0%	2.9%
<u>Other food</u>									
Primary	53.6	65.5	67.2	72.6	80.7	4.1%	1.3%	1.6%	2.2%
Secondary north	29.0	34.9	35.8	38.6	42.8	3.8%	1.3%	1.5%	2.1%
Secondary south	22.9	27.9	28.8	31.4	35.2	4.1%	1.5%	1.7%	2.3%
Total	105.5	128.3	131.8	142.5	158.7	4.0%	1.3%	1.6%	2.2%
<u>Non-food & retail services</u>									
Primary	180.8	220.9	225.0	244.0	273.8	4.1%	0.9%	1.6%	2.3%
Secondary north	97.9	117.7	119.8	129.1	144.4	3.8%	0.9%	1.5%	2.3%
Secondary south	77.4	94.3	96.6	106.1	120.2	4.0%	1.2%	1.9%	2.5%
Total	356.1	433.0	441.4	479.1	538.4	4.0%	1.0%	1.7%	2.4%
<u>Total</u>									
Primary	401.4	480.0	499.3	545.4	618.2	3.6%	2.0%	1.8%	2.5%
Secondary north	221.0	259.8	270.4	293.9	332.2	3.3%	2.0%	1.7%	2.5%
Secondary south	178.4	212.5	222.5	245.3	280.3	3.6%	2.3%	2.0%	2.7%
Total	800.7	952.3	992.3	1,084.6	1,230.7	3.5%	2.1%	1.8%	2.6%

Note:

Food, Liquor & Groceries (FL&G) is the majority of supermarket turnover and includes perishable and non-perishable food, take-home liquor, cigarettes, personal care and non-prescription pharmaceuticals, magazines & stationery

Other Food includes takeaway food, dining out at cafés and restaurants

Non-food & retail services include auto accessories, fashion, furniture & furnishings, hardware & garden, pharmaceuticals, home appliances & entertainments, homewares, reading & writing, recreational goods, hairdressing & personal care, dry cleaning, optical, repairs & alterations, photo developing & video hire.

Source: Deep End Services; ABS; Market Data Systems; Deloitte Access Economics

2.5 Retail hierarchy

Residents of the catchment area are currently served by a number of centres situated within the catchment and beyond. These are described below and floorspace estimates – based on inspections and other data – are provided within Table 4 on the following page.

Catchment area

The catchment area contains three Town Centres and a Neighbourhood Centre of relevance, as classified in the *Lake Macquarie City Lifestyle 2030 Strategy*. These centres comprise the following components:

- Belmont Town Centre – includes two shopping centres, the Coles-anchored Belmont Citi Centre and the Woolworths-anchored Belmont Central. The town centre also includes local strip-based retailing mainly along a 1.3 km stretch of the Pacific Highway. The strip includes a freestanding ALDI supermarket (the closest supermarket to the subject site), The Reject Shop and a large Liquorland store.
- Mount Hutton Town Centre – located within the Secondary north sector, the main shopping component is Lake Macquarie Fair, the only enclosed sub-regional shopping centre in the catchment. The shopping centre is anchored by a 4,165 sqm Woolworths and a 6,350 sqm Big W.

Adjoining Lake Macquarie Fair is the smaller Coles-anchored Mount Hutton Plaza. These two Charter Hall-owned centres are currently undergoing a major redevelopment, involving the demolition of Mount Hutton Plaza and the construction of a new larger Coles tenancy and specialty stores. The new 4,224 sqm Coles and mall will integrate with the existing Lake Macquarie Fair, with completion expected by the end of 2018. The balance of the town centre includes the adjacent Lake Macquarie Tavern and a small cluster of shopfronts along Wilsons Road, 200 metres north of the shopping centre.

- Swansea Town Centre – situated 8 km south of the subject site, this centre consists of local convenience retail shopfronts extending 700 metres on the western side of the Pacific Highway. The centre is anchored by a 3,485 sqm Woolworths to the north and a 3,262 sqm Coles to the south as well as a Dan Murphy's liquor store.
- Jewells Neighbourhood Centre – the only neighbourhood centre of relevance within the catchment, the centre is embedded within a residential neighbourhood located 3 km north-east of the subject site. The centre comprises Jewellstown Plaza, a small Coles-anchored (formerly Bi-Lo) neighbourhood shopping centre.

Several other small neighbourhood centres within residential pockets are located throughout the catchment. These centres are typically anchored by small Foodworks or Friendly Grocer supermarkets and cater to the everyday convenience needs of local

residents, rather than providing an alternative supermarket shopping function. Hence, their competitive relevance to the proposed development is minimal.

Beyond catchment

- Charlestown Regional Centre – located 8 km north of the subject site, this centre is the only designated regional centre within the City of Lake Macquarie and serves the higher order retail and commercial needs for the Hunter region. The main retail core is centred on Charlestown Square, a super-regional shopping centre containing almost 90,000 sqm floorspace and is anchored by Myer, Big W, Target, Woolworths and Coles and includes a Reading cinema complex. In addition, Charlestown Regional Centre encompasses a large street-based precinct surrounding the shopping centre to the east and north.
- Warners Bay Town Centre – located on the northern shores of Lake Macquarie, 6 km north of the subject site (10 km by road), the main retail focus is on Warners Bay Village, a convenience-based neighbourhood centre anchored by a moderate sized Coles. Just to the south is a new apartment development incorporating a ground level shopping complex, Shearwater Plaza. This new centre is anchored by ALDI and 10 specialty shops, which are yet to be leased. The balance of the town centre comprises attractive strip-based retailing with a focus on cafes and restaurants along the foreshore.

Table 4—Estimated retail floorspace by category

Activity centre	Occupied retail floorspace (sqm)				Total retail
	Smkts	Other food & drink	Total food & drink	Non-food & services	
WITHIN CATCHMENT					
Belmont Citi Centre	4,856	680	5,536	810	6,346
Belmont Central	3,784	440	4,224	1,200	5,424
Balance Belmont Town Centre	1,796	3,130	4,926	7,320	12,246
Belmont Town Centre	10,436	4,250	14,686	9,330	24,016
Lake Macquarie Fair*	8,389	1,453	9,842	10,845	20,687
Balance Mount Hutton Town Centre	0	300	300	400	700
Mount Hutton Town Centre	8,389	1,753	10,142	11,245	21,387
Swansea Town Centre	6,747	3,000	9,747	3,200	12,947
Jewells Neighbourhood Centre	2,032	600	2,632	1,500	4,132
Total catchment	27,604	9,603	37,207	25,275	62,482
BEYOND CATCHMENT					
Charlestown Square	10,565	5,705	16,270	55,992	72,262
Balance Charlestown precinct	0	2,190	2,190	5,030	7,220
Charlestown Regional Centre	10,565	7,895	18,460	61,022	79,482
Warners Bay Village	3,012	675	3,687	850	4,537
Shearwater Plaza	1,509	0	1,509	0	1,509
Balance Warners Bay Town Centre	0	4,300	4,300	2,600	6,900
Warners Bay Town Centre	4,521	4,975	9,496	3,450	12,946

*Redeveloped Lake Macquarie Fair including new Coles and retail specialty floorspace (construction anticipated to be completed end of 2018)

Source: Deep End Services floorspace survey October 2018; Property Council Australia.

2.6 Catchment area – current and future floorspace and sales

A summary of catchment area retail floorspace by broad product group (Food, Liquor & Grocery, Non-Food & Services and Total) is provided in Table 5 at right. This table also provides estimated sales and trading levels for the activity centres in 2018. This is based on information in published sources such as Shopping Centre News and supplemented by Deep End Services' databases and observations.

No significant supermarket-based retail developments are assumed to occur within the catchment area over the period 2018 to 2023.

As a result, the combined sales within the catchment area centres is forecast to increase from \$491.8 million in 2018 to \$538.3 million in 2023, a \$46.5 million increase over 5 years.

The largest increase will be in the FL&G market, with sales recorded by local retailers in these product groups forecast to increase by \$32.3 million during the next 5 years.

Within the relevant centres beyond the catchment, a small increase in retail specialty floorspace (and sales) is assumed for the Warners Bay Town Centre due to the assumption that the retail tenancies at Shearwater Plaza and adjacent approved Water Edge development will be fully leased by 2023.

Table 5—Existing floorspace and sales estimates, 2018

Activity centre	Floorspace (sqm)			Estimated sales (\$m)			Trading level (\$/sqm)		
	FL&G	NF & Services	Total	FL&G	NF & Services	Total	FL&G	NF & Services	Total
WITHIN CATCHMENT									
Belmont Town Centre	13,016	11,000	24,016	119.2	62.8	182.1	\$9,161	\$5,712	\$7,581
Mount Hutton Town Centre	9,117	12,270	21,387	92.7	62.9	155.6	\$10,170	\$5,122	\$7,274
Swansea Town Centre	8,667	4,280	12,947	86.0	28.1	114.1	\$9,925	\$6,562	\$8,813
Jewells Neighbourhood Centre	2,307	1,825	4,132	27.2	12.6	39.9	\$11,809	\$6,925	\$9,652
Total catchment	33,108	29,374	62,482	325.2	166.4	491.6	\$9,823	\$5,665	\$7,868
BEYOND CATCHMENT									
Charlestown Regional Centre	17,732	61,750	79,482	201.5	397.1	598.7	\$11,365	\$6,431	\$7,532
Warners Bay Town Centre	8,773	4,173	12,946	87.7	30.8	118.5	\$10,001	\$7,373	\$9,153

Source: Deep End Services (including floorspace survey October 2018); Property Council of Australia

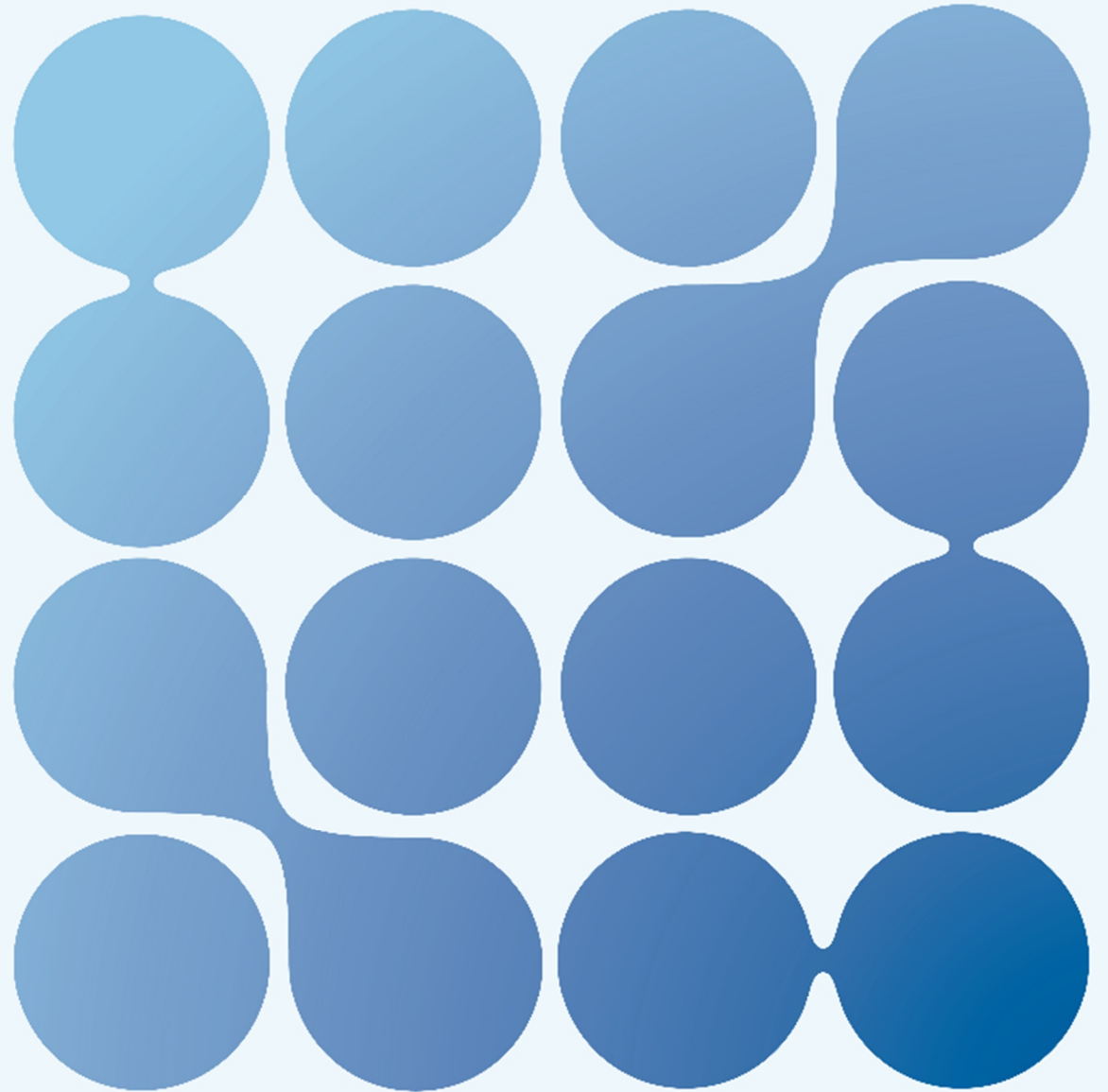
Table 6—Future floorspace and sales forecasts, 2023 ("base case")

Activity centre	Floorspace (sqm)			Estimated sales (\$m)			Trading level (\$/sqm)		
	FL&G	NF & Services	Total	FL&G	NF & Services	Total	FL&G	NF & Services	Total
WITHIN CATCHMENT									
Belmont Town Centre	13,016	11,000	24,016	131.1	68.2	199.3	\$10,070	\$6,200	\$8,297
Mount Hutton Town Centre	9,117	12,270	21,387	101.9	68.2	170.1	\$11,178	\$5,560	\$7,955
Swansea Town Centre	8,667	4,280	12,947	94.6	30.5	125.0	\$10,909	\$7,122	\$9,657
Jewells Neighbourhood Centre	2,307	1,825	4,132	29.9	13.7	43.7	\$12,981	\$7,517	\$10,567
Total catchment	33,108	29,374	62,482	357.5	180.6	538.1	\$10,797	\$6,149	\$8,612
BEYOND CATCHMENT									
Charlestown Regional Centre	17,732	61,750	79,482	221.5	431.1	652.6	\$12,492	\$6,981	\$8,211
Warners Bay Town Centre	9,693	4,703	14,396	99.2	34.9	134.1	\$10,234	\$7,422	\$9,316

Source: Deep End Services

3

Economic impact assessment



3.1 Sales forecast

Supermarket

The sales forecast for the Kaufland supermarket has been prepared on a market share basis as set out in Table 7 at right. As indicated, a market share of 10.5% is expected to be achieved in the key Primary sector due to proximity and excellent accessibility to the site. Whilst accessibility is also very good for the secondary sectors, considerably lower market shares are forecast to be achieved, at 3.8% within the Secondary south and 2.2% from the more competitive Secondary north sector. Additional sales are forecast to be sourced from non-catchment residents (15%) and non FL&G product categories (10%).

The resulting sales forecast for the Kaufland supermarket is \$40.4 million in 2023, representing a strong first year performance.

Other tenants

Forecast sales for the associated retail specialty tenants are \$3.6 million in 2023, the majority of which is assumed to be derived from specialty food retail tenants (i.e. fresh food, takeaway food and/or café).

Total centre

The total retail sales forecast for the subject site in 2023 are \$44.0 million as set out in Table 8. Of this, \$39.4 million is forecast to be derived from Food & Liquor goods and \$4.6 million from Non-Food & Services.

Table 7—Forecast Kaufland Belmont North supermarket sales, 2023

Catchment sector	FL&G spending (\$m)	Market share (%)	Turnover (\$m)	Sales distribution (%)
Primary	228.9	10.5%	24.0	66.1%
Secondary				
Secondary north	126.2	2.2%	2.8	7.6%
Secondary south	107.9	3.8%	4.1	11.3%
Total secondary	234.1	2.9%	6.9	18.9%
Total catchment area	463.0	6.7%	30.9	85.0%
Beyond sales (15%)			5.5	15.0%
Total FL&G sales			36.4	
Non-FL&G sales (10%)			4.0	10.0%
Total			40.4	

Source: Deep End Services

Table 8—Forecast Kaufland Belmont North total centre sales, 2023

Tenancy	Floorspace (sqm GLA)	Sales (\$m)	Trading level (\$/sqm)	Sales by category (\$m)		
				FL&G	NF & Services	Total retail
Supermarket	4,000	40.4	\$10,100	36.4	4.0	40.4
Other tenants	500	3.6	\$7,100	3.0	0.6	3.6
Total retail	4,500	44.0	\$9,767	39.4	4.6	44.0

Source: Deep End Services

3.2 Trading impacts

The trading impacts from the proposed development are set out in Table 9 for 2023.

Due its large “draw”, the proposed Belmont North Kaufland supermarket will attract sales from many supermarkets and other retailers throughout the region (including beyond the catchment at Charlestown and Warners Bay).

The average one-off impact across the catchment area is forecast as -7.1% for Food, Liquor & Groceries and -1.7% for Non-Food & Services, representing an overall average of -5.3% or -\$28.4 million.

The highest one-off impacts are anticipated within the Belmont Town Centre (-7.3%) and the Jewells Neighbourhood Centre (-6.8%). However, both centres are anchored by successful supermarkets which would continue to operate after the introduction of Kaufland at Belmont North.

Anticipated one-off impacts on other centres are substantially lower.

As a result, the proposed development will not have an unreasonable detrimental economic impact on the commercial viability of any existing activity centre.

Table 9—Forecast Kaufland Belmont North development trading impacts, 2023

Activity centre	Base case sales 2023			Post development sales			Impacts \$m			Impacts %		
	FL&G	NF & Services	Total	FL&G	NF & Services	Total	FL&G	NF & Services	Total	FL&G	NF & Services	Total
Kaufland Belmont North development				39.4	4.6	44.0						
WITHIN CATCHMENT												
Belmont Town Centre	131.1	68.2	199.3	118.5	66.3	184.7	-12.6	-1.9	-14.5	-9.6%	-2.8%	-7.3%
Mount Hutton Town Centre	101.9	68.2	170.1	97.0	67.6	164.6	-4.9	-0.6	-5.6	-4.8%	-0.9%	-3.3%
Swansea Town Centre	94.6	30.5	125.0	89.4	30.3	119.7	-5.1	-0.2	-5.3	-5.4%	-0.8%	-4.3%
Jewells Neighbourhood Centre	29.9	13.7	43.7	27.2	13.5	40.7	-2.8	-0.2	-3.0	-9.2%	-1.7%	-6.8%
Total catchment	357.5	180.6	538.1	332.1	177.6	509.7	-25.4	-3.0	-28.4	-7.1%	-1.7%	-5.3%
BEYOND CATCHMENT												
Charlestown Regional Centre	221.5	431.1	652.6	215.6	430.3	645.9	-5.9	-0.8	-6.7	-2.7%	-0.2%	-1.0%
Warners Bay Town Centre	99.2	34.9	134.1	97.4	34.9	132.3	-1.8	0.0	-1.8	-1.8%	-0.1%	-1.4%
Other centres/locations							-6.3	-0.8	-7.1			
Total							-39.4	-4.6	-44.0			

Source: Deep End Services

3.3 Other economic effects

Employment benefits

The total cost for the construction of the proposed development is estimated at \$25 million with the work conducted over an 18-month period. The construction phase is expected to generate 150 full-time equivalent jobs ("FTE") over this period. Another 265 indirect FTE jobs are expected to be created in the wider economy, some of which would be retained locally through supply contracts, expenditure and wages, etc.

An estimated 100 ongoing jobs (FTE) will be directly created during operation, with approximately 125 jobs created through multiplier effects, some of which would be retained locally (refer Table 10).

An important aspect is that most, if not all, jobs created on-site would be filled by local residents, and a share of the indirect jobs would also support the local labour market. Retail job opportunities are important for community members such as students and semi-retirees who are seeking to work close to home with flexible hours.

Other benefits

The development will introduce a new supermarket brand to the region, enhancing the choice and range available to residents in the area. The small number of specialty shops to be provided will also enhance the experience.

Table 10—Employment creation, Kaufland Belmont North development, 2023 onwards

Tenancy type	Floorspace (sqm)	FTE direct job creation per 100 sqm	Direct ongoing jobs (FTE)	Indirect jobs (FTE)
Supermarket	4,000	2.2	85	106
Other retail	500	3.0	15	19
Job creation			100	125

Source: Deep End Services

4

Net community benefit



4.1 Summary of opinion

The planned relocation of Bunnings from Belmont North presents a significant redevelopment opportunity for this large strategic site and it is in this context that the possible introduction of a Kaufland supermarket has been assessed.

The unique nature of Kaufland means that it will attract customers from a wider region than a typical supermarket. This contributes to the assessment that the store is likely to achieve sales slightly in excess of \$40 million in 2023, its first year of trading.

Sales will be redirected from centres throughout the catchment and beyond (including Charlestown and Warners Bay). One-off impacts are anticipated to be modest and not threaten the viability of any of the centres (including those closest at Belmont and Jewells).

On the other hand, the proposed redevelopment will introduce a new international retail brand to the Hunter region and a new supermarket alternative for residents in the area. The additional choice and increased competition will likely increase downward pressure on food and grocery prices, providing another benefit for local consumers.

Furthermore, the redevelopment will provide 150 direct and 265 indirect FTE jobs during the construction phase as well as an estimated 100 ongoing direct FTE jobs and additional employment created in the wider economy through the employment multiplier.

As a consequence, it is assessed that the proposed Kaufland Belmont North development will result in a positive net community benefit.