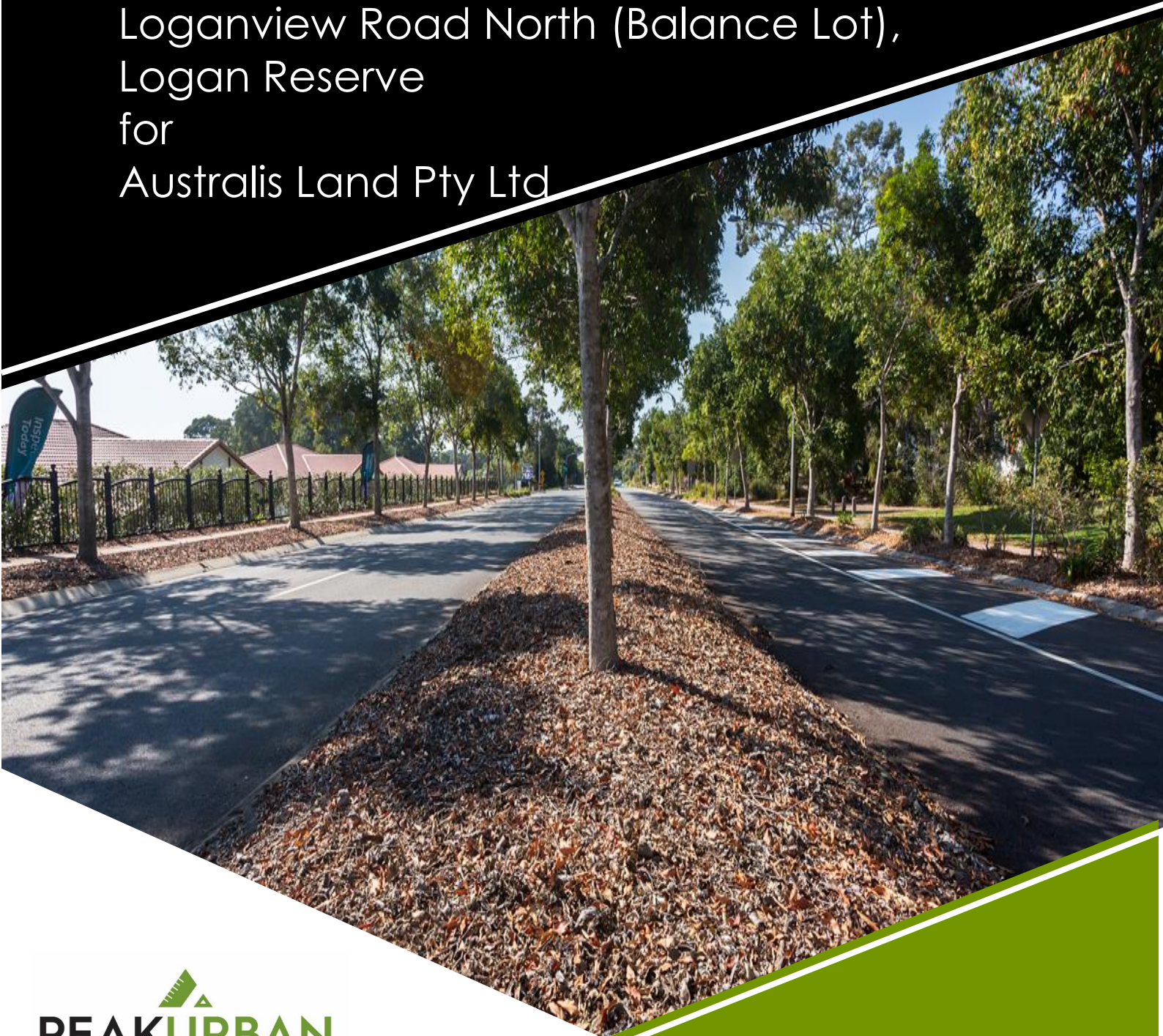


Engineering Services Report

115 & 117 School Road and 250-258
Loganview Road North (Balance Lot),
Logan Reserve
for
Australis Land Pty Ltd



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CONTENTS

1. INTRODUCTION	1
2. EARTHWORKS	2
3. SEDIMENT AND EROSION CONTROL.....	2
4. ROADWORKS	2
5. SEWERAGE RETICULATION	3
6. WATER SUPPLY	3
7. STORMWATER QUALITY AND QUANTITY	3
8. UTILITIES	3
9. CONCLUSION	4

LIST OF FIGURES

Figure 1: Site Location	1
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APPENDICES

Appendix A	Code Responses
Appendix B	Concept Engineering Plans
Appendix C	Stormwater Management Plan



1. INTRODUCTION

PEAKURBAN Pty Ltd has been engaged by Australis Land Pty Ltd to prepare this Civil Engineering Services Report to support the DA submission for a residential subdivision on the balance parcel of 115 & 117 School Road and 250-258 Loganview Road North, Logan Reserve on land described as Lot 25 & 26 on RP97736 and Lots 40 & 41 on RP229101 and as shown in Figure 1 below:

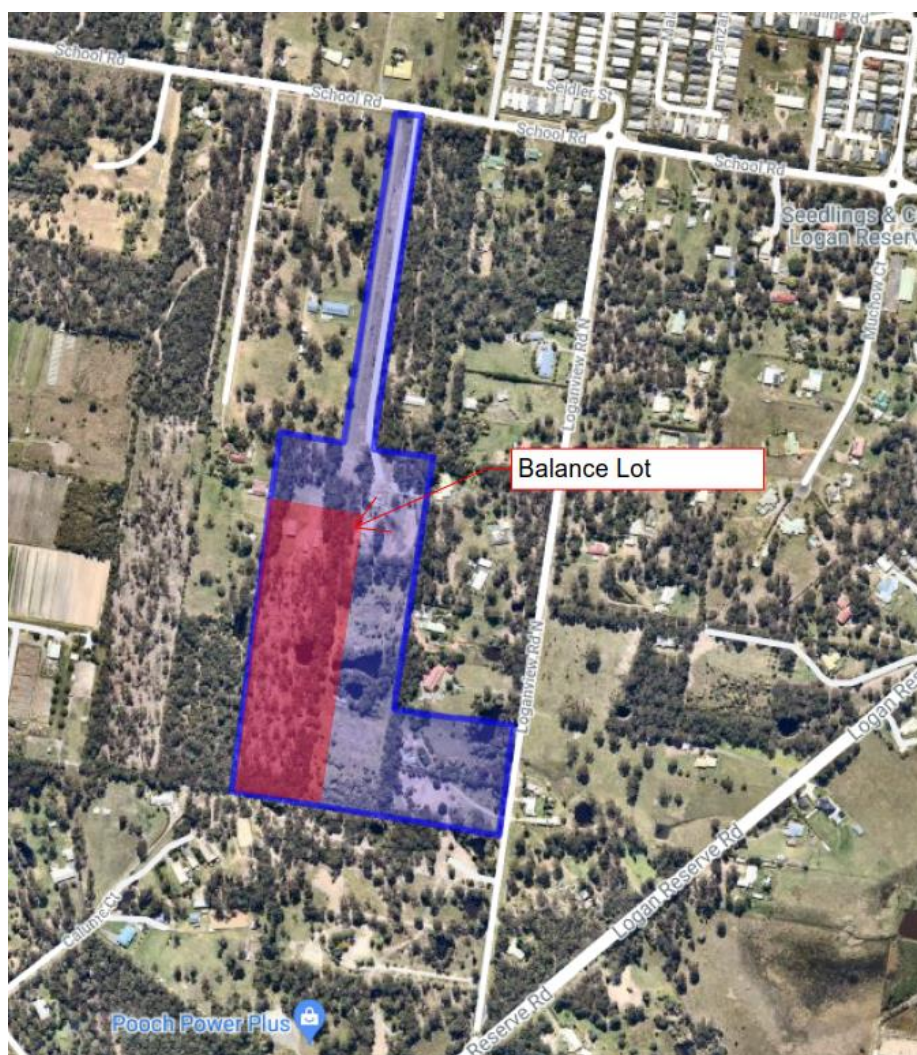


Figure 1: Site Location

This report covers the following civil infrastructure:

- ▶ Earthworks
- ▶ Sediment and Erosion Control
- ▶ Roadworks
- ▶ Sewerage Reticulation
- ▶ Water Supply
- ▶ Stormwater Quality and Quantity
- ▶ Utilities



This report will confirm that the proposed development can be adequately serviced and comply with the Logan City Council Planning Scheme where relevant, Queensland Streets, Australian Standards and other relevant guidelines where appropriate.

2. EARTHWORKS

The development will consist of civil earthworks in accordance with AS3798-2007. Topsoil is to be stripped from the majority of the development area and used on-site where possible. Any material requiring disposal from site will be disposed of at a Council approved location in a lawful manner with acceptable haul routes to be determined at the time of construction.

It is anticipated that larger cut areas will be required to the steep areas of the site. While the northern portion generally has an average slope of 3.5% from west to east, the steepest areas of the site have an average slope of approximately 8.5% from a south to north direction. Therefore, greater cut depths are required to address the site constraints. For areas of greater cut, slope stability will be satisfied through the provision of a geotechnical assessment by a suitably qualified professional.

Proposed retaining walls will be minimised as much as possible with isolated locations requiring higher walls to address the areas of steeper topography. Retaining wall heights to side boundaries will be in the order of 1-1.5m maximum and at the rear of lots, maximum heights of 3m are anticipated and these walls will be in two (2) tiers. Typically retaining walls will be located within the low-side lot. Retaining walls shall not be located within verges or parks, unless agreed to otherwise with Council.

The bulk earthworks and retaining walls will be formalised through the detailed design at the Operational Works phase as necessary.

3. SEDIMENT AND EROSION CONTROL

Sediment and erosion control will generally comprise of clean and dirty water diversion drains, temporary sediment basin as appropriate, silt fences, early stabilisation of disturbed areas where possible and other control measures as appropriate and/or required to meet Logan City Council requirements.

Detail design of the sediment and erosion control strategy, prepared by the civil contractor's CPESC, will be submitted prior to the commencement of construction. The civil works undertaken by the contractor will implement a site management plan to incorporate and achieve compliance with the sediment and erosion control strategy at the time of construction.

4. ROADWORKS

The development is proposed to be accessed via the road networks as part of the adjoining development application. Site roads will be designed in accordance with the traffic impact assessment prepared by Lambert & Rehbein.

The internal development will be serviced via roads constructed as Urban Access Streets/Roads and Concrete Driveways, refer to drawing 21-0073-P1004 enclosed in **Appendix B** for the proposed road layout.



The inverted concrete roads will include a centrally located Q100 piped drainage system to appropriately convey stormwater flows to a lawful point of discharge and adequately protect dwellings from overland flow in the major rainfall event.

Road pavement designs will be prepared and provided to Council where appropriate and based on CBR results taken throughout the course of construction.

5. SEWERAGE RETICULATION

The development is proposed to be serviced by an extension of the gravity reticulation network from the adjoining development to the east. Refer drawing 21-0073-P1005 identifying the conceptual layout for the proposed sewer reticulation network in **Appendix B**.

The internal development will be serviced in accordance with the requirements of the SEQ Code and will be formalised through detailed design at the Operational Works Phase.

6. WATER SUPPLY

For works covered under this development application, connection points will be made at the end of each of the internal roads to tie into the overarching water supply strategy. Refer drawing 21-0073-P1005 enclosed in **Appendix B**.

The internal development will be serviced in accordance with the requirements of the SEQ Code and will be formalised through detailed design at the Operational Works Phase.

7. STORMWATER QUALITY AND QUANTITY

The proposed development will achieve no-worsening of the upstream and downstream waterways through the implementation of a stormwater management plan. Bio-basins at the north eastern and south eastern boundaries of the adjoining development have been sized in order to treat run off from this development application.

Overflow from the existing upstream dam on the adjoining property to the west is proposed to be diverted to the road network and associated stormwater drainage network.

For further details with respect to Stormwater Management, please refer to **Appendix C** Stormwater Management Plan.

8. UTILITIES

The site will be serviced with electrical and telecommunication reticulation that abut the site with agreements entered into with the relevant service providers. Adequate service corridors will be provided to enable service connection with designs being undertaken in accordance with a suitably qualified electrical consultant at the Operational Works/Building Application



phase, as necessary. Subject to advice from the service provider, gas will be reticulated into the site.

9. CONCLUSION

This report is accompanied with the relevant code responses and supporting documentation to demonstrate that the development can be adequately serviced in accordance with Council's standards and guidelines.

We therefore request Council approval of the engineering components for the proposed development with reasonable and relevant conditions.

APPENDICES



Appendix A Code Responses

115 & 117 School Road and 250 -258 Loganview Road North, Logan Reserve
 8.2.8 Landslide Hazard and Steep Slope Area Overlay Code – Logan City Council

Performance outcomes	Acceptable outcomes	Comments
For accepted development (subject to requirements) and assessable development		
Natural physical processes and safety of people and premises		
<p>PO1 Development on premises in a Steep slope area identified on Landslide hazard and steep slope area overlay map-OM-08.00:</p> <ul style="list-style-type: none"> (a) takes into account the risks associated with the natural physical processes of land movement and erosion; (b) is located so that it is geologically stable in the long term and not at risk from landslide. 	<p>AO1 Development on premises in a Steep slope area identified on Landslide hazard and steep slope area overlay map-OM-08.00 is carried out in accordance with a site-specific geotechnical report:</p> <ul style="list-style-type: none"> (a) prepared in accordance with section 2.2.6 of planning scheme policy 5-Infrastructure and is provided to the local government; (b) that assesses the suitability of the proposed development based on existing geotechnical conditions of the site; (c) identifies all risk mitigation measures required to ensure the development remains geologically stable in the long term; (d) that includes a certification by a Registered Professional Engineer of Queensland specialising in geotechnical engineering that the development the subject of the report has a factor of safety greater than 1.5 against geotechnical failure. 	<p>Areas identified on OM-08.00 within the site are associated with man-made features such as dams. These existing man-made features shall be removed and earthworks undertaken to create the landform for the proposed residential development. Any retaining walls shall be designed by a Registered Professional Engineer of Queensland and associated Form 15 & 16 will be provided prior to construction.</p>
<p>PO2 Development protects the safety of people and property and the environment from the impacts of landslide on hazardous materials stored or handled on the premises.</p>	<p>AO2 Storage of hazardous materials is in compliance with AS1940-The storage and handling of flammable and combustible liquids.</p>	<p>No hazardous materials are proposed to be stored as part of the development. The civil contractor shall provide a Construction Management Plan that will identify any interim storage of hazardous materials during the construction phase.</p>

115 & 117 School Road and 250 -258 Loganview Road North, Logan Reserve
 8.2.8 Landslide Hazard and Steep Slope Area Overlay Code – Logan City Council

Performance outcomes	Acceptable outcomes	Comments
Design		
<p>PO3 Development in a Steep slope area identified on Landslide hazard and steep slope area overlay map-OM-08.00 is designed to be responsive to:</p> <ul style="list-style-type: none"> (a) the topography of the premises; (b) the visual amenity of adjoining premises, the streetscape and the locality. 	<p>AO3 Development in a Steep slope area identified on Landslide hazard and steep slope area overlay map-OM-08.00 does not involve cut and fill.</p>	<p>Areas identified on OM-08.00 within the site are associated with man-made features such as dams. These existing man-made features shall be removed and earthworks undertaken to create the landform for the proposed residential development</p>
<p>PO4 The undercroft of a building or structure located in a Steep slope area identified on Landslide hazard and steep slope area overlay map-OM-08.00 is screened when viewed from:</p> <ul style="list-style-type: none"> (a) adjoining premises; (b) a road. 	<p>AO4 The undercroft of the building or structure in a Steep slope area identified on Landslide hazard and steep slope area overlay map-OM-08.00 has:</p> <ul style="list-style-type: none"> (a) skirting or landscape screening to the full height of the undercroft; (b) a maximum height at the perimeter of the building or structure of three metres above ground level. 	<p>Not applicable – “flat” lots are proposed and as such, no undercrofts will result.</p>
Stormwater drainage		
<p>PO5 Development in a Steep slope area identified on Landslide hazard and steep slope area overlay map-OM-08.00 ensures that stormwater runoff does not increase the susceptibility of the site and neighbouring sites to landslide.</p>	<p>AO5 Development in a Steep slope area identified on Landslide hazard and steep slope area overlay map-OM-08.00 manages stormwater drainage (including roof guttering and rainwater tank overflows) to avoid, on the site and on neighbouring sites:</p> <ul style="list-style-type: none"> (a) redirection of the flow of surface water or groundwater; (b) concentration of surface water or groundwater. 	<p>Areas identified on OM-08.00 within the site are associated with man-made features such as dams. These existing man-made features shall be removed and earthworks undertaken to create the landform for the proposed residential development. Conventional stormwater system will convey minor storm flows via a piped network and major storm events via overland flow contained within the road reserve or overland flow paths.</p>

Logan City Council
9.4.2 Excavation and Filling Code

Project Name: 115 & 117 School Road and 250-258 Loganview Road North, Logan Reserve



Performance outcomes	Acceptable outcomes	Comments
For accepted development (subject to requirements) and assessable development		
Protection of natural processes and ecosystems		
<p>PO1 The discharge of sediments and pollutants from filling or excavation does not adversely affect a waterway or the stormwater network.</p>	<p>AO1 The discharge of sediments and pollutants to a waterway or stormwater network complies with part 3.3—Filling and excavation standards in planning scheme policy 5—Infrastructure.</p>	<p>Drainage, sediment, erosion and dust control shall be designed in accordance with the Best Practice Erosion Guidelines (IECA 2008). Temporary sediment basins will be utilised during the construction phase. Upstream catchments will be directed around the site where possible. Silt fences, temporary berms and/or temporary swales will be utilised to direct run-off to the temporary sediment basins.</p>
<p>PO2 Topsoil and spoil stockpiled on the premises do not adversely affect natural processes and ecosystems.</p>	<p>AO2 Topsoil and spoil is stockpiled to comply with part 3.3—Filling and excavation standards in planning scheme policy 5—Infrastructure.</p>	<p>Stockpiles shall be located outside overland flow paths, in an area approved by Council and shall be protected by silt fences. Topsoil stockpile heights shall be minimised to ensure organics in the soil are not adversely affected. Stockpiles shall be seeded or otherwise sealed to prevent dust erosion.</p>
<p>PO3 Filling is carried out using stable, solid and clean earth, free of organic and putrescible waste, rubbish and refuse material.</p>	<p>AO3 Filling complies with part 3.3—Filling and excavation standards in planning scheme policy 5—Infrastructure.</p>	<p>Clean fill obtained from cutting operations on-site shall be utilised. During the detailed design phase it is anticipated that an overall balanced earthworks design for the project will be achievable. Filling shall comply with part 3.3 – Filling and excavation standards in PSP 5.</p>

Logan City Council
9.4.2 Excavation and Filling Code



Project Name: 115 & 117 School Road and 250-258 Loganview Road North, Logan Reserve

Performance outcomes	Acceptable outcomes	Comments
Protection of existing and planned infrastructure		
<p>PO4 Filling or excavation works do not adversely affect infrastructure, including any services.</p>	<p>AO4 Filling or excavation works comply with part 3.3– Filling and excavation standards in planning scheme policy 5–Infrastructure.</p>	<p>Construction will be in accordance with part 3.3 filling and excavation standards identified within PSP 5 – infrastructure. No existing services will be impacted by filling or excavation works on site. Detailed survey is to be completed to confirm no services will be negatively impacted.</p>
Protection and enhancement of personal health and safety and premises		
<p>PO5 Filling or excavation works do not adversely affect personal health and safety.</p>	<p>AO5 Filling or excavation works comply with part 3.3– Filling and excavation standards in planning scheme policy 5–Infrastructure.</p>	<p>Filling and excavation works shall be undertaken in accordance with part 3.3 – Filling and excavation standards of PSP 5 to minimise the risk of any adverse affects.on personal health and safety.</p>
Surface water flow		
<p>PO6 Surface water drainage does not cause any of the following: (a) ponding on any premises; or (b) a hazard or adversely affect personal health and safety and premises; or (c) diversion or concentration of flow from or onto adjoining premises or infrastructure.</p>	<p>AO6 Surface water drainage complies with part 3.3– Filling or excavation standards in planning scheme policy 5–Infrastructure.</p>	<p>During earthworks operations, surface water drainage shall be controlled to comply with part 3.3 – Filling and excavation standards of PSP 5 and Best Practice Erosion and Sediment Control Guidelines (IECA 2008). Existing discharge characteristics shall be maintained to match with the existing discharge arrangements at the downstream boundaries of the adjoining development to the east. This will include both no increase in peak flows across the boundary as well as maintaining the physical discharge arrangements that currently exist.</p>

Performance outcomes	Acceptable outcomes	Comments
Batters		
<p>PO7 A batter:</p> <ul style="list-style-type: none"> (a) does not adversely affect the natural physical processes and ecosystems; (b) protects existing and planned infrastructure; (c) is safe, stable and easily maintained; (d) is landscaped to enhance visual amenity. 	<p>AO7 A batter is designed and constructed to comply with the standards specified in section 3.3.6–Batters and retaining walls in planning scheme policy 5–Infrastructure.</p>	<p>Batter heights/grades will be confirmed following detailed design. Batters are not anticipated to be greater than 1 in 4 and any permanent batters exceeding this, will be accompanied with a slope stability analysis.</p>
Retaining walls		
<p>PO8 A retaining wall:</p> <ul style="list-style-type: none"> (a) is not constructed of timber and are not located on existing or proposed lot boundaries, or movement networks; (b) does not adversely affect the natural physical processes and ecosystems; (c) is located to avoid conflict with adjoining premises; (d) is located such that existing and planned infrastructure is not adversely affected; (e) protects the visual amenity of adjoining premises or a public open space; 	<p>AO8 A retaining wall is designed and constructed to comply with the standards specified in section 3.3.6.2–Retaining walls in planning scheme policy 5–Infrastructure.</p>	<ul style="list-style-type: none"> a) Retaining walls constructed with the civil works include all walls where the difference in finished level is 500mm or greater. Timber shall not be used in the construction of these walls. b) Retaining walls shall be designed and constructed to comply with the standards specified in section 3.3.6.2 – Retaining walls in PSP 5. c) The structure of the retaining wall shall be solely contained within one property, typically the lower allotment and shall not be located within the road reserve or other public space. d) Where adjacent or crossing existing or proposed underground services, retaining walls shall be designed such that there is not an adverse impact on the service. e) Concrete sleeper retaining walls shall typically be utilised throughout the site.

Logan City Council
9.4.2 Excavation and Filling Code



Project Name: 115 & 117 School Road and 250-258 Loganview Road North, Logan Reserve

Performance outcomes	Acceptable outcomes	Comments
<p>(f) is located within the premises that is being filled;</p> <p>(g) is located within the premises that is cut and is designed to take any surcharge loading allowable on the uphill lot;</p> <p>(h) is safe and stable;</p> <p>(i) enables easy access for maintenance.</p>		<p>f) Refer (c) above.</p> <p>g) Refer (c) above.</p> <p>h) Walls shall be designed in accordance with AS4678:2002: Earth-retaining Structures Code, including current amendments.</p> <p>i) Being within the lower lot typically provides easy access for maintenance. However, materials chosen are low maintenance and comply with the design life requirements for the applicable application.</p>
Filling of a dam		
<p>PO9</p> <p>The filling of a dam:</p> <p>(a) does not adversely affect the natural physical processes and ecosystems;</p> <p>(b) creates a safe and stable surface;</p> <p>(c) is integrated into the landscape.</p>	<p>AO9</p> <p>The filling of a dam complies with part 3.3–Filling and excavation standards in planning scheme policy 5–Infrastructure.</p>	<p>Filling of the existing dam onsite will be designed in accordance with part 3.3 in planning scheme policy 5.</p>

Performance outcomes	Acceptable outcomes	Comments
For accepted development (subject to requirements) and assessable development		
Provision, design, construction, and location of infrastructure		
<p>PO1 Development is demonstrated to be capable of being serviced by necessary infrastructure.</p>	<p>AO1 Reports, plans and drawings are provided in accordance with part 2 of planning scheme policy 5–Infrastructure.</p>	<p>Reports, plans and drawings shall be provided in accordance with part 2 of PSP 5.</p>
<p>PO2 Development: (a) provides necessary infrastructure to service the development; (b) provides that the design, construction and location of necessary infrastructure: (i) protects existing and planned infrastructure networks; (ii) services proposed development; (iii) integrates with existing and planned infrastructure networks; (iv) delivers a standard of service that is efficient and equitable; (v) minimises the cost to the community for the life of the infrastructure by providing a suitable design life, ease of maintenance and ease of replacement; (vi) protects personal health, safety and premises; (vii) protects environmental values.</p>	<p>AO2 Development: (a) in a water supply service area connects to the water network in accordance with the SEQ Water Supply and Sewerage Design and Construction Code; (b) not in a water supply service area provides a tank with a minimum storage capacity of 45,000 litres; (c) in a sewerage supply service area connects to the waste water network in accordance with the SEQ Water Supply and Sewerage Design and Construction Code; (d) not in a sewerage supply service area complies with part 1 of the Queensland Plumbing and Wastewater Code; (e) provides stormwater infrastructure in accordance with part 3.6 of planning scheme policy 5–Infrastructure; (f) provides a movement network infrastructure in accordance with part 3.4 of planning scheme policy 5–Infrastructure; (g) provides parks in accordance with part 3.12 of planning scheme policy 5–Infrastructure;</p>	<p>a. Connections to the watermain within the proposed development to the east will be in accordance with the SEQ WS&S D&C manual. b. N/A c. Connections to the proposed sewer network within the adjoining development to the east shall be in accordance with the SEQ WS&C D&C manual. d. N/A e. Stormwater infrastructure shall be provided in accordance with part 3.6 of PSP5. f. Movement network infrastructure shall be provided in accordance with part 3.4 of PSP 5. g. No park within this development. Park is provided with the adjoining development to the east.</p>

Performance outcomes	Acceptable outcomes	Comments
	<p>(h) provides road lighting in accordance with part 3.5 of planning scheme policy 5–Infrastructure;</p> <p>(i) provides electricity reticulation in accordance with part 3.8 of planning scheme policy 5–Infrastructure;</p> <p>(j) provides gas and telecommunications reticulation in accordance with part 3.9 of planning scheme policy 5–Infrastructure.</p> <p>Editor's note—The delivery of any part of a network identified in the plans for trunk infrastructure is governed by Part 4–Local government infrastructure plan.</p>	<p>h. Road lighting shall be provided in accordance with part 3.1.2 of PSP 5. The appointed Electrical Consultant is yet to be confirmed.</p> <p>i. Electrical reticulation shall be provided in accordance with part 3.8 of PSP 5. As advised above, the appointed electrical consultant is yet to be appointed.</p> <p>j. Gas, if available, and telecommunications reticulation shall be provided in accordance with part 3 of PSP 5 unless varied otherwise by the service provider's requirements. NBN shall be designed by the appointed Electrical Consultant.</p>
Location of development		
<p>PO3 Development is located to protect existing and planned infrastructure networks.</p>	<p>AO3 Development is located outside:</p> <p>(a) planned widening of a road or a new road identified in Table 7.3.1.1–Road encroachment maps of planning scheme policy 5–Infrastructure;</p> <p>(b) planned public transport network identified on Figure 3.4.1.3.1—Public transport network in planning scheme policy 5–Infrastructure;</p> <p>(c) a planned cycle network identified on Figure 3.4.1.2.1–Cycle network in planning scheme policy 5–Infrastructure;</p> <p>(d) a planned network identified in Local government infrastructure plan map–LGIP-07.00 Plan for trunk parks infrastructure in</p>	<p>a) Roads identified in Table 7.3.1.1 – Road encroachment maps of PSP 5 do not impact this site.</p> <p>b) The roads of this development are not identified on Figure 3.4.1.3.1 – Public transport network in PSP 5.</p> <p>c) No planned cycle network is identified on Figure 3.4.1.2.1 – Cycle network in PSP 5 on the site.</p> <p>d) No parks identified in LGIP07.00 Plan for trunk parks infrastructure in Schedule 3 – Local Government Infrastructure Plans</p>

Project Name: 115 & 117 School Road and 250-258 Loganview Road North, Logan Reserve

Performance outcomes	Acceptable outcomes	Comments
	Schedule 3–Local government infrastructure plan mapping and tables.	mapping and tables are located on the proposed development site
Fire fighting		
<p>PO4 Development in a water service area accessed by common private title provides: (a) fire hydrant infrastructure; (b) unimpeded access for emergency services vehicles.</p> <p>Editor's note—The term common private title refers to areas such as access roads in community title developments or strata title unit access, which are private and under group or body corporate control.</p>	<p>AO4 Development in a water service area accessed by common private title complies with the Acceptable outcomes of the SPP code: Fire services in developments accessed by common private title in Appendix 1 of the state planning policy.</p>	Not applicable – project is not of this type.
<p>PO5 Development not in a water service area provides sufficient water storage with adequate pressure, volume and flow to service development for fire fighting purposes.</p>	<p>AO5 Development: (a) is connected to a reticulated water supply scheme that has sufficient flow and pressure characteristics for fire fighting purposes at all times with a minimum pressure and flow of 10 litres per second at 200kPa; or (b) has an on-site water storage dedicated or retained for fire fighting purposes that is made of fire resistant materials and is: (i) a separate tank; or (ii) a reserve section in the bottom part of the main water supply tankwater tank .</p> <p>Editor's note—The requirement in AO5 is;</p>	<p>a. Connection into the proposed watermain within the adjoining development to the east.</p> <p>b. N/A</p>

Performance outcomes	Acceptable outcomes	Comments
	<ul style="list-style-type: none"> - in addition to the requirement for potable water supply/storage in AO2 in Table 9.4.3.3.1-Infrastructure code: accepted development (subject to requirements) and assessable development; - reflected in AO5 in Table 8.2.3.3.1-Bushfire hazard overlay code: accepted development (subject to requirements) and assessable development. 	
Disposal of trade waste		
<p>PO6 The disposal of trade waste in a sewerage supply service area does not adversely affect the sewerage network.</p>	<p>AO6 The disposal of trade waste in a sewerage supply service area complies with the sewer admission standards in section 3.2.6-Sewer admission standards in planning scheme policy 3-Environmental management.</p>	N/A
Roof water drainage and surface water drainage		
<p>PO7 Development provides stormwater infrastructure for the drainage of the premises so as not to cause any of the following: (a) ponding of stormwater on the premises; (b) a hazard to personal health and safety; (c) damage to premises; (d) an increased risk of flooding to premises within the catchment.</p>	<p>AO7 Development complies with the standards for stormwater infrastructure specified in part 3.6 of planning scheme policy 5-Infrastructure.</p>	<p>b) As demonstrated in PEAKURBAN's Stormwater Management Plan (ref: 21-0073SMP01-V1), the proposed stormwater management plan has been designed to reduce risk to humans. This was achieved by ensuring bio-detention batter slopes were 1:6 and Q20 basin water levels were less than 1.2m as per QUDM guidelines.</p> <p>d) the detention basins have been designed such that each have sufficient storage capacity so as not to cause an increased risk of flooding.</p>

Performance outcomes	Acceptable outcomes	Comments
Natural flow of surface water		
<p>PO8 Development provides that the natural flow of surface water is:</p> <ul style="list-style-type: none"> (a) not altered so as to cause a risk to personal health and safety or damage to property; (b) not increased in intensity, velocity or frequency; (c) not concentrated onto adjoining premises. 	<p>AO8 Development complies with the standards for stormwater infrastructure specified in part 3.6 of planning scheme policy 5–Infrastructure.</p>	<p>a/b) As demonstrated in PEAKURBAN's Stormwater Management Plan (ref: 21-0073SMP01-V1), the proposed stormwater quantity management strategy is in accordance with part 3.6 of PSP 5. The two proposed bio-detention basins were found to mimic natural flow directions, reduce intensity of stormwater discharge velocity and quantity.</p> <p>c) The two discharge locations have been proven to be Lawful Point of Discharge, and as such are not concentrated onto adjoining premises.</p>
Water sensitive urban design		
<p>PO9 Development which provides stormwater infrastructure incorporates water sensitive urban design principles having regard to:</p> <ul style="list-style-type: none"> (a) protecting existing natural features and ecological processes; (b) protecting the natural hydrologic behaviour of catchments; (c) protecting the existing natural flow and water quality regimes of waterways; (d) protecting water quality of surface and ground waters; (e) minimising demand on the water network; (f) minimising sewage discharges to the natural environment; (g) integrating water into the landscape to enhance visual and ecological values. 	<p>AO9 Development complies with the standards for stormwater infrastructure specified in part 3.6 of planning scheme policy 5–Infrastructure.</p>	<p>As demonstrated in PEAKURBAN's Stormwater Management Plan (ref: 21-0073SMP01-V1), the proposed stormwater quality management strategy is in accordance with part 3.6 of PSP 5. The two proposed bio-detention basins were found to exceed water quality objectives prescribed in the SPP and as such, satisfy requirements a, b c, d, and g.</p>

Performance outcomes	Acceptable outcomes	Comments
Movement network		
<p>PO10 The projected traffic levels for a use do not adversely affect the planned standards of service for a road or intersection.</p>	<p>AO10 Development does not cause or contribute to projected traffic levels: (a) exceeding the maximum vehicle trips per day in Table 3.4.1.4.2 in planning scheme policy 5—Infrastructure; or (b) exceeding the maximum control delays through intersections in peak periods in Table 3.4.1.4.3 in planning scheme policy 5—Infrastructure.</p>	<p>Refer traffic impact assessment prepared by Lambert & Rehbein.</p>
Integrated movement concept report		
<p>PO11 Development which generates more than 3,000 vehicle trips per average weekday is designed to integrate the movement network to minimise the transportation costs required to service the use.</p>	<p>AO11 Development which generates more than 3,000 vehicle trips per average weekday provides an integrated movement concept report which integrates the planning of the movement network in accordance with part 2 and 3 of planning scheme policy 5—Infrastructure.</p>	<p>Refer traffic impact assessment prepared by Lambert & Rehbein.</p>

Performance outcomes	Acceptable outcomes	Comments
For assessable development only		
Land use and transport integration		
<p>PO12 Development within 400 metres of existing or future public passenger transport facilities where the total site area is 5,000m² or more:</p> <ul style="list-style-type: none"> (a) supports a road hierarchy which facilitates efficient, safe and accessible bus services connecting to existing and future public passenger transport facilities; (b) enhances connectivity between existing and future public passenger transport facilities and other transport modes; (c) optimises the walkable catchment to existing and future public passenger transport facilities; (d) provides for direct and safe access to and use of existing or future public passenger transport facilities. <p>Note—SPP code: Land use and transport integration in Appendix 4 of the state planning policy provides guidance to achieve this outcome.</p>	<p>AO12 No acceptable outcome provided.</p>	<p>Refer traffic impact assessment prepared by Lambert & Rehbein.</p>

Performance outcomes	Acceptable outcomes	Comments
For accepted development (subject to requirements) and assessable development		
Protection of natural processes and ecosystems		
<p>PO1 Vehicle parking, loading and servicing and pick up / set down areas are provided that satisfy the expected demand for the number and type of vehicles likely to be generated by a use having regard to:</p> <ul style="list-style-type: none"> a. The particular circumstances of the premises including the; <ul style="list-style-type: none"> - Nature, intensity and hours of operation of the use; - desirability of providing a car park and attracting vehicles to the premises; - maximum number of employees and customers to be on the premises at any one time; - size, levels and dimensions of the premises; b. the proximity of the premises to an existing or future parking station other available car park or public transport facility. 	<p>AO1 Vehicle parking, vehicle washing, loading and servicing and pick up / set down areas are provided:</p> <ul style="list-style-type: none"> a. For a use listed in Table 9.4.7.3.2 – Vehicle parking and servicing, to comply with columns 2 to 5 of Table 9.4.7.3.2 – vehicle parking and servicing; b. For a use not listed in Table 9.4.7.3.2 – vehicle parking and servicing, in accordance with a car parking assessment report to be provided to the local government and prepared in accordance with Part 2 of Planning scheme policy 5 – infrastructure. <p>Editors Note: for building work, car parking for people with a disability is to be provided in accordance with Table D3.5 – carparking spaces for people with a disability in the Building Code of Australia.</p>	<p>Not applicable – this is a residential development and parking is provided within lots and on-street parking.</p>
<p>PO2 Development with a security gate provides accessible visitor parking in front of the security gate.</p>	<p>AO2 Development with a security gate provides visitor vehicle parking that complies with Table 9.4.7.3.4 – Visitor parking spaces for uses incorporating a security gate.</p>	<p>Not applicable – this is not a gated community</p>

Performance outcomes	Acceptable outcomes	Comments
<p>PO3 A car park not being a Parking Station provides free and unobstructed access for the use by employees and visitors during the normal hours of operation of the use.</p>	<p>AO3 A use other than a Residential activity or a Parking Station, provides vehicle access that;</p> <ul style="list-style-type: none"> a. Is kept, used and maintained exclusively for car parking; b. Is accessible to all employees and visitors during the normal hours of operation of the use with no encumbrance, fee or charge; c. Does not have a gate, door or similar device that restricts vehicular access by employees or visitors. 	<p>Not applicable – development is a residential activity</p>
Provision of motorcycle parking		
<p>PO4 Motorcycle parking is provided that is safe and functional.</p>	<p>AO4 Motorcycle parking is provided to comply with section 2.4.7 of AS2890.1.2004 – Parking facilities – Off street car parking.</p>	<p>Not applicable - this is a residential development and parking is provided within lots and on-street parking.</p>
Provision of bicycle parking		
<p>PO5 Bicycle parking facilities are provided that:</p> <ul style="list-style-type: none"> a. Satisfy the likely demand for bicycle parking; b. Are functional; c. Are located close to a pedestrian entry to a building 	<p>AO5 Bicycle parking facilities comply with:</p> <ul style="list-style-type: none"> a. The rate specified in column 7 of Table 9.4.7.3.2 – vehicle parking and servicing; b. AS2890.3 – 1993 – Bicycle parking facilities. 	<p>Not applicable - this is a residential development and parking is provided within lots and on-street parking.</p>

Performance outcomes	Acceptable outcomes	Comments
Provision of vehicle manoeuvring area		
<p>PO6 Development provides a safe and functional vehicle manoeuvring area.</p>	<p>AO6 Development provides a vehicle manoeuvring area that:</p> <ul style="list-style-type: none"> a. Enables vehicles to enter and exit the site in a forward motion where the development: <ul style="list-style-type: none"> - Is non-residential development; or - Is for five or more dwellings; b. Accommodates the design vehicle specified in Table 9.4.7.3.5 – Design vehicle for a manoeuvring area; c. Complies with section 3.4.4.10 – Manoeuvring areas of Planning scheme policy 5 – Infrastructure. 	<p>Cul-de-sacs and temporary turnarounds at stage boundaries shall be designed in accordance with Council's PSP 5 to enable manoeuvring of the garbage truck. As required, shared driveways will enable manoeuvring of a design vehicle to enter and exit in a forward direction.</p>
Vehicles washing bay		
<p>PO7 A vehicle washing bay does not cause environmental harm.</p>	<p>AO7 A vehicle washing bay provides that run off is discharged to:</p> <ul style="list-style-type: none"> a. A grassed area or permeable landscape area; or b. The sewerage system. 	<p>Not applicable - this is a residential development and therefore vehicle washing bays are not provided.</p>
Car Park Access		
<p>PO8 Vehicular access to a car parking area has sufficient queuing space to ensure a vehicle does not queue on a road, cycleway or footpath.</p>	<p>A08 Vehicular queuing space to a car parking area:</p>	<p>Not applicable – carpark queuing lengths are not applicable as this is a residential development and</p>

Performance outcomes	Acceptable outcomes	Comments
	<ul style="list-style-type: none"> a. Does not provide a turning movement, intersecting aisle or a speed hump in a queuing area; b. Complies with Table 9.4.7.3.3 – queuing spaces c. Complies with Table 9.4.7.3.6 – queuing requirements for particular uses. 	parking in provided within lots and on-street parking.
Access and driveways		
<p>PO9 A driveway is safe, functional and does not Adversely affect infrastructure.</p>	<p>AO9 A driveway is designed and constructed to comply with section 3.4.5 – design standards for access and driveways of Planning scheme policy 5 – infrastructure.</p>	Driveways constructed with the subdivision shall be designed in accordance with Council's PSP 5.
Design and construction of a car parking area		

<p>PO10 A car parking area is designed to:</p> <ul style="list-style-type: none"> a. Provide easy way finding for pedestrians, cyclists and motorists; b. Provide appropriately sized and line marked spaces in accordance with relevant Australian standards; c. Provide a convenient and safe pedestrian network. d. Provide safe and efficient vehicle circulation; e. Provide a progressive reduction in the speed environment in moving between the road and a parking space; f. Provide a safe sight distance at a potential conflict point; g. Provide for efficient and simple parking space search patterns; h. Provide for uncongested public transport and service vehicle movements through the premises; i. Keeps a heavy vehicle out of parking aisle; j. Ensure no heavy vehicle reverses across a pathway; k. Prevent parking off a circulation road; l. Prevent an adverse impact on the safety and efficiency of the existing or planned movement network; m. Prevent a motorist from reversing on a road; n. Prevent an unnecessary space that encourages illegal parking; o. Address safety of users through appropriate lighting; p. Be appropriately landscaped; Be surfaced so as to be useable in all weather conditions Manage stormwater flows. 	<p>AO10 A car parking area is designed and constructed in accordance with section 3.4.6 – design standards for car parking of Planning scheme policy 5 – Infrastructure.</p>	<p>Not applicable – this is a residential development and parking is provided within lots and on-street parking.</p>
--	--	--

Performance outcomes	Acceptable outcomes	Comments
Vehicle queuing		
<p>PO11 Queuing associated with a drive through facility (including Service stations and car washes) does not cause blockages to traffic on the road network. Note – Planning scheme policy 5 – Infrastructure provides guidelines on how to achieve this outcome.</p>	<p>AO11 No acceptable outcome provided.</p>	<p>Not applicable – no drive through facilities are proposed</p>



Appendix B Concept Engineering Plans

RESIDENTIAL DEVELOPMENT - LOGAN RESERVE

DEVELOPMENT APPLICATION (WEST)

115 & 117 SCHOOL ROAD AND 250-258 LOGANVIEW ROAD NORTH, LOGAN RESERVE FOR 'AUSTRALIS LAND'

DRAWING LIST

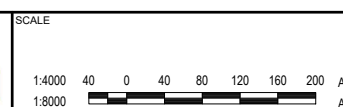
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- 21-0073-P1002 BULK EARTHWORKS CONCEPT LAYOUT PLAN
- 21-0073-P1003 BULK EARTHWORKS CONCEPT CROSS SECTIONS
- 21-0073-P1004 CONCEPT ROADWORKS AND DRAINAGE LAYOUT PLAN
- 21-0073-P1005 CONCEPT WATER AND SEWER LAYOUT PLAN

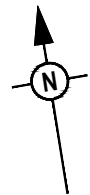


LOCALITY PLAN
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SCALE 1:8000 (A3)

PROJECT INFORMATION SUMMARY:	
No. OF LOTS =	80
AREA OF SITE =	4.17 ha
RP DESCRIPTION	LOTS 25 & 26 ON RP97736 AND LOTS 40 & 41 ON RP229101
DATUM LEVEL AND LOCATION	P.S.M. - RL - AHD LOCATED
LOCAL AUTHORITY:	LOGAN CITY COUNCIL
COUNCIL REFERENCE NUMBER:	COM/13/2021

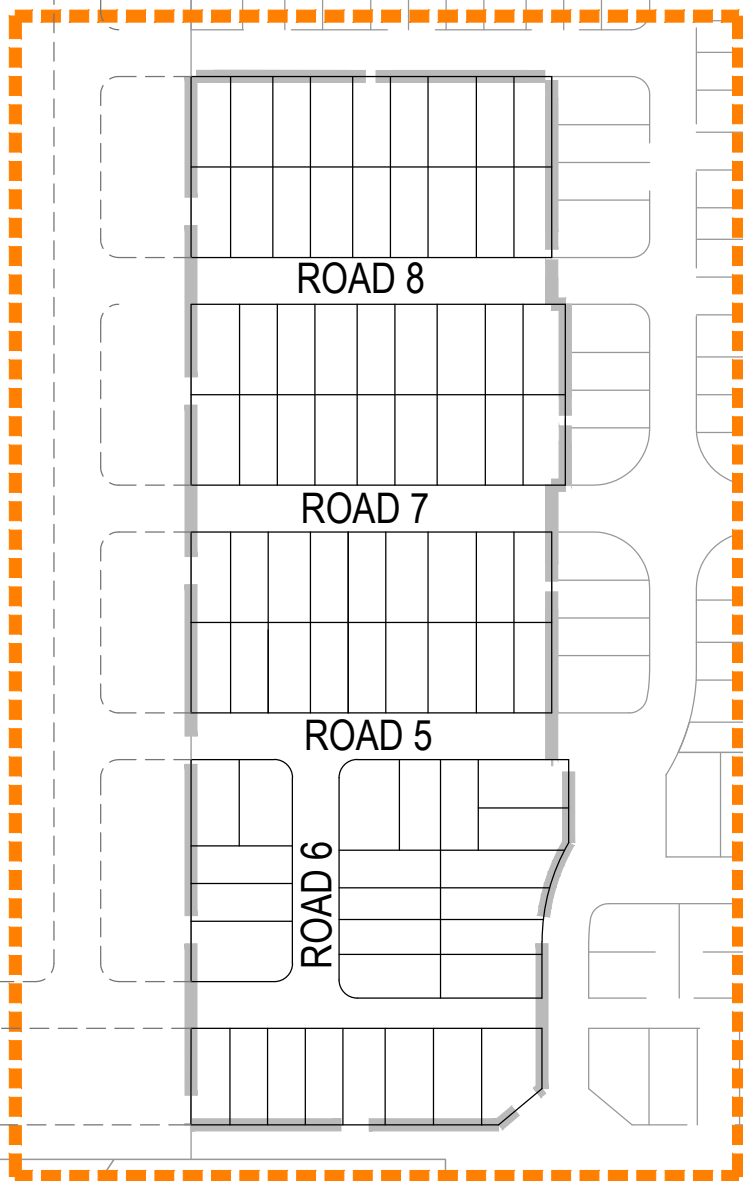
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						FOR AND ON BEHALF OF PEAKURBAN PTY LTD			DRAWING No. P1000
									REVISION 1





EASTERN PORTION
(SEPERATE APPLICATION)

SHEET 1



EASTERN PORTION
(SEPERATE APPLICATION)

LOGANVIEW ROAD NORTH

REV	DATE	DESIGN	DRAWN	REVISION DETAILS
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DRAWN	STATUS
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	RPEQ 04618
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SCALE

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CLIENT

AUSTRALIS LAND

ASSOCIATED CONSULTANT
PEAK URBAN
07 3532 1300

PROJECT NAME

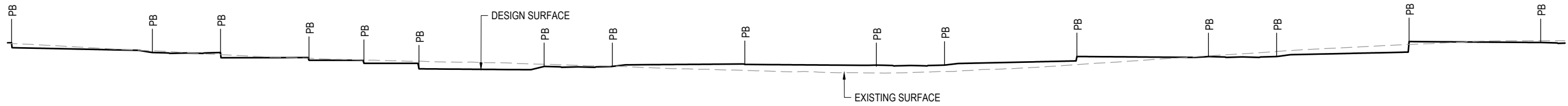
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(WEST)**

115 & 117 SCHOOL ROAD AND 250-258
LOGANVIEW ROAD NORTH, LOGAN RESERVE

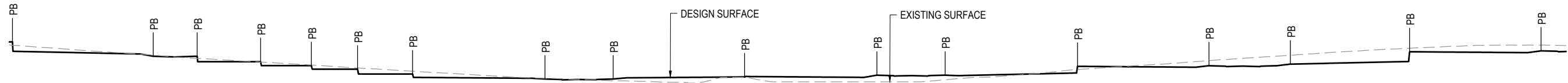
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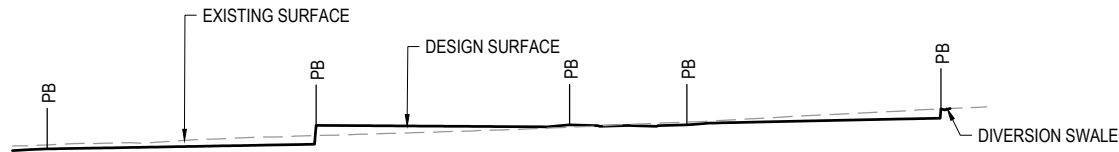
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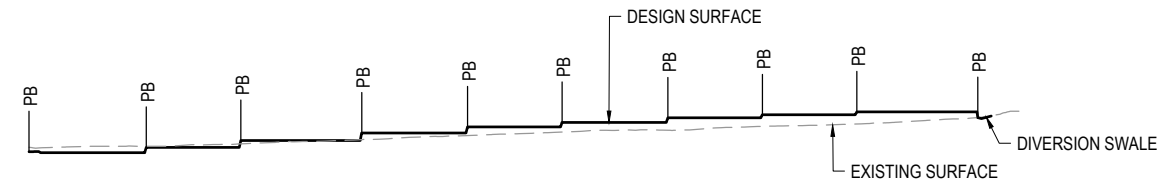
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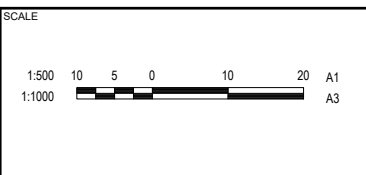


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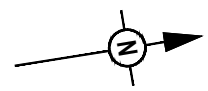


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AUSTRALIS LAND

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 PEAK URBAN
 07 3532 1300

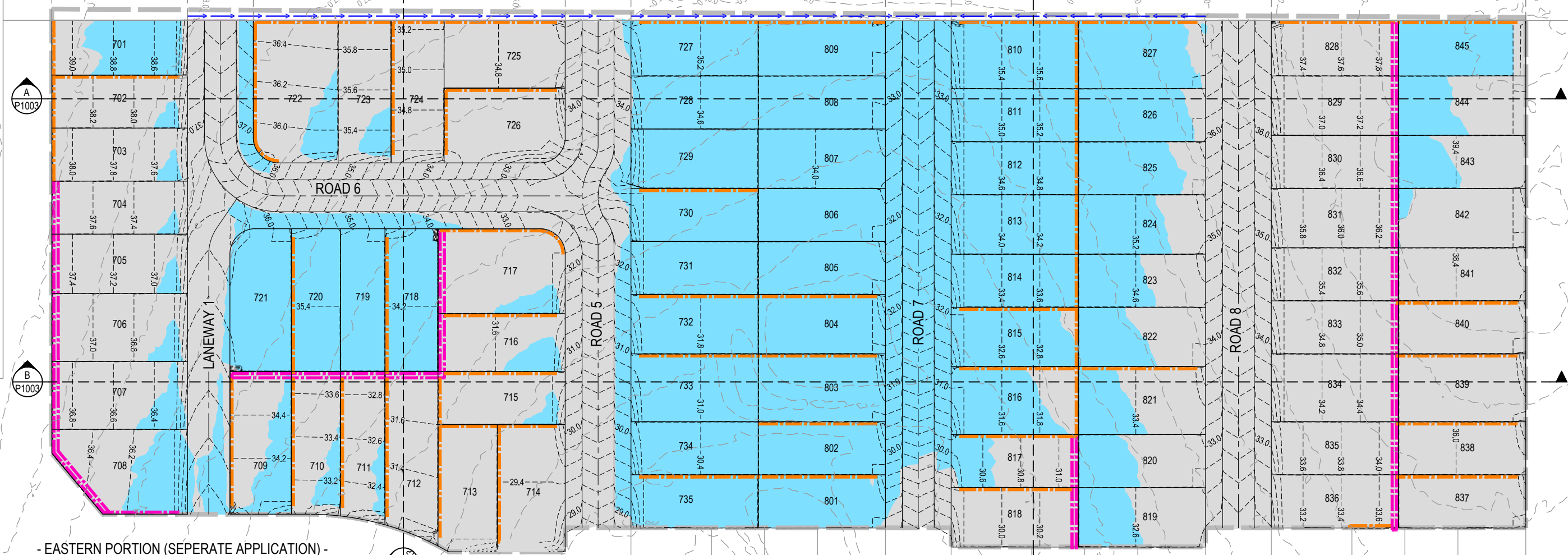
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 115 & 117 SCHOOL ROAD AND 250-258
 LOGANVIEW ROAD NORTH, LOGAN RESERVE

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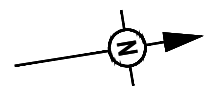
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- EXISTING SURFACE CONTOUR
- DIVERSION DRAIN
- PROPOSED CONCRETE SLEEPER RETAINING WALL 1.50m MAX HEIGHT
- PROPOSED CONCRETE SLEEPER RETAINING WALL TIERED 3.0M MAX HEIGHT
- PROPOSED AREA OF CUT
- PROPOSED AREA OF FILL



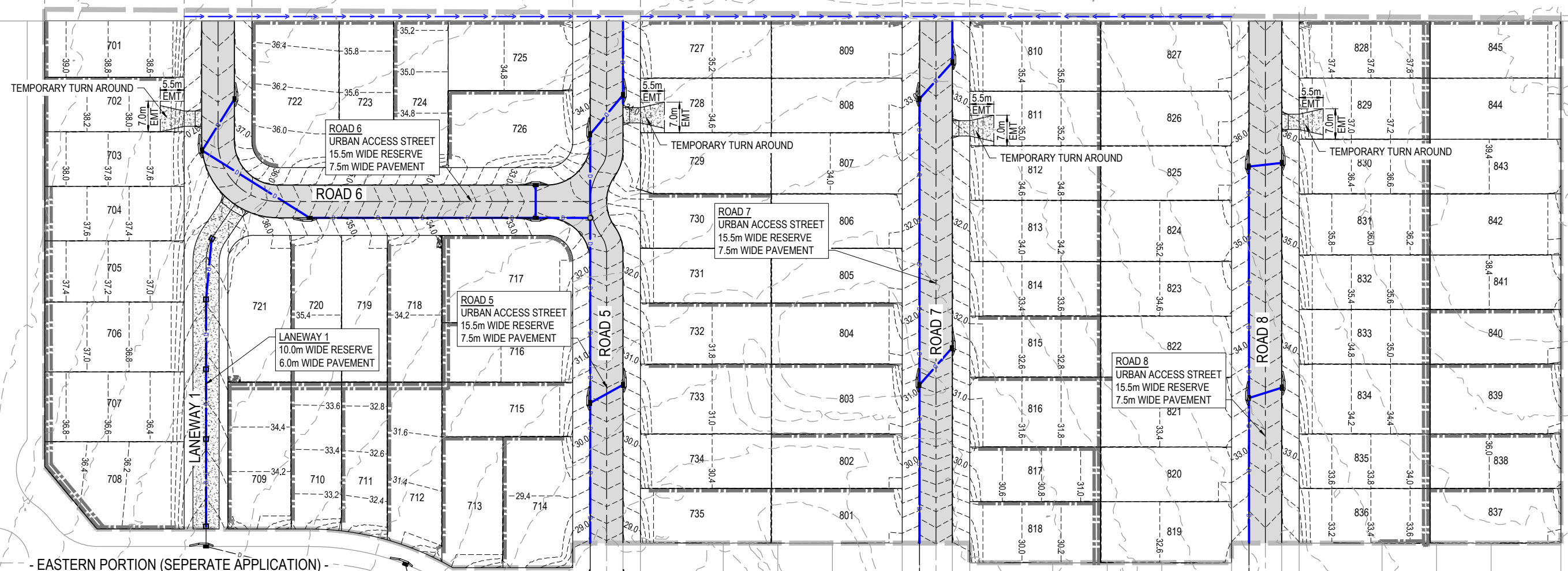
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- EASTERN PORTION (SEPERATE APPLICATION) -

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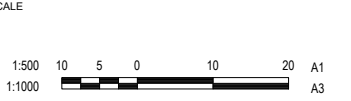
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	PROPOSED KERB INVERT LINE
	PROPOSED EDGE OF BITUMEN
	EXISTING EDGE OF BITUMEN
	PROPOSED CONCRETE PATH AND PRAM RAMP
	PROPOSED NEW ROAD PAVEMENT
	PROPOSED SURFACE CONTOUR
	EXISTING SURFACE CONTOUR
	PROPOSED STORMWATER DRAINAGE PIPE
	EXISTING STORMWATER DRAINAGE PIPE
	PROPOSED DRAINAGE SWALE
	PROPOSED CONCRETE SLEEPER RETAINING WALL



- EASTERN PORTION (SEPERATE APPLICATION) -

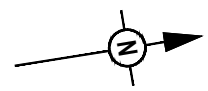
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					DESIGN	APPROVED SCOTT THOMAS		ASSOCIATED CONSULTANT PEAK URBAN 07 3532 1300	115 & 117 SCHOOL ROAD AND 250-258 LOGANVIEW ROAD NORTH, LOGAN RESERVE	PROJECT No. 21-0073
						RPEQ 04618				DRAWING No. P1004
						FOR AND ON BEHALF OF PEAKURBAN PTY LTD				REVISION 1



PROJECT No.	DRAWING No.	REVISION
21-0073	P1004	1

LEGEND	
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	PROPOSED WATER RETICULATION
	PROPOSED SEWERAGE RETICULATION
	EXISTING SEWER MAIN
	PROPOSED SURFACE CONTOUR
	EXISTING SURFACE CONTOUR
	PROPOSED STORMWATER DRAINAGE PIPE
	PROPOSED CONCRETE SLEEPER RETAINING WALL



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CLIENT
AUSTRALIS LAND
ASSOCIATED CONSULTANT PEAK URBAN 07 3532 1300

PROJECT NAME
RESIDENTIAL SUBDIVISION (WEST)
115 & 117 SCHOOL ROAD AND 250-258 LOGANVIEW ROAD NORTH, LOGAN RESERVE

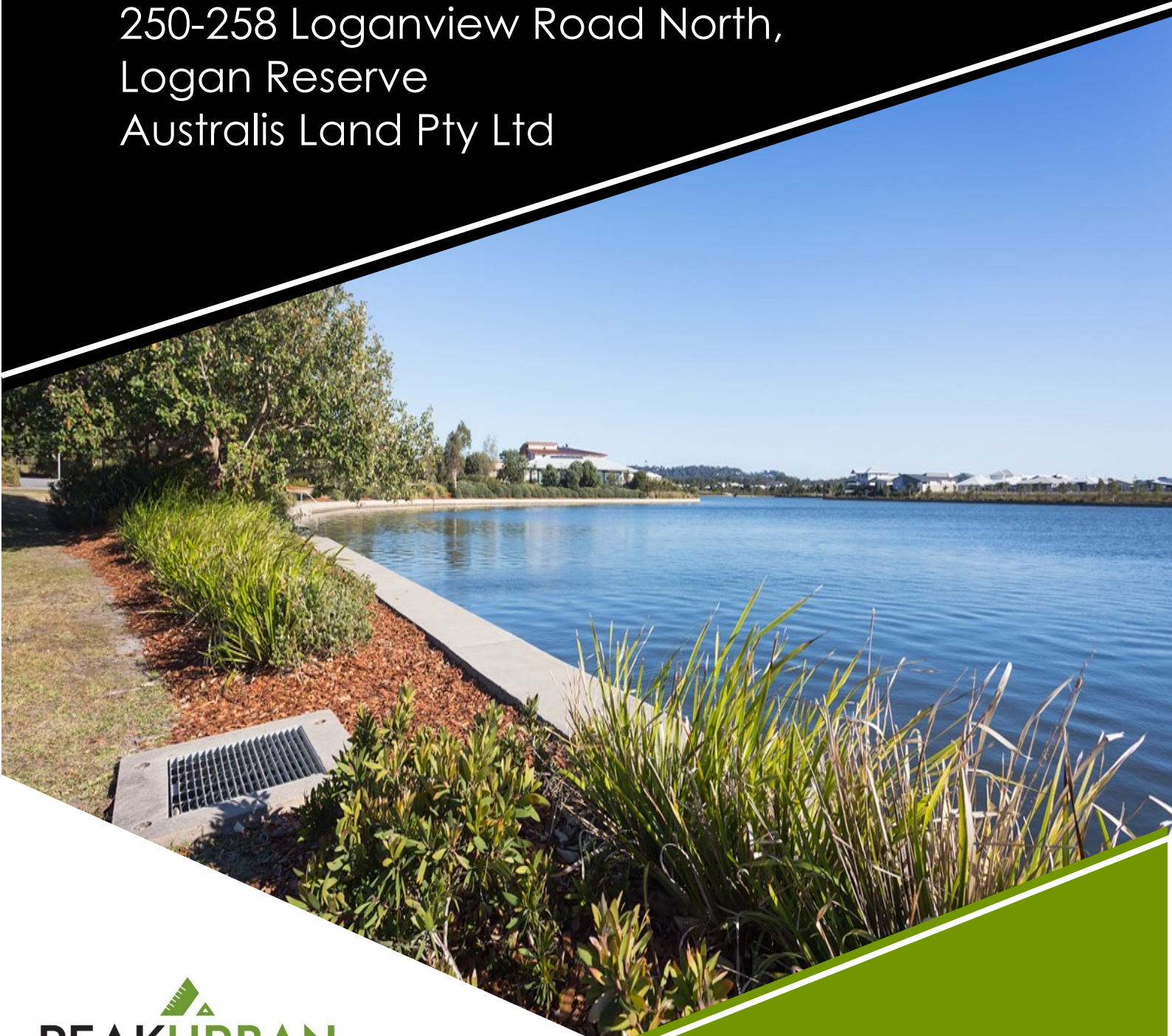
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Appendix C Stormwater Management Plan

Stormwater Management Plan

115 and 117 School Road and
250-258 Loganview Road North,
Logan Reserve
Australis Land Pty Ltd



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DOCUMENT CONTROL

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1	27/08/2021	For Issue	DM	KM	KM		09298

CONTENTS

1. INTRODUCTION	1
1.1. Project Context	1
1.2. Report Objectives	1
1.3. Site Description and Hydrological Setting	1
1.4. Report Structure	4
2. STORMWATER QUALITY MANAGEMENT	5
2.1. Stormwater Quality Design Objectives	5
2.2. Stormwater Quality Management Strategy	5
2.3. Stormwater Quality Analysis	7
2.3.1. MUSIC Model Analysis: Northern Catchment	8
2.3.2. MUSIC Model Analysis: Southern Catchment	8
2.3.3. Treatment Measures	9
2.3.4. MUSIC Model Results: Summary	10
2.4. Stormwater Quality Device Maintenance	11
3. STORMWATER QUANTITY MANAGEMENT	13
3.1. Stormwater Quantity Design Objectives	13
3.2. Stormwater Quantity Management Strategy	13
3.3. Hydrological Modelling	13
3.3.1. Pre- and post-development sub-catchments	13
3.3.2. WBNM Parameters	14
3.3.3. WBNM Analysis	14
3.3.4. WBNM Validation	16
3.4. Lawful Point of Discharge	17
4. CONCLUSION	18
5. DISCLAIMER	18
6. REFERENCES	19

LIST OF TABLES

Table 2-1: Water Quality Objectives for South East Queensland [Source: (Department of Infrastructure, Local Government and Planning (DILGP), 2014)].	5
Table 2-2: MUSIC Hydrological Data. [Source: Table A.1.1, Water by Design, 2010].	7
Table 2-3: Source Node Configuration – Split Land-Use	7
Table 2-4: Pollutant Export Parameters. [Source: Table 3.9, Water by Design, 2010].	7
Table 2-5: Bioretention Basin Design Parameters	10
Table 2-6: MUSIC Model Results	10
Table 2-7: Operational Maintenance Requirements (Modified from FAWB 2008)	12
Table 3-1: Catchment Parameters	14
Table 3-2: WBNM Parameters	14

Table 3-3: Northern Catchment WBNM Results.....	15
Table 3-4: Northern Basin Outlet Configuration and Stage-Storage Curve.	15
Table 3-5: Southern Catchment WBNM Results.....	16
Table 3-6: Southern Basin Outlet Configuration and Stage-Storage Curve.	16
Table 3-7: Comparison of WBNM and Rational Northern Method Peak Flows	17
Table 3-8: Comparison of WBNM and Rational Method Southern Peak Flows	17

LIST OF FIGURES

Figure 1-1: Site Location - 115 and 117 School Road and 248-285 Loganview Road, Logan Reserve.....	2
Figure 1-2: Q100 Flood Hazard overlay extent. [Source: LCC, 2015].....	3
Figure 1-3: Post-development Catchments. Pink = north, red = south).	3
Figure 2-1. Proposed Stormwater Quality Treatment Device Locations (green). [Source: PEAKURBAN's drawing number: 20-0136-PD1 [A]].	6
Figure 2-2: Northern Catchment Layout.	8
Figure 2-5: Southern Catchment Layout.....	9
Figure 2-8: Bioretention Basins – Examples.	9
Figure 3-1: WBNM pre-development (left) and post-development (right) sub-catchments. Areas shown in hectares (ha). Note: bio-detention basin size and location are indicative.....	13

APPENDICES

Appendix A	Lot Configuration
Appendix B	Relevant Engineering Drawings
Appendix C	WBNM Summary



1. INTRODUCTION

PEAKURBAN Pty Ltd (PEAKURBAN) has been engaged by Australis Land Pty Ltd to prepare a Stormwater Management Plan (SMP) that supports the development application for the proposed residential subdivision at 115 and 117 School Road and 248-258 Loganview Road North, Logan Reserve. The report will confirm that the proposed SMP will comply with Logan City Council (LCC) Planning Scheme 2015, and other relevant guidelines as required.

1.1. Project Context

This SMP has adopted the most recent lot layout, PEAKURBAN's drawing: 20-0136-PD1[A]. See Appendix A for Lot Layout.

An initial technical memorandum, undertaken by PEAKURBAN, was conducted to establish a preliminary stormwater management strategy, however no design calculations or modelling were undertaken. The technical memorandum proposed that the stormwater management plan roughly maintains natural catchment boundaries and proposed water sensitive urban design (WSUD) devices to improve stormwater quality and mitigate runoff.

1.2. Report Objectives

The purpose of this report is to quantify the impact that the proposed development has on the site and propose strategies to return stormwater quality and quantity to pre-development conditions. As requested by Australis, this report will:

- ▶ Detail the proposed stormwater quality management strategy and outline how the load reduction objectives, as specified in Schedule 6.2.5 – Part 3.6.1.5(1) of the LCC's *Planning Scheme (2015)*, meet the *State Planning Policy (SPP; 2017)* targets during the operational phase of the development;
- ▶ Outline the maintenance requirements for the proposed stormwater quality improvement devices;
- ▶ Detail the proposed stormwater quantity management strategy and outline how it complies with the *Queensland Urban Drainage Manual's (QUDM's) principles (2017)* as specified in Schedule 6 – Part 3.6 of the LCC's *Planning Scheme (2015)*;
- ▶ Outline the maintenance requirements for the proposed stormwater quantity management devices; and
- ▶ Demonstrate how the lawful point of discharge requirements for the site are compliant as per Section 3.9 of *QUDM (2017)*.

1.3. Site Description and Hydrological Setting

The site is located at 115 and 117 School Road and 248-258 Loganview Road North, Logan Reserve in the Logan City Council (LCC) Local Government Area (LGA). It is described as Lots 25 and 26 on RP97736 and 40 and 41 on RP229101. The site is approximately 13.54 ha and currently contains low-density rural residential housing and forest. Under the current LCC Planning Scheme, the site is zoned as an Emerging Community.

It is bound by School Road to the north, Loganview Road North to the east and a new proposed road to the south. The remaining lot boundaries back onto other Emerging Community zones. Figure 1-1 (below) shows the site location and bordering roads.

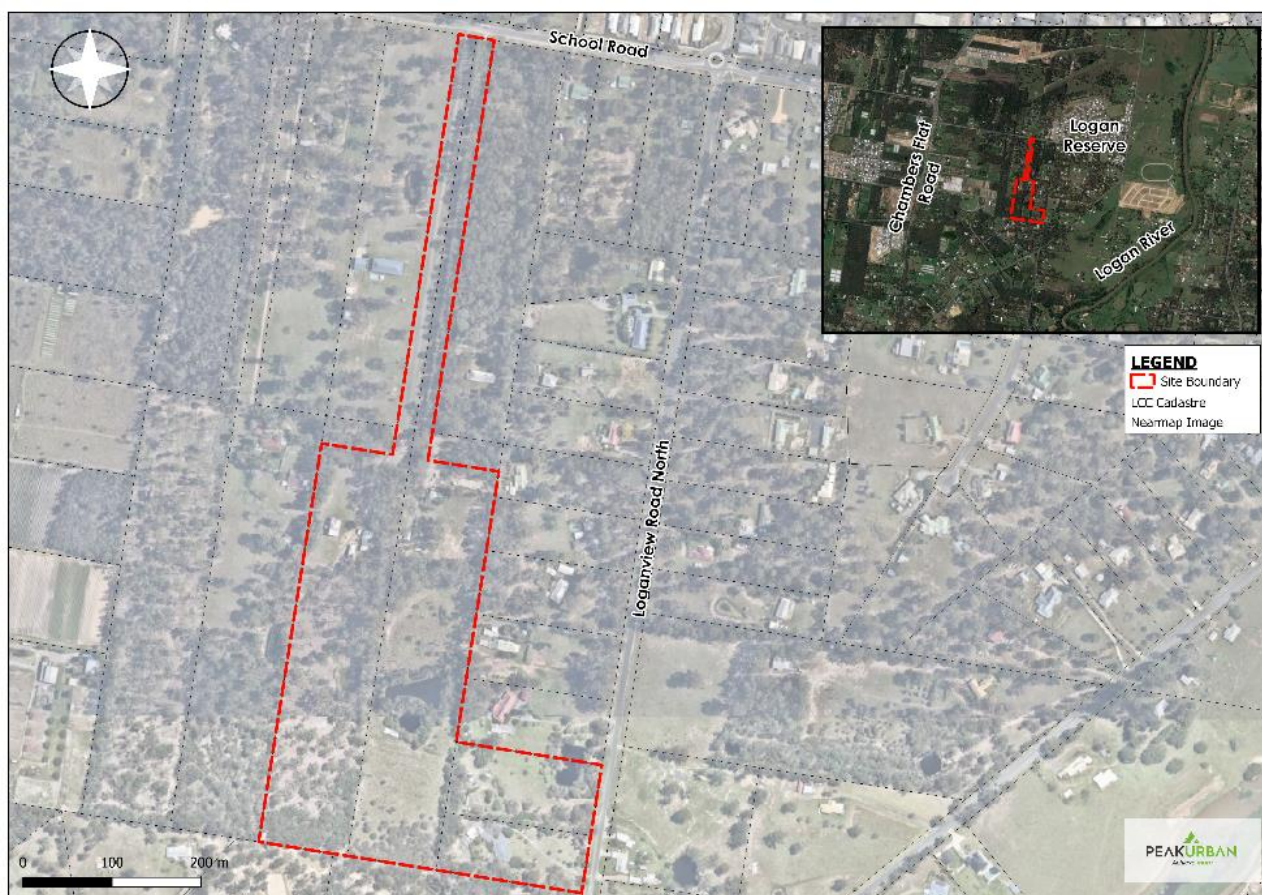


Figure 1-1: Site Location - 115 and 117 School Road and 248-285 Loganview Road, Logan Reserve.

The site is located in the headwaters of the Logan-Albert drainage basin. A 40m AHD crest, located in the north-western corner of the site, divides the site into two sub-catchments. Majority of the site falls within the southern catchment and drains east towards the 23 m AHD low point. The remaining 15-20 percent of the site drains north towards a low point located offsite.

The developed site closely follows the natural topography of the existing surface. The development is therefore divided into a northern and southern catchment. See Figure 1-2 for the two catchment areas in the developed state.

A review of Logan City Council Flood Level Report shows that Lots 117 School Road and 250-258 Loganview Road trigger the Flood Hazard overlay code. The extent of the Flood Hazard overlay on the site is shown in Figure 1-3. No design flood levels are nominated by LCC for the site.

As Figure 1-3 shows the site is located in the upstream extent of the flood overlay and is assessed as not being located in an area that would act in a flood storage capacity. The area within the flood overlay extent is significantly altered by current landuse activities and includes a constructed dam which is located partially on the subject site. On this basis, it has been determined that no flood analysis will be required as long as the proposed development demonstrates acceptable mitigation of peak flows from the site are achieved through hydrologic analysis.



Figure 1-2: Post-development Catchments. Pink = north, red = south).



Figure 1-3: Q100 Food Hazard overlay extent. [Source: LCC, 2015].



1.4. Report Structure

The remainder of this report is divided into two sections and concludes with a summary. Section 2 is devoted to stormwater quality. It outlines the relevant water quality objectives for the site; summarises the critical elements of the water quality analysis and results; outlines the water quality management strategy; and provides water quality device maintenance recommendations. Section 3 is a similarly structured section devoted to water stormwater quantity. It outlines the governing water quantity management design objectives; summarises the critical findings and assumptions of the water quality analysis; outlines the water quantity management strategy; provides water quantity device maintenance recommendations; and demonstrates compliance with Lawful Point of Discharge requirements. Section 4 provides a summary of the investigation.



2. STORMWATER QUALITY MANAGEMENT

2.1. Stormwater Quality Design Objectives

This section identifies the stormwater quality management objectives for the operational phase (post-construction phase) of the proposed development. Construction based stormwater quality management objectives will need to be addressed as part of operational works documentation.

The LCC's Logan Planning Scheme requires water quality objectives to be, at a minimum, equivalent to those stated in the SPP (Section 3.6.1.5(1) - LCC, 2020). The Water Quality Objective (WQO's) mean annual load reduction targets adopted for this assessment are provided in Table 2-1.

Table 2-1: Water Quality Objectives for South East Queensland [Source: (Department of Infrastructure, Local Government and Planning (DILGP), 2014)].

Minimum reductions in mean annual loads from unmitigated development (%)			
Total Suspended Solids (TSS)	Total Phosphorous (TP)	Total Nitrogen (TN)	Gross pollutants >5 mm
80	60	45	90

2.2. Stormwater Quality Management Strategy

It is proposed that runoff from the development be treated via end-of-line bioretention basins prior to discharging to the environment. Two areas, located in the northern and southern extents of the site, have been identified for water quality treatment devices. See Lots 901 and 1001 (coloured green) in Figure 2-1.

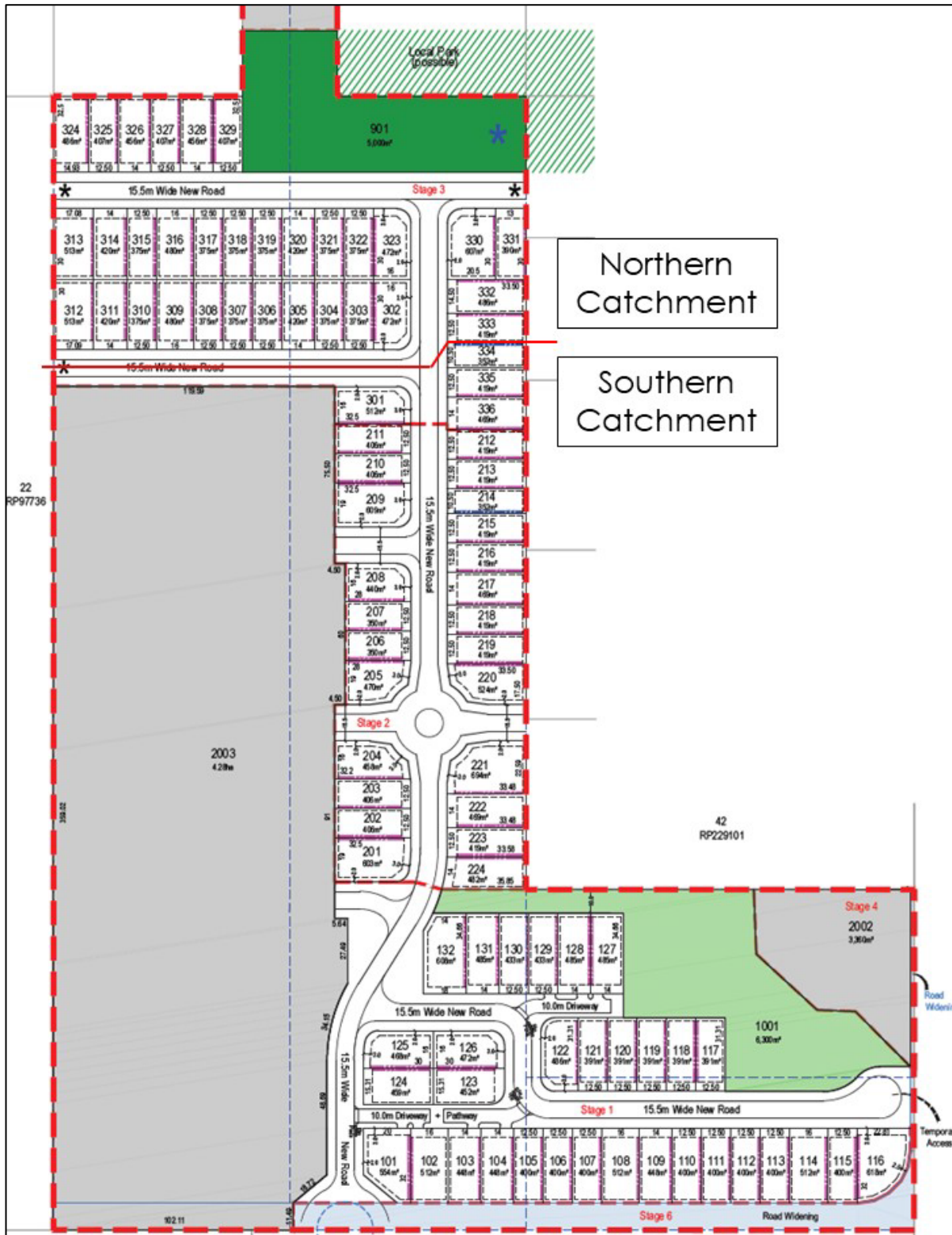


Figure 2-1. Proposed Stormwater Quality Treatment Device Locations (green). [Source: PEAKURBAN's drawing number: 20-0136-PD1[A]].



2.3. Stormwater Quality Analysis

The LCC requires all stormwater quality modelling to be in accordance with the latest Model for Urban Stormwater Improvement Conceptualisation (MUSIC) Modelling Guidelines and is to be modelled using the latest MUSIC program (Section 2.4.1.3(e)- LCC, 2020). MUSIC Modelling Guidelines – Version 1 (Water by Design, 2010) and MUSIC – Version 6.3 (eWater, 2014) were adopted for this assessment. Ten years of rainfall and PET data from 1990 to 1999 was adopted for the model. A 6-minute time-step period was also used. The hydrological data adopted for this analysis is summarised in Table 2-2.

Table 2-2: MUSIC Hydrological Data. [Source: Table A.1.1, Water by Design, 2010].

MUSIC Hydrological Data											
Council	Station ID	Station Name	Climate Period	Mean Annual Rainfall (mm)	Time Step						
Logan City Council (East)	40715	Shailer Park	1/1/1990-31/12/1999	1119	6 min						
Mean PET (mm)											
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
195	153	149	107	74	61	63	80	110	148	173	199

A split catchment land-use methodology was adopted for the water quality. The impervious fraction values adopted for this assessment are in accordance with Table 3.7 (Water by Design, 2010). The proposed development was calculated to have 14.3 dwellings per hectare. As such, impervious fraction values for 15 dwellings per hectare was adopted. See Table 2-2 for Source Node Configuration details.

Table 2-3: Source Node Configuration – Split Land-Use

Source Node	Total Area (ha)	Road (ha)	Roof (ha)	Ground (ha)
% Impervious		60	100	20
Northern Catchments				
N01	1.95	0.49	0.63	0.83
Southern Catchments				
S06	5.698	1.42	1.85	2.42
S05	0.634	0.16	0.21	0.27
S01	1.976	0.49	0.64	0.84
S01b	0.252	0.06	0.08	0.11

The Base and Stormflow Pollutant Export Parameters for residential surfaces, as per MUSIC Guidelines are presented in Table 2-4.

Table 2-4: Pollutant Export Parameters. [Source: Table 3.9, Water by Design, 2010].

Pollutant Export Parameters for Split Catchment Land-use (Log10 values)								
Land Use	Split	Flow Type	TSS		TP		TN	
			Mean	Std. Dev	Mean	Std. Dev	Mean	Std. Dev
Urban Residential	Roof	Baseflow	N/A	N/A	N/A	N/A	N/A	N/A
		Stormflow	1.3	0.39	-0.89	0.31	0.26	0.23
	Roads	Baseflow	1	0.34	-0.97	0.31	0.2	0.2
		Stormflow	2.43	0.39	-0.3	0.31	0.26	0.23
	Ground	Baseflow	1	0.34	-0.97	0.31	0.2	0.2
		Stormflow	2.18	0.39	-0.47	0.31	0.26	0.23



2.3.1. MUSIC Model Analysis: Northern Catchment

The layout for the Northern Catchment MUSIC model is shown in Figure 2-2. No routing methods were applied as the catchment area is relatively small. Due to the park contours sloping north, the park runoff was routed to discharge directly to the environment, rather than through the bioretention basin. The MUSIC analysis calculated that a bioretention basin with a filter media area of 200 m² is required to meet WQOs.

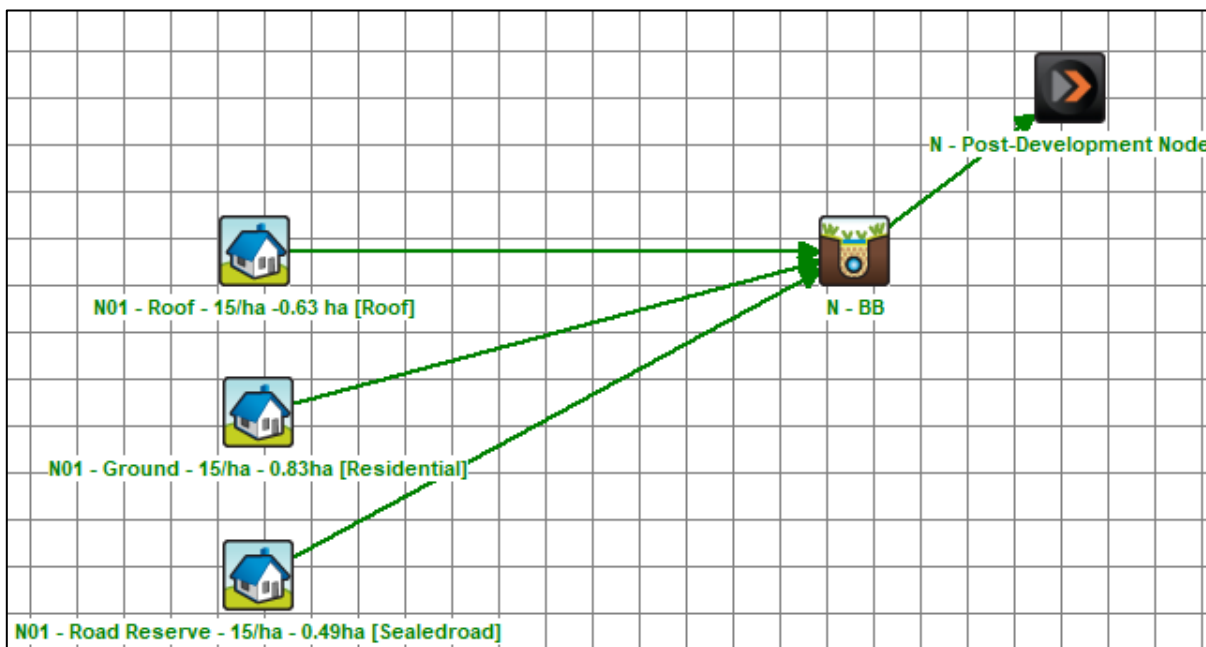


Figure 2-2: Northern Catchment Layout.

2.3.2. MUSIC Model Analysis: Southern Catchment

The layout for the Southern Catchment MUSIC model is shown in Figure 2-4. Due to the small size of the catchment, routing methods were not applied. To be conservative, it was assumed that Lot 2003 would also be developed in a similar layout to the proposed development. A small catchment (Sb01) cannot be directed to the basin due to level constraints and as such has been modelled as a bypass catchment. To achieve WQOs at the junction, which includes stormwater runoff from untreated catchment, a filter media area of 910 m² is required.

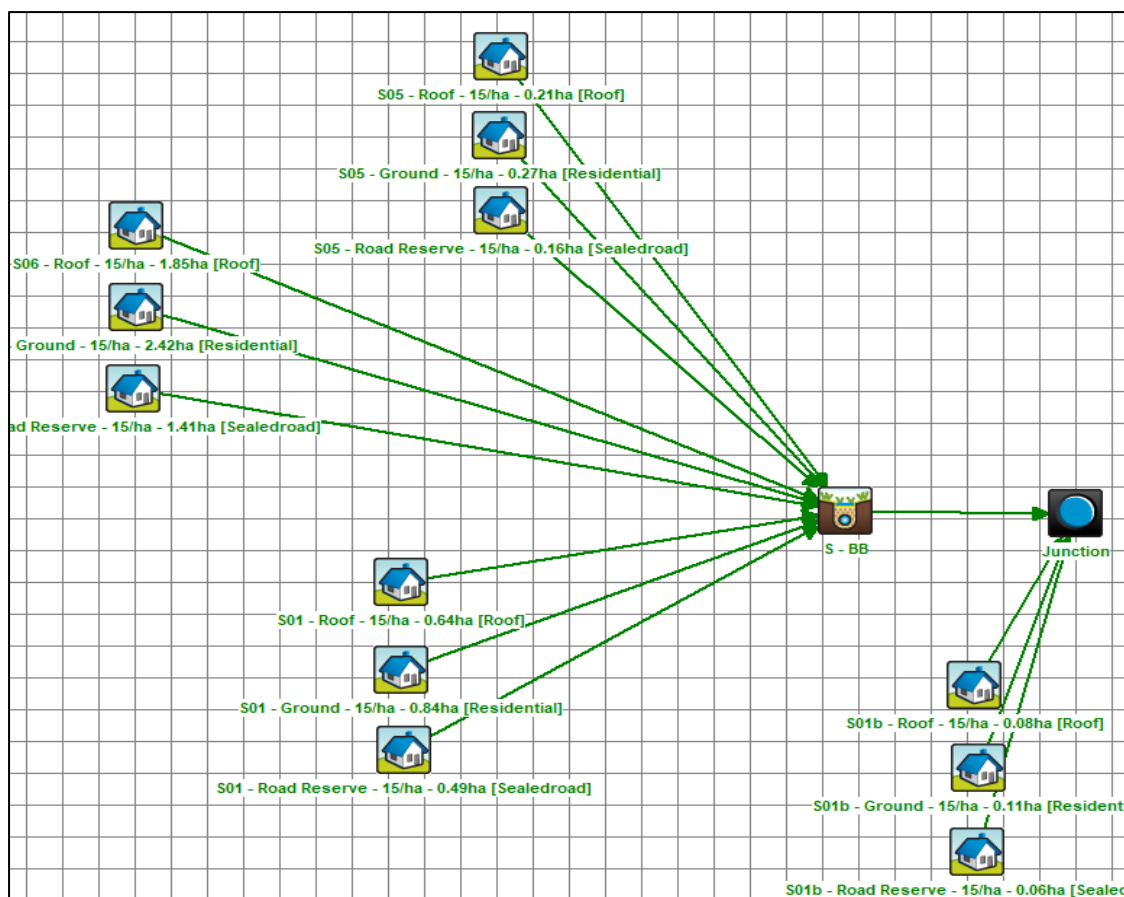


Figure 2-3: Southern Catchment Layout.

2.3.3. Treatment Measures

A description of the selected treatment measures, including a summary of the designed parameters, are provided in the following sections.

2.3.3.1. Bioretention Basins

Bioretention systems use ponding above a treatment surface to maximise the volume of runoff flowing through the filtration media. They typically convey flows above the design event through overflow pits or a weir. The treatment system operates by firstly filtering surface flows through surface vegetation and then percolating runoff through prescribed filtration media. This media provides treatment through fine filtration, extended detention and biological uptake of nutrients.

As these systems take approximately 12-24hrs to drain, the maximum depth of pondage allowed to occur over the filter area has been limited to 300mm, with a minimum filter media depth of 500mm. Table 2-6 summarises the proposed design parameters for each bioretention system for this development. It is to be noted that the Orthophosphate content of the filter media has been reduced to 30mg/kg in line with recent advice from Healthy Waterways.



Figure 2-4: Bioretention Basins – Examples.



Table 2-5: Bioretention Basin Design Parameters.

Bioretention Basin		N-BB	S-BB-1
Inlet Properties			
Low-flow bypass	m ³ /sec	0	0
High-flow bypass	m ³ /sec	100	100
Storage Properties			
Extended Detention	m	0.3	0.3
Surface Area	m ²	200	910
Filter and Media Properties			
Filter Area	m ²	200	910
Unlined Filter Media Perimeter	m ²	0.01	0.01
Saturated Hydraulic Conductivity	mm/hr	200	200
Filter Depth	m	0.5	0.5
TN Content on Filter Media	mg/kg	400	400
Orthophosphate Content	mg/kg	30	30
Infiltration Properties			
Exfiltration Rate	mm/hr	0	0
Lining			
Based Lined?	-	Yes	Yes
Vegetation Properties			
Plant Selection	-	Effective	Effective
Outlet Properties			
Overflow Weir Width	-	2	5
Underdrain Present?	-	Yes	Yes
Submerged Zone with Carbon?	-	No	No
Depth (of submerged zone)	-	N/A	N/A

2.3.4. MUSIC Model Results: Summary

Results from the MUSIC model are presented in Table 2-7. As shown, the load reduction targets have been achieved for both discharge locations.

Table 2-6: MUSIC Model Results

Northern Catchment			
Pollutant	Target Reduction (%)	Reduction Achieved (%)	Compliance
TSS	80	82.5	✓
TP	60	74.3	✓
TN	45	52.0	✓
GP	90	100.0	✓
Southern Catchment			
Pollutant	Target Reduction (%)	Reduction Achieved (%)	Compliance
TSS	80	80.1	✓
TP	60	72.3	✓
TN	45	51.9	✓
GP	90	97.1	✓



2.4. Stormwater Quality Device Maintenance

To ensure the proposed treatment train will function as per the design intent, periodic inspections and maintenance of the stormwater quality improvement devices will be required. When undertaking maintenance or rectifications works of the proposed bioretention devices, reference should be made to the following guidelines in addition to this report:

- ▶ *Maintaining Vegetated Stormwater Assets* (Water by Design, 2012);
- ▶ *Rectifying Vegetated Stormwater Assets* (Water by Design 2012);
- ▶ *Construction and Establishment Guidelines: Swales, Bioretention Systems and Wetlands* (Water by Design 2010); and
- ▶ *Guidelines for Filter Media in Biofiltration Systems* (Facility for Advancing Water Biofiltration, 2009)

2.4.1.1. Construction and Establishment Phase

To minimise the long-term maintenance of the proposed bioretention devices it is critical to protect the filter media during the construction phases. As detailed in the Construction and Establishment Guidelines (Water by Design 2012) there are four options for protecting the bioretention devices during the construction phase:

- ▶ **Option 1** – Surface Protection. The filter media of the bioretention basin is protected by a filter cloth and turf layer which is removed after 80% of the contributing catchment is built out.
- ▶ **Option 2** – Bypass and early establishment. Flows are diverted around the bioretention system (or isolated from the filter media). When over 80% of the contributing catchment is built out the bypass is removed
- ▶ **Option 3** – Sediment Basin and Bioretention. This strategy combines with Option 2 with a sediment basin upstream of the proposed bioretention basin (with surface protection). However, this option is only practical where there is sufficient room for both devices.
- ▶ **Option 4** – Leave as sediment basin. Instead of installing the bioretention media the basin is allowed to operate as a sediment basin during the built-out period in the contributing catchment. Once 80% of the building work is completed the bioretention under drainage and media is installed.

For this proposed development, the following measures are proposed:

- ▶ **Bioretention Basin** – surface protection to be installed once bioretention basin construction is complete.

2.4.1.2. Operational Maintenance

Routine inspection and maintenance of the bioretention devices will be required to maintain their water quality function. Table 2-8 details the operational inspection and maintenance requirements for the bioretention devices.



Table 2-7: Operational Maintenance Requirements (Modified from FAWB 2008)

Item	Task	Frequency
Filter Media Inspection		
Sediment Deposition	Remove sediment build up from coarse forebays in bioretention basins and from the surface of the filter media in bioretention street trees.	Quarterly
Scouring of Filter Media	Check for evidence of scour or erosion of filter media. Provide additional rock or erosion protection if required	Quarterly
Filter Media Porosity/Hydraulic Conductivity	Inspect filter media to ensure that ponded water after rainfall events drains after a few hours. Repair minor sediment accumulation that may have formed by raking media surface. Remove accumulated leaf litter. If filter media continues to drain poorly, refer to <i>Rectifying Vegetated Stormwater Assets</i> (Water by Design 2012) for further guidance.	Quarterly
Litter	Inspect forebays and filter media surface for accumulation of litter and debris, remove as required.	Quarterly
Vegetation Management		
Pest and Diseases	Inspect plants for signs of pests and diseases. Treat and replace plants as required	Quarterly
Plant Density	Ensure sufficient plant density is maintained with the basin (6 to 10 plants per square metre). Undertake infill planting if required.	Quarterly
Weeds	Inspect for signs of weeds and remove manually where possible. Application of herbicides to be avoided where practical	Quarterly
Drainage Tasks		
Under drainage pipes	Ensure slotted under drainages pipes are functioning correctly and not blocked. A small steady flow of water should be observed a few hours after rainfall events. In the event pipes are blocked undertake flushing of underdrainage using cleanout points or CCTV to determine cause of blockage	6 Monthly
Inlet and outlet structure, overflow weirs and embankments	Ensure outlet structures are clear of debris. Remove sediment from inlet structures. Inspect embankment and overflow weir for signs of scouring. Provide additional scour protection if required.	Annually and after large rainfall events.

3. STORMWATER QUANTITY MANAGEMENT

3.1. Stormwater Quantity Design Objectives

The proposed stormwater quantity management plan has been designed in accordance with the design objectives outlined in Schedule 6.2.5 – Part 2.4.1.2 of LCC's *Planning Scheme* (2015). Hydrological modelling was undertaken to mitigate any increase in flows to ensure non-worsening peak flows downstream. Detention devices were designed such that each device would drain to a lawful point of discharge within 24 hours.

3.2. Stormwater Quantity Management Strategy

Two collocated bio-detention basins are proposed to attenuate peak flows discharging from the site to demonstrate non-worsening and meet legal point of discharge requirements. The locations of each basin (N-BB for the northern bio-detention basin and S-BB for the southern bio-detention basin) are shown in Figure 3-1.

3.3. Hydrological Modelling

The hydrological modelling was undertaken using the Water Bound Network Modelling (WBNM) program. The detention basins are proposed to be collocated with the bioretention basins.

3.3.1. Pre- and post-development sub-catchments

The catchment that the site is located within is bounded by the head of the catchment and Loganview Road North in the upper and lower extents, respectively. The sub-catchments for the pre- and post-development states are shown below in Figure 3-1. The pre- and post-development catchments were drawn to be as similar as practically possible in both states to minimise complexity and reduce error.

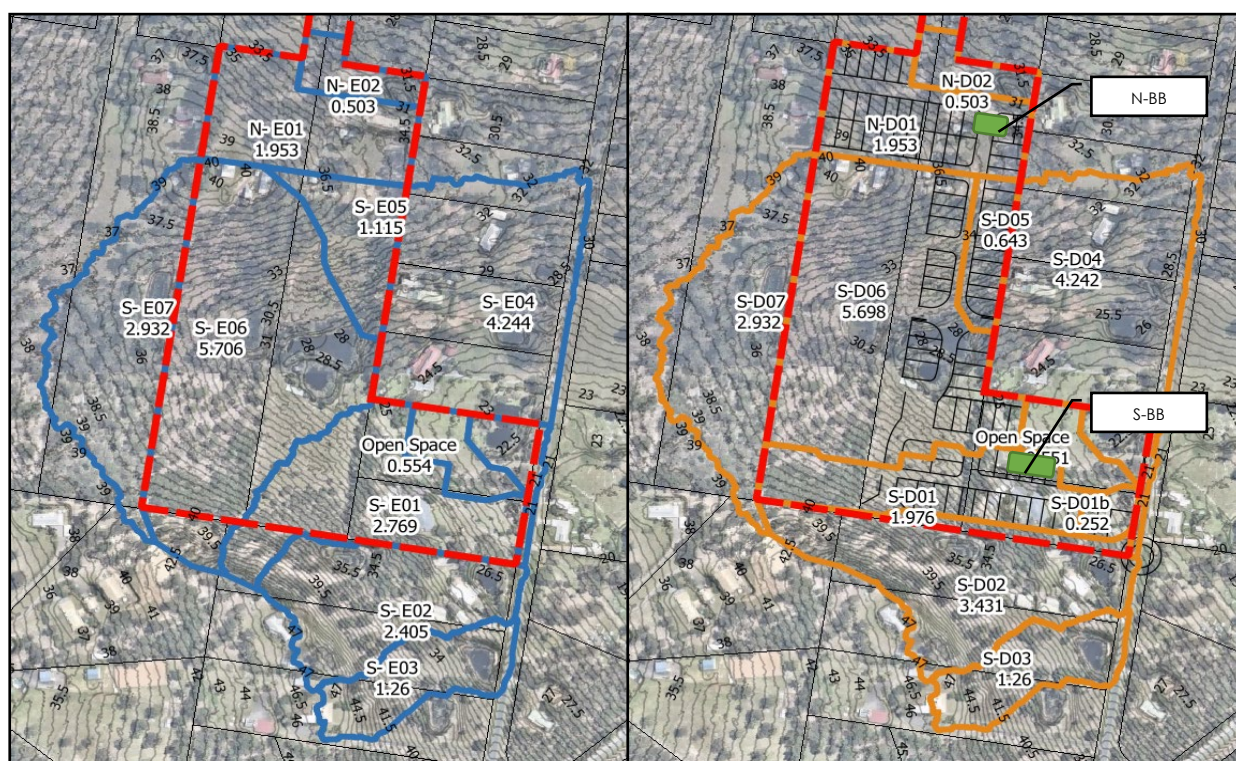


Figure 3-1: WBNM pre-development (left) and post-development (right) sub-catchments. Areas shown in hectares (ha). Note: bio-detention basin size and location are indicative.



3.3.2. WBNM Parameters

The following sections outline the catchment parameters adopted in WBNM. Table 3-1 details the catchment areas and adopted fraction impervious values. Percent impervious values are in accordance with Table 4.5.1 of QUDM (2017). The dwelling density of the pre-development case is approximately 0.5 dwellings per hectare. This density is less than QUDM's 'rural residential' definition (2 to 5 dwellings per hectare), however has more impervious surfaces than open space. As such, a percent impervious value of 5 percent was adopted for the pre-development case.

In the developed state, residential areas will have a dwelling density of approximately 14.3 dwellings per hectare. This falls within QUDM's 'urban residential – low density' classification. As such, residential areas and adjacent roads will be modelled as 70 percent impervious.

Table 3-1: Catchment Parameters

Pre-development Sub-catchments			Post-development Sub-catchments		
Name	Area (ha)	% Impervious	Name	Area (ha)	% Impervious
North – E01	1.95	5	North – D01	1.95	70
North – E02	0.50	0	North – D02	0.50	0
South – E01	2.769	10	South – D01	1.976	70
			South – D01b	0.252	70
South – E02	2.405	10	South – D02	3.431	10
South – E03	1.260	2	South – D03	1.26	2
South – E04	4.244	20	South – D04	4.242	20
South – E05	1.115	5	South – D05	0.634	70
South – E06	5.706	5	South – D06	5.689	70
South – E07	2.932	0	South – E07	2.932	0

The intensity-frequency-duration (IFD) parameters adopted for this report were taken from the Bureau of Meteorology's (BOM) 2016 Design Rainfall Data System using the site's exact coordinates to determine the closest rain station. The adopted WBNM parameters are provided in Table 3-2.

Table 3-2: WBNM Parameters

Lag Parameter (C Value)	Calculation Timestep (min)	Flow Path Routing Parameter (R)	Initial Loss (mm)	Continuing Loss (mm/hr)
1.6	1	1	20	1.5

3.3.3. WBNM Analysis

Both catchments underwent modelling of the 63.2, 50, 20, 10, 5, 2, and 1 percent Annual Exceedance Probability (AEP) for storm event durations of 10 to 360 minutes for the following scenarios:

1. Existing Scenario (base case);
2. Developed Scenario; and
3. Mitigated Scenario.

3.3.3.1. Northern Bio-detention Basin

The peak flows of each AEP case for the Existing and Mitigated Scenarios are presented in Table 3-3. The detention basin parameters designed to reduce peak flows to pre-development flows are presented in Table 3-4. It is expected that the proposed bio detention basin will require 1,245m² (excluding the external batters). See Appendix B for preliminary engineering drawings and Appendix C for detailed WBNM Results.



Table 3-3: Northern Catchment WBNM Results.

Northern Catchment WBNM Results: Existing and Mitigated Cases							
AEP (%)	63.2	50	20	10	5	2	1
Existing	0.17	0.21	0.35	0.47	0.58	0.73	0.84
Mitigated	0.16	0.19	0.28	0.34	0.39	0.45	0.50
Difference	-0.01	-0.02	-0.07	-0.14	-0.19	-0.28	-0.34
% Change	-4%	-7%	-20%	-29%	-33%	-38%	-41%

Table 3-4: Northern Basin Outlet Configuration and Stage-Storage Curve.

Parameter	Outlet 1	Outlet 2
Type of Outlet	Pipe	Weir
Invert [mAHD]	30.5	31.7
No. Barrels	1	N/A
Dia./[Width][m]	0.45	10
Stage-Storage Curve (1:6 batters)		
Elevation (mAHD)	Storage (m³)	
30.5	0	
31	291	
31.5	705	
32	1254	
Critical Results		
1% AEP Depth (m)	1.2	
1% AEP WL (m AHD)	31.7	
5% AEP Depth (m)	0.9	
5% AEP WL (m AHD)	31.4	
Batter slopes	1:4	
Crest Height (mAHD)	32.0	

Including Extended Detention Depth of Bioretention Basin.

A sensitivity analysis was performed on the northern basin. This was undertaken by checking the maximum water level for the 1% AEP event when the outlet pipes are blocked (i.e. modelling the number of pipes as zero). It was found that when the pipes are blocked, the maximum water elevation reaches 31.78 m AHD (1.28m). As this height is less than the crest height, the design of the northern bio-detention basin is satisfactory.

3.3.3.2. Southern Bio-detention Basin

The peak flows of each AEP case for the Existing and Mitigated Scenarios are presented in Table 3-5. The detention basin parameters designed to reduce peak flows to pre-development flows are presented in Table 3-6. It is expected that the proposed bio-detention basin will require 3,437m² (excluding the external batters). See Appendix B for preliminary engineering drawings and Appendix C for detailed WBNM Results.



Table 3-5: Southern Catchment WBNM Results.

Southern Catchment WBNM Results: Existing and Mitigated Cases							
AEP (%)	63.2	50	20	10	5	2	1
Existing	1.20	1.52	2.56	3.39	4.26	5.17	6.04
Mitigated	1.12	1.44	2.54	3.32	4.10	4.93	5.66
Difference	-0.07	-0.08	-0.01	-0.08	-0.15	-0.23	-0.39
% Change	-6%	-5%	-1%	-2%	-4%	-5%	-6%

Table 3-6: Southern Basin Outlet Configuration and Stage-Storage Curve.

Parameter	Outlet 1	Outlet 2	Outlet 3	Outlet 4
Type of Outlet	Pipe	Pipe	Pipe	Weir
Invert [mAHD]	22	22.5	22.5	23.2
No. Barrels	1	1	1	N/A
Dia./[Width][m]	0.450	0.600	0.600	15
Stage-Storage Curve (1:6 batters)				
Elevation (mAHD)	Storage (m³)			
22	0			
22.3	313			
22.6	990			
22.9	1764			
23	2045			
23.5	3618			
Critical Results				
1% AEP Depth (m)	1.18			
1% AEP WL (m AHD)	23.18			
5% AEP Depth (m)	1.00			
5% AEP WL (m AHD)	23.00			
Batter slopes	1:4			
Crest Height (mAHD)	1.5 m (23.5 m AHD)			

Including Extended Detention Depth of Bioretention Basin.

A sensitivity analysis was performed on the southern basin. This was undertaken by checking the maximum water level for the 1% AEP event when the outlet pipes are blocked (i.e. modelling the number of pipes as zero). It was found that when the pipes are blocked, the maximum water elevation reaches 23.5 m AHD. As this height is less than the crest height, the design of the southern bio-detention basin is satisfactory.

3.3.4. WBNM Validation

Pre-development peak flows have been checked against peak flows determined using the Rational Method (RM) as shown in Table 3-7 and Table 3-8. It was determined that the WBNM model flows are suitable for use as majority of the events are within 10 percent of each other. Refer to Appendix C for a summary of rational method parameters used.



Table 3-7: Comparison of WBNM and Rational Northern Method Peak Flows

Event AEP (%)	63.2	50	20	10	5	2	1
WBNM (m ³ /s)	0.17	0.21	0.35	0.47	0.58	0.73	0.84
Rational (m ³ /s)	0.22	0.27	0.41	0.51	0.61	0.79	0.91
Difference (%)	-26%	-24%	-16%	-7%	-5%	-7%	-8%

Table 3-8: Comparison of WBNM and Rational Method Southern Peak Flows

Event AEP (%)	63.2	50	20	10	5	2	1
WBNM (m ³ /s)	2.67	3.65	6.05	8.07	9.82	12.75	15.65
Rational (m ³ /s)	2.91	3.51	5.48	6.92	8.47	11.10	13.07
Difference (%)	-9%	4%	10%	15%	15%	14%	18%

3.4. Lawful Point of Discharge

As per the LCC’s Planning Scheme Policy 5, “all developments shall discharge to a lawful point of discharge in accordance with the Queensland Urban Drainage Manual” (QUDM; Section 3.6.2.3, 2020). As outlined by *QUDM – 4th Edition*, one of three criteria must be met to determine whether a lawful point of discharge (LPOD) exists (Institute of Public Works Engineering Australasia, Queensland (IPWEAQ), 2017).

The three criteria for determining the lawful point of discharge (LPOD) are:

- (i) Will the proposed development alter the site’s stormwater discharge characteristics in a manner that may substantially damage a third-party property?
 - ▶ If not, then no further steps are required to obtain tenure for a lawful point of discharge (assuming any previous circumstances and changes were lawful).

(IPWEAQ, 2017)

The two discharge locations are deemed to satisfy the LPOD requirements, as the northern and southern discharge flows have been demonstrated to not increase the site’s stormwater discharge.



4. CONCLUSION

PEAKURBAN Pty Ltd has been engaged by Australis Land Pty Ltd to prepare a Stormwater Management Plan that supports the development application for the proposed subdivision at 115 and 117 School Road and 248-258 Loganview Road North, Logan Reserve.

This plan demonstrates that effective stormwater management at the proposed development can be achieved through the integration of Water Sensitive Urban Design (WSUD) principles and collocated detention basins. To achieve water quality and quantity requirements set out LCC, the follow infrastructure is required:

- ▶ Two bio-retention basins are required at the northern and southern low points of the site. To meet SPP WQO's, the filter media area required is 200m² and 910m² for the northern and southern basins respectively.
- ▶ Each basin will require detention storage to ensure non-worsening flows. The northern and southern basins require 907 m³ and 2,640 m³ of storage respectively to mitigate flows up to and including the 1`% AEP event.
- ▶ Each discharge location was deemed to be a lawful point of discharge, as proven in Section 3.5 of this report.

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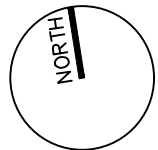
6. REFERENCES

- ▶ Construction and Establishment Guidelines: Swales, Bioretention Systems and Wetlands (Water by Design 2010)
- ▶ Construction and Establishment Guidelines (Water by Design 2012).
- ▶ DILGP. (2014). *State Planning Policy*. www.dilgp.qld.gov.au
- ▶ Guidelines for Filter Media in Biofiltration Systems (Facility for Advancing Water Biofiltration, 2009)
- ▶ IPWEAQ. (2016). *Queensland Urban Drainage Manual*.
- ▶ LCC. (2020). *Logan Planning Scheme* (pp. 1–88)
- ▶ Maintaining Vegetated Stormwater Assets (Water by Design, 2012)
- ▶ MUSIC Modelling Guidelines (Water by Design, 2010)
- ▶ QLD Globe, n.d <https://qldglobe.information.qld.gov.au/> accessed 15/02/2021
- ▶ Rectifying Vegetated Stormwater Assets (Water by Design 2012)

APPENDICES



Appendix A Lot Configuration



0 50 100 150

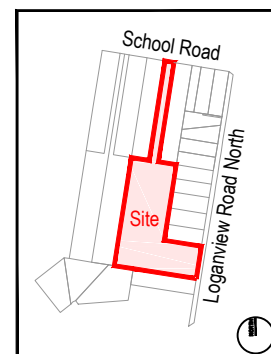
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LEGEND

Site boundary	- - - - -
Existing lot boundaries	- - - - -
Core Koala Habitat Area + Category B on the regulated vegetation management map (TRACED) (subject to detail investigation)	Green cross-hatch pattern
37.0m offset from Core Koala Habitat Area + Category B on the regulated vegetation management map (TRACED) (subject to detail investigation)	Orange dashed line
OM-05.00 Flood hazard trigger- Flooding and inundation areas (TRACED) (subject to further investigation)	Blue cross-hatch pattern
Possible Local Park	Green solid fill
Possible Stormwater Treatment	Light green solid fill
Balance lot	Grey solid fill
Temporary turnaround subject to detail design	*
Stormwater Treatment (1,500m ²)	Blue asterisk
Indicative future road network	Black dashed line
Vendor lot	Black solid line

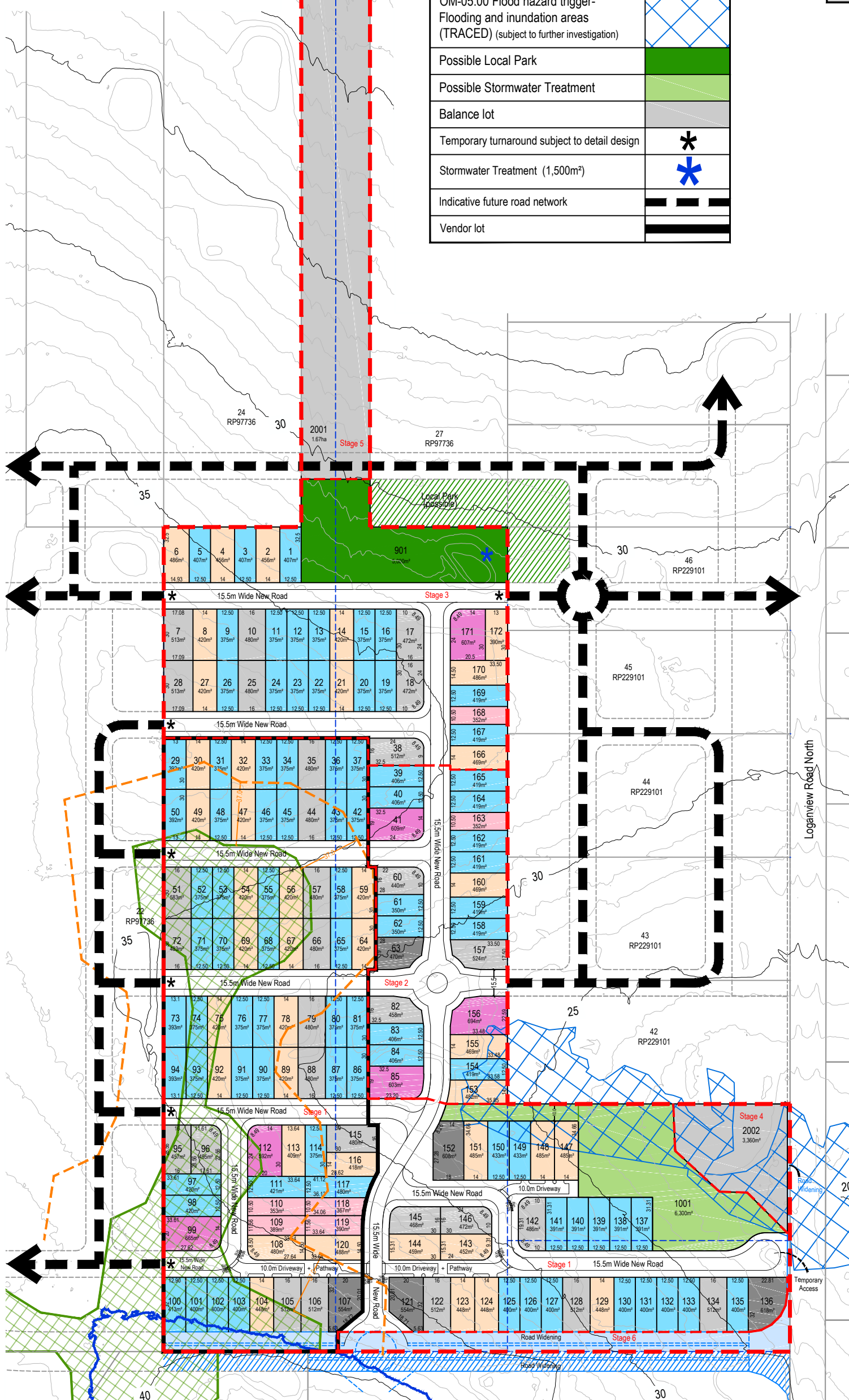
YIELD SUMMARY

Lot Frontage	Number of Lots	%
10.00-12.49m	6	3.5%
12.50-13.99m	86	50.0%
14.00-15.99m	40	23.3%
16.00-17.99m	29	16.9%
≥18.0m	5	2.9%
Duplex Lots	6	3.5%
TOTAL	172	100%



KEY DIAGRAM (nts)

DRAFT FOR DISCUSSION PURPOSES ONLY



CLIENT Baycrown Pty Ltd	
PROJECT Concept Sketch Plan	
115 + 117 School Road and 248-258 Loganview Road North, Logan Reserve	
25 + 26 RP97736 + 40+41 RP229101	
AMENDMENTS:	DATE:
A Original	18.02.2021
B Add Duplex Lots	22.02.2021
C Amend layout	18.03.2021
D	
E	
F	
G	
H	
DESIGNED: KS	DATE: 18.03.2021
DRAWN: KS	DATE: 18.03.2021
SCALE: 1:2,500 @ A3	1 of 1
IMPORTANT NOTES:	
This note is an integral part of this plan. This plan may not be reproduced without this note.	
This plan was prepared for discussion purposes only and is conceptual only. This plan should not be used for any other purposes.	
This plan remains subject to, but not limited to, authority approval, detail design and final survey.	
The total number of lots shown on this plan is approximate only.	
No relevance should be placed on the information on this plan for any financial dealings involving the land.	
Copyright © PEAK URBAN Pty Ltd (18.03.2021)	
Cadastral Boundaries: DCDB © State of Queensland (Department of Natural Resources and Mines) 2020	
Koala Mapping: State of Queensland (Department of Environment and Science) 2020	
DRAWING NUMBER: 20-0136-SK3	ISSUE: C



Appendix B Relevant Engineering Drawings

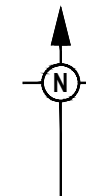
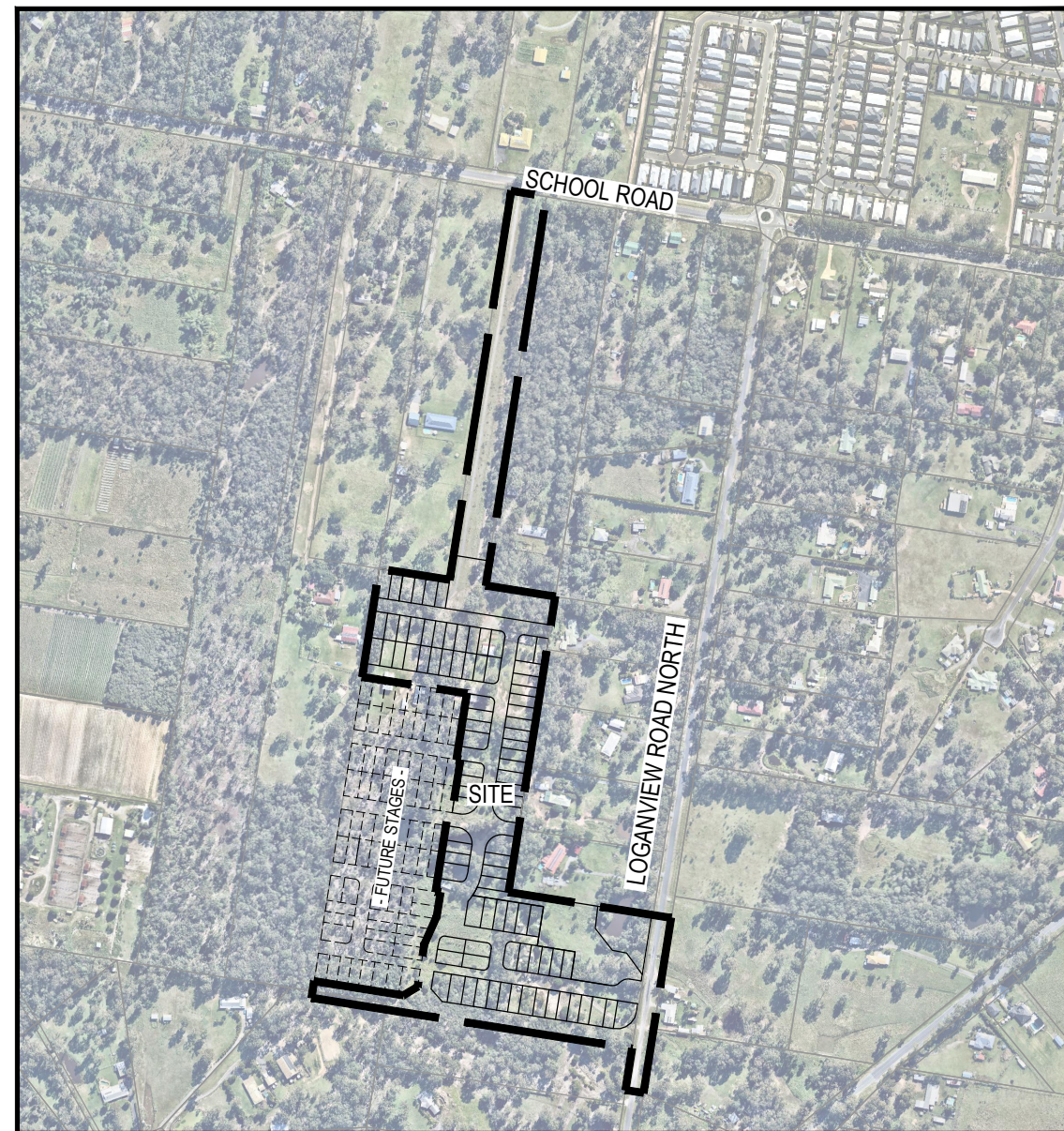
RESIDENTIAL DEVELOPMENT - LOGAN RESERVE

DEVELOPMENT APPLICATION (EAST)

115 & 117 SCHOOL ROAD AND 250-258 LOGANVIEW ROAD NORTH, LOGAN RESERVE FOR 'AUSTRALIS LAND'

DRAWING LIST

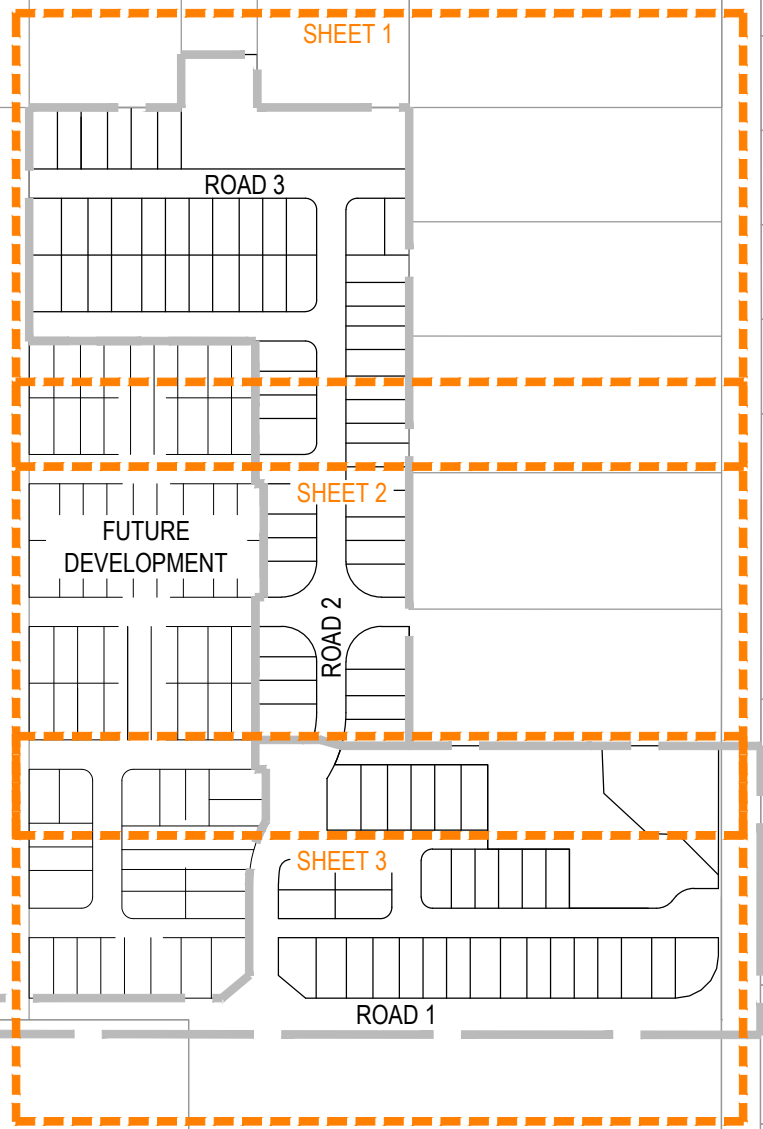
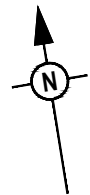
- 21-0073-P100 COVER PLAN
- 21-0073-P101 OVERALL LAYOUT PLAN
- 21-0073-P102 BULK EARTHWORKS CONCEPT LAYOUT PLAN SHEET 1
- 21-0073-P103 BULK EARTHWORKS CONCEPT LAYOUT PLAN SHEET 2
- 21-0073-P104 BULK EARTHWORKS CONCEPT LAYOUT PLAN SHEET 3
- 21-0073-P106 CONCEPT ROADWORKS AND DRAINAGE LAYOUT PLAN SHEET 1
- 21-0073-P107 CONCEPT ROADWORKS AND DRAINAGE LAYOUT PLAN SHEET 2
- 21-0073-P108 CONCEPT ROADWORKS AND DRAINAGE LAYOUT PLAN SHEET 3
- 21-0073-P109 LOGANVIEW ROAD / ROAD 01 INTERIM / ULTIMATE INTERSECTION ARRANGEMENTS
- 21-0073-P300 CONCEPT WATER AND SEWER LAYOUT PLAN SHEET 1
- 21-0073-P301 CONCEPT WATER AND SEWER LAYOUT PLAN SHEET 2
- 21-0073-P302 CONCEPT WATER AND SEWER LAYOUT PLAN SHEET 3



PROJECT INFORMATION SUMMARY:	
No. OF LOTS =	92
AREA OF SITE =	7.57 ha
RP DESCRIPTION	LOTS 25 & 26 ON RP97736 AND LOTS 40 & 41 ON RP229101
DATUM LEVEL AND LOCATION	P.S.M. - RL - AHD LOCATED
LOCAL AUTHORITY:	LOGAN CITY COUNCIL
COUNCIL REFERENCE NUMBER:	COM/13/2021

LOCALITY PLAN
SCALE 1:4000 (A1)
SCALE 1:8000 (A3)

REV	DATE	DESIGN	DRAWN	REVISION DETAILS		DRAWN	STATUS	SCALE	CLIENT	PROJECT NAME	DRAWING TITLE		
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						DESIGN	APPROVED SCOTT THOMAS RPEQ 04618		ASSOCIATED CONSULTANT PEAK URBAN 07 3532 1300	115 & 117 SCHOOL ROAD AND 250-258 LOGANVIEW ROAD NORTH, LOGAN RESERVE	PROJECT No. 21-0073	DRAWING No. P100	REVISION 1
						FOR AND ON BEHALF OF PEAKURBAN PTY LTD		ENQUIRIES@PEAKURBAN.COM.AU					




REV	DATE	DESIGN	DRAWN	REVISION DETAILS
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DRAWN	STATUS
	NOT FOR CONSTRUCTION
DESIGN	APPROVED
SCOTT THOMAS	RPEQ 04618
FOR AND ON BEHALF OF PEAKURBAN PTY LTD	


 ENQUIRIES@PEAKURBAN.COM.AU

SCALE

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1:4000  A3

CLIENT

AUSTRALIS LAND

ASSOCIATED CONSULTANT

PEAK URBAN
07 3532 1300

PROJECT NAME

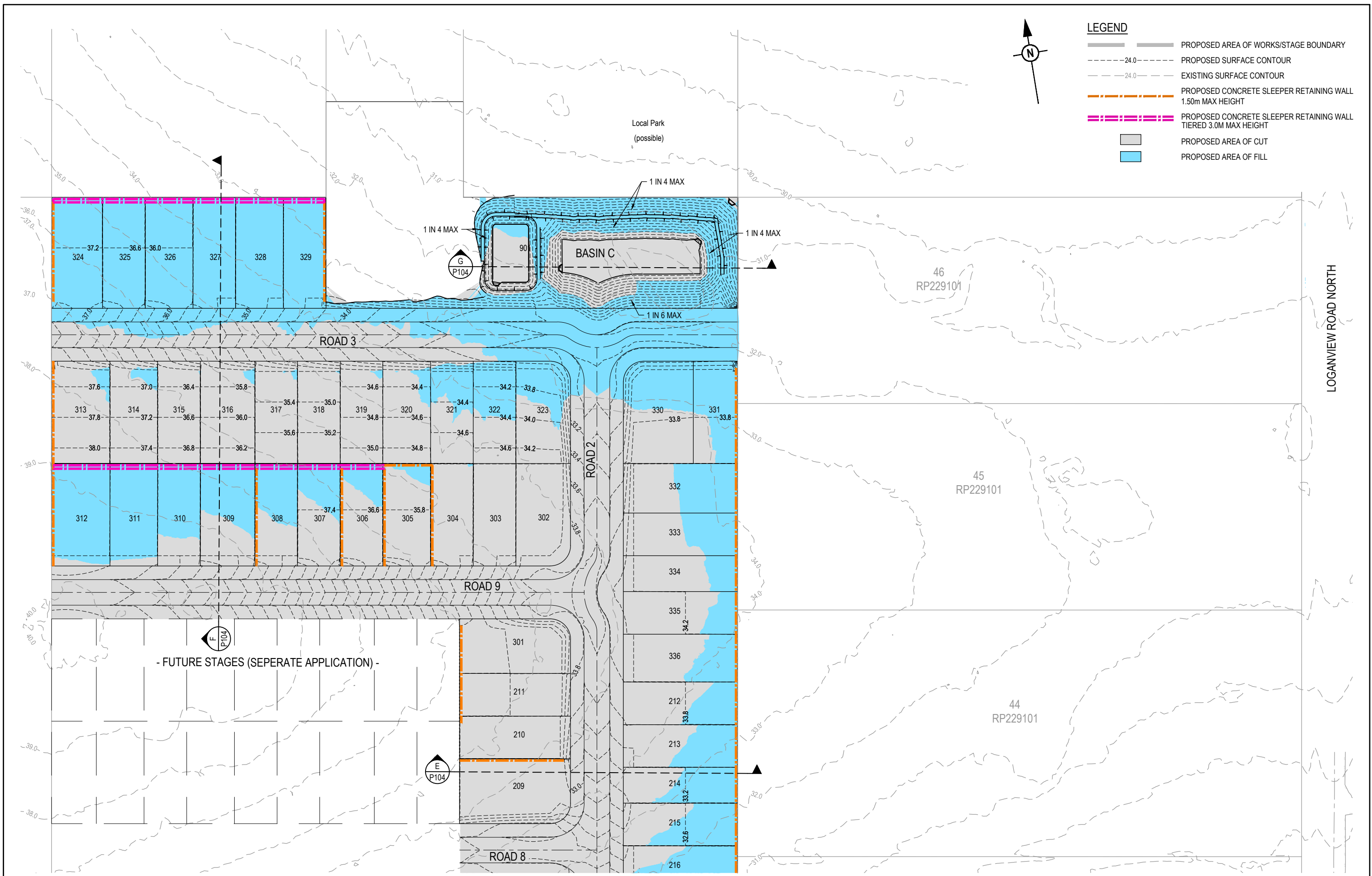
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(EAST)**

115 & 117 SCHOOL ROAD AND 250-258
LOGANVIEW ROAD NORTH, LOGAN RESERVE

DRAWING TITLE

OVERALL LAYOUT PLAN

PROJECT No.	DRAWING No.	REVISION
21-0073	P101	1



REFER SHEET 2 FOR CONTINUATION

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DRAWN	STATUS
	NOT FOR CONSTRUCTION
DESIGN	APPROVED
SCOTT THOMAS	RPEQ 04618
FOR AND ON BEHALF OF PEAKURBAN PTY LTD	

PEAKURBAN
Achieve more.
ENQUIRIES@PEAKURBAN.COM.AU

SCALE
1:500 10 5 0 10 20 A1
1:1000

CLIENT
AUSTRALIS LAND

ASSOCIATED CONSULTANT
PEAK URBAN
07 3532 1300

PROJECT NAME
RESIDENTIAL SUBDIVISION (EAST)

115 & 117 SCHOOL ROAD AND 250-258
LOGANVIEW ROAD NORTH, LOGAN RESERVE

DRAWING TITLE
BULK EARTHWORKS CONCEPT LAYOUT PLAN SHEET 1

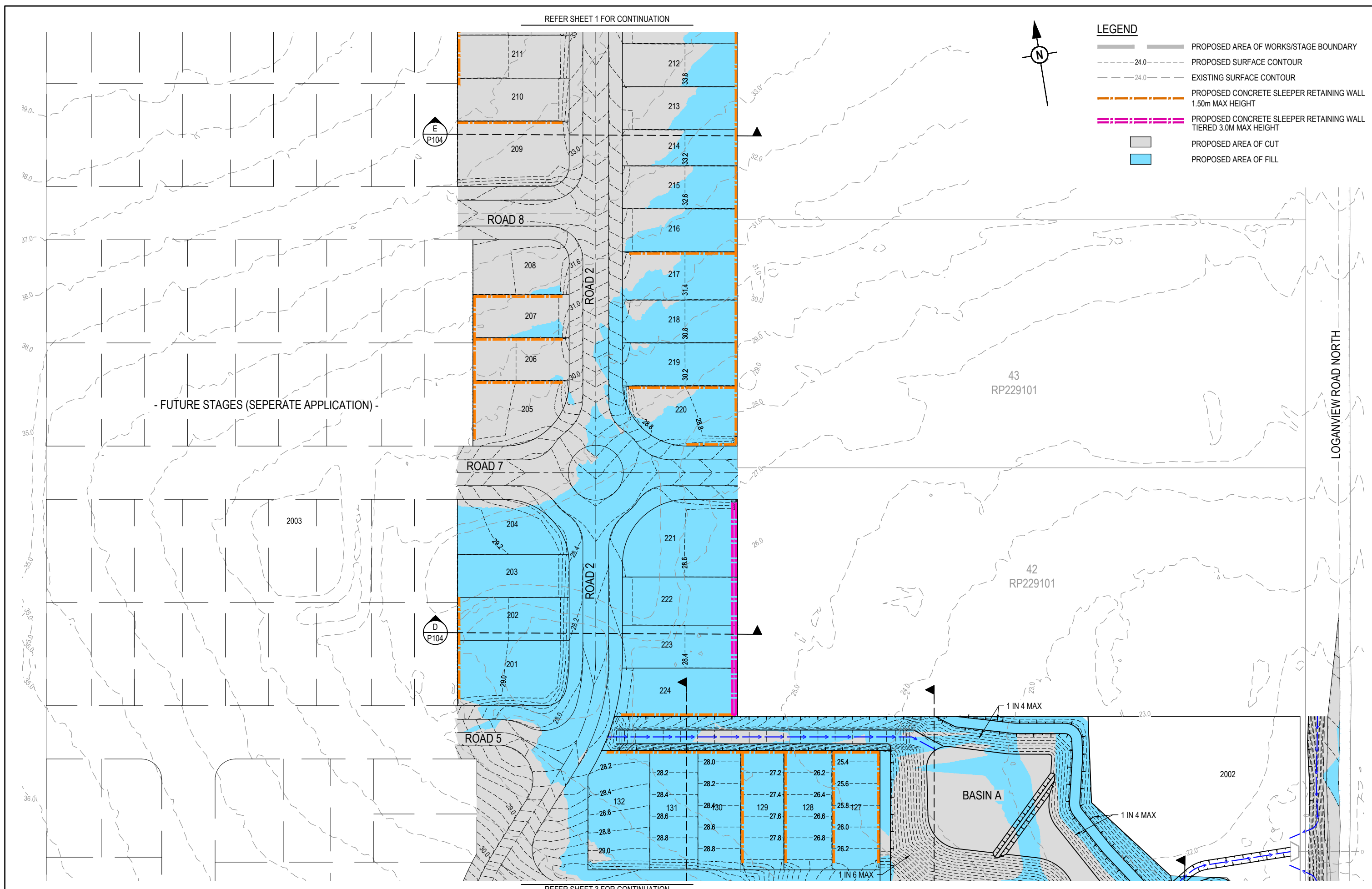
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21-0073	P102	1

REFER SHEET 1 FOR CONTINUATION



LEGEND

- PROPOSED AREA OF WORKS/STAGE BOUNDARY
- PROPOSED SURFACE CONTOUR
- EXISTING SURFACE CONTOUR
- PROPOSED CONCRETE SLEEPER RETAINING WALL 1.50m MAX HEIGHT
- PROPOSED CONCRETE SLEEPER RETAINING WALL TIERED 3.0M MAX HEIGHT
- PROPOSED AREA OF CUT
- PROPOSED AREA OF FILL



- FUTURE STAGES (SEPERATE APPLICATION) -

REFER SHEET 3 FOR CONTINUATION

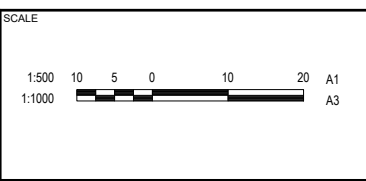
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NOT FOR CONSTRUCTION

DESIGN APPROVED
SCOTT THOMAS

RPEQ 04618

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CLIENT
AUSTRALIS LAND

ASSOCIATED CONSULTANT
PEAK URBAN
07 3532 1300

PROJECT NAME
RESIDENTIAL SUBDIVISION (EAST)

115 & 117 SCHOOL ROAD AND 250-258
LOGANVIEW ROAD NORTH, LOGAN RESERVE

DRAWING TITLE
BULK EARTHWORKS CONCEPT LAYOUT PLAN SHEET 2

PROJECT No. **21-0073**

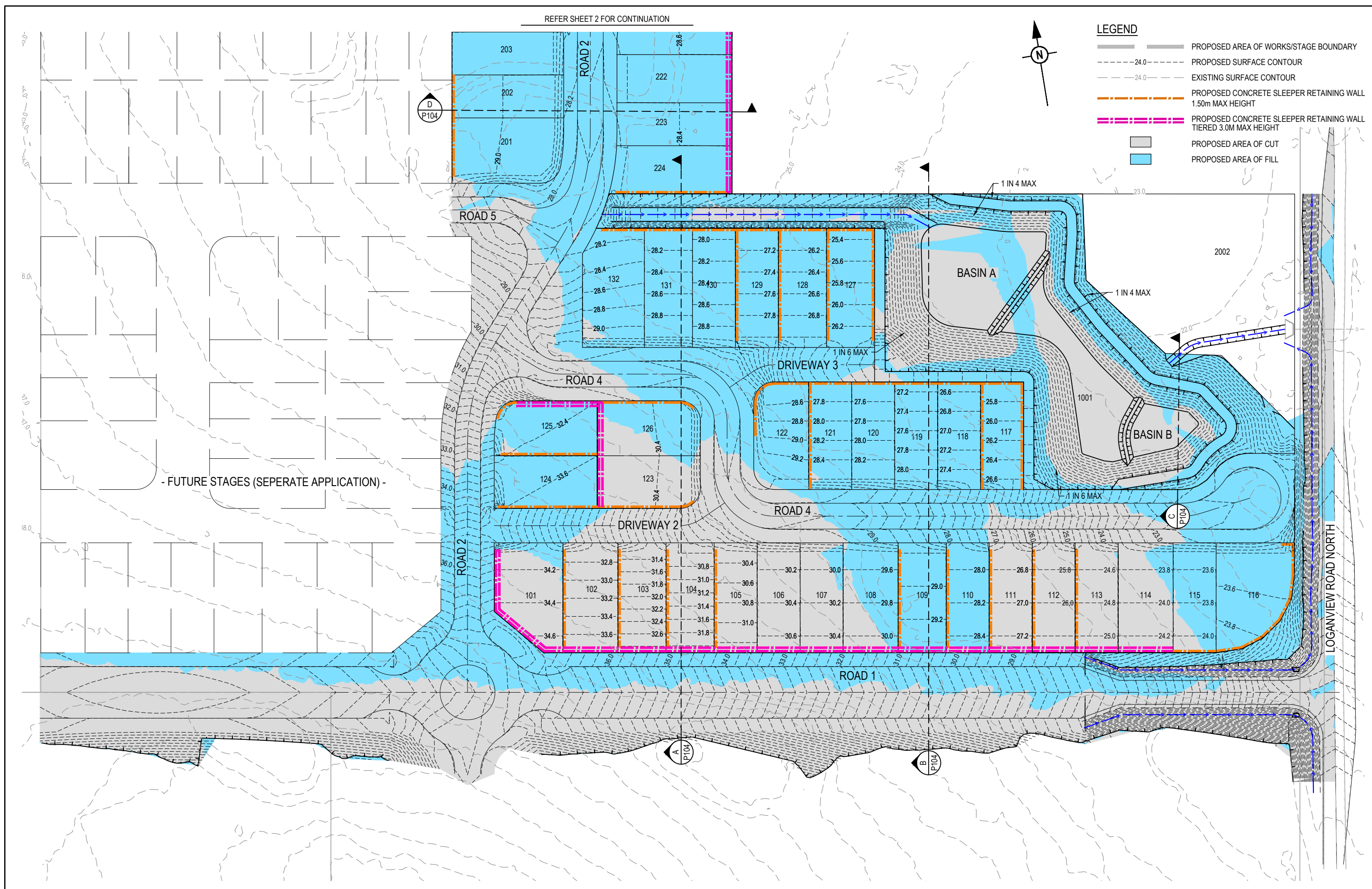
DRAWING No. **P103**

REVISION **1**

REFER SHEET 2 FOR CONTINUATION

LEGEND

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- PROPOSED SURFACE CONTOUR
- EXISTING SURFACE CONTOUR
- PROPOSED CONCRETE SLEEPER RETAINING WALL 1.50m MAX HEIGHT
- PROPOSED CONCRETE SLEEPER RETAINING WALL TIERED 3.0M MAX HEIGHT
- PROPOSED AREA OF CUT
- PROPOSED AREA OF FILL



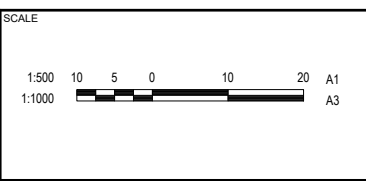
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NOT FOR CONSTRUCTION

DESIGN APPROVED
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CLIENT

AUSTRALIS LAND

ASSOCIATED CONSULTANT
PEAK URBAN
07 3532 1300

PROJECT NAME

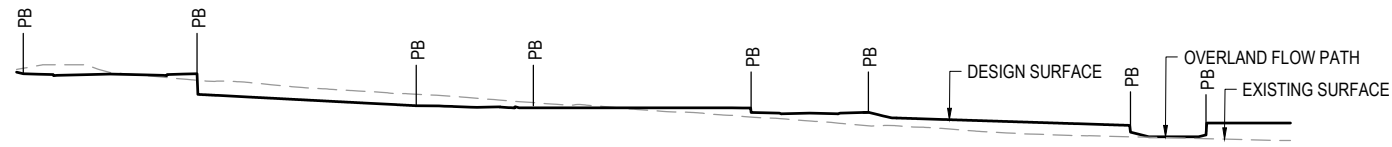
RESIDENTIAL SUBDIVISION (EAST)

115 & 117 SCHOOL ROAD AND 250-258 LOGANVIEW ROAD NORTH, LOGAN RESERVE

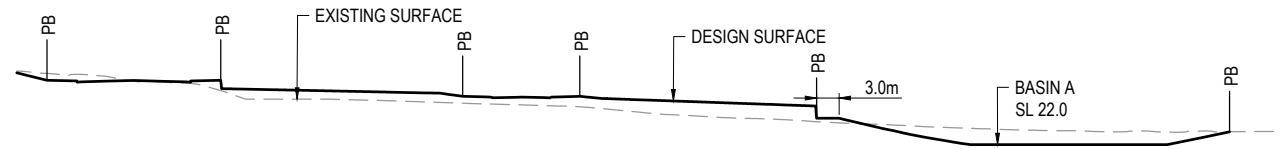
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BULK EARTHWORKS CONCEPT LAYOUT PLAN SHEET 3

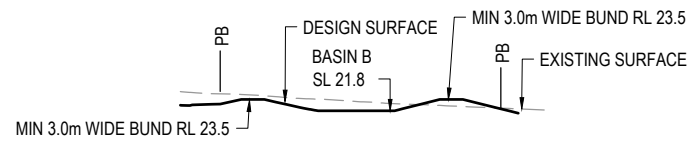
PROJECT No. **21-0073**
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REVISION **1**



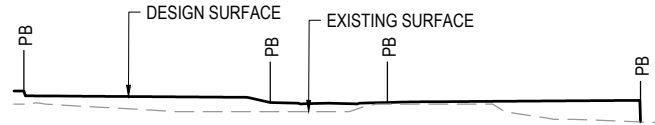
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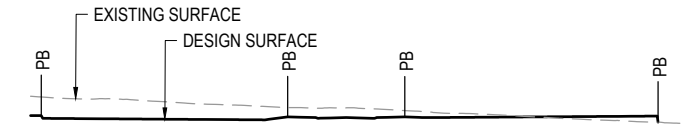
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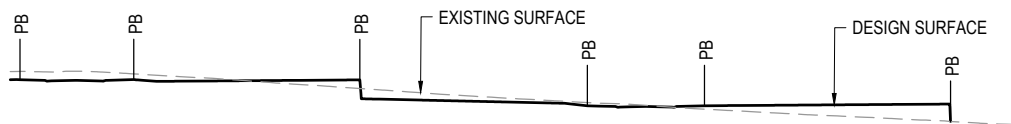
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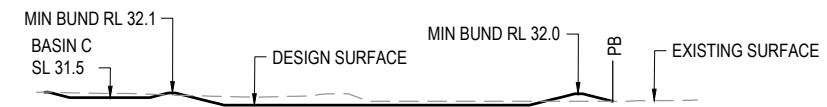
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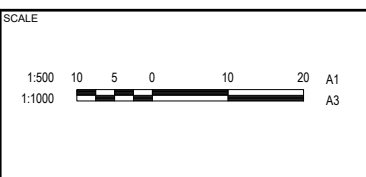
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SECTION G
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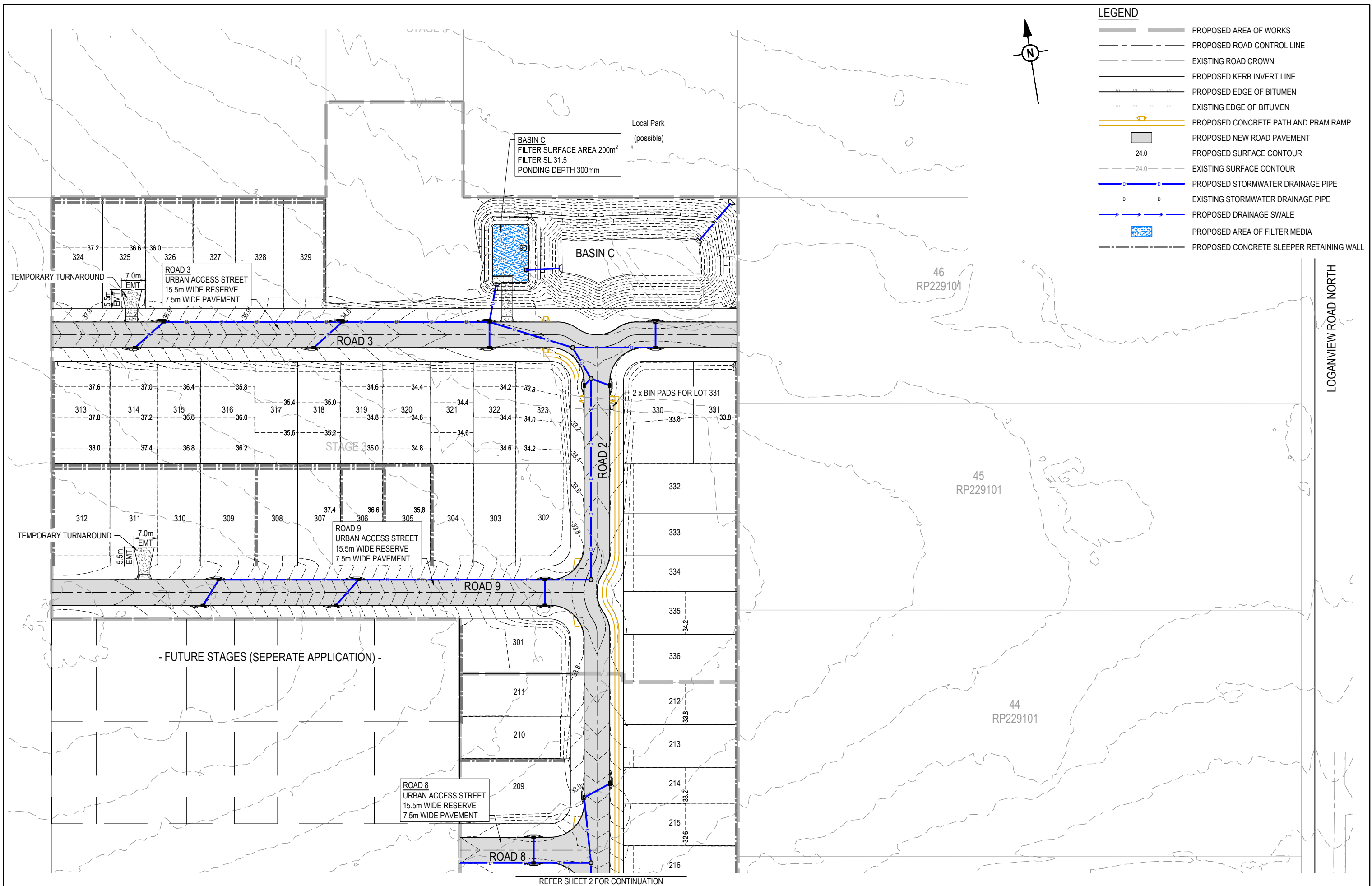
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	NOT FOR CONSTRUCTION
DESIGN	APPROVED
	SCOTT THOMAS
	RPEQ 04618
FOR AND ON BEHALF OF PEAKURBAN PTY LTD	



CLIENT
AUSTRALIS LAND
ASSOCIATED CONSULTANT
PEAK URBAN 07 3532 1300

PROJECT NAME
RESIDENTIAL SUBDIVISION (EAST)
115 & 117 SCHOOL ROAD AND 250-258 LOGANVIEW ROAD NORTH, LOGAN RESERVE

DRAWING TITLE		
BULK EARTHWORKS CONCEPT CROSS SECTIONS		
PROJECT No.	DRAWING No.	REVISION
21-0073	P105	1



LEGEND

- PROPOSED AREA OF WORKS
- PROPOSED ROAD CONTROL LINE
- EXISTING ROAD CROWN
- PROPOSED KERB INVERT LINE
- PROPOSED EDGE OF BITUMEN
- EXISTING EDGE OF BITUMEN
- PROPOSED CONCRETE PATH AND PRAM RAMP
- PROPOSED NEW ROAD PAVEMENT
- PROPOSED SURFACE CONTOUR
- EXISTING SURFACE CONTOUR
- PROPOSED STORMWATER DRAINAGE PIPE
- EXISTING STORMWATER DRAINAGE PIPE
- PROPOSED DRAINAGE SWALE
- PROPOSED AREA OF FILTER MEDIA
- PROPOSED CONCRETE SLEEPER RETAINING WALL

REFER SHEET 2 FOR CONTINUATION




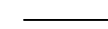
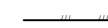










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						APPROVED SCOTT THOMAS	RPEQ 04618		PEAK URBAN 07 3532 1300	115 & 117 SCHOOL ROAD AND 250-258 LOGANVIEW ROAD NORTH, LOGAN RESERVE	PROJECT No. 21-0073
											DRAWING No. P106
											REVISION 1



FOR AND ON BEHALF OF PEAKURBAN PTY LTD ENQUIRIES@PEAKURBAN.COM.AU

REFER SHEET 1 FOR CONTINUATION

LEGEND

-  PROPOSED AREA OF WORKS
-  PROPOSED ROAD CONTROL LINE
-  EXISTING ROAD CROWN
-  PROPOSED KERB INVERT LINE
-  PROPOSED EDGE OF BITUMEN
-  EXISTING EDGE OF BITUMEN
-  PROPOSED CONCRETE PATH AND PRAM RAMP
-  PROPOSED NEW ROAD PAVEMENT
-  PROPOSED SURFACE CONTOUR
-  EXISTING SURFACE CONTOUR
-  PROPOSED STORMWATER DRAINAGE PIPE
-  EXISTING STORMWATER DRAINAGE PIPE
-  PROPOSED DRAINAGE SWALE
-  PROPOSED AREA OF FILTER MEDIA
-  PROPOSED CONCRETE SLEEPER RETAINING WALL



- FUTURE STAGES (SEPERATE APPLICATION) -

ROAD 8
URBAN ACCESS STREET
15.5m WIDE RESERVE
7.5m WIDE PAVEMENT

ROAD 7
URBAN ACCESS STREET
15.5m WIDE RESERVE
7.5m WIDE PAVEMENT

ROAD 5
URBAN ACCESS STREET
15.5m WIDE RESERVE
7.5m WIDE PAVEMENT

ROAD 7
URBAN ACCESS STREET
15.5m WIDE RESERVE
7.5m WIDE PAVEMENT

ROUNDABOUT
CENTRAL ISLAND R8.0
CIRCULATING WIDTH 6.7m

ROUNDABOUT
CENTRAL ISLAND R8.0
CIRCULATING WIDTH 6.7m

BASIN A
FILTER SURFACE AREA 800m²
FILTER SL 22.0
PONDING DEPTH 300mm

LOGANVIEW ROAD NORTH (INTERIM)
3.5m TRAVEL LANE
1.0m SEALED SHOULDER
TABLE DRAIN

BASIN B
FILTER SURFACE AREA 150m²
FILTER SL 21.8
PONDING DEPTH 300mm

Single Unit Truck/Bus (12.5 m)
Overall Length 12.500m
Overall Width 2.500m
Overall Body Height 4.300m
Min Body Ground Clearance 0.490m
Track Width 2.500m
Lock-to-lock time 6.00s
Curb to Curb Turning Radius 12.500m

OVERLAND FLOW PATH

MAJOR FLOW DISSIPATION SUBJECT TO DETAILED DESIGN

TAPER TO EXISTING

OUTLET SWALE IL

REFER SHEET 3 FOR CONTINUATION

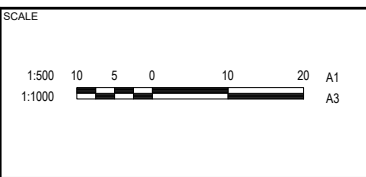
REV	DATE	DESIGN	DRAWN	REVISION DETAILS
1	20.08.21	RD	RD	ORIGINAL ISSUE

NOT FOR CONSTRUCTION

DESIGN APPROVED
SCOTT THOMAS

RPEQ 04618

FOR AND ON BEHALF OF PEAKURBAN PTY LTD



CLIENT
AUSTRALIS LAND

ASSOCIATED CONSULTANT
PEAK URBAN
07 3532 1300

PROJECT NAME
RESIDENTIAL SUBDIVISION (EAST)

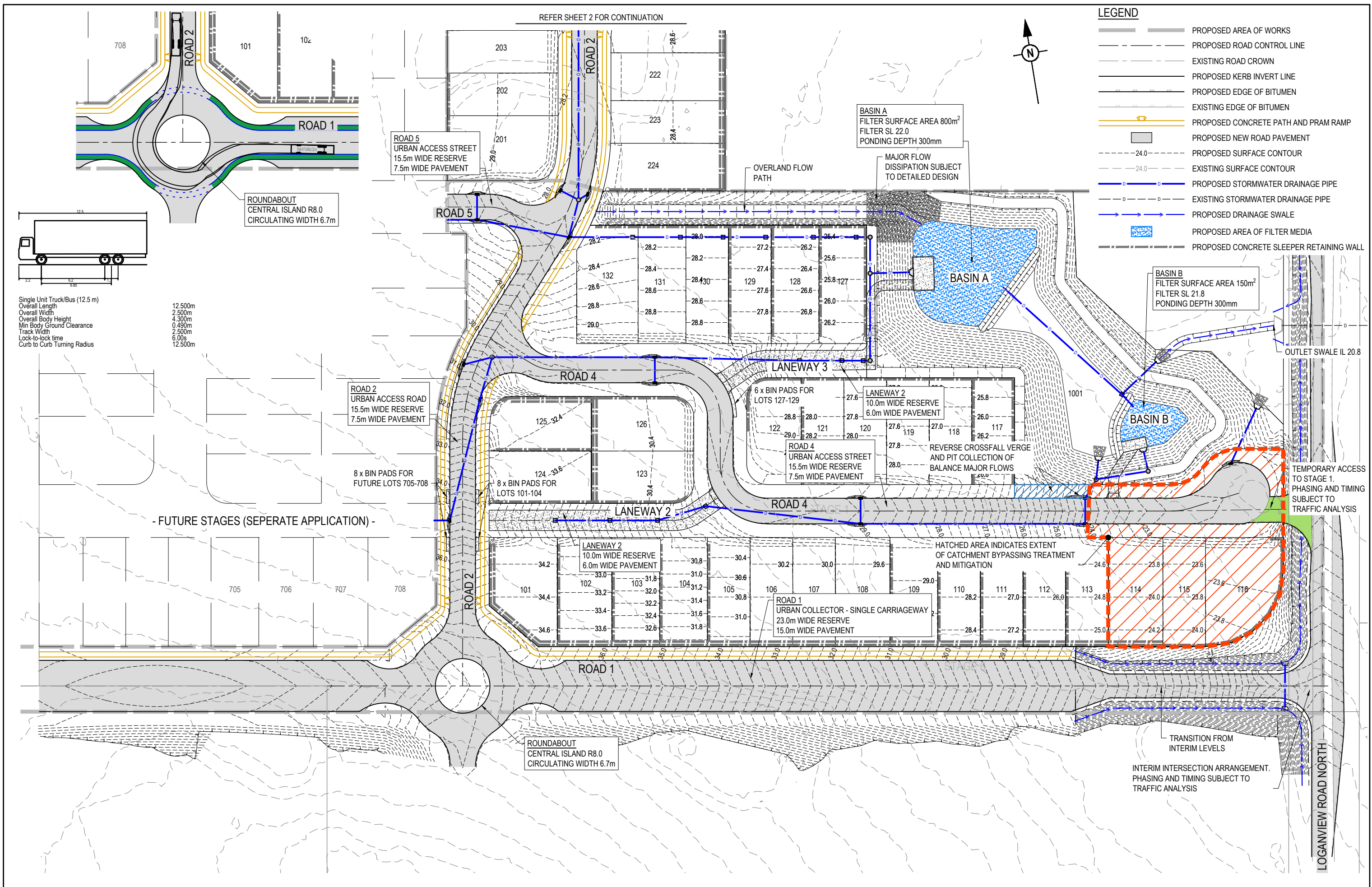
115 & 117 SCHOOL ROAD AND 250-258
LOGANVIEW ROAD NORTH, LOGAN RESERVE

DRAWING TITLE
CONCEPT ROADWORKS AND DRAINAGE LAYOUT PLAN SHEET 2

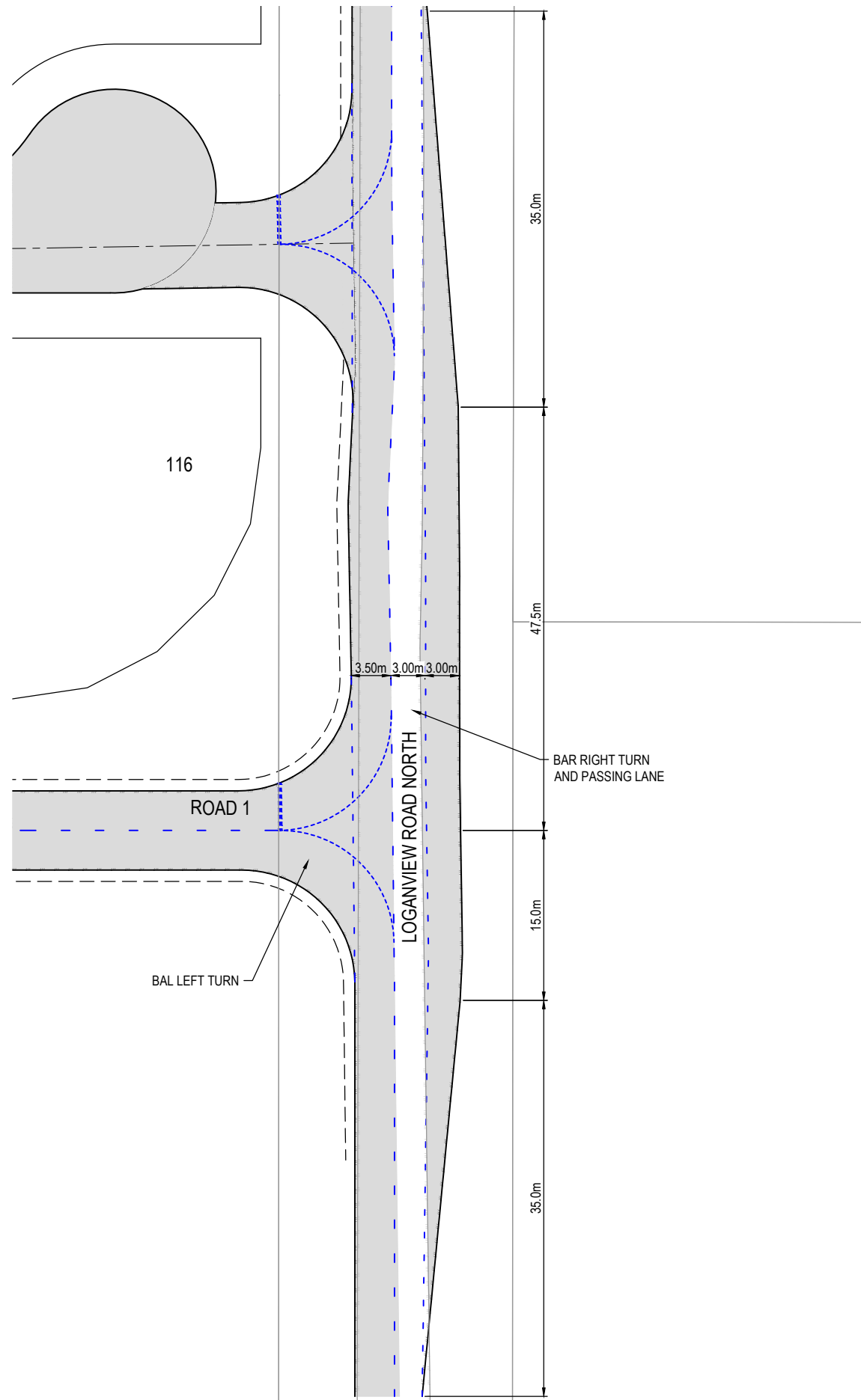
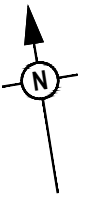
PROJECT No. **21-0073**

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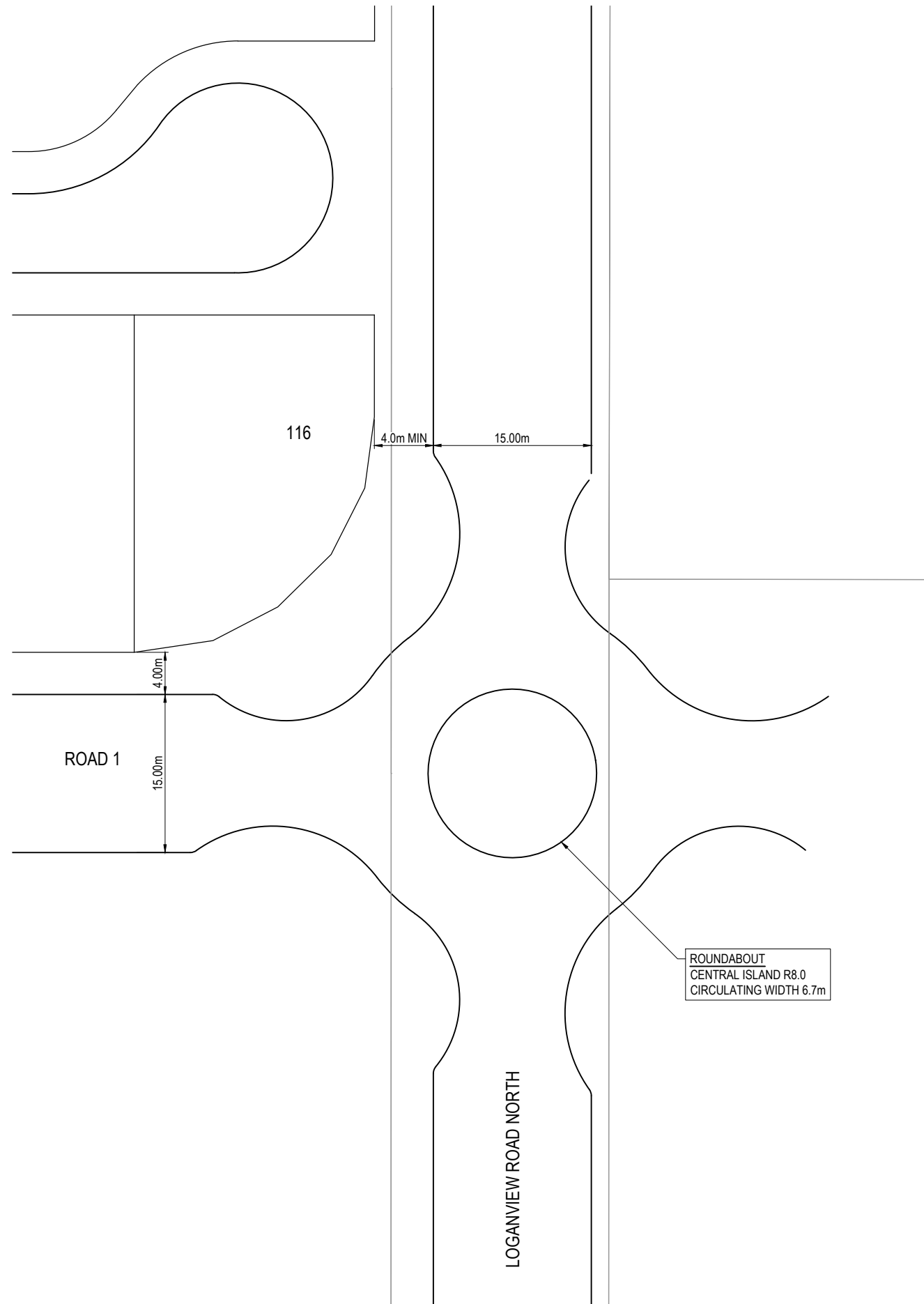
REVISION **1**



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						NOT FOR CONSTRUCTION				
						DESIGN APPROVED SCOTT THOMAS		ASSOCIATED CONSULTANT PEAK URBAN 07 3532 1300	115 & 117 SCHOOL ROAD AND 250-258 LOGANVIEW ROAD NORTH, LOGAN RESERVE	PROJECT No. 21-0073
						RPEQ 04618				DRAWING No. P108
						FOR AND ON BEHALF OF PEAKURBAN PTY LTD				REVISION 1



INTERIM INTERSECTION ARRANGEMENT



ULTIMATE INTERSECTION ARRANGEMENT

REV	DATE	DESIGN	DRAWN	REVISION DETAILS
1	20.08.21	RD	RD	ORIGINAL ISSUE

DRAWN	STATUS
	NOT FOR CONSTRUCTION
DESIGN	APPROVED
SCOTT THOMAS	RPEQ 04618
FOR AND ON BEHALF OF PEAKURBAN PTY LTD	

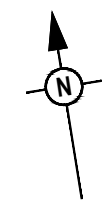
PEAKURBAN
Achieve more.
ENQUIRIES@PEAKURBAN.COM.AU

SCALE
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1:500

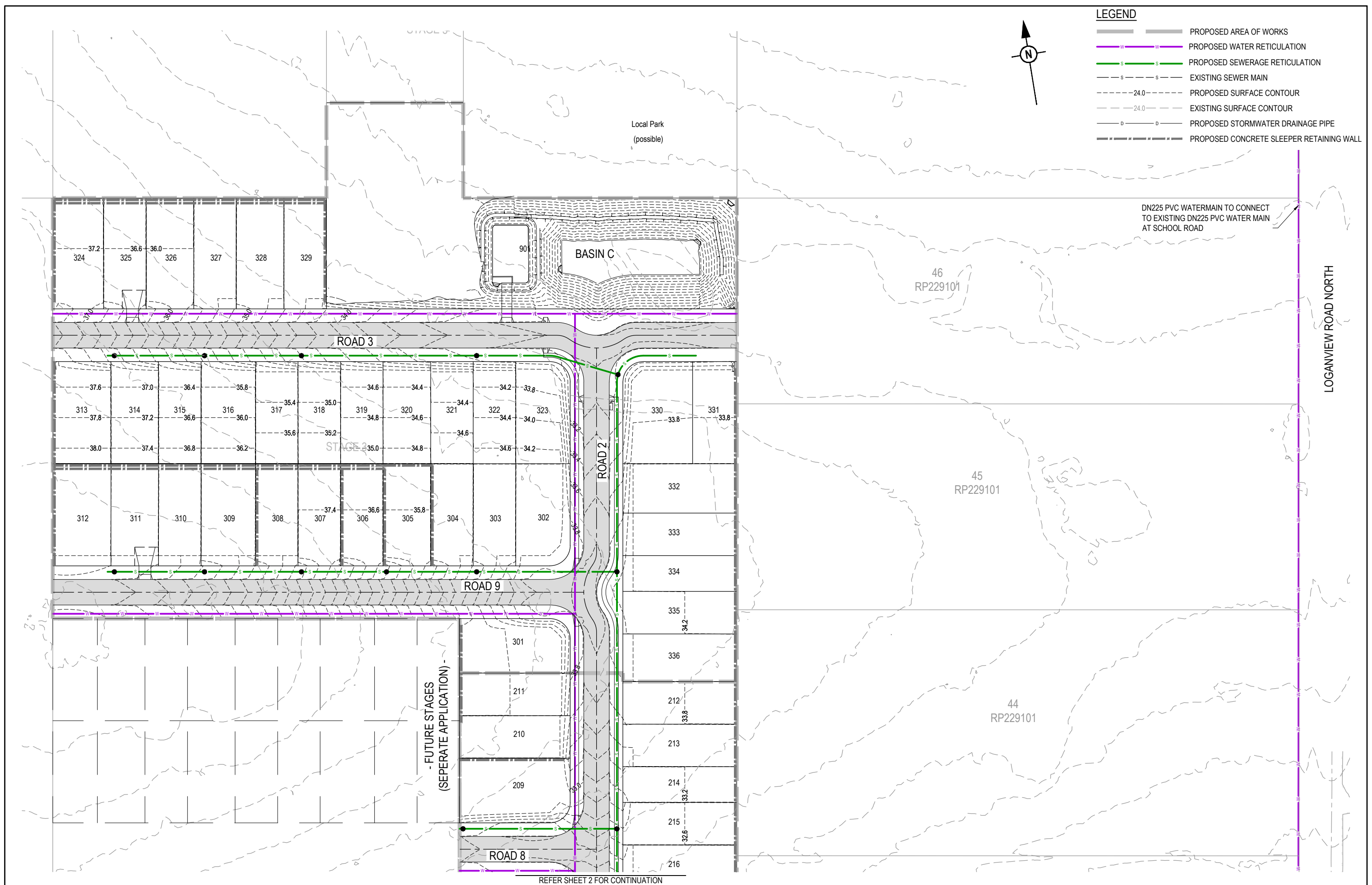
CLIENT
AUSTRALIS LAND
ASSOCIATED CONSULTANT
PEAK URBAN
07 3532 1300

PROJECT NAME
RESIDENTIAL SUBDIVISION (EAST)
115 & 117 SCHOOL ROAD AND 250-258
LOGANVIEW ROAD NORTH, LOGAN RESERVE

DRAWING TITLE
LOGANVIEW ROAD / ROAD 01 INTERIM / ULTIMATE INTERSECTION ARRANGEMENTS
PROJECT No. **21-0073**
DRAWING No. **P109**
REVISION **1**



LEGEND	
	PROPOSED AREA OF WORKS
	PROPOSED WATER RETICULATION
	PROPOSED SEWERAGE RETICULATION
	EXISTING SEWER MAIN
	PROPOSED SURFACE CONTOUR
	EXISTING SURFACE CONTOUR
	PROPOSED STORMWATER DRAINAGE PIPE
	PROPOSED CONCRETE SLEEPER RETAINING WALL



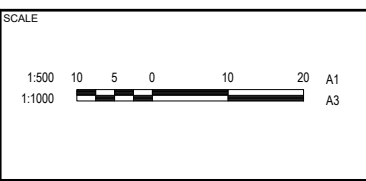
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NOT FOR CONSTRUCTION

DESIGN APPROVED
SCOTT THOMAS

RPEQ 04618

FOR AND ON BEHALF OF PEAKURBAN PTY LTD



CLIENT

AUSTRALIS LAND

ASSOCIATED CONSULTANT
PEAK URBAN
07 3532 1300

PROJECT NAME









RESIDENTIAL SUBDIVISION (EAST)

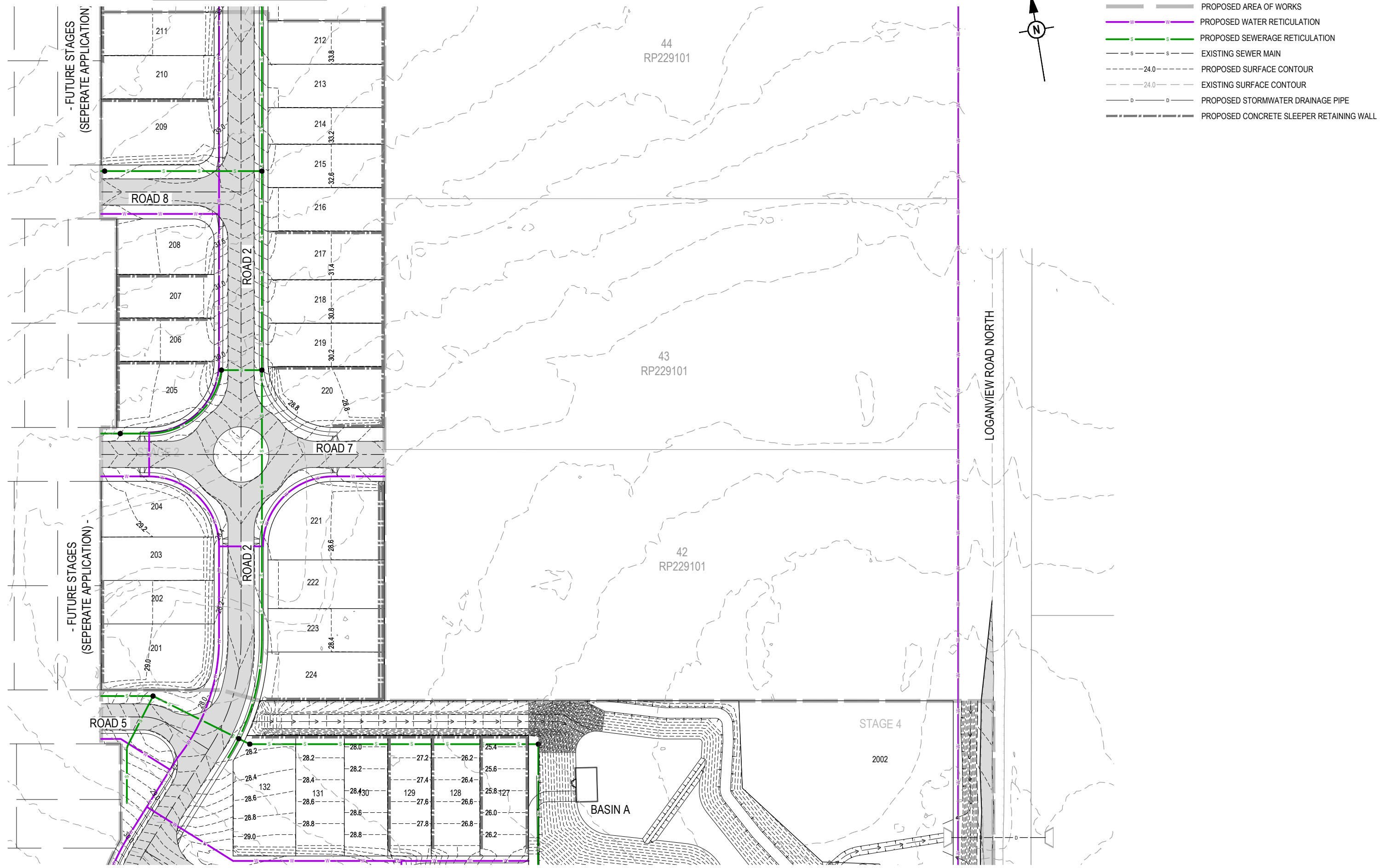
115 & 117 SCHOOL ROAD AND 250-258
LOGANVIEW ROAD NORTH, LOGAN RESERVE

DRAWING TITLE		
CONCEPT WATER AND SEWER LAYOUT PLAN SHEET 1		
PROJECT No.	DRAWING No.	REVISION
21-0073	P300	1

REFER SHEET 1 FOR CONTINUATION

LEGEND

-  PROPOSED AREA OF WORKS
-  PROPOSED WATER RETICULATION
-  PROPOSED SEWERAGE RETICULATION
-  EXISTING SEWER MAIN
-  PROPOSED SURFACE CONTOUR
-  EXISTING SURFACE CONTOUR
-  PROPOSED STORMWATER DRAINAGE PIPE
-  PROPOSED CONCRETE SLEEPER RETAINING WALL



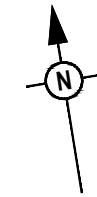
REFER SHEET 3 FOR CONTINUATION

REV	DATE	DESIGN	DRAWN	REVISION DETAILS	DRAWN	STATUS		SCALE	CLIENT	PROJECT NAME	DRAWING TITLE
1	20.08.21	RD	RD	ORIGINAL ISSUE		NOT FOR CONSTRUCTION		1:500 1:1000	AUSTRALIS LAND	RESIDENTIAL SUBDIVISION (EAST)	CONCEPT WATER AND SEWER LAYOUT PLAN SHEET 2
						DESIGN APPROVED SCOTT THOMAS	RPEQ 04618		ASSOCIATED CONSULTANT PEAK URBAN 07 3532 1300	115 & 117 SCHOOL ROAD AND 250-258 LOGANVIEW ROAD NORTH, LOGAN RESERVE	PROJECT No. 21-0073
											DRAWING No. P301
											REVISION 1



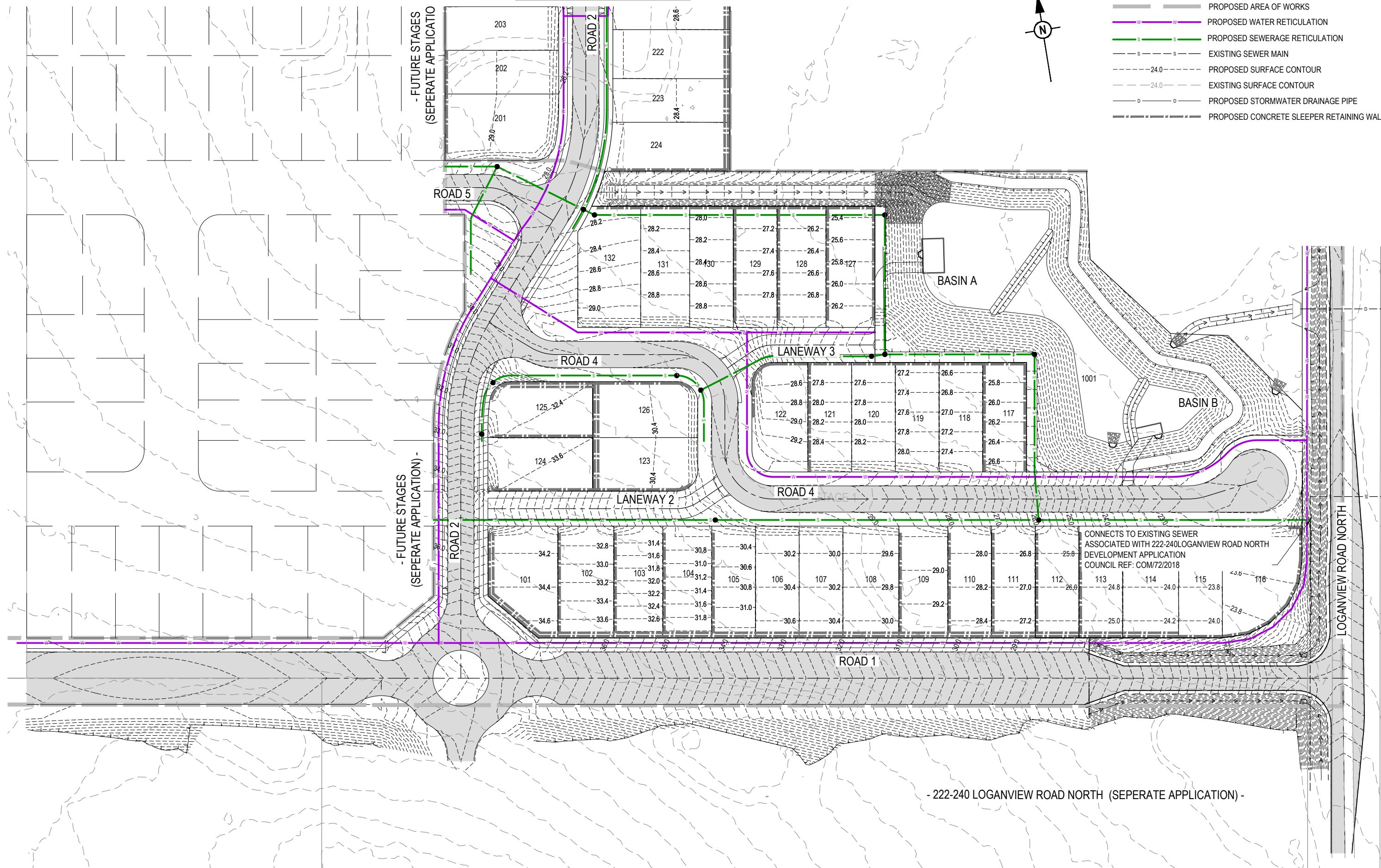
FOR AND ON BEHALF OF PEAKURBAN PTY LTD ENQUIRIES@PEAKURBAN.COM.AU

REFER SHEET 2 FOR CONTINUATION



LEGEND

- PROPOSED AREA OF WORKS
- PROPOSED WATER RETICULATION
- PROPOSED SEWERAGE RETICULATION
- EXISTING SEWER MAIN
- PROPOSED SURFACE CONTOUR
- EXISTING SURFACE CONTOUR
- PROPOSED STORMWATER DRAINAGE PIPE
- PROPOSED CONCRETE SLEEPER RETAINING WALL



CONNECTS TO EXISTING SEWER ASSOCIATED WITH 222-240 LOGANVIEW ROAD NORTH DEVELOPMENT APPLICATION COUNCIL REF: COM/72/2018

- 222-240 LOGANVIEW ROAD NORTH (SEPERATE APPLICATION) -

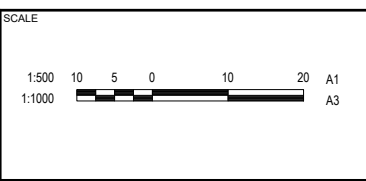
REV	DATE	DESIGN	DRAWN	REVISION DETAILS
1	20.08.21	RD	RD	ORIGINAL ISSUE

NOT FOR CONSTRUCTION

DESIGN APPROVED
SCOTT THOMAS

RPEQ 04618

FOR AND ON BEHALF OF PEAKURBAN PTY LTD



CLIENT
AUSTRALIS LAND

ASSOCIATED CONSULTANT
PEAK URBAN
07 3532 1300

PROJECT NAME
RESIDENTIAL SUBDIVISION (EAST)

115 & 117 SCHOOL ROAD AND 250-258 LOGANVIEW ROAD NORTH, LOGAN RESERVE

DRAWING TITLE
CONCEPT WATER AND SEWER LAYOUT PLAN SHEET 3

PROJECT No. **21-0073**

DRAWING No. **P302**

REVISION **1**

RESIDENTIAL DEVELOPMENT - LOGAN RESERVE

DEVELOPMENT APPLICATION (WEST)

115 & 117 SCHOOL ROAD AND 250-258 LOGANVIEW ROAD NORTH, LOGAN RESERVE FOR 'AUSTRALIS LAND'

DRAWING LIST

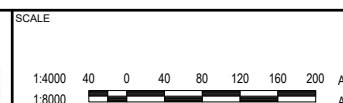
- 21-0073-P1000 COVER PLAN
- 21-0073-P1001 OVERALL LAYOUT PLAN
- 21-0073-P1002 BULK EARTHWORKS CONCEPT LAYOUT PLAN
- 21-0073-P1003 BULK EARTHWORKS CONCEPT CROSS SECTIONS
- 21-0073-P1004 CONCEPT ROADWORKS AND DRAINAGE LAYOUT PLAN
- 21-0073-P1005 CONCEPT WATER AND SEWER LAYOUT PLAN

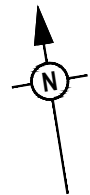


LOCALITY PLAN
SCALE 1:4000 (A1)
SCALE 1:8000 (A3)

PROJECT INFORMATION SUMMARY:	
No. OF LOTS =	80
AREA OF SITE =	4.17 ha
RP DESCRIPTION	LOTS 25 & 26 ON RP97736 AND LOTS 40 & 41 ON RP229101
DATUM LEVEL AND LOCATION	P.S.M. - RL - AHD LOCATED
LOCAL AUTHORITY:	LOGAN CITY COUNCIL
COUNCIL REFERENCE NUMBER:	COM/13/2021

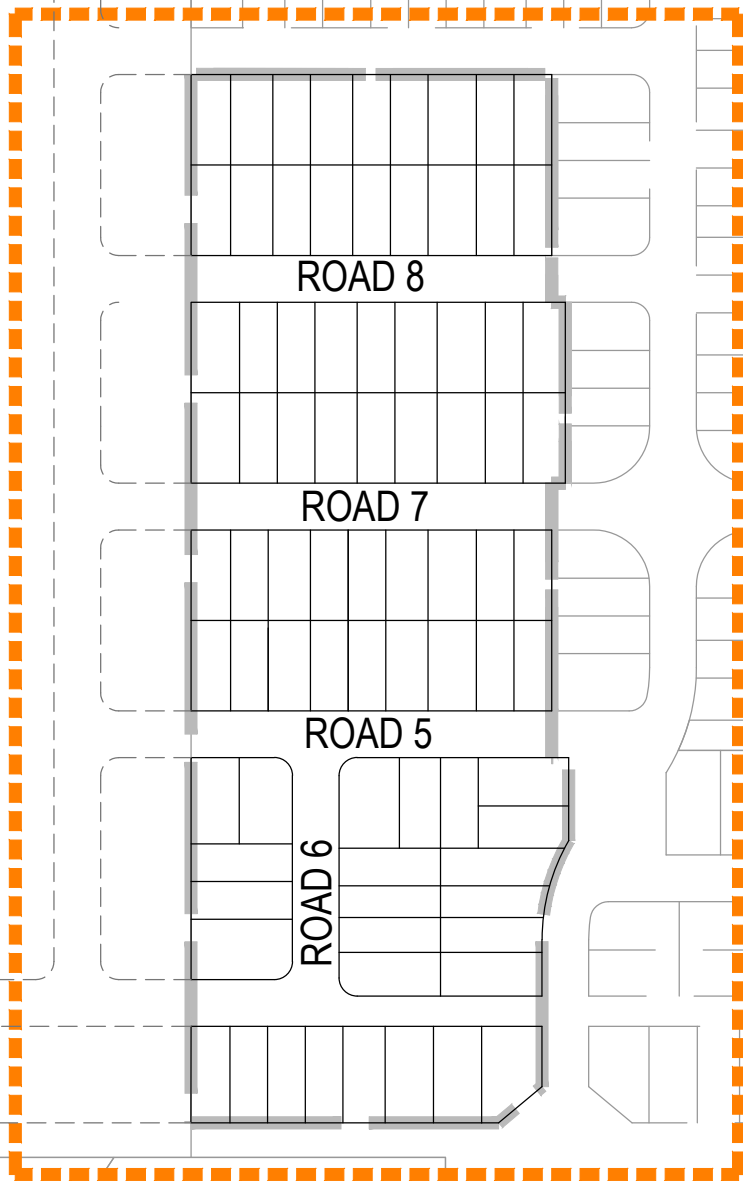
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					DESIGN	APPROVED SCOTT THOMAS RPEQ 04618	ASSOCIATED CONSULTANT PEAK URBAN 07 3532 1300	115 & 117 SCHOOL ROAD AND 250-258 LOGANVIEW ROAD NORTH, LOGAN RESERVE	PROJECT No. 21-0073
						FOR AND ON BEHALF OF PEAKURBAN PTY LTD			DRAWING No. P1000
									REVISION 1





EASTERN PORTION
(SEPERATE APPLICATION)

SHEET 1



LOGANVIEW ROAD NORTH

EASTERN PORTION
(SEPERATE APPLICATION)

REV	DATE	DESIGN	DRAWN	REVISION DETAILS
1	20.08.21	RD	RD	ORIGINAL ISSUE

DRAWN	STATUS
	NOT FOR CONSTRUCTION
DESIGN	APPROVED
SCOTT THOMAS	RPEQ 04618
FOR AND ON BEHALF OF PEAKURBAN PTY LTD	

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SCALE

1:2000 20 0 20 40 60 80 100 A1
1:4000

CLIENT

AUSTRALIS LAND

ASSOCIATED CONSULTANT

PEAK URBAN
07 3532 1300

PROJECT NAME

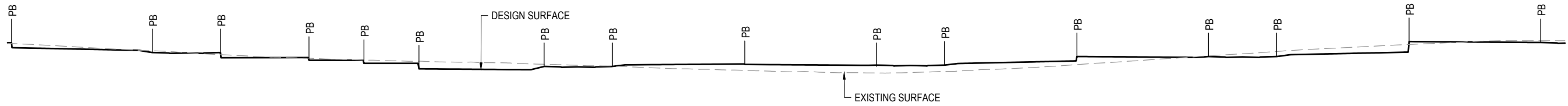
**RESIDENTIAL SUBDIVISION
(WEST)**

115 & 117 SCHOOL ROAD AND 250-258
LOGANVIEW ROAD NORTH, LOGAN RESERVE

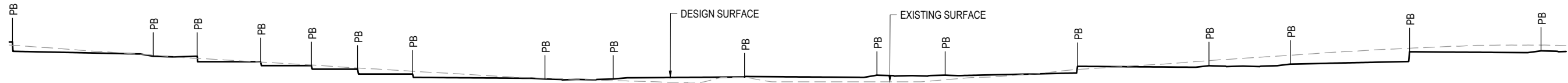
DRAWING TITLE

OVERALL LAYOUT PLAN

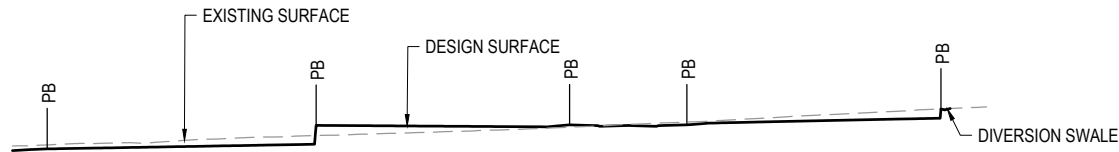
PROJECT No.	DRAWING No.	REVISION
21-0073	P1001	1



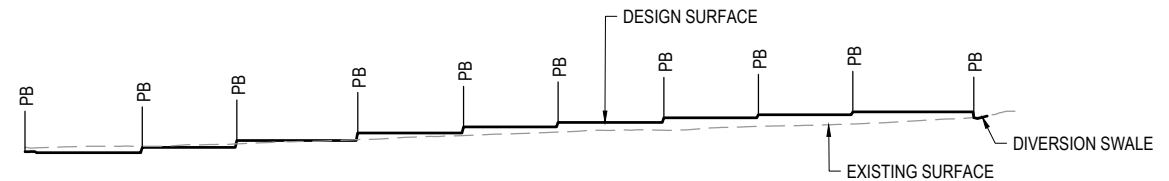
RL20.00
SECTION A
SCALE 1:500 (A1)
SCALE 1:1000 (A3)



RL20.00
SECTION B
SCALE 1:500 (A1)
SCALE 1:1000 (A3)



RL20.00
SECTION C
SCALE 1:500 (A1)
SCALE 1:1000 (A3)

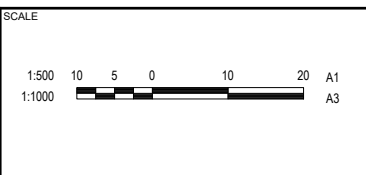


RL20.00
SECTION D
SCALE 1:500 (A1)
SCALE 1:1000 (A3)

REV	DATE	DESIGN	DRAWN	REVISION DETAILS
1	20.08.21	RD	RD	ORIGINAL ISSUE

DRAWN	STATUS
	NOT FOR CONSTRUCTION
DESIGN	APPROVED
	SCOTT THOMAS
	RPEQ 04618
FOR AND ON BEHALF OF PEAKURBAN PTY LTD	

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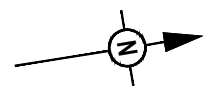
CLIENT
AUSTRALIS LAND

ASSOCIATED CONSULTANT
PEAK URBAN
07 3532 1300

PROJECT NAME
RESIDENTIAL SUBDIVISION (WEST)

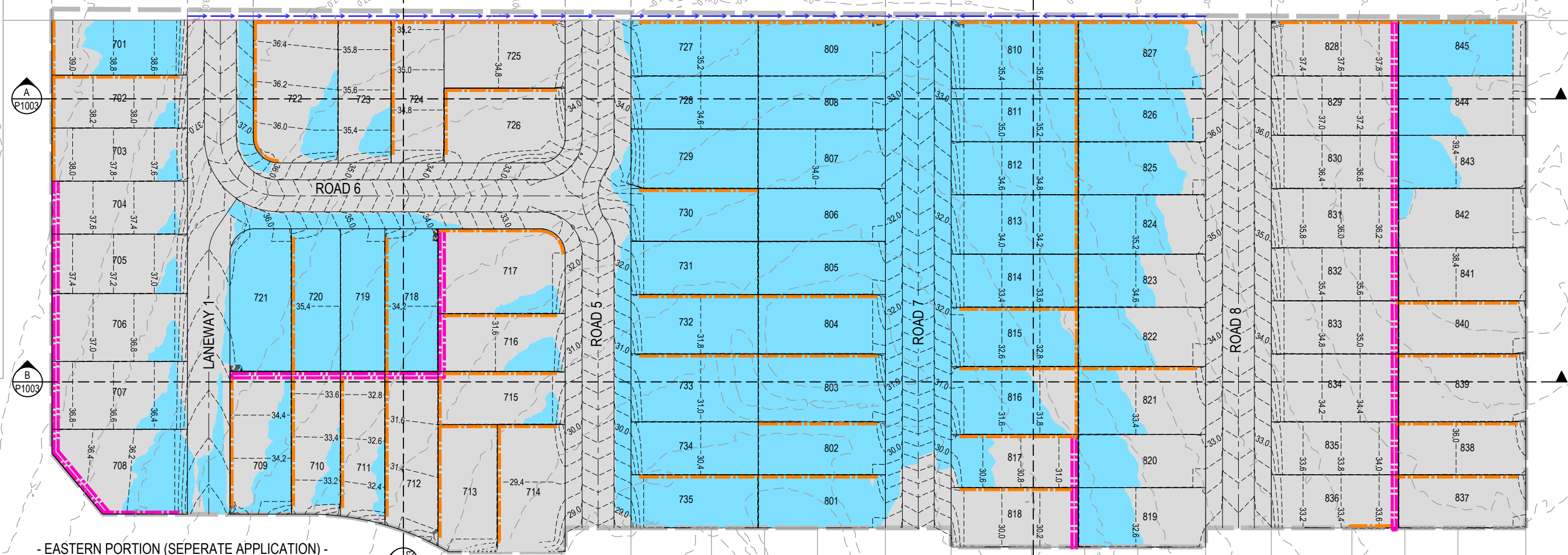
115 & 117 SCHOOL ROAD AND 250-258
LOGANVIEW ROAD NORTH, LOGAN RESERVE

DRAWING TITLE		
BULK EARTHWORKS CONCEPT CROSS SECTIONS		
PROJECT No.	DRAWING No.	REVISION
21-0073	P1003	1



LEGEND

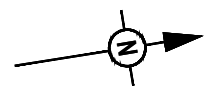
- PROPOSED AREA OF WORKS/STAGE BOUNDARY
- PROPOSED SURFACE CONTOUR
- EXISTING SURFACE CONTOUR
- DIVERSION DRAIN
- PROPOSED CONCRETE SLEEPER RETAINING WALL 1.50m MAX HEIGHT
- PROPOSED CONCRETE SLEEPER RETAINING WALL TIERED 3.0M MAX HEIGHT
- PROPOSED AREA OF CUT
- PROPOSED AREA OF FILL



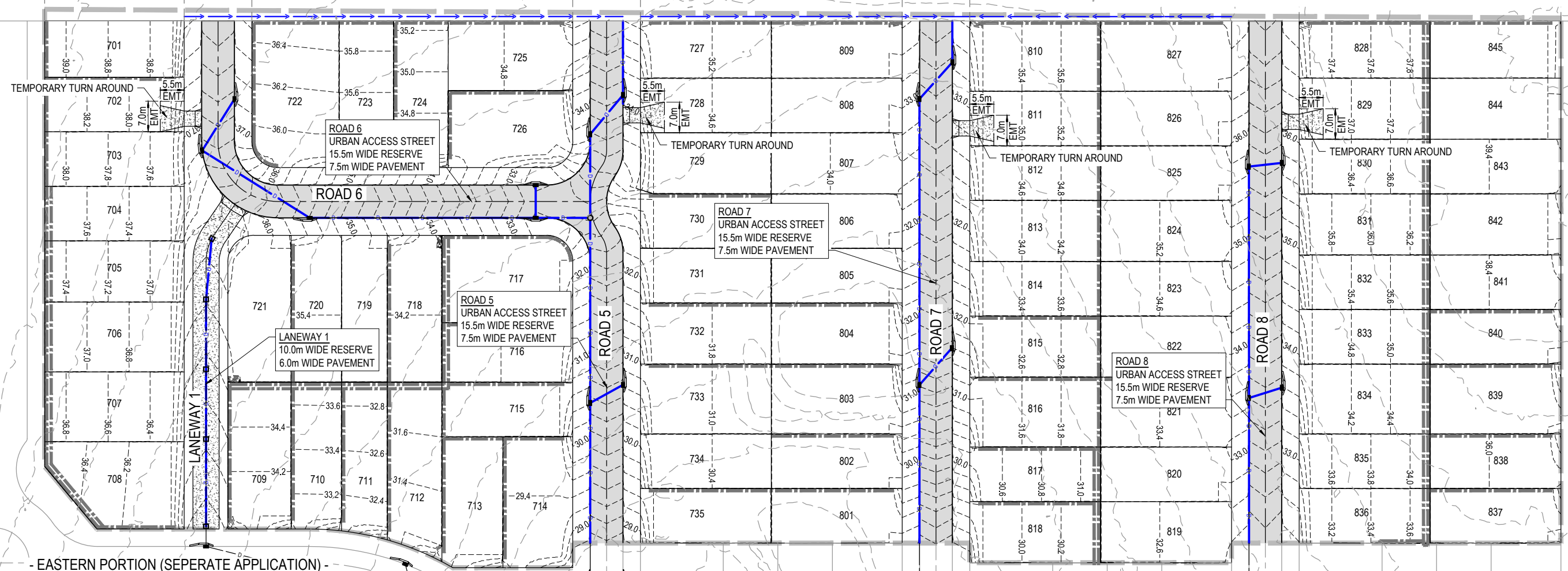
- EASTERN PORTION (SEPERATE APPLICATION) -

- EASTERN PORTION (SEPERATE APPLICATION) -

REV	DATE	DESIGN	DRAWN	REVISION DETAILS	DRAWN	STATUS		SCALE	CLIENT	PROJECT NAME	DRAWING TITLE
1	20.08.21	RD	RD	ORIGINAL ISSUE		NOT FOR CONSTRUCTION		1:500 1:1000	AUSTRALIS LAND	RESIDENTIAL SUBDIVISION (WEST)	BULK EARTHWORKS CONCEPT LAYOUT PLAN
						DESIGN APPROVED SCOTT THOMAS	RPEQ 04618		ASSOCIATED CONSULTANT PEAK URBAN 07 3532 1300	115 & 117 SCHOOL ROAD AND 250-258 LOGANVIEW ROAD NORTH, LOGAN RESERVE	PROJECT No. 21-0073
						FOR AND ON BEHALF OF PEAKURBAN PTY LTD	ENQUIRIES@PEAKURBAN.COM.AU				DRAWING No. P1002
											REVISION 1



LEGEND	
	PROPOSED AREA OF WORKS
	PROPOSED ROAD CONTROL LINE
	EXISTING ROAD CROWN
	PROPOSED KERB INVERT LINE
	PROPOSED EDGE OF BITUMEN
	EXISTING EDGE OF BITUMEN
	PROPOSED CONCRETE PATH AND PRAM RAMP
	PROPOSED NEW ROAD PAVEMENT
	PROPOSED SURFACE CONTOUR
	EXISTING SURFACE CONTOUR
	PROPOSED STORMWATER DRAINAGE PIPE
	EXISTING STORMWATER DRAINAGE PIPE
	PROPOSED DRAINAGE SWALE
	PROPOSED CONCRETE SLEEPER RETAINING WALL



- EASTERN PORTION (SEPERATE APPLICATION) -

- EASTERN PORTION (SEPERATE APPLICATION) -

REV	DATE	DESIGN	DRAWN	REVISION DETAILS
1	20.08.21	RD	RD	ORIGINAL ISSUE

DRAWN	STATUS
	NOT FOR CONSTRUCTION
DESIGN	APPROVED SCOTT THOMAS
	RPEQ 04618
FOR AND ON BEHALF OF PEAKURBAN PTY LTD	



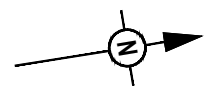
SCALE
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CLIENT
AUSTRALIS LAND
ASSOCIATED CONSULTANT PEAK URBAN 07 3532 1300

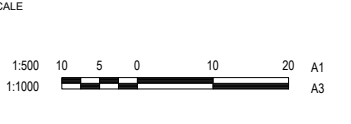
PROJECT NAME
RESIDENTIAL SUBDIVISION (WEST)
115 & 117 SCHOOL ROAD AND 250-258 LOGANVIEW ROAD NORTH, LOGAN RESERVE

DRAWING TITLE		
CONCEPT ROADWORKS AND DRAINAGE LAYOUT PLAN		
PROJECT No.	DRAWING No.	REVISION
21-0073	P1004	1

LEGEND	
	PROPOSED AREA OF WORKS
	PROPOSED WATER RETICULATION
	PROPOSED SEWERAGE RETICULATION
	EXISTING SEWER MAIN
	PROPOSED SURFACE CONTOUR
	EXISTING SURFACE CONTOUR
	PROPOSED STORMWATER DRAINAGE PIPE
	PROPOSED CONCRETE SLEEPER RETAINING WALL



REV	DATE	DESIGN	DRAWN	REVISION DETAILS	DRAWN	STATUS	SCALE	CLIENT	PROJECT NAME	DRAWING TITLE
1	20.08.21	RD	RD	ORIGINAL ISSUE			1:500 1:1000	AUSTRALIS LAND	RESIDENTIAL SUBDIVISION (WEST)	CONCEPT WATER AND SEWER LAYOUT PLAN
						NOT FOR CONSTRUCTION				
						DESIGN APPROVED SCOTT THOMAS		ASSOCIATED CONSULTANT PEAK URBAN 07 3532 1300	115 & 117 SCHOOL ROAD AND 250-258 LOGANVIEW ROAD NORTH, LOGAN RESERVE	PROJECT No. 21-0073
						RPEQ 04618				DRAWING No. P1005
						FOR AND ON BEHALF OF PEAKURBAN PTY LTD				REVISION 1



CLIENT
AUSTRALIS LAND

ASSOCIATED CONSULTANT
PEAK URBAN
07 3532 1300

PROJECT NAME
RESIDENTIAL SUBDIVISION (WEST)

115 & 117 SCHOOL ROAD AND 250-258
LOGANVIEW ROAD NORTH, LOGAN RESERVE

DRAWING TITLE
CONCEPT WATER AND SEWER LAYOUT PLAN

PROJECT No.
21-0073

DRAWING No.
P1005

REVISION
1



Appendix C WBNM Summary



WBNM Results: Northern Catchment

Existing Results

E01	Duration												
AEP	0.17	0.25	0.33	0.42	0.5	0.75	1	1.5	2	3	4.5	6	Max.
63	0.02	0.02	0.03	0.06	0.08	0.13	0.15	0.17	0.15	0.14	0.14	0.12	0.17
50	0.02	0.03	0.07	0.11	0.15	0.19	0.20	0.21	0.18	0.18	0.17	0.14	0.21
20	0.05	0.16	0.25	0.30	0.34	0.34	0.35	0.34	0.29	0.29	0.27	0.21	0.35
10	0.13	0.28	0.38	0.43	0.47	0.47	0.43	0.40	0.40	0.35	0.32	0.30	0.47
5	0.21	0.39	0.51	0.55	0.58	0.58	0.53	0.49	0.49	0.43	0.38	0.36	0.58
2	0.33	0.55	0.66	0.72	0.73	0.68	0.64	0.58	0.54	0.48	0.40	0.44	0.73
1	0.43	0.67	0.77	0.84	0.84	0.78	0.74	0.67	0.62	0.56	0.47	0.52	0.84

Developed Results

D01	Duration												
AEP	0.17	0.25	0.33	0.42	0.5	0.75	1	1.5	2	3	4.5	6	Max.
63	0.27	0.26	0.26	0.27	0.27	0.24	0.24	0.24	0.20	0.18	0.18	0.14	0.27
50	0.31	0.31	0.31	0.32	0.33	0.30	0.29	0.29	0.24	0.22	0.21	0.16	0.33
20	0.45	0.51	0.52	0.53	0.53	0.47	0.46	0.44	0.38	0.33	0.33	0.24	0.53
10	0.58	0.65	0.68	0.66	0.67	0.62	0.55	0.50	0.48	0.40	0.36	0.34	0.68
5	0.72	0.79	0.82	0.79	0.80	0.74	0.67	0.59	0.57	0.47	0.42	0.40	0.82
2	0.90	0.98	0.95	0.98	0.95	0.88	0.78	0.70	0.61	0.55	0.45	0.50	0.98
1	1.04	1.11	1.08	1.11	1.08	1.01	0.89	0.80	0.70	0.63	0.53	0.57	1.11

Mitigated Results

M01	Duration												
AEP	0.17	0.25	0.33	0.42	0.5	0.75	1	1.5	2	3	4.5	6	Max.
63	0.09	0.11	0.13	0.14	0.15	0.16	0.16	0.15	0.14	0.14	0.13	0.11	0.16
50	0.10	0.13	0.15	0.17	0.19	0.19	0.19	0.18	0.16	0.17	0.15	0.13	0.19
20	0.15	0.21	0.25	0.27	0.28	0.28	0.28	0.26	0.24	0.24	0.22	0.18	0.28
10	0.19	0.26	0.30	0.32	0.33	0.34	0.32	0.30	0.30	0.28	0.25	0.24	0.34
5	0.23	0.30	0.35	0.37	0.38	0.39	0.38	0.35	0.34	0.33	0.29	0.28	0.39
2	0.28	0.36	0.40	0.44	0.45	0.45	0.44	0.42	0.39	0.34	0.32	0.33	0.45
1	0.31	0.40	0.45	0.48	0.50	0.49	0.48	0.47	0.44	0.39	0.36	0.40	0.50



WBNM Results: Southern Catchment

Existing Results

E01	Duration												
AEP	0.17	0.25	0.33	0.42	0.5	0.75	1	1.5	2	3	4.5	6	Max.
63	0.32	0.32	0.32	0.41	0.55	0.87	1.05	1.20	1.13	1.08	1.10	0.90	1.20
50	0.37	0.38	0.51	0.73	0.93	1.26	1.41	1.52	1.40	1.36	1.31	1.10	1.52
20	0.58	1.08	1.58	1.96	2.23	2.47	2.56	2.53	2.23	2.27	2.07	1.72	2.56
10	0.97	1.77	2.43	2.85	3.18	3.39	3.22	3.10	3.10	2.78	2.51	2.36	3.39
5	1.46	2.50	3.27	3.72	4.06	4.26	3.97	3.78	3.77	3.36	3.04	2.88	4.26
2	2.19	3.49	4.32	4.94	5.17	5.12	5.00	4.61	4.25	3.76	3.21	3.52	5.17
1	2.79	4.26	5.15	5.82	6.04	5.95	5.78	5.34	4.92	4.40	3.74	4.12	6.04

Developed Results

D01	Duration												
AEP	0.17	0.25	0.33	0.42	0.5	0.75	1	1.5	2	3	4.5	6	Max.
63	1.32	1.35	1.31	1.36	1.39	1.37	1.40	1.51	1.33	1.26	1.23	1.02	1.51
50	1.51	1.55	1.60	1.68	1.76	1.72	1.77	1.85	1.62	1.54	1.49	1.22	1.85
20	2.22	2.66	2.89	3.04	3.14	2.96	3.02	2.99	2.54	2.45	2.32	1.85	3.14
10	2.94	3.54	3.90	3.96	4.11	4.03	3.64	3.46	3.51	3.01	2.74	2.57	4.11
5	3.71	4.42	4.82	4.87	5.05	4.93	4.47	4.21	4.22	3.64	3.29	3.11	5.05
2	4.73	5.61	5.84	6.17	6.11	5.76	5.47	4.99	4.60	4.12	3.46	3.77	6.17
1	5.54	6.50	6.73	7.10	7.02	6.67	6.28	5.77	5.31	4.79	4.01	4.40	7.10

Mitigated Results

M01	Duration												
AEP	0.17	0.25	0.33	0.42	0.50	0.75	1.00	1.50	2.00	3.00	4.50	6.00	Max.
63.00	0.34	0.41	0.49	0.63	0.76	0.98	1.09	1.12	1.07	1.08	1.01	0.82	1.12
50.00	0.39	0.49	0.69	0.91	1.10	1.35	1.44	1.44	1.34	1.37	1.23	1.01	1.44
20.00	0.63	1.18	1.67	2.03	2.28	2.47	2.54	2.40	2.15	2.23	2.00	1.67	2.54
10.00	0.97	1.78	2.39	2.80	3.10	3.32	3.13	2.97	2.94	2.70	2.41	2.27	3.32
5.00	1.42	2.38	3.10	3.57	3.88	4.10	3.85	3.60	3.56	3.26	2.92	2.77	4.10
2.00	2.02	3.18	4.04	4.65	4.84	4.93	4.75	4.42	4.08	3.55	3.11	3.41	4.93
1.00	2.48	3.81	4.75	5.40	5.58	5.66	5.43	5.08	4.68	4.14	3.62	3.97	5.66