

**290-308 Aldington Road &
59-62 & 63 Abbotts Road
(Lots 11-13, DP 253503)
Kemps Creek**

Civil Infrastructure Report

ESR Development (Australia) Pty Ltd

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20-748

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1. Executive Summary

This report is a summary of the civil infrastructure requirements to aid in the development of the ESR Kemps Creek Logistics Park. The site is located to the east of Aldington Road, and is legally described as Lots 11-13 in DP 253503 and has an area of approximately 32 hectares (ha). It is located within the Penrith City Council Local Government Area (LGA).

The site is located at the eastern end of the Abbotts Road cul-de-sac and has approximately 170m of direct frontage to Abbotts Road and 190m of direct frontage to Aldington Road. The subject site will be developed with proposed lots on either side of the Abbotts Road extension which will provide vehicular access to the proposed lots. Until the connection of Aldington Road to the future Southern Link Road (located to the north) is constructed, the access to the site will be provided from the South bound lane of Mamre Road via Abbotts Road.

The site is located approximately 4km north-west of the future Western Sydney Nancy-Bird Walton Airport, 13km south-east of the Penrith CBD and 40km west of the Sydney CBD.

The site is part of the Broader Western Sydney Employment Area and is zoned land under the *State Environmental Planning Policy (Western Sydney Employment Area) 2009 (SEPP WSEA)*.

Consistent with the above, this report has been prepared to support a State Significant Development Application (SSDA) under Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) to enable the construction of industrial warehouse and distribution buildings.

2. Compliance with Planning SEARs

This report responds to the NSW Planning Secretary's Environmental Assessment Requirements (SEARs) issued by the NSW Department of Planning, Industry and Environment (DPIE) in September 2020 and subsequently updated in December 2020. **Table 1** below summaries all key civil infrastructure issues raised in the SEARs and how they have been addressed in this report.

Table 1: Secretary's Environmental Assessment Requirements addressed in this report

Key Issue listed in the SEARs	Response
Traffic and Transport	
Connection of development to adjoining sites Detailing how the proposed development connects to adjoining sites to facilitate their future development for their intended purposes	<p>Overall General Arrangement Plan 20-748-C1005 prepared by AT&L indicates Abbots Road layout which provide connection to adjoining lots to the south east for future development via further extension of Abbots Road beyond the cul-de-sac currently proposed towards the south-east of the proposed development.</p> <p>It is proposed that detailed coordination of precinct connectivity may occur post formal SSD exhibition stage to enable concurrent development of the <i>Aldington Road Precinct Structure Plan – Local Road Network Structure Plan</i> by TfNSW and Penrith City Council.</p>
Site access and internal road layout Detailed plans of the site access and proposed layout of the internal road and pedestrian network and parking on site in accordance with the relevant Australian Standards and Council's DCP	<p>Access for the site is off Abbots Road via a proposed three-way junction at the intersection of Abbots Road and Aldington Road. This three-way junction is designed to provide a future roundabout intersection for future road Aldington Road extension in the southerly direction. The existing Abbots Road cul-de-sac is proposed to be extended further to the south-easterly direction with a proposed cul-de-sac providing vehicular access to the overall development. Both junctions can provide future connection to the adjoining lands located to the south of the proposed development. Until the connection of Aldington Road to the future Southern Link Road (located to the north) is constructed, the access to Aldington Road will be provided from the North and South bound traffic via a signalised intersection on the South bound lane of the Mamre Road via Abbots Road.</p>

	<p>Refer Roadworks and Stormwater Drainage Plans 20-748-C1041 to C1047 prepared by AT&L indicating site access along with the proposed road layouts. Note also pedestrian footpath included within the plans.</p> <p>Refer to Architectural plans prepared by NETTLETON TRIBE for internal parking layouts.</p> <p>Abbotts Road and pedestrian networks are proposed to be provided in accordance with Penrith City Council's standard DCP requirements with exception of a proposed wider verge on the shared pathway side to enable a consistent landscape zone within both road verges.</p>
<p>Swept path diagrams</p> <p>Swept path diagrams depicting vehicles entering, exiting and manoeuvring throughout the site</p>	<p>Refer to Vehicle Turn Path drawings 20-748-C1311 to 20-748-C1312 prepared by AT&L for Abbotts Road vehicle analysis.</p> <p>For internal lot turning manoeuvres, refer to the traffic engineering report prepared by ASON.</p>
<p>Road upgrade detail</p> <p>Details of road upgrades, infrastructure works, or new roads or access points required for the development</p>	<p>All upgrade works to Abbotts Road and Aldington Road along with details for new roads within the development have been documented within the AT&L Civil drawings.</p>
Soils and Water	
<p>Topographic assessment</p> <p>A topographic assessment and justification the proposed earthworks are site responsive and contextually appropriate</p>	<p>A Topographic assessment and justification on proposed earthworks are discussed within Section 5 and 7 of this report</p>
<p>Detailed site water balance</p> <p>A detailed site water balance including identification of water requirements for the life of the project, measures that would be implemented to ensure an adequate and secure water supply is available for the development and a detailed description of the measures to minimise the water use at the site</p>	<p>A Water Balance section has been included in this report. Refer Section 10 for all site water balance details, water supply source, usage calculations and efficiency measures.</p>
<p>Satisfactory arrangements for drinking, wastewater and recycled water</p> <p>Demonstration satisfactory arrangements for drinking water, wastewater and if required recycled water services have been made</p>	<p>Refer to Section 11 of this report for discussion on water and sewerage for the site along with servicing advice received from Sydney Water</p>

<p>Discharge water quality</p> <p>Characterisation of water quality at the point of discharge to surface and/or groundwater against the relevant water quality criteria (including proposed mitigation measures to manage any impacts to receiving waters and monitoring activities and methodologies)</p>	<p>Refer Section 9 of this report where stormwater quality is discussed. Note all stormwater discharge off site will be treated to ensure Penrith City Council's DCP treatment rates are achieved.</p> <p>Refer Appendix C for water treatment train.</p>
<p>Site specific integrated water management strategy</p> <p>A site-specific integrated water management strategy with details of stormwater/wastewater management system including how it will be designed, operated and maintained, including the capacity of onsite detention system(s), onsite sewage management and measures to treat, reuse (including indicative quantities) or dispose of water</p>	<p>Refer to Section 9 and 10 of this report for Integrated Water Management strategy.</p>
<p>Measures to minimise water use</p> <p>Description of the measures to minimise water use</p>	<p>Refer to Section 10 of this report for discussion on water re-use across the site using rainwater harvest tanks</p>
<p>Erosion and sediment control</p> <p>Description of the proposed erosion and sediment controls during construction</p>	<p>Sediment and Erosion control measures across the site are discussed in Section 6 of this report. Note all control measures have been designed in accordance with Managing Urban Stormwater – Soils and Construction (Landcom, 2004).</p> <p>Also note the Erosion and Sediment Control plan has been provided for the development assuming that the works will be completed in one stage. As the staging plan is developed, erosion and sediment control measures will be developed to suit the works.</p>
<p>Infrastructure Requirements</p>	
<p>Description of infrastructure required on site</p> <p>A detailed written and/or graphical description of infrastructure required on the site, including any upgrades required</p>	<p>Infrastructure requirements for the site have been documented in the Services and Utilities Coordination Plans prepared by AT&L.</p> <p>Section 11 of this report also discusses all service utilities within and adjacent to the site.</p> <p>Continued coordination with utility infrastructure providers will be undertaken concurrent to formal ESR Developments SSD exhibition to ensure that adequate arrangements are made to ensure required infrastructure will be made available when required.</p>
<p>Identification of infrastructure upgrades</p>	<p>Refer to Section 11 which highlights proposed infrastructure upgrade works required to service the</p>

Identification of any infrastructure upgrades required off-site to facilitate the development, and describe any arrangements to ensure that the upgrades will be implemented in a timely manner and maintained	proposed development. Note all these works will need to be confirmed with the relevant service Authority during detailed design stages. Consultation with each of these Authorities has commenced as part of this SSD process and will continue so during detailed design
Infrastructure delivery and staging plan An infrastructure delivery and staging plan, including a description of how infrastructure on and off-site will be co-ordinated and funded to ensure it is in place prior to the commencement of construction	Refer to Section 12 for indicative infrastructure delivery and staging arrangements.
Development impact on existing utility infrastructure An assessment of the impacts of the development on existing utility infrastructure and service provider assets surrounding the site.	Any impacts to existing utility infrastructure will be discussed with the relevant service Authority during the detailed design phase. ESR Developments and AT&L has, and will continue to, coordinate with utility authorities regarding the proposed SSD development to identify augmentations required to existing infrastructure because of the proposed development. No significant impacts on existing utility infrastructure surrounding the site are envisaged as part of the proposed ESR Developments SSD development.
Agency Comments	
Penrith City Council	
Water Quality Management and Stormwater Management	
Water quality and water quantity are to be addressed. Post developed flows shall match pre-developed flows. Water quality shall be in accordance with Council's DCP and WSUD policies. It is Council's preference that on-lot water quality and water quantity treatment be provided for rather than large open basins. If large basins are proposed, then they shall remain under the ownership and maintenance of the development site. Council will not accept the dedication of any drainage basin as a public asset.	Refer Section 9 of this report where stormwater quantity and quality are discussed. Note all stormwater discharge off site will be treated to ensure Penrith City Council's treatment rates are achieved. OSD/Water treatment basins and GPTs are proposed to ensure Council's stormwater management requirements are met. These basins are proposed to remain in the ownership and maintained by the Developer and not be dedicated to Council.

3. Agency Consultation

This report summarises all consultation and correspondence undertaken with the relevant authorities during the design phase. The following table summarises and the relevant correspondence. It should be noted that not all authorities were consulted during the initial design phase.

Table 2: Summary of agency consultation

Agency Consulted	Correspondence
Sydney Water	Sydney Water's input to SEARs for SSD-9138102 dated 4 September 2020 have been acknowledged and servicing arrangements for the site and the Aldington Road Precinct.
Endeavour Energy	During the design phase of the SSDA, AT&L has begun the discussions with Endeavour Energy. As per the email conversation dated 25 th September and the project specifics and EE's comments have been taken into consideration as part of design documentation. Section 11 highlights the EE servicing strategy for the site.
Transport for NSW	TfNSW's input for SSD-10479 dated 16 July 2020 and meeting held on 21 st September 2020 have been acknowledged and these comments have been considered as part design documentation and responded to accordingly.
WaterNSW	WaterNSW input for SSD-913802 dated 25 September 2020 has been acknowledged and these comments have been considered as part design documentation and responded to accordingly

4. Introduction

4.1. Background

This report is a summary of the Masterplan servicing strategy and infrastructure requirements to aid in the development of the ESR Australia's Site located on 290-308 Aldington Road and 59-63 Abbotts Road Kemps Creek.

The Site is located within the Penrith City Council LGA, approximately 4km south of Erskine Park and approximately 9km north-east from the proposed Western Sydney Airport. The Site is legally known as Lots 11-13 DP 253503. The site has a total land area of approximately 32 Ha. The extent of the site is presented in **Figure 1**.



Figure 1: Site Location (Courtesy of Nearmap)

4.2. Development Site

The total Site area is approximately 32 Ha and is currently rural in use, comprising of dwellings, sheds, dams and grassed fields. The Site is partially bordered by Aldington Road to the west and existing rural lots to the west, north, south and east.

The Site has a general fall from the east to west towards Abbots Road with existing levels ranging from RL92.5 in the south east, RL 87.5 in the north-east, RL 58.5 in the north west and RL51.0 in Abbots Rd and Aldington Rd intersection.

There is an external catchment approximately 1.21 Ha entering the northern boundary of the site. An external catchment of approximately 8.2 Ha is entering the eastern boundary of the site. Refer to Figure 2 for external catchment locations.

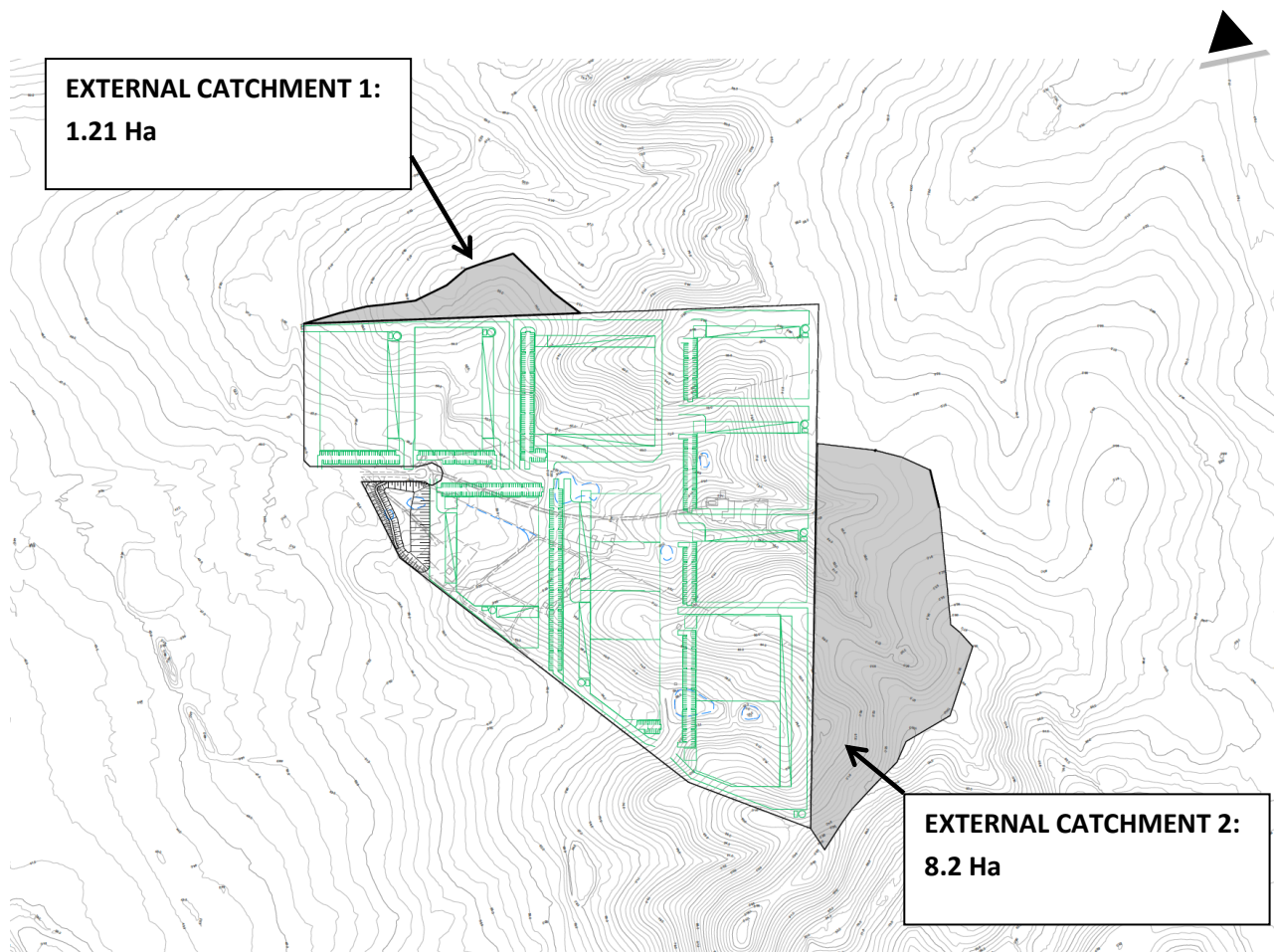


Figure 2: Extent of external catchments

The Site can be categorised as undulating rural land with several key constraints, including:

- the relatively steep slopes
- lack of existing services

- rural road access

There is little or no significant vegetation on the site apart from trees that have been planted and grown around the existing dwellings.

Most of the site is used for general farming activities which appear to be ongoing. There is a potential for low-level pesticide and herbicide contamination which would need to be investigated by the relevant specialist.



Figure 3: Site View from Aldington Rd Abbotts Rd Intersection (Google Street View)

The development site is proposed to be cleared of all the existing built form, dams de-watered and filled, with earthworks to be undertaken across the Site to provide for flat benched platforms. Road and associated infrastructure are proposed to be constructed to services the developed platforms.

External services infrastructure required to service the Site include water main, sewer main, lead-in electrical and NBN.

4.3. Scope and Staging

The scope of this report is to provide the findings of the master planning that has been undertaken to establish the ideal layout for the site. The report summarises the following outcomes:

- Potable water and sewer connections
- Electrical connection points to supply the site
- External access requirements
- Earthworks strategy, retaining walls and boundary conditions
- Stormwater infrastructure requirements
- Estimate of costs for the development and assumptions

Investigations of the Site were carried out based on:

- Dial Before You Dig (DBYD)
- Sydney Water Hydra System
- Penrith City Council Engineering Design Specification
- Penrith City Council Stormwater Drainage Specification



5. Earthworks

5.1. Existing Geology

Based on the Preliminary Geotechnical Investigation undertaken by Douglas Partners (reference: 92352.00, dated August 2019) for 59-63 Abbotts Road and the Geotechnical Investigation Report prepared by Alliance Geotechnical (reference: 9687-GR-1-1, dated October 2019) for 290-308 Aldington Road, the following inferred sub surface soils were encountered across the site:

- TOPSOIL / topsoil filling to depths of 0.1 - 0.6m
- FILL to depths of 2.3m over parts of the site
- Residual Soil – variably stiff to hard silty clay, to depths in the range 2.5-3.5m
- BEDROCK - initially extremely low to very low strength shale or sandstone at first contact at depths of 0.7

5.2. Proposed Earthworks

The site in its existing condition is characterised by undulating topography. It is the intent of the proposed development to produce several “flat” pads to facilitate the development of large-scale industrial lots. This will require earthworks across the site to achieve a benched site, refer to Appendix A for a cut/fill plan.

The cut / fill requirements within the site have been defined through multiple iterations and careful consideration of the following:

- Undulating topography within the Aldington Road Precinct resulting in the requirement for extensive cut and fill operations to allow ESR Development to facilitate economic development and provide flexibility to cater for the range of industrial customer requirements.
- Provisioning for connectivity to adjoining lands and managing existing upstream catchment flows.
- Avoiding retaining walls fronting Aldington Road and mitigating retaining walls fronting internal public road reserves.
- Mitigate extensive cut in bedrock sub-surface units.
- Meet the requirements for the site to cater for IN1 – General Industrial employment which requires large flexible allotments.

It is recommended that the proposed earthworks design contained within the AT&L documentation provides the most contextually and economically appropriate design in consideration of the above requirements. Whilst retaining walls fronting Abbotts Road have been avoided as much as possible, this has resulted in a maximum 10m high fill retaining wall along a section of the southern site boundary due to existing topography.

Refer to Drawing 19-609-C1030 for Bulk Earthworks Cut/Fill Plan within Appendix A. Net export is the value highlighted in bold in **Table 3** below.

Table 3: Summary of proposed cut and fill volumes across the site

Item	Volume (m ³)
Stripping of existing topsoil	- 65,700
Excavation of existing creeks and dams (to be exported from site)	- 10,500
Net Cut (including topsoil stripping)	- 709,300
Net Fill	+ 685,800
Balance	- 23,500 (export)

Note these volumes are based on the current design, further detailed design may alter these. – (Negative) balance indicates net cut whilst + (positive) balance indicates import required. It is assumed that all topsoil from the site will be re-used on site as per the specification of the Geotechnical Engineer. Excess topsoil will be exported as required.

The cut and fill volumes presented above have been calculated based on the following assumptions:

- 200mm depth of topsoil stripping over the entire site.
- Any topsoil stripped from the site can be blended in with cut material to be reused based on our experience on similar sites within the vicinity and will therefore not need to be exported off site. This will need to be confirmed by a Geotechnical Engineer at the detailed design phase.

All import materials will comply with the requirements of the requirements of the Import Fill Protocol and Geotechnical Specifications for the Development. Topsoil stripping, blending and placement will be completed in accordance with the Geotechnical Engineering Specifications for the project.

6. Sedimentation and Erosion Control

6.1. Sedimentation and Erosion Control (Construction)

A Soil and Water Management Plan (SWMP) has been prepared in accordance with the NSW Department of Housing Publication titled: Managing Urban Stormwater – Soils and Construction (2004) for the whole site.

The key objectives of the SWMP are:

- Acknowledging the activities on a construction site which may contribute to erosion, sedimentation and water quality impacts.
- The implementation of industry best management practices to minimise adverse water quality and sedimentation impacts brought about through construction activities on waterbodies surrounding the work.
- Establishment of processes that effectively manage erosion, sedimentation and water quality practices during the life of the project.

6.1.1. Sources of Pollution

The activities and aspects of the works that have potential to lead to erosion, sediment transport, siltation and contamination of natural waters include:

- Earthworks undertaken immediately prior to rainfall periods.
- Work areas that have not been stabilised.
- Extraction of construction water from waterways during low rainfall periods.
- Clearing of vegetation and the methods adopted, particularly in advance of construction works.
- Stripping of topsoil, particularly in advance of construction works.
- Bulk earthworks and construction of pavements.
- Works within drainage paths, including depressions and waterways.
- Stockpiling of excavated materials.
- Storage and transfer of oils, fuels, fertilisers and chemicals.
- Maintenance of plant and equipment.
- Ineffective implementation of erosion and sediment control measures.
- Inadequate maintenance of environmental control measures; and
- Time taken for the rehabilitation / revegetation of disturbed areas.

6.1.2. Potential Impacts

The major potential impacts on the riparian environment relate to erosion of distributed areas or stockpiles and sediment transportation. Potential adverse impacts from erosion and sediment transportation can include:

- Loss of topsoil.

- Increased water turbidity.
- Decreased levels of dissolved oxygen.
- Changed salinity levels.
- Changed pH levels.
- Smothering of stream beds and aquatic vegetation.
- Reduction in aquatic habitat diversity.
- Increased maintenance costs.
- Decrease in waterway capacity leading to increased flood levels and durations.

6.2. RUSLE Analysis

Prior to the design of the SWMP, a Revised Universal Soil Loss Equation (RUSLE) has been undertaken in accordance with the “Blue Book”. This analysis has been undertaken to predict the long term, average and annual soil loss from sheet and rill flow from the site under specified management conditions.

Estimating soil loss for a proposed development has four important applications to soil and water management. These are to:

1. Assess the erosion risk at a site.
2. Identify suitable measures to overcome the erosion risk.
3. Estimate the required capacity of sediment retarding basins.
4. Compare the effectiveness of various erosion control measures.

Refer to **Table 4** below for estimates of soil loss on the site.

Table 4: RUSLE Analysis

Parameter	Item (Blue Book Reference)
Rainfall Erosivity Factor, R	1,897.10
Soil Erodibility Factor, K (Table C20, Blue Book)	0.05
Slope Length/Gradient Factor, LS	1.19
Erosion Control Practice Factor, P	1.20
Ground Cover and Management Factor, C	1
Computed Soil Loss (tonnes/ha/year), ($A = R \times K \times LS \times P \times C$)	135.45
Soil Loss Class	1 (Table 4.2)

It should be noted the following parameters/assumptions were used for the analysis of this site:

- Rainfall Erosivity Factor (R) = 2,413.51 from (Equation 2, Appendix A2 Blue Book).
- Soil Erodibility Factor (K) = 0.05 (from Appendix C, Table C19 of Blue Book).

- Slope Length (LS): Is assumed to not exceed 80m immediately before forecast rainfall or during shutdown periods and a maximum grade of 5%.
- Erosion Control Factor (P): Is the ratio of soil loss with a nominated surface condition ploughed up and down the slope (from Appendix A5, Blue Book); and
- Cover Factor (C): Is the ratio of soil loss from land under specified crop or mulch conditions to the corresponding loss from continuously tilled, bare soil. With the proposed ESC measures being installed post bulk earthworks, it is assumed that all soil is recently disturbed, thus a C factor of 1 is chosen.

Table 4.2 The Soil Loss Classes (adapted from Morse and Rosewell, 1996)

Soil Loss Class	Calculated soil loss (tonnes/ha/yr)	Erosion hazard
1	0 to 150	very low
2	151 to 225	low
3	226 to 350	low-moderate
4	351 to 500	moderate
5	501 to 750	high
6	751 to 1,500	very high
7	>1,500	extremely high

Figure 5: Table 4.2 from the Blue Book

The erosion hazard potential of the site is considered very low, due to the calculated soil loss lying in the range of 0 to 150 tonnes/ha/year as per Table 4.2 of the Blue Book.

6.3. Soil and Water Management Plan

6.3.1. Overall Strategy

The following construction methodology will be followed to minimise the impact of sedimentation due to construction works:

- Diversion of “clean” water away from the disturbed areas and discharge via suitable scour protection.
- Provision of hay bale type flow diverters to catch drainage and divert to “clean” water drains.
- Diversion of sediment-laden water into temporary sediment control basins to capture the design storm volume and undertake flocculation (if required).
- Provision of construction traffic shaker grids and wash-down to prevent vehicles carrying soils beyond the site.

- Provision of catch drains to carry sediment-laden water to sediment basins.
- Provision of silt fences to filter and retain sediments at source.
- Rapid stabilisation of disturbed and exposed ground surfaces with hydro-seeding areas where future construction and building works are not currently proposed.
- All temporary sediment basins will be located clear of the 100yr ARI flood extent from South Creek and all associated tributaries.
- The weir levels of temporary sediment basins will be located above the 100yr ARI flood event levels from Ropes Creek and tributaries; and
- Bio-retention basins are to be utilised as temporary sediment control basins. The bio-retention basins shall not be converted into the final/ultimate basins until such time as all building and construction works within the site has been completed and 90% of the site is stabilised.

Refer to AT&L Drawings 20-748-1201 for Erosion and Sediment Control Plans, for all proposed control and protection measures across the site until completion of on lot works.

Suitable temporary erosion and sediment controls shall be designed by a suitably qualified Engineer. Erosion and sediment controls shall be installed and maintained by the Contractor throughout all stages of works. Such controls shall be in accordance with the relevant requirements in the latest version of the managing urban stormwater: soils and construction guideline (Landcom).

6.3.2. Design of Sediment and Erosion Control Measures

Suitable erosion and sediment controls shall be provided by the Contractor and maintained throughout all stages of works, including at completion of the bulk earthworks.

All design, documentation, installation and maintenance of sediment and erosion controls will be in accordance with the requirements of:

- *Protection of the Environment Operations Act*
- Penrith City Council's guidelines and specifications
- *Managing Urban Stormwater: Soils and Construction*, Landcom, (4th Edition) (The "Blue Book") Volume 1 and Volume 2

The proposed stormwater detention basin is proposed to be used temporarily as sitewide sediment basin during the bulk earthworks construction. For this approval it has been assumed that the on-lot works will be completed simultaneously, negating the need for individual sediment basins. Ultimately, the final temporary sediment basin locations and sizes will be provided to suit development staging requirements and will be sized and maintained in accordance with the requirements of the above-mentioned authority documents.

With the proposed site being larger than 2,500m² in disturbed area, sediment basins are required. The following temporary sediment basins are to be in-place at the commencement of demolition works. Refer to drawings in Appendix A and 'Earth Basin Wet' SD6-4 for details, and **Table 5** below for basin sizes.

Table 5: Site Data

Parameter	Item (Blue Book Reference)
Soil Type	Type F (Appendix C, Table C19, Blue Book)
Design Rainfall Depth (Days)	5
Design Rainfall Depth (Percentile)	80
x-day, y-percentile rainfall event (Table 6.3a)	27.4
Rainfall Intensity: 2-year, 6-hour storm	9.93
Rainfall Erosivity (R-factor)	1,897.10

Table 6: Design parameters for estate-wide temporary sediment basin

Parameter	Temporary Sediment basin
Volumetric runoff coefficient	0.5
Area	31.88 ha
80%, 5-day rainfall depth	27.4
Settling zone volume	4368 m ³
Sediment storage volume	2184 m ³
Total sediment volume	6552 m ³

6.4. Site Inspection and Maintenance

The inspection and maintenance requirements outlined in this section must be carried out while either earthworks or quarrying is being conducted, and all areas re-established.

The Contractor will be required to inspect the site after every rainfall event and at least weekly, and will:

- Inspect and assess the effectiveness of the SWMP and identify any inadequacies that may arise during normal work activities or from a revised construction methodology.
- Construct additional erosion and sediment control works as necessary to ensure the desired protection is given to downstream lands and waterways.
- Ensure that drains operate properly and to affect any repairs.
- Remove spilled sand or other materials from hazard areas, including lands closer than 5 metres from areas of likely concentrated or high velocity flows especially waterways and paved areas.
- Remove trapped sediment whenever less than design capacity remains within the structure.
- Ensure rehabilitated lands have affectively reduced the erosion hazard and to initiate upgrading or repair as appropriate.
- Maintain erosion and sediment control measures in a fully functioning condition until all construction activity is completed and the site has been rehabilitated.

- Remove temporary soil conservation structures as the last activity in the rehabilitation.
- Inspect the sediment basin during the following periods:
 - ▶ During construction to determine whether machinery, falling trees, or construction activity has damaged and components of the sediment basin. If damage has occurred, repair it.
 - ▶ After each runoff event, inspect the erosion damage at flow entry and exit points. If damage has occurred, make the necessary repairs.
 - ▶ At least weekly during the nominated wet season (if any), otherwise at least fortnightly; and
 - ▶ Prior to, and immediately after, periods of 'stop work' or site shutdown.
- Clean out accumulated sediment when it reaches the marker board/post and restore the original volume. Place sediment in a disposal area or, if appropriate, mix with dry soil on the site.
- Do not dispose of sediment in a manner that will create an erosion or pollution hazard.
- Check all visible pipe connections for leaks, and repair as necessary.
- Check all embankments for excessive settlement, slumping of the slopes or piping between the conduit and the embankment, make all necessary repairs.
- Remove the trash and other debris from the basin and riser; and
- Submerged inflow pipes must be inspected and de-silted (as required) after each inflow event.

6.4.1. Sediment Basin Maintenance

As stated in Section 4.3.2 above, the proposed development site contains 'Type F' soils, or soils that contain a significant proportion of fine grained (33% or more of finer than 0.02mm) and require a much longer residence time to settle.

Stormwater within the settling zone should be drained or pumped out within 5 days (design time), if the nominated water quality targets can be met, to the satisfaction of the superintendent. Flocculation should be employed where extended settling is likely to fail to meet the objectives within the 5-day period.

Flocculation is when flocculating agents are applied to the sediment basins causing the colloidal particles to clump into larger units or 'floc' that can either settle in a reasonable time or be filtered.

Refer to Appendix E4 of the Blue Book for flocculation methodologies and manufacturer's instructions for application rates, regarding the proposed sediment basins.

6.5. Conclusion

The erosion control measures proposed for the site will comply with the requirements of Penrith City Council Engineering Guidelines and The Department of Environment, Climate Change and Water (DECC).

The proposed SWMP will ensure that the best management practice is applied to the development site in controlling and minimising the negative impacts of soil erosion.

7. Retaining Walls

Where possible, batter slopes will be provided to accommodate level changes. Where this is not possible retaining walls will be constructed along the road, lots and basins based on the current civil and earthworks design. A keystone product or other similar face block will be adopted for all retaining walls and will be detailed on the civil drawings. Refer to **Figure 6** to **Figure 8** inclusive for images of the proposed retaining walls.

The proposed retaining walls will be built to the manufacturers design guideline requirements and verified by a structural engineer prior to construction. This practice has previously been adopted other developments within the Penrith City Council LGA and considered input from the geotechnical engineer, utility coordination as well as entry and exit points from proposed lots.

‘Boulder’ retaining walls are considered another potential retaining wall option for the site. Potential locations of ‘boulder’ walls will be identified during the detailed design. The walls will be designed and constructed to the structural engineer’s specification. Refer to **Figure 9** for an example of the potential “boulder” retaining wall.

Retaining is required along the north, east, and southern site boundary where the proposed building pad levels will be altered from existing levels. Refer to Drawing 20-748-C1080 for cut and fill wall locations. Retaining walls will be designed and constructed using standard industry practices.

All retaining walls will be constructed on a staged basis and as required to suit the development earthworks and stormwater basin works. Where the walls are not constructed a batter of 1 in 4 will be maintained for stability purposes. Any batter steeper than 1 in 5 shall be vegetated.

All retaining walls will be located within private property and not within the road reserve areas, unless within drainage easements.

All retaining walls will have pedestrian and vehicular safety barriers (if required) in accordance with Austroads Guidelines as required.

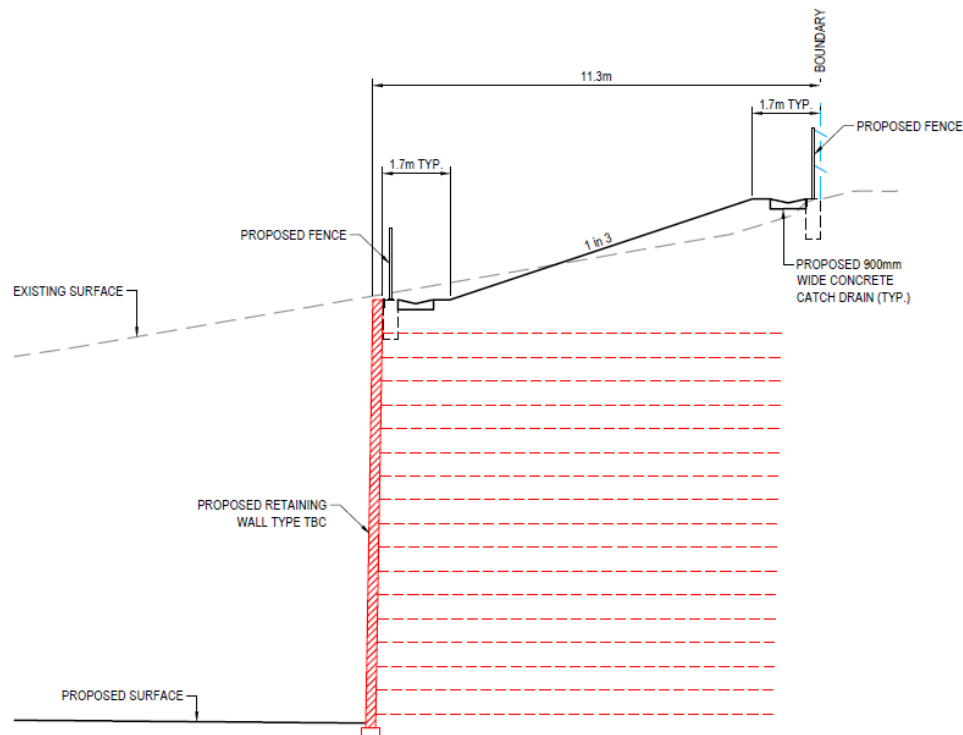


Figure 6: Typical retaining wall section



Figure 7: Example of retaining wall in location of fill adjacent to road reserve



Figure 8: Example of retaining wall in location of cut



Figure 9: Tiered boulder retaining wall

8. Road Design

8.1. Horizontal and Vertical Geometry

The existing Aldington Road could be classified as a rural road. It currently has a 6-8 metre wide sealed pavement with tables drains on either side within a 20.1m road reserve (refer to **Figure 10**).



Figure 10: View of Aldington Road looking north from Abbots Road

Aldington Road upgrade has generally been designed to meet Austroads requirements and Australian Standards to accommodate B-Double truck movements. It is expected that Aldington Road will adopt a similar cross-section to that shown below in **Figure 11** when upgraded. With this in mind, we expect a 30.6m wide reservation to be considered along the frontage of the site for the future widening.

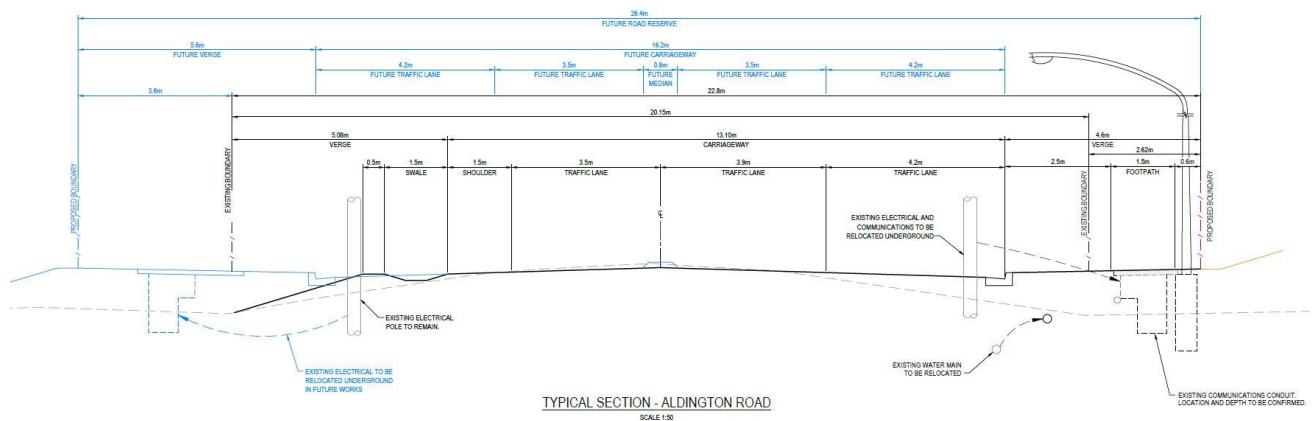


Figure 11: Typical Section of the proposed upgrade of Aldington Road

See drawings within Appendix A for proposed Road layout.

Subject to Council Approval, it is anticipated that works will need to be undertaken on Aldington Road for the frontage of the site.

The following works are anticipated:

- Access the site via an upgraded intersection at Mamre and Abbotts Road to RMS requirements. This intersection upgrade is an interim design and is not intended to accommodate the future Mamre Road upgrade mentioned above.
- Abbotts Road and Aldington Road are proposed to be upgraded from Mamre Road and the site generally as shown on Sections 1 & 2 on dwg 20-748-C1010.
- Aldington Road fronting the site will be upgraded generally as shown on dwg 20-748-C1010.

Access to the site is proposed to be via 3-way junction at the Abbotts Road and Aldington Road intersection sized to cater for B-Doubles. The layout provided is intended to be constructed in the interim until the final Aldington Road upgrade is completed by others. The layout provided is contained wholly within the existing road reserve negating the need for adjacent owner's consent. An indicative future road and intersection layout had been provided on plan for context only. Refer to plans 20-748-C1041 and 20-748-C1042.

8.2. Internal Road Network

The internal road network will be designed and constructed in accordance with the Penrith City Council design and construction specifications.

Cul-de-sacs will also be designed and constructed in accordance with the Council guidelines requiring a 16.5m radius on the turn heads.

The Design vehicle is to be a B-Double with a design speed of 60km/hr in the estate roads (extension of Abbotts Road) and 80km/hr on Aldington Road (subject to Council/RMS Approval).

The current Penrith City Council DCP requires a 20.6m wide road reserve to be established. The proposed road reserve has been increased in line with precinct wide discussion and provides a shared path within one of the dedicated verge areas as requested by Penrith City Council. The overall width of the road reservation and following widths for the estate road (Abbotts Road) has been utilised for the site.

The proposed typical ESR Developments Estate Road (Abbotts Road) is designed as such:

Estate Road (extension of Abbotts Road) – refer to Figure 12:

- 24.0m wide Road Reserve
- 15.0m wide Carriageway comprising:
 - ▶ 2 x 3.5m wide traffic lanes
 - ▶ 2 x 4.0m wide parking lanes adjacent kerb

- Verge 1 at 4.0m wide containing a 1.5m footpath and verge 2 at 5.0m wide containing a 2.5m shared path
- Cul-De-Sac have been shown at 33m diameter to accommodate the largest design vehicle
- The largest design vehicle is a B-Double
- Design Speed of Road = 60km/hr
- No guard fences have been shown or are envisaged at this stage, though these will be assessed at detailed design stage in accordance with Austroads.

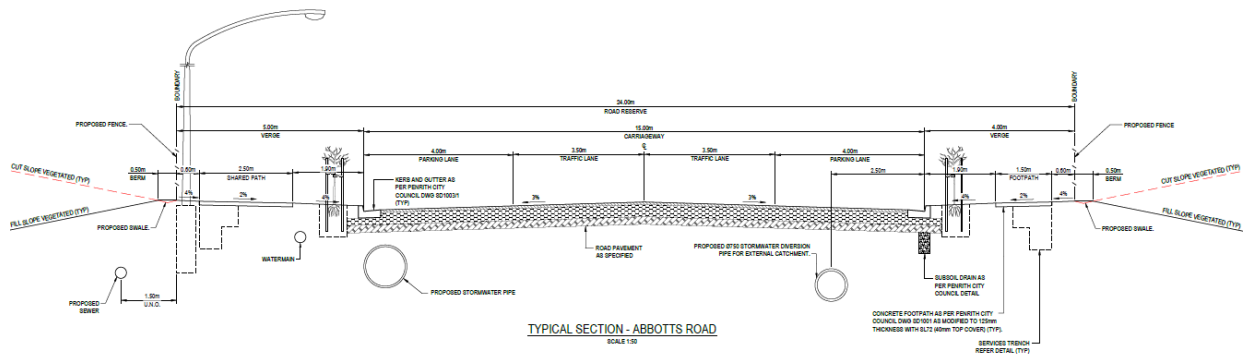


Figure 12: Typical Section of the proposed upgrade of Abbots Road

8.3. Pavement

Pavement will be designed based on the requirements of Austroads Pavement Design Guide – A Guide to the Structural Design of Road Pavements and recommendations provided by Douglas Partners and Alliance Geotechnical reports submitted as part of this SSDA.

The basis of this design is:

- Design Traffic Loading: $N = 1 \times 10^7$ ESA (in accordance with Penrith City Council requirements for Heavy Industrial)
- Design subgrade CBR = 2% (based on Section 6.7.1 of the Douglas Partners and Alliance Geotechnical Reports)

Based on these parameters the indicative pavement design is as follows:

- 70mm AC 14 320 Bitumen
- 7mm Spray Seal
- 250mm DGB 20 (placed in two layers)
- 500mm Select Sandstone Fill with minimum CBR = 35% (placed in three layers)

If the subgrade CBR = 5% the bottom 200mm of select sandstone fill can be replaced with select fill with minimum CBR of 5%.

CBR testing is proposed to be undertaken at the subgrade level to confirm this pavement design. Polymer modified asphalt will be used within all cu-de-sacs with the asphalt concrete layer becoming a 75mm thick polymer modified AC14.

8.4. Batter Design

Any permanent batters steeper than 1 in 5 will be vegetated in accordance with Penrith City Council requirements. All external batters to the development have been limited to 1 in 4 as a minimum generally, with the maximum localised batter being 1 in 3.

Any temporary batters constructed during the works will be in accordance with the geotechnical report and ongoing advice from the Level 1 supervisor.

8.5. Conclusion

All road design as demonstrated above is in accordance with Austroads Standards and the requirements of Penrith City Council, as a minimum.

A professional geotechnical engineer will be engaged to design the structural pavement. This will be in accordance with *Austroads Pavement Design Guide – A Guide to Structural Design of Road Pavements*.

9. Stormwater Management

9.1. Existing Site Stormwater Drainage

Refer to 20-748-C1061 for a pre-development stormwater catchment plan.

Currently the site comprises rural land and is classified as a “greenfield” site with an entire coverage of pervious areas and farm dams.

The existing site is approximately 32Ha in area with internal catchments falling to the north, east, south and west. There are external catchments entering the site from the northwest corner and eastern boundary of the proposed development with an area of area of 9.41Ha.

There is no existing formal stormwater infrastructure along Abbots Road and Aldington Road. The site has limited pit and pipe infrastructure to drain the existing site and discharges into Abbots Road verge. The high point of the site is located on the south eastern side of the site and ranges from approximately RL 88.0m to RL 91.0m. Subsidiary high points on site are in the north eastern corner of the site. Most of the site flows towards the western boundary in the direction of Abbots Road.

Under existing conditions, stormwater runoff drains across the site via natural swales and farm dams.

Note for the analysis of the pre-development flow rates all dams on the site are assumed to be full, with no allowance for any inherent retention or water quality benefit.

9.2. Proposed Site Stormwater Drainage

Refer to drawing 20-748-C1065 for the proposed catchment plan.

The proposed drainage network has been designed to safely convey major and minor flows within the site prior to discharging towards Abbots Road. Design rainfall intensities for the proposed drainage network have been adopted as follows:

- Minor System (pits and pipes / culverts): 5% AEP
- Major System (overland flow paths and channels): 1% AEP

The site is mainly a single catchment originating from the north, east and southern boundaries and flowing towards the western boundary where a proposed OSD basin will be located (refer to **Figure 13**).

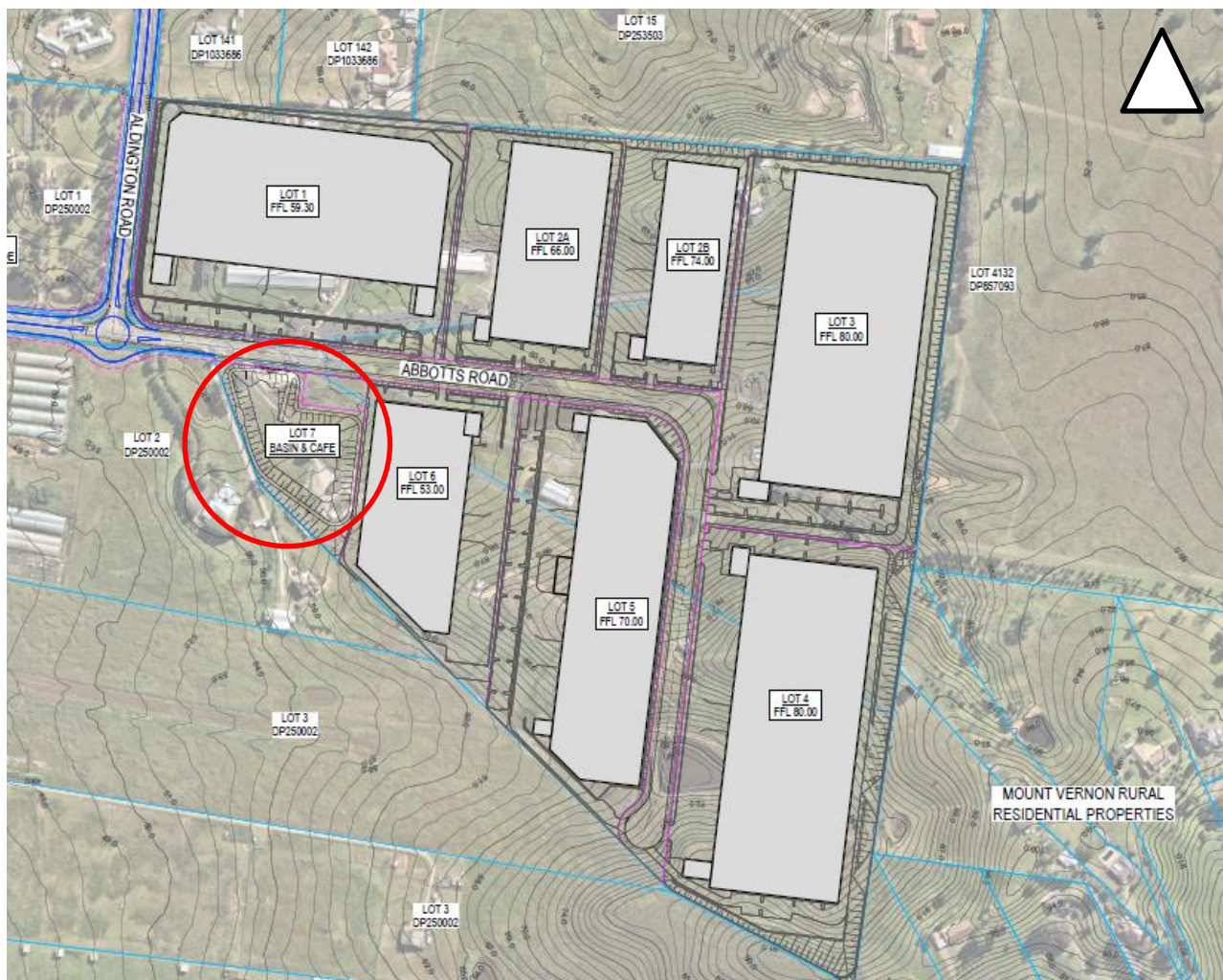


Figure 13: Location of proposed basin

The proposed on-lot stormwater infrastructure will drain to the stormwater network within the road reserve. The road pit and pipe network will connect to an estate-based On-Site Detention (OSD) basin located in the eastern corner of the site. The proposed OSD basin will have an outlet structure to drain into a pipe system that will discharge in a westerly direction towards the existing gully under Mamre Road. For storm events exceeding the 1% AEP event, the OSD basin will utilise an overflow weir system to drain overland on the neighbouring lot to the west, mimicking the existing overland flow paths onsite. Appropriate flow dissipation will be utilised to control the flow depth and velocity.

A new pipe system is anticipated in the existing Abbotts Road verge downstream of the site, which will convey treated runoff from the proposed bio-retention basin. The pipe is to be located wholly in the existing verge and coordinated with the final design of the upgrade of Abbotts Road. As the pipe will be located in the existing road reserve, it is not anticipated that the adjacent landowners' consent would be required. The pipe system will be combined with the flows from the external catchments located along the eastern boundary and conveyed west towards Mamre Road. The system will discharge overland to a

piped road crossing under Mamre Road. Eventually, when the stormwater system is completed on the upgrade to Mamre Road, the outlet from the basin will connect into this infrastructure.

Refer to the Civil Drawings 20-748-C1041 to 20-748-C1047 for layout and details for the proposed catchments as well as the stormwater network across the site.

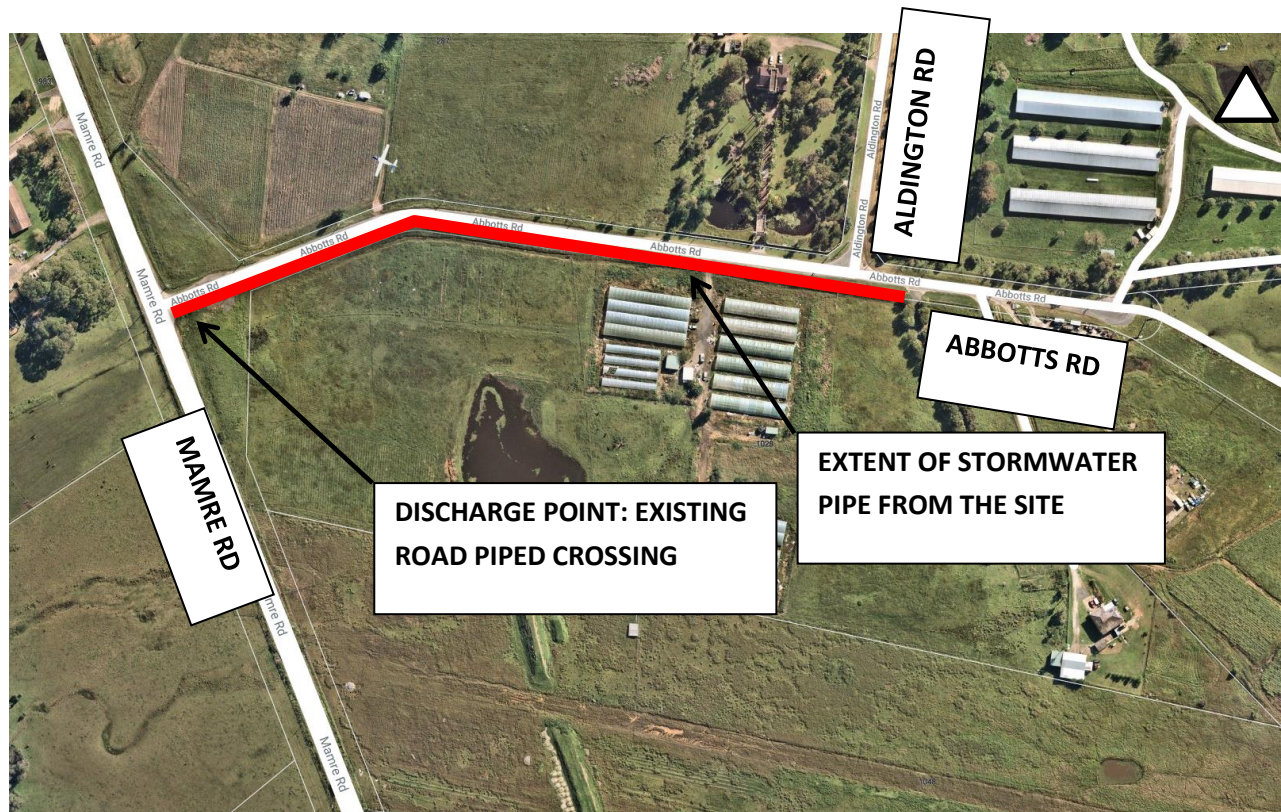


Figure 14: Location of Proposed Pipe System to Carry Stormwater Discharge from ESR Development

9.2.1. External Upstream Stormwater Drainage

Part of the overall stormwater strategy for the site involves conveying stormwater flows generated from upstream catchments.

The eastern external catchments will be conveyed via a separate pipe system through the Abbots Road extension and will be combined with the discharge pipe from the bio-retention basin. As per AT&L drawing 20-748-C1065, the external upstream catchment is located on the eastern boundary of the site. Currently, this catchment sheet flows overland into the site in a westerly direction and discharges to the gully adjacent to Abbots Road. The total size of the eastern external catchment is 8.2Ha.

The northern external catchment will be conveyed via a separate pipe system along the northern site boundary and into the Aldington Road proposed drainage line. This drainage line drains to the south into the existing piped road crossing at the intersection of Aldington Road and Abbots Road. As per AT&L drawing 20-748-C1065, the external upstream catchment is located adjacent to the northern boundary of the site. It drains in a southerly direction and discharges into the existing piped road crossing at the

intersection of Aldington Road and Abbotts Road. The total size of the northern external catchment is 1.2Ha.

The impacts on the stormwater design from combining the external catchment flows with the internal site drainage is to be explored in the detail design of the works and an external drainage strategy confirmed prior to issue of construction certificate.

9.3. Stormwater Management Design Criteria Requirements

Design criteria and requirements for the proposed site stormwater management and stormwater drainage are outlined in the following documents:

- AS 3500.3 – Plumbing and drainage – Stormwater drainage
- Commonwealth of Australia (Geoscience Australia), *Australian Rainfall and Runoff: A guide to flood estimation*, 2019.
- NSW Department of Planning, Industry and Environment (DPIE), *Mamre Road Precinct, DRAFT Development Control Plan*, November 2020. NB: this document has yet to be finalised and adopted by the NSW DPIE.
- Penrith City Council, *Design Guidelines for Engineering Works for Subdivisions and Developments*, as amended 20 November 2013.
- Penrith City Council, *Penrith Development Control Plan 2014, Part C3 Water Management*.
- Penrith City Council, *Water Sensitive Urban Design (WSUD) Policy*, December 2013.
- Penrith City Council, *WSUD Technical Guidelines*, Version 4 – October 2020.

9.4. Stormwater Management Strategy Objectives

The main objectives pertaining to the management of stormwater associated with the proposed development are as follows:

- Stormwater Quantity Management:
 - ▶ To ensure post-development peak flow rates do not exceed the pre-development peak flow rates for a range of design storm frequencies and durations, up to and including the 1% AEP design event.
 - ▶ To demonstrate how the proposed site design and WSUD measures contribute to the interim NSW Government stormwater catchment flow objectives for the Wianamatta-South Creek catchment, such that the combined effect of site design and site WSUD measures (including on-lot, on street and end of pipe measures) shall contribute no more than 1.9 ML/ha/year in mean annual runoff at any discharge point.
- Stormwater Quality Management:
 - ▶ To provide a stormwater treatment train to satisfy pollutant reduction targets outlined in the *Mamre Road Precinct Draft DCP* (NB: pollutant load reduction targets in the Draft DCP are significantly higher than those adopted in Penrith City Council's *WSUD Technical Guidelines*).
- Stormwater Drainage and Flooding:
 - ▶ To provide a stormwater drainage system that complies with Penrith City Council design guidelines and specifications.
 - ▶ Finished Floor Levels (FFL) of proposed buildings within the precinct shall have a minimum 500mm freeboard to 1% AEP overland flows.

- Stormwater harvesting and reuse:
 - ▶ To install rainwater tanks to meet 80% of non-potable demand including outdoor use, toilets, and laundry (refer to Section 10 of this report for a more detailed description on rainwater harvesting tanks).

The objective to control mean annual runoff volume (MARV) from the site to no more than 1.9 ML/ha/year will require measures to capture and store stormwater runoff in excess of those typically required to satisfy development controls contained in the *Penrith DCP 2014*. Such measures, as outlined in the *Mamre Road Flood, Riparian Corridor and Integrated Water Cycle Management Strategy* (Sydney Water, October 2020), could include:

- Rainwater reuse
- Street tree pits
- Permeable pavements
- Estate-wide irrigation
- Estate-based evaporation ponds
- Wetlands
- Evaporative roof misting

9.5. Stormwater Management Strategy Overview

The proposed stormwater management strategy for the site has been prepared based on an Estate Plan prepared by nettleton tribe (acting on behalf of ESR).

Discussions with ESR established that there is a general preference for achieving stormwater quality objectives through the implementation of end-of-line (estate-wide) stormwater treatment measures, as opposed to at-source (on-lot) measures.

The proposed stormwater quality management strategy for the site has been developed to incorporate the following key measures:

- A gross pollutant trap (GPT) to capture and treat low flow (nominally between the 4 EY and 1 EY design events).
- A bio-retention system to provide secondary treatment of stormwater runoff from the site.

To address Penrith City Council's development controls relating to water conservation, rainwater tanks shall be installed to meet at least 80% of non-potable demand such as outdoor use (irrigation), toilets and laundry.

OSD is required within the development to attenuate post-development flows to pre-development flow rates for a range of design storm events up to and including the 1% AEP event. The required OSD will be incorporated into an estate-wide basin at the downstream end of the site adjacent to Abbotts Road. The OSD basin will incorporate a multi-stage outlet to provide the required stormwater detention volume and to limit discharge such that post-development peak discharge rates do not exceed pre-development peak discharge rates.

As a minimum, the proposed OSD basin will comply with the requirements outlined in the *Penrith City Council Stormwater Drainage Guidelines for Building Developments*.

To comply with the MARV control outlined in the *Mamre Road Flood, Riparian Corridor and Integrated Water Cycle Management Strategy* (Sydney Water, October 2020), additional stormwater management measures will be needed over and above those needed to satisfy the typical (business as usual) stormwater quality and quantity management measures. The measures that have been adopted in the Stormwater Management Strategy for the ESR development site are summarised in **Table 7**:

Table 7: Additional stormwater management measures to satisfy MARV requirement

Measure to achieve MARV control	Adopted in this strategy	Justification
Rainwater reuse	Yes	Can be incorporated into building design with minimal impact on development. Rainwater tanks required to satisfy Council DCP performance criteria for non-potable water demand.
Street tree pits	No	Relatively low benefit cost ratio in terms of reduction in mean annual runoff.
Permeable pavements	No	Heavy duty pavements surrounding warehouse buildings are likely to be required to accommodate future tenants (i.e., not conducive to permeable pavements). Permeable pavements could be adopted in car parks but would comprise a relatively small proportion of overall impervious area.
Evaporative roof misting	Yes	Considered an effective measure to reduce runoff from the site. Relatively high benefit cost ratio in terms of reduction in mean annual runoff. Relatively low impact on the Estate Plan layout compared to other measures.
Estate-based evaporative ponds	Yes	Rainwater reuse and evaporative roof misting not sufficient to meet MARV target of 1.9 ML/ha/yr.
Wetlands	No	Higher maintenance cost than an evaporative pond. Stormwater quality management primarily provided by means of bio-retention.

9.6. Stormwater Management System Modelling

9.6.1. Hydrological and Hydraulic Modelling

DRAINS modelling software has been used to calculate the Hydraulic Grade Line (HGL) of the estate stormwater pipes. DRAINS is a computer program used for designing and analysing urban stormwater drainage systems and catchments. It is widely accepted by Council's across NSW as the basis for

stormwater design and has been confirmed by Penrith City Council as the preferred stormwater software analysis package. DRAINS data files and output results are attached in Appendix B.

9.6.2. Hydrological and Hydraulic Design Parameters

- Minor system (pit and pipe) drainage shall be designed to accommodate the 5% AEP storm event.
- The combined piped and overland flow paths shall be designed to accommodate the 1% AEP storm event.
- Where trapped low points are unavoidable and potential for flooding private property is a concern, an overland flowpath capable of carrying the total 1% AEP storm event shall be provided. Alternatively, the pipe and inlet system may be upgraded to accommodate the 1% AEP storm event.
- Rainfall intensities have been adopted using the Bureau of Meteorology Design Rainfall Data System (2016).
- Times of concentration for each sub catchment shall be determined using the kinematic wave equation.
- The width of flow in the gutter shall not exceed 2.5 metres and pits shall be spaced no further than 75 metres apart.
- Velocity x depth product shall not exceed $0.4 \text{ m}^2/\text{s}$ for all storms up to and including the 1% AEP event.
- Bypass from any pit on grade shall not exceed 15% of the total flow at the pit; and
- Blockage factors of 20% and 50% shall be adopted for on-grade and sag pits respectively, with these blockage factors in-built to each pit within the DRAINS model.
- A hydraulic grade line HGL design method shall be adopted for all road pipe drainage design.
- Pipelines in roadways shall have a minimum diameter of 375mm.
- A desirable minimum grade of 1% for all pipelines is preferred for self-cleansing under low flow velocities.
- The minimum cover over pipes shall be 450mm in grassed areas and 600mm within carriageways.
- Where minimum cover cannot be achieved due to physical constraints the pipe class shall be suitably increased.
- All pipes in trafficable areas shall be Reinforced Concrete Pipes or Fibre Reinforced Cement equivalent.
- Structural design for all stormwater pits and pipes shall be designed for the ultimate service loads and where applicable, construction loads will be designed for.
- Pipes discharging to the overland flow path shall adopt a minimum tailwater level equivalent to respective overland flow level.
- Pit Loss coefficients shall be calculated in accordance with Missouri Charts.
- A minimum 150mm freeboard shall be maintained between pit HGL and pit surface levels for the minor design storm event (5% AEP).
- Overland flowpaths shall maintain a minimum of 300mm freeboard to all habitable floor levels; and
- Pits deeper than 1.2m shall contain step irons at 300 mm centres.

9.6.3. Water Quality Modelling

The Model for Urban Stormwater Improvement Conceptualisation (MUSIC, Version 6.3.0) was used to evaluate pollutant loads from each of the proposed lots for Post-development (treated) conditions based on the proposed site development. A conceptual view of the MUSIC model used in this report can be found in Appendix C.

Pluviometer data (six-minute rainfall intensity and evapotranspiration) for Penrith Lakes AWS (Station 67113) was used in the MUSIC model. Other parameters that need to be nominated in the MUSIC model (soil characteristics, pollutant event mean concentrations (EMCs)) are consistent with those outlined in the *NSW MUSIC Modelling Guidelines* (August 2015) and the Penrith City Council *WSUD Technical Guidelines* (June 2015).

MUSIC model input parameters for these catchments including rainfall-runoff, base flow concentration and stormflow concentration parameters were selected as per. The parameters used for the various catchment areas are presented in **Table 8** to **Table 11** inclusive.

Table 8: Rainfall-runoff parameters adopted in MUSIC

Parameter	Unit	Value
Rainfall Threshold	mm/day	1.40
Soil Storage Capacity	mm	105.00
Initial Storage	% of Capacity	30.00
Field Capacity	mm	70.00
Infiltration Capacity Coefficient α	-	150.00
Infiltration Capacity Coefficient β	-	3.50
Initial Depth (Ground Water)	mm	10.00
Daily Recharge Rate	%	25.00
Daily Baseflow Rate	%	10.00
Daily Seepage Rate	%	0.00

Table 9: Base Flow/Stormwater Concentration Parameters – Impervious (Roofed) Areas

Pollutant	Baseflow Concentration Parameter – Mean (log mg/L)	Baseflow Concentration Parameter – Std Dev (log mg/L)	Stormflow Concentration Parameters – Mean (log mg/L)	Stormflow Concentration Parameters – Std Dev (log mg/L)
TSS	0.000	0.000	1.300	0.320
TP	0.000	0.000	-0.890	0.250
TN	0.000	0.000	0.300	0.190

Table 10: Base Flow/Stormwater Concentration Parameters – Pervious Areas

Pollutant	Baseflow Concentration Parameter – Mean (log mg/L)	Baseflow Concentration Parameter – Std Dev (log mg/L)	Stormflow Concentration Parameters – Mean (log mg/L)	Stormflow Concentration Parameters – Std Dev (log mg/L)
TSS	1.200	0.170	2.150	0.320
TP	-0.850	0.190	-0.600	0.250
TN	0.110	0.120	0.300	0.190

Table 11: Base Flow/ Stormwater Concentration Parameters - Road

Pollutant	Baseflow Concentration Parameter – Mean (log mg/L)	Baseflow Concentration Parameter – Std Dev (log mg/L)	Stormflow Concentration Parameters – Mean (log mg/L)	Stormflow Concentration Parameters – Std Dev (log mg/L)
TSS	0.000	0.00	2.430	0.320
TP	0.000	0.000	-0.300	0.250
TN	0.000	0.000	0.340	0.190

9.6.4. Catchments

A Stormwater Catchment Plan for each catchment and flow paths into the proposed bio-retention basin is shown in Appendix A. As indicated in the Catchment Plan the basin is to be a bio-retention basin designed to attenuate stormwater flows and treat stormwater pollutants to Penrith City Council target pollutant reduction rates. These treatment rates are from the *Penrith City Council DCP – Section C3 Water Management*.

The overall developed site catchments are as per drawing 20-748-C1065.

A summary of the catchment and the outflow and overflow locations are described below:

Internal Catchments (Lots 01, 02A, 02B, 03, 04, 05, 06, Basin, Café, Roads)

- Total Area = 31.88Ha.
- Flow path to north and east of catchment into the Basin; and
- Outlet flows from the basin to drain to the piped system proposed along Abbots Road west of the site.
- Overland flow from the basin to discharge overland on the adjacent property located on the west of the ESR development.

External Catchments (A, B, C and D)

- Total Area = 9.41Ha.

- Includes external catchments to the north and east of the ESR Development site.
- Flow path to west of catchment via a separate pipe to carry the overland flows from the external catchments.

9.7. Proposed Stormwater Management Measures

A series of stormwater quantity and quality control measures are proposed to be adopted within the ESR Development site to satisfy the stormwater management strategy objectives listed in **Section 9.4**. A general description of the proposed stormwater treatment train components is presented in the following sections.

9.7.1. Rainwater Tanks

Rainwater tanks retain a significant proportion of stormwater that falls on roof areas. Given the large-scale industrial development proposed on the site, rainwater tanks can provide a significant contribution to the objective of minimising the total volume of runoff discharging from the site.

A rainwater tank reuse system on individual lots can be installed in many different configurations, including placing the tank above or below ground and using gravity or pressure systems (pumps) to supply rainwater for non-potable domestic uses. These uses typically include toilet flushing, laundry, hot water installations, car washing and irrigation.

Considering rainwater tanks are likely to be fitted with first flush devices, it is likely that they would have minimal water quality benefit. However, they would be required to satisfy the Penrith DCP requirement to meet at least 80% of non-potable demand.

The MUSIC model was developed to estimate the rainwater tank volume required to satisfy the Penrith DCP requirement. To determine the tank volume required to meet at least 80% of non-potable demand on individual lots, the following assumptions have been made:

- Non-potable demand of 0.1 kL/toilet/day has been adopted. The number of toilets within each lot has been estimated based on the floor area of warehouses and offices. Fixed daily demands have been pro-rated based on the warehouses and offices being occupied six days per week (Monday to Saturday).
- Non-potable demand of 2.5 ML/ha/year has been adopted for irrigation of landscape areas on each lot. Irrigation demand has been estimated based on potential evapotranspiration minus rainfall (PET – rain) to account for the likely variability in irrigation demand throughout the year (i.e., high demand in summer, low demand in winter).
- 50% of the total warehouse roof area would drain to the rainwater tank.

A summary of the rainwater tank volumes adopted in MUSIC is presented below in **Table 12**.

Table 12: Rainwater tank volumes adopted in MUSIC

Lot (refer to Estate Plan)	Total Lot Area (ha)	Roof area to rainwater tank ⁽¹⁾ (ha)	Non-potable demand in toilets (kl/day)	Non-potable irrigation demand (ML/year)	Adopted rainwater tank volume (kL)	% of reuse demand met ⁽²⁾
1	5.10	1.432	2.40	1.32	170	81.9
2a	2.64	0.700	1.20	1.09	120	82.3
2b	2.19	0.500	1.20	1.08	140	81.0
3	5.83	1.583	2.06	1.85	170	81.0
4	5.93	1.535	3.43	3.74	500	81.5

(1) 50% of total warehouse roof area

(2) From MUSIC model Node Water Balance

9.7.2. Gross Pollutant Traps

The proposed stormwater treatment train would consist of a gross pollutant trap (GPT) as a means of primary stormwater treatment. GPTs are designed to capture litter, debris, coarse sediment, as well as some oils and greases.

A proprietary GPT such as the Ocean Protect OceanSave would be adopted to capture and treat low flows prior to discharge to secondary treatment (bio-retention). The GPT(s) would be located adjacent to the proposed bio-retention / detention basin.

A high-flow bypass for the GPTs would nominally be equivalent to the 4 EY (3-month ARI) peak flow rate discharging to the GPT. Design flows for the GPTs and their final configuration would be confirmed at the detailed design phase.

9.7.3. Bio-Retention Systems

The objective of bio-retention systems is to provide a filtering effect when stormwater runoff flows through a vegetation layer and sand and/or gravel filter media to remove pollutants from the runoff. Bio-retention systems generally consist of an open space containing landscaping of native grasses, shrubs and trees with an underlying filter media.

A bio-retention basin is proposed to be located adjacent to Abbots Road and the western boundary of the site. This basin would be constructed to collect surface runoff from roads and industrial lots.

MUSIC model parameters used for the Bio-retention basin were based off guidelines provided by FAWB – Stormwater Biofiltration Systems – Version 1, 2009, and were modified accordingly. Parameters used to model the bio-retention basin are shown in the **Table 13**.

Table 13: Bio-retention basin parameters

Parameter	Unit	Value
Extended Detention Depth	m	0.30
Surface Area	m ²	3800
Filter Area	m ²	3440
Unlined Filter Media Perimeter	m	0.01
Saturated Hydraulic Conductivity	mm/hour	125
Filter Depth	m	0.50
TN Content of Filter Media	mg/kg	800
Orthophosphate Content of Filter Media	mg/kg	40
Exfiltration Rate	mm/hour	0.00
Base Lined	-	No
Vegetation Properties	-	Vegetated with Effective Nutrient Removal Plants
Overflow Weir Width	m	10.00
Underdrain Present	-	Yes
Submerged Zone	-	No

9.7.4. On-Site Stormwater Detention (OSD)

As discussed in Section 9.1 the site is mainly a single large stormwater catchment with external catchments. The stormwater on the lots and within the road reserve for the overall development of the site is proposed to be collected via pits and pipes and connect into an OSD basin adjacent to the western boundary of the site.

The external catchment runoff will not be detained or treated and will bypass the site's bio-retention basin. It is assumed that any stormwater quantity or quality management that may be required for these upstream catchments would occur on the separate lots at the time of development.

For the post-development case it is proposed to maintain the existing point of discharge and ensure peak flow rates are not increased via the OSD basin. Controlled outlets from the OSD basin will include surcharge pits connected to subsurface drainage pipes (for low flows) and weirs (for high flows). Refer to Drawing 20-748-C1071 & 20-748-C1072 for the OSD basin details.

9.7.5. Estate-wide Ponds

Ponds are considered to provide an effective means of reducing runoff volume from the site as water would be lost via evaporation over a large area. A pond can be relatively cheap to construct with the potential to capture large quantities of stormwater runoff, while also being relatively easy to maintain.

Large-scale MUSIC modelling undertaken by AT&L indicates that, in combination with other measures, ponds can achieve a relatively high reduction of stormwater runoff volume.

A major drawback of estate-wide ponds is the significant portion of developable land that would need to be set aside. MUSIC modelling undertaken of a typical large-scale industrial estate indicates that, to achieve the target of MARV of 1.9 ML/ha/year, around 15% of the total area of an estate would need to be set aside for ponds.

This Stormwater Management Strategy, which addresses the target MARV specified in the *Draft Mamre Road Precinct DCP*, incorporates ponds on proposed Lots 5 and 6. Key parameters adopted for the two ponds are summarised below in **Table 14**.

Table 14: Adopted pond parameters

Parameter	Pond 5	Pond 6
Inflow from:	Proposed Lots 2b, 3 and 4	Proposed Lot 2a Pond 5
Outflow to:	Pond 6	Proposed drainage in extension of Abbotts Road
Surface Area (m ²)	29000	10600
Permanent Pool Volume (m ³)	54000	18800
Exfiltration rate (mm/hr)	0	0
Evaporative loss (% of PET)	75	75
Outlet (equivalent pipe diameter)	600	375

9.7.6. Evaporative misting on roof areas

Roof misting is a relatively new and emerging technology that can be used for cooling and dust suppression. It is a method for reducing ambient temperatures inside and outside of buildings that is promoted by the Low Carbon Living CRC (2017) as an urban cooling strategy to reduce the impacts of extreme heat and as a means of reducing stormwater runoff volumes (Sydney Water, 2020).

While a significant water storage is required for each industrial lot, the misting infrastructure is relatively basic and can be incorporated into the final building services design.

To estimate the potential water loss by evaporation for a roof misting system, additional rainwater tanks have been modelled in MUSIC. As per the *Mamre Road Precinct FRCIWCM Report* (Sydney Water, 2020), a notional demand rate of 4.5ML/Nha/yr has been adopted and distributed as a fixed annual demand, variable by PET minus rainfall.

The storage tanks required for roof misting could be amalgamated into rainwater reuse tanks for non-potable water reuse. For this Stormwater Management Strategy, it is assumed that the rainwater reuse tanks for non-potable water supply would be separate to the tanks for evaporative misting supply.

Due to potential impacts of roof misting systems on the performance of rooftop solar panels, it has been assumed that misting would be applied to no more than 50% of the total warehouse roof area.

Further analysis would be required at the detailed design phase to verify evaporative misting system design parameters such as:

- Extent of roof area that would drain to a rainwater tank installed for the purpose of evaporative misting.
- The available roof area for misting, taking into consideration the cost of misting infrastructure and interface with other infrastructure such as solar panels.
- The impact of an additional pipe network and the corresponding roof weight on the structural design.
- Ongoing maintenance and WHS considerations associated with roof misting infrastructure.

A summary of the rainwater tanks for roof misting adopted in MUSIC is presented below in **Table 15**.

Table 15: Summary of roof misting tank parameters

Lot (refer to Estate Plan)	Total Lot Area (ha)	Roof area to roof misting tank ⁽¹⁾ (ha)	Adopted roof misting tank volume (kL)	Annual misting demand (ML/year)	MUSIC Node Water Balance Results		
					Inflow (ML/yr)	Misting Supply (ML/yr)	Tank Overflow (ML/yr)
1	5.10	1.43	150	6.45	8.46	2.73	5.73
2a	2.64	0.70	150	3.15	4.14	1.85	2.31
2b	2.19	0.50	150	2.25	2.95	1.50	1.47
3	5.83	1.58	150	7.12	9.35	2.85	6.49
4	5.93	1.54	150	6.91	9.07	2.82	6.25

(1) It is assumed that 50% of the total warehouse roof area would drain to the rainwater tank for roof misting.

9.8. Scenario Modelling

A MUSIC model was created to simulate both the pre-development and post-development scenarios. The pre-development model is a single source node to estimate the mean annual runoff and pollutant loads under existing conditions. The post-development model has been created based upon the land uses depicted in the Estate Plan prepared by nettleton tribe (refer to **Figure 4**). The layout of the post-development scenario is presented in **Figure 15**.

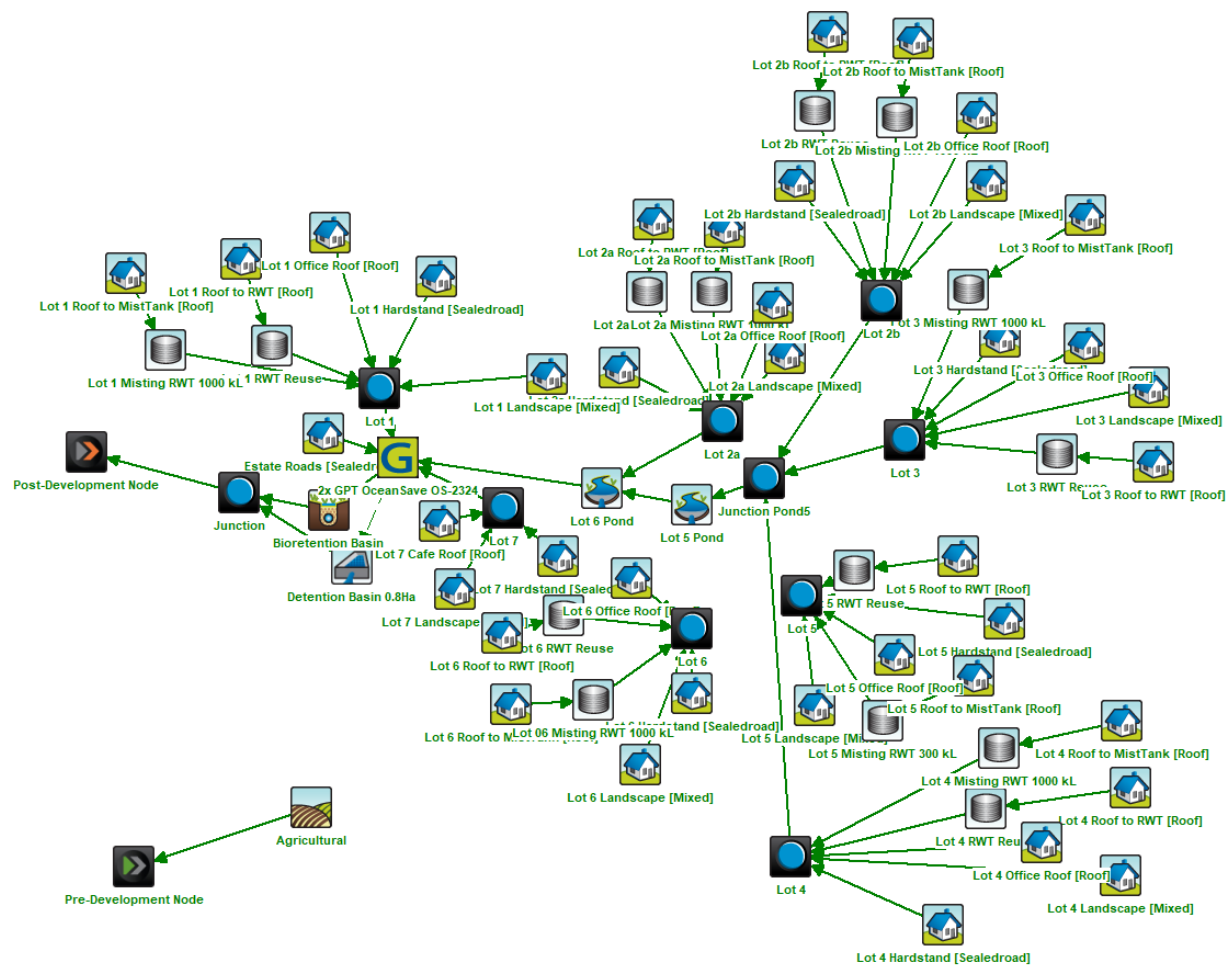


Figure 15: MUSIC model layout

The land use breakdown for each of the catchments under the post-development scenario is presented in **Table 16**.

Table 16: Post-development scenario land use breakdown

Catchment	Total Area (ha)	Warehouse Roof Area (ha)	Office Roof Area (ha)	Hardstand area (ha)	Landscape Area (ha)
Lot 1	5.10	2.87	0.09	1.62	0.53
Lot 2a	2.64	1.40	0.05	0.75	0.43
Lot 2b	2.20	1.00	0.05	0.71	0.43
Lot 3	5.83	3.17	0.10	1.83	0.74
Lot 4	5.93	3.07	0.07	1.29	1.50
Lot 7	0.17	-	0.02	0.04	0.12
Access Road	1.85	-	-	1.85	-

The post-development scenario model incorporates the following stormwater management measures:

- Rainwater tanks, as per the parameters presented in **Table 12**.
- GPTs, as per the parameters described in **Section 9.7.2**.
- A bio-retention system, as per the parameters presented in **Table 13**.
- An OSD basin, as per the parameters described in **Section 9.7.2**.
- Estate-wide ponds on proposed lots 5 and 6, as per the parameters presented in **Table 14**.
- Evaporative misting using rainwater collected in dedicated tanks, as per the parameters in **Table 15**.

The attributes for each of the proposed stormwater management measures have been determined such that they will satisfy the pollutant reduction targets and MARV target outlined in **Section 9.4**.

9.9. Model Results

9.9.1. MUSIC Model Results

MUSIC modelling results presented as mean annual loads at the receiving node indicate that adopted target reductions are achieved, as shown in **Table 17**.

Table 17: Summary of MUSIC modelling results

Parameter	Sources – Pre-Development	Sources – Post-Development	Residual Load – Post-Development	Reduction (%)	Target Reduction (%) – Mamre Road Precinct Draft DCP ⁽¹⁾	Target Reduction (%) – Penrith DCP
Flow (ML/yr)	47.8	122	59.1	51.6	50.2	
TSS (kg/yr)	8720	18700	193	99.0	95	85
TP (kg/yr)	14.2	39.4	3.88	90.2	75	60
TN (kg/yr)	106	275	40.5	85.3	68	45
Gross Pollutants (kg/yr)	49.6	3290	0	100	100	90

(1) Target flow reduction based on post-development flow calculated in MUSIC (122 ML/yr) and target MARV of 1.9 ML/ha/year * 32 ha = 60.8 ML

9.9.2. DRAINS Model Results

Table 18 presents the pre-development and post development flow rates for all storm events at the outlet of the proposed OSD basins. The OSD within the Basin has been designed to achieve the following outcomes for all pre and post developed cases.

Table 18: Pre-development and post-development peak flow rates from the proposed development

Design Storm Event	Pre-Development Peak Flow Rate (m ³ /s)	Post Development Peak Flow Rate (m ³ /s)
1 EY	4.16	2.55
0.5 EY	5.44	2.72
0.2 EY	7.77	2.96
5% AEP	10.8	3.23
1% AEP	14.5	3.51

9.10. Conclusion

As highlighted in the above section all stormwater drainage within the ESR development has been designed in accordance with the Penrith City Council Engineering Guidelines. This includes design of the stormwater network (pits and pipes), On-Site Detention basins and WSUD infrastructure. To summarise:

- OSD has been to be sized to ensure that for all rainwater events up to and including the 1% AEP event, does not increase peak stormwater flows downstream of the site.
- OSD to attenuate post development peak flow rates to less than pre-development flows for a range of design storm events.
- WSUD to achieve the target pollutant reductions outlined in the *Draft Mamre Road Precinct DCP*:
 - ▶ 95% Total Suspended Solids (TSS)
 - ▶ 75% Total Phosphorus (TP)
 - ▶ 68% Total Nitrogen (TN)
 - ▶ 100% Gross Pollutants (GP)
- Finished Floor Levels (FFL) to have minimum 500mm freeboard to 1% AEP overland flows.

10. Water Balance

10.1. General

A water balance model was developed using the MUSIC software package to allow the evaluation of various elements of the water cycle to be assessed.

Penrith City Council WSUD policy (July 2015) stipulates that rainwater tanks are required to meet 80% of non-potable demand including outdoor use, toilets and laundry.

10.2. Water Balance Objective

Potable water supplies in the Sydney area are in recognised short supply with projected population increases, potential climate change and periods of extended drought. It is acknowledged that any development in the Sydney region places greater demand on an already limited water supply. As a result, government bodies, together with Sydney Water have encouraged sustainable development by the implementation of an integrated approach to water cycle management (potable water, sewerage, stormwater and rainwater) to minimise potable water demand and maximise the potential for non-potable water sources to replace potable water demand where possible.

Whilst opportunities for water reuse could include initiatives as regional stormwater harvesting, and reticulated recycled water, this development is limited to rainwater harvesting and reuse on an individual lot by lot basis.

As such, we have used MUSIC to establish an estimated tank size for each lot within the development and demonstrated the volume of water reuse possible and provide a more sustainable servicing solution.

10.3. Water Balance End Uses

AT&L has identified the following water demand end uses to be required across the development:

- Toilet flushing (within the proposed warehouse and office developments).
- Landscape irrigation (outdoor garden use).

The proportion of total water demands for irrigation and toilet flushing within the development could be met with the use of recycled roof water drained directly into a rainwater tank. The tank should be sized to ensure the site meets the requirement to meet the 80% non-potable reuse requirement. This is in accordance with Penrith City Council's WSUD policy.

10.4. Total Site Demands and Non-Potable Reuse Rates

The following rates were adopted from the *Penrith City Council WSUD Technical Guidelines* for Industrial and Commercial developments (Section 4.5):

- 2.5 ML/ha/yr for landscape irrigation (variable by potential evapotranspiration minus rain).

- 0.1 kL/day per toilet per year for toilet flushing.

10.5. Rainwater Reuse

The use of rainwater collected in rainwater tanks from runoff on the roofs of the warehouse roofs provides a valuable alternative to potable water for a variety of non-potable end uses, such as vehicle washing, air conditioning cooling, and toilet flushing and watering.

It has been assumed for this development that irrigation systems will be plumbed to the rainwater tanks. Other uses of harvested rainwater such as truck washing may be considered at the detailed design stage but would be dependent on the water demands of individual tenants.

A rainwater tank model was constructed to simulate the rainwater tank operations and select the optimal rainwater tank size, in doing so, the following considerations were made:

- Rainfall on the catchment.
- Roof area (it is assumed that rainwater harvesting would be limited to roof areas only).
- Roof wetting.
- First flush; and
- Rainwater demands (by end use).

10.6. Proposed Rainwater Tank Parameters

As presented in **Table 12**, the MUSIC model results demonstrate that rainwater tanks on each of the individual lots can satisfy the Penrith DCP requirement for non-potable water supply throughout the development.

The adoption of rainwater harvesting tanks as part of the site water management strategy, and the design basis to size the tanks to comply with the requirement that 80% of all non-potable water demand on each lot can be sourced from the tank, demonstrates a commitment to water recycling and minimising the usage of potable water throughout the development. This is in line with the industry best practice and the NSW Government's objective of reducing the amount of potable (drinking) water consumed for non-potable uses.

11. Services Investigation

Based on an initial desk top study conducted from information obtained from Dial Before You Dig (DBYD) records, the following utility services are located within the vicinity of the Site:

- Potable water – Sydney Water
- Electrical – Endeavour Energy
- Telecommunications – Telstra

No sewer or gas was noted to be located within the vicinity of the Site.

Investigations of the Site were carried out based on:

- Site inspection
- Dial Before You Dig (DBYD) search
- Sydney Water Hydra System
- Penrith City Council Engineering Design Specification
- LIDAR Survey information
- Sydney Water South West Growth Servicing Plan 2017-2022

11.1. Potable Water

11.1.1. Existing Potable Water

Dial Before You Dig (DBYD) indicates the following water services within the area:

- 100mm diameter CICL potable watermain on the southern side of Abbots Road
- 150mm diameter DICL potable watermain on the northern side of Abbots Road
- 180mm diameter uPVC PE on eastern side of Aldington Road.

11.1.2. Proposed Potable Water

Based on our investigations and ongoing discussions with Sydney Water, connection to the Oakdale West infrastructure will be utilised to provide water services to the site is proposed.

As part of the Oakdale West Development (north of the site), a Local Area Servicing Plan (LASP) was prepared and endorsed by Sydney Water which will provide additional trunk water infrastructure for the area. Included within these works is an extension of a 300mm diameter main from Lenore Drive through to Bakers Lane.

Subject to Sydney Water approval and further modelling, it is proposed to extend the above-mentioned 300mm main along Aldington Road to service the Site. The main will be cross connected to the existing water mains and through connected to the existing 2 x 150mm diameter main within Mamre Road. This main will be fully reimbursable subject to SWC approval.

The internal reticulation will consist of either a 200 or 250dia main running along the side of the road.

Refer to **Figure 16** below for the proposed potable water services to the site.

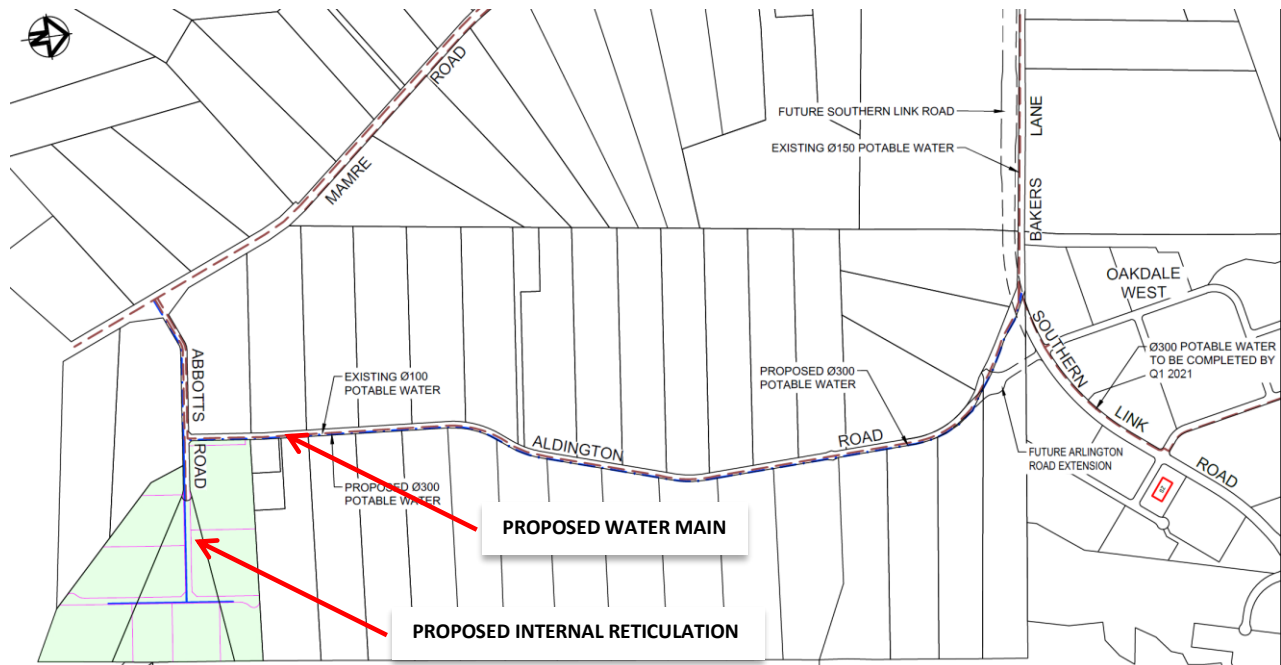


Figure 16: Proposed Water Strategy

11.2. Sewer

11.2.1. Existing Sewer

Dial Before You Dig (DBYD) indicates there is no existing sewer infrastructure located at or adjacent to the Site.

11.2.2. Proposed Sewer

The Site is located within the western catchment of Mamre Road Precinct that drains to a proposed wastewater pumping station via proposed trunk wastewater carriers. The pumping station will be required to transfer flows to St Marys wastewater network for interim servicing to 2026 and after this time it is intended for the pumping station to transfer flows south to the proposed Upper South Creek Advanced Water Recycling Centre. This is due to capacity constraints in the St Marys wastewater network:

- Sydney Water planned to start concept design in November 2020, for the wastewater pumping station and carriers servicing the western catchment. Concept design will include environmental approvals, geotechnical investigations, survey, etc.
- The delivery date for servicing the western catchment is planned for 2023/24 and subject to funding approval.

Refer to indicative wastewater servicing plan below.

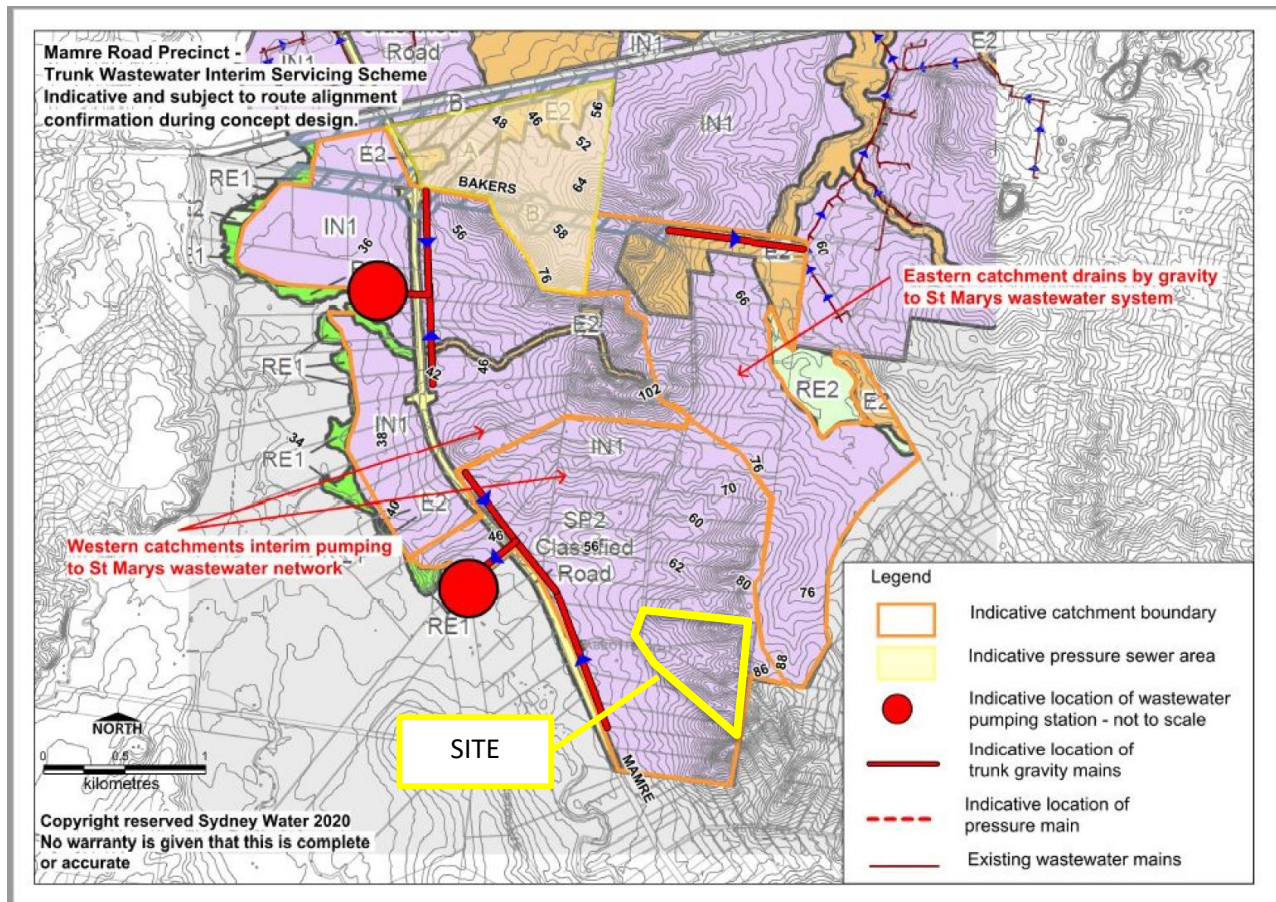


Figure 17: Indicative Wastewater servicing plan (Sydney Water)

Note - all the assets are in planning stage, indicative and subjected to route alignment confirmation during concept and detailed design. Additional reticulation mains are required to service the development and are required to be sized to service the natural catchment as per the WSAA Code.

If the site is developed in advanced of Sydney Water's proposed works and sufficient infrastructure is not available, an Interim Operating Procedure (IOP) will need to be developed to allow for wastewater to be constructed to service the site. The IOP will need to be raised and will be subject to approval from Sydney Water.

11.3. Electrical

11.3.1. Existing Electrical

Recent site inspection indicates that there is an overhead power line (11kV and 240v) on the eastern side of Aldington Road reserve parallel to the boundary. Dial Before You Dig (DBYD) indicates that there are no underground services within the vicinity of the Site.

11.3.2. Proposed Electrical

Consultation has been undertaken with Endeavour Energy regarding electrical servicing strategies for the Broader Western Sydney Employment Area (BWSEA) which includes the wider Aldington Road Precinct and the Site.

The Endeavour Energy 'Western Sydney Priority Growth Area – Area Plan April 2018' indicates the proposed high voltage network to be delivered as part of the wider Endeavour Energy electrical network required to service the Aerotropolis.

Endeavour Energy's Asset Planning & Performance Branch has provided the following advice:

- Asset Planning & Performance have met with consultants for ESR Kemps Creek Logistics Park and discussed power servicing requirements at an early high-level stage.
- Based on standard warehousing load estimations, the client was advised that a new 11 kV feeder would be required to be established from Kemps Creek Zone Substation located at 120 Cross Street Kemps Creek (Lot 1 DP 532554) to the site to provide the required capacity. This is due to the existing electrical infrastructure in the vicinity having insufficient capacity to support the proposed large-scale development along Mamre Road and Aldington Road with several partial developments involving a number of warehouses which have been processed and allowed to connect.
- This has subsequently resulted in no further spare capacity being available without extensive new capital investment required to provide new capacity in addition to and in advance of the proposed new 132kV / 22 kV zone substation within the Oakdale West Precinct known as South Erskine Park Zone Substation by the current expected commissioning date of October 2022. This substation will service both the Oakdale West and Mamre Precincts and limited parts of the Oakdale South Precinct.
- Developments which are running ahead of Endeavour Energy's infrastructure delivery timeline are being advised to make alternative arrangements to access spare capacity from either Kemps Creek Zone Substation or Mamre Zone Substation located at 8 John Morphett Place Erskine Park (Lot 9 DP 1097134) depending on where they are located until supply can be redirected from the new South Erskine Park Zone Substation. Some warehousing has been accommodated where possible on an interim basis until the new zone substation is available.
- Asset Planning & Performance are happy to meet with ESR to continue conversations regarding the provision of capacity ahead of South Erskine Park Zone Substation which may entertain connection of one or two warehouses dependent on the load requirement, some infrastructure augmentation is still likely to be required due to the rural construction type of existing infrastructure.

Although it was not identified which option would be the most suitable option, Connect Infrastructure has advised that further consultation with Endeavour Energy will be required and based on the risk / reward profile, a suitable option can be determined.

11.4. Telecommunications

Dial Before You Dig (DBYD) indicates that Telstra below-ground conduits are located within the Aldington Road Reserve parallel to the boundary.

Site inspection has identified there are aboveground assets along the western side of Aldington Road.

It is expected connection could be made from the existing infrastructure located within Aldington Road. Subject to the requirements of the relevant telecommunications authority, new pit and pipe may need to be installed from Erskine Park Road to the Site.

11.5. Gas

There are no existing Jemena gas mains located within the vicinity of the Site. No contact has been made with Jemena to determine if there are plans to service the area in future.

11.6. Conclusion

This section demonstrates that services including wastewater, potable water, power, telecommunications and gas can be made available to the site.

Internal reticulation will be coordination at the detailed design stage of works with formal applications made to the relevant service authorities.

12. Infrastructure Delivery and Staging

12.1. Staging

The estate wide civil infrastructure works will be undertaken within Stage 1 of the development of the site. The infrastructure works will include, but are not limited to:

- Upgrade of Abbots Road and Aldington Road.
- Extension of Abbots Road within the development site.
- Earthworks and retaining walls / structures.
- Stormwater drainage systems, including diversion of external catchments through the site.
- Stormwater management measures, including on-site detention and bio-retention systems.
- Utility services (water, sewerage, power, communications), including lead-in works as required.

Stage 1 will include external road upgrades and service lead-in works. The delivery of construction will be undertaken progressively to meet end user requirements.

12.2. Funding Arrangements

The assumed funding arrangement for civil infrastructure works will be as follows:

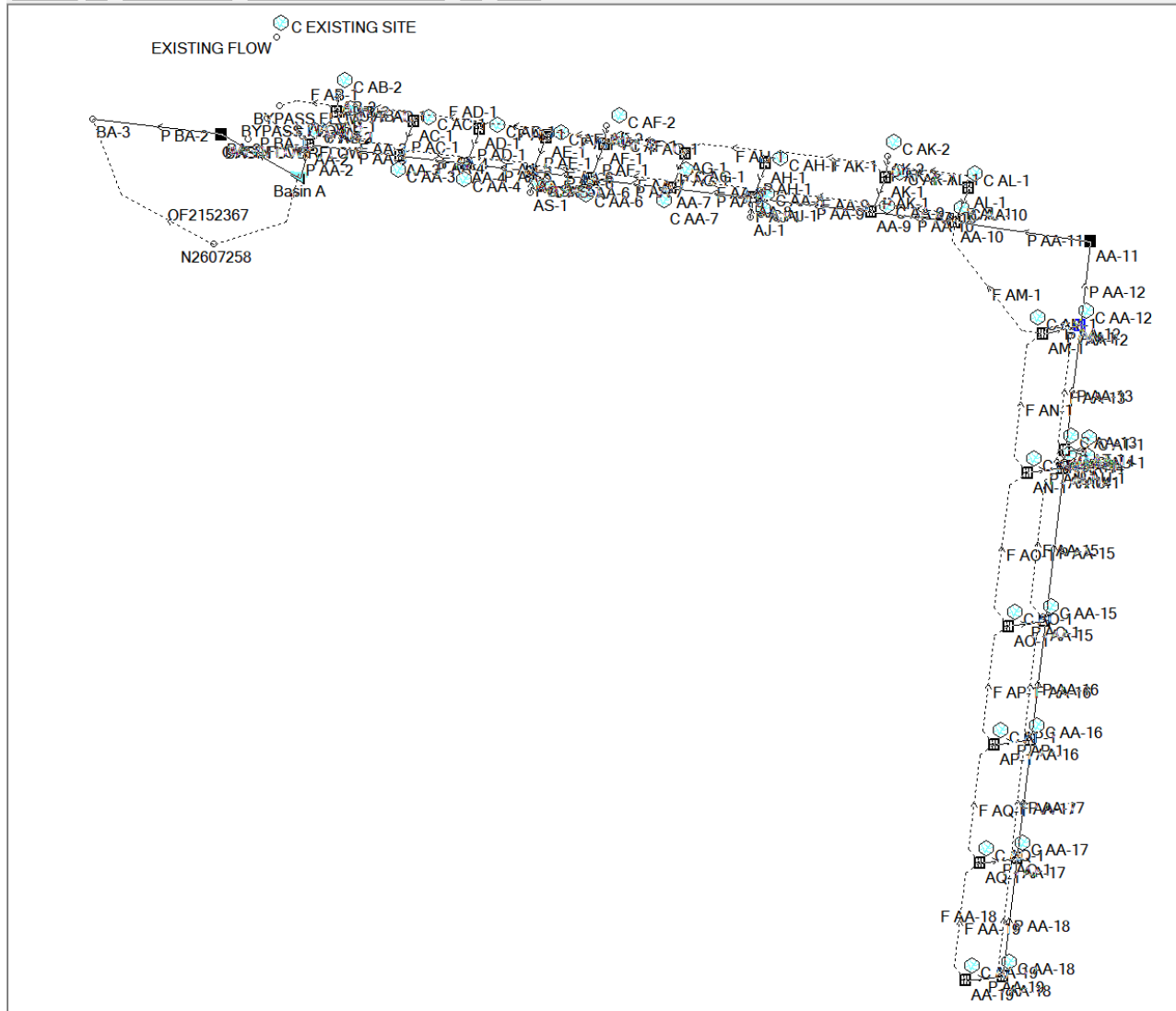
- **Abbots Road and Aldington Road Upgrades (including roundabout):** Proposed to be delivered as Works in Kind Agreement against Section 7.11 and/or Section 7.12 contributions (subject to authority approvals).
- **Lead-in services:** Proponent funded with potential reimbursements subject to relevant authority approvals and procurement processes.
- **Internal works:** Proponent funded.

APPENDIX A – Civil Engineering Plans

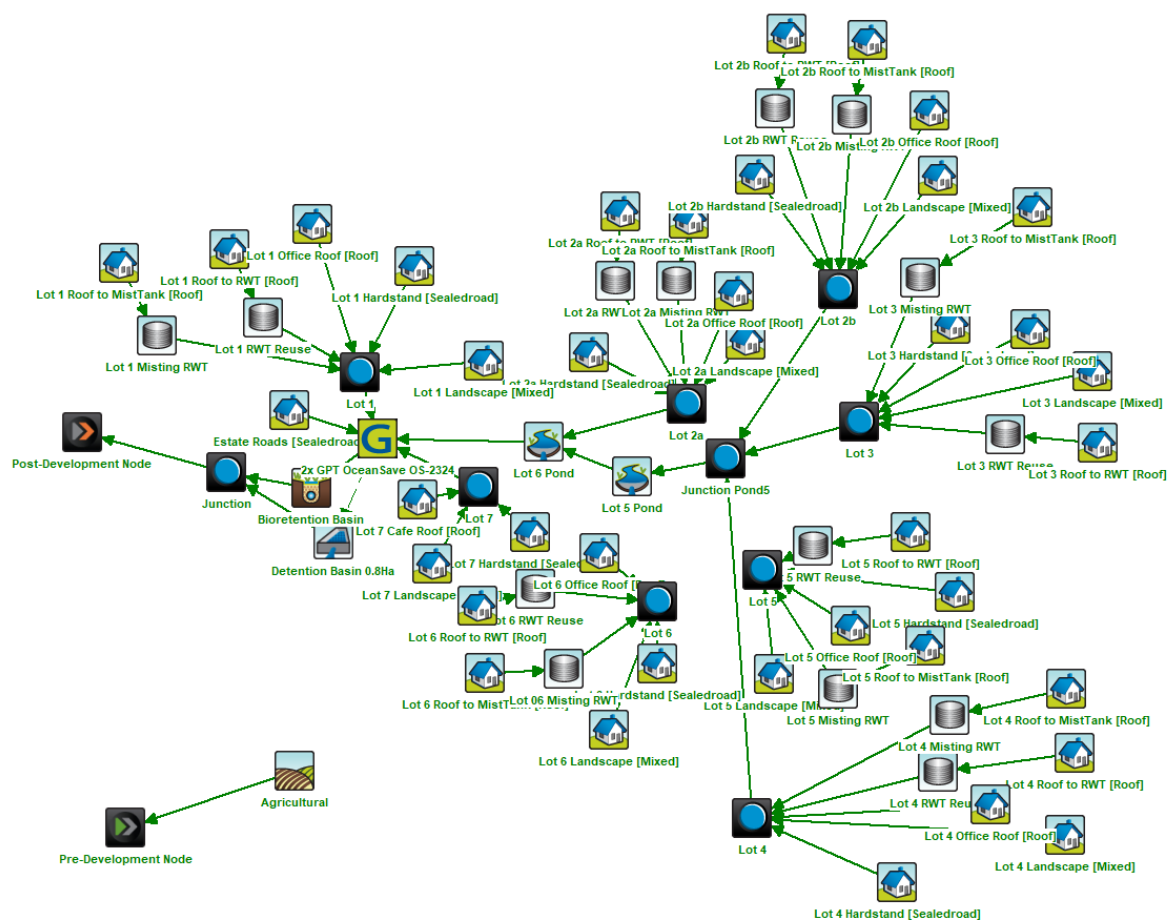
APPENDIX B – DRAINS Model

20-748 ESR MAMRE RD-INFRA STORMWATER [REV 3].drn - DRAINS

File Edit Project View Draw Run Help



APPENDIX C – MUSIC Results



Treatment Train Effectiveness - Post-Development Node						
	Sources		Residual Load		% Reduction	
	Pre	Post	Pre	Post	Pre	Post
Flow (ML/yr)	47.8	122	47.8	59.1	0	51.6
Total Suspended Solids (kg/yr)	8690	18600	8690	195	0	99
Total Phosphorus (kg/yr)	13.9	39.4	13.9	3.88	0	90.2
Total Nitrogen (kg/yr)	105	274	105	40.4	0	85.3
Gross Pollutants (kg/yr)	49.6	3290	49.6	0	0	100

☒ Include Pre-Development

The first of these is the fact that the system is not a simple one. It is a complex system, and as such, it is not possible to understand it by looking at its parts in isolation. The system is a whole, and its behavior is determined by the interactions between its parts. This is a fundamental principle of systems thinking, and it is one that is often overlooked in traditional approaches to problem-solving.

The second of these is the fact that the system is dynamic. It is not a static system, and its behavior changes over time. This is another fundamental principle of systems thinking, and it is one that is often overlooked in traditional approaches to problem-solving.

The third of these is the fact that the system is open. It is not a closed system, and it interacts with its environment. This is another fundamental principle of systems thinking, and it is one that is often overlooked in traditional approaches to problem-solving.

The fourth of these is the fact that the system is self-organizing. It is not a system that is imposed from the outside, but one that emerges from the interactions between its parts. This is another fundamental principle of systems thinking, and it is one that is often overlooked in traditional approaches to problem-solving.

The fifth of these is the fact that the system is resilient. It is not a fragile system, and it is able to withstand change. This is another fundamental principle of systems thinking, and it is one that is often overlooked in traditional approaches to problem-solving.

The sixth of these is the fact that the system is adaptable. It is not a rigid system, and it is able to change in response to its environment. This is another fundamental principle of systems thinking, and it is one that is often overlooked in traditional approaches to problem-solving.

The seventh of these is the fact that the system is sustainable. It is not a system that is doomed to failure, but one that is able to continue to exist and thrive. This is another fundamental principle of systems thinking, and it is one that is often overlooked in traditional approaches to problem-solving.

The eighth of these is the fact that the system is equitable. It is not a system that is based on inequality, but one that is based on fairness. This is another fundamental principle of systems thinking, and it is one that is often overlooked in traditional approaches to problem-solving.

The ninth of these is the fact that the system is just. It is not a system that is based on injustice, but one that is based on justice. This is another fundamental principle of systems thinking, and it is one that is often overlooked in traditional approaches to problem-solving.

The tenth of these is the fact that the system is peaceful. It is not a system that is based on conflict, but one that is based on peace. This is another fundamental principle of systems thinking, and it is one that is often overlooked in traditional approaches to problem-solving.

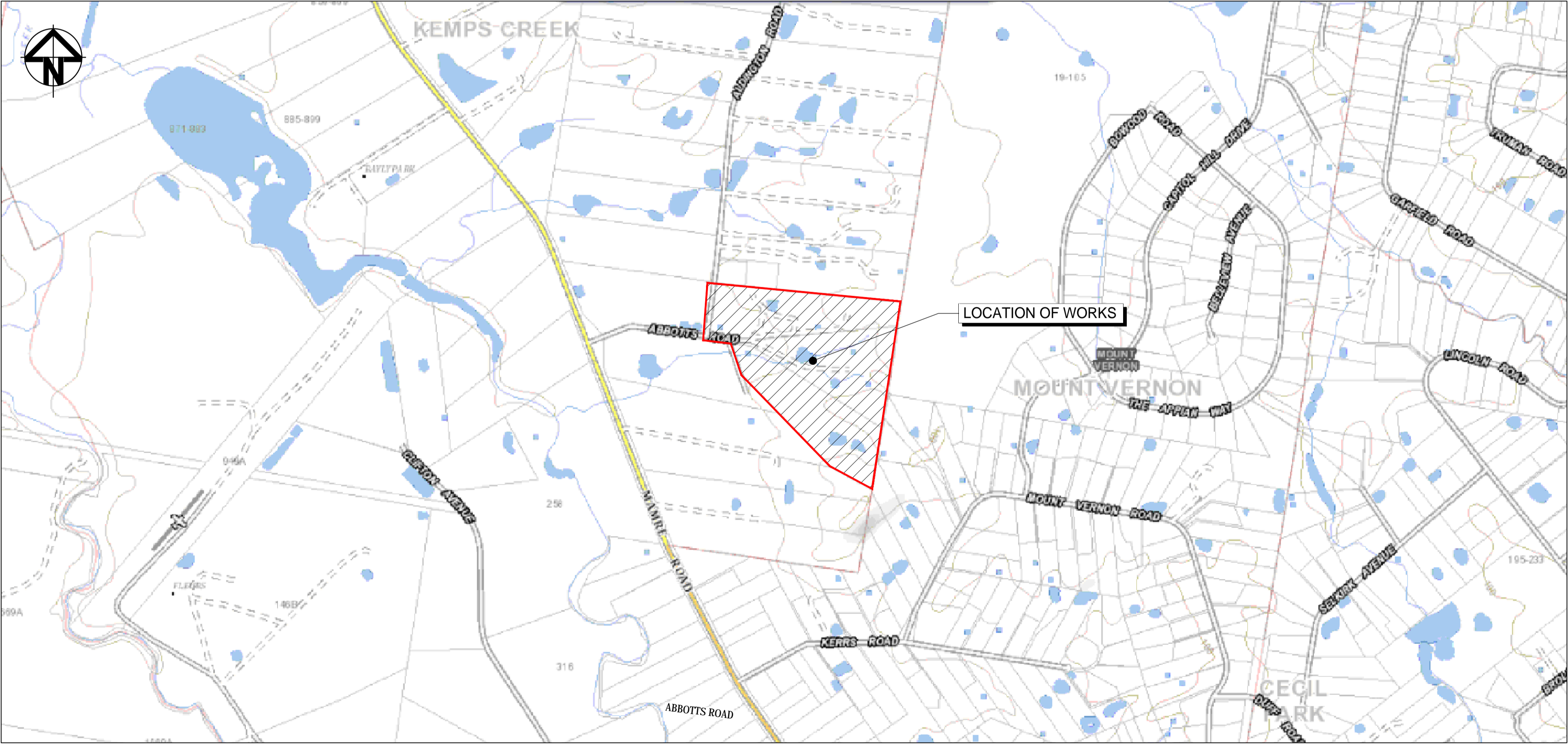


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ABBOTTS ROAD
KEMPS CREEK
CIVIL WORKS PACKAGE
STATE SIGNIFICANT DEVELOPMENT
APPLICATION





LOCALITY PLAN
NTS

		Bar Scales	THIS DRAWING CANNOT BE COPIED OR REPRODUCED IN ANY FORM OR USED FOR ANY OTHER PURPOSE OTHER THAN THAT ORIGINALLY INTENDED WITHOUT THE WRITTEN PERMISSION OF AT&L	Client <div></div>	Scales	Drawn	PDK	Project PROPOSED INDUSTRIAL DEVELOPMENT ABBOTTS ROAD KEMPS CREEK	Civil Engineers and Project Managers <div><div>Level 7, 153 Walker Street North Sydney NSW 2060 ABN 96 130 882 405 Tel: 02 9439 1777 Fax: 02 9923 1055 www.atl.net.au info@atl.net.au</div></div>		
					N.T.S.	Designed	PDK				
					Grid	GDA94 MGA56	Checked			TM	
					Height Datum	AHD	Approved				
B	ISSUED FOR DEVELOPMENT APPLICATION	19-04-21	COVER SHEET						Status	PRELIMINARY	A1
A	ISSUED FOR DEVELOPMENT APPLICATION	22-12-20							NOT TO BE USED FOR CONSTRUCTION		Issue
Issue	Description	Date							Project - Drawing No. 20-748-C1000		B

DRAWING LIST	
DRAWING No.	DRAWING TITLE
1000-SERIES INFRASTRUCTURE	
20-748-C1000	COVER SHEET
20-748-C1001	DRAWING LIST
20-748-C1002	GENERAL NOTES
20-748-C1005	GENERAL ARRANGEMENT PLAN
20-748-C1010	TYPICAL ROAD SECTIONS SHEET 1
20-748-C1011	TYPICAL ROAD SECTIONS SHEET 2
20-748-C1020	BOUNDARY INTERFACE PLAN
20-748-C1021	BOUNDARY INTERFACE SECTIONS SHEET 1
20-748-C1022	BOUNDARY INTERFACE SECTIONS SHEET 2
20-748-C1023	BOUNDARY INTERFACE SECTIONS SHEET 3
20-748-C1030	BULK EARTHWORKS CUT/FILL PLAN
20-748-C1041	ROADWORKS AND STORMWATER DRAINAGE PLAN SHEET 1
20-748-C1042	ROADWORKS AND STORMWATER DRAINAGE PLAN SHEET 2
20-748-C1043	ROADWORKS AND STORMWATER DRAINAGE PLAN SHEET 3
20-748-C1044	ROADWORKS AND STORMWATER DRAINAGE PLAN SHEET 4
20-748-C1045	ROADWORKS AND STORMWATER DRAINAGE PLAN SHEET 5
20-748-C1046	ROADWORKS AND STORMWATER DRAINAGE PLAN SHEET 6
20-748-C1047	ROADWORKS AND STORMWATER DRAINAGE PLAN SHEET 7
20-748-C1050	ABBOTTS ROAD (MC01) LONGITUDINAL SECTION SHEET 1
20-748-C1051	ABBOTTS ROAD (MC01) LONGITUDINAL SECTION SHEET 2
20-748-C1052	ABBOTTS ROAD (MC01) LONGITUDINAL SECTION SHEET 3
20-748-C1055	ALDINGTON ROAD (MC02) LONGITUDINAL SECTION SHEET 1
20-748-C1061	STORMWATER DRAINAGE CATCHMENT PLAN (PRE-DEVELOPED)
20-748-C1065	STORMWATER DRAINAGE CATCHMENT PLAN (POST-DEVELOPED)
20-748-C1071	BIO-RETENTION BASIN DETAIL PLAN
20-748-C1072	BIO-RETENTION BASIN SECTION
20-748-C1080	RETAINING WALL GENERAL ARRANGEMENT PLAN SHEET 1
20-748-C1081	RETAINING WALL GENERAL ARRANGEMENT PLAN SHEET 2
20-748-C1085	RETAINING WALL PROFILES SHEET 1
20-748-C1086	RETAINING WALL PROFILES SHEET 2
20-748-C1087	RETAINING WALL PROFILES SHEET 3
20-748-C1088	RETAINING WALL PROFILES SHEET 4
20-748-C1089	RETAINING WALL PROFILES SHEET 5
20-748-C1090	RETAINING WALL PROFILES SHEET 6
20-748-C1091	RETAINING WALL PROFILES SHEET 7
20-748-C1092	RETAINING WALL PROFILES SHEET 8
20-748-C1093	RETAINING WALL PROFILES SHEET 9
20-748-C1094	RETAINING WALL PROFILES SHEET 10
20-748-C1095	RETAINING WALL PROFILES SHEET 11
20-748-C1101	SERVICES AND UTILITIES COORDINATION PLAN SHEET 1
20-748-C1102	SERVICES AND UTILITIES COORDINATION PLAN SHEET 2
20-748-C1103	SERVICES AND UTILITIES COORDINATION PLAN SHEET 3
20-748-C1201	EROSION AND SEDIMENT CONTROL PLAN
20-748-C1210	EROSION AND SEDIMENT CONTROL DETAILS
20-748-C1311	VEHICLE TURNPATH PLAN SHEET 1
20-748-C1312	VEHICLE TURNPATH PLAN SHEET 2

2000-SERIES ON LOT	
20-748-C2111	LOT 01 SITEWORKS AND STORMWATER DRAINAGE PLAN
20-748-C2121	LOT 01 PAVEMENT PLAN
20-748-C2211	LOT 02A & LOT 2B SITEWORKS AND STORMWATER DRAINAGE PLAN
20-748-C2221	LOT 02A & LOT 2B PAVEMENT PLAN
20-748-C2311	LOT 03 SITEWORKS AND STORMWATER DRAINAGE PLAN SHEET 1
20-748-C2312	LOT 03 SITEWORKS AND STORMWATER DRAINAGE PLAN SHEET 2
20-748-C2321	LOT 03 PAVEMENT PLAN SHEET 1
20-748-C2322	LOT 03, LOT 04 & LOT 5 PAVEMENT PLAN SHEET 2
20-748-C2411	LOT 04 SITEWORKS AND STORMWATER DRAINAGE PLAN SHEET 1
20-748-C2412	LOT 04 SITEWORKS AND STORMWATER DRAINAGE PLAN SHEET 2
20-748-C2421	LOT 04 & LOT 5 PAVEMENT PLAN SHEET 1
20-748-C2422	LOT 04 & LOT 5 PAVEMENT PLAN SHEET 2
20-748-C2511	LOT 05 SITEWORKS AND STORMWATER DRAINAGE PLAN SHEET 1
20-748-C2512	LOT 05 SITEWORKS AND STORMWATER DRAINAGE PLAN SHEET 2
20-748-C2521	LOT 05 & LOT 06 PAVEMENT PLAN SHEET 1
20-748-C2522	LOT 05 PAVEMENT PLAN SHEET 2
20-748-C2611	LOT 06 & LOT 07 SITEWORKS AND STORMWATER DRAINAGE PLAN

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B	ISSUED FOR DEVELOPMENT APPLICATION	19-04-21	Title DRAWING LIST	Status PRELIMINARY NOT TO BE USED FOR CONSTRUCTION	A1				
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100mm on Original

SITEWORKS NOTES

1. ORIGIN OF LEVELS:- REFER SURVEY NOTES.
2. CONTRACTOR MUST VERIFY ALL DIMENSIONS AND EXISTING LEVELS ON SITE PRIOR TO COMMENCEMENT OF WORK. ANY DISCREPANCIES TO BE REPORTED TO AT & L.
3. MAKE SMOOTH CONNECTION WITH EXISTING WORKS.
4. ALL TRENCH BACKFILL MATERIAL SHALL BE COMPACTED TO THE SAME DENSITY AS THE ADJACENT MATERIAL.
5. ALL SERVICE TRENCHES UNDER VEHICULAR PAVEMENTS SHALL BE BACKFILLED WITH SAND TO 300mm ABOVE PIPE. WHERE PIPE IS UNDER PAVEMENTS BACKFILL REMAINDER OF TRENCH TO UNDERSIDE OF PAVEMENT WITH SAND OR APPROVED GRANULAR MATERIAL. COMPACTED IN 150mm LAYERS TO MINIMUM 98% MODIFIED MAXIMUM DRY DENSITY IN ACCORDANCE WITH AS 1289 5.2.1. (OR A DENSITY INDEX OF NOT LESS THAN 75)
6. PROVIDE 10mm WIDE EXPANSION JOINTS BETWEEN BUILDINGS AND ALL CONCRETE OR UNIT PAVEMENTS.
7. ASPHALTIC CONCRETE SHALL CONFORM TO R.M.S SPECIFICATION R116.
8. ALL BASECOURSE MATERIAL SHALL BE IGNEOUS ROCK QUARRIED MATERIAL TO COMPLY WITH R.M.S FORM 3051. 3051.1 AND COMPACTED TO MINIMUM 98% MODIFIED DENSITY IN ACCORDANCE WITH AS 1289 5.2.1. FREQUENCY OF COMPACTION TESTING SHALL NOT BE LESS THAN 1 TEST PER 50m OF BASECOURSE MATERIAL PLACED.
9. ALL SUB-BASE COURSE MATERIAL SHALL BE IGNEOUS ROCK QUARRIED MATERIAL TO COMPLY WITH R.M.S FORM 3051. 3051.1 AND COMPACTED TO MINIMUM 95% MODIFIED DENSITY IN ACCORDANCE WITH A.S 1289 5.2.1. FREQUENCY OF COMPACTION TESTING SHALL NOT BE LESS THAN 1 TEST PER 50m OF SUB-BASE COURSE MATERIAL PLACED.
10. AS AN ALTERNATIVE TO THE USE OF IGNEOUS ROCK AS A SUB-BASE MATERIAL IN (9) A CERTIFIED RECYCLED CONCRETE MATERIAL COMPLYING WITH R.M.S FORM 3051 AND 3051.1 WILL BE CONSIDERED. SUBJECT TO MATERIAL SAMPLES AND APPROPRIATE CERTIFICATIONS BEING PROVIDED TO THE SATISFACTION OF AT & L.
11. SHOULD THE CONTRACTOR WISH TO USE A RECYCLED PRODUCT THE CONTRACTOR IS TO SEEK ACCEPTANCE OF THE PRODUCT FROM AT&L. THE PRICE DIFFERENCE BETWEEN AN IGNEOUS PRODUCT AND A RECYCLED PRODUCT SHALL BE CLEARLY INDICATED.
12. WHERE NOTED ON THE DRAWINGS THAT WORKS ARE TO BE CARRIED BY OTHERS, (eg. ADJUSTMENT OF SERVICES), THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE CO-ORDINATION OF THESE WORKS.

SURVEY NOTES

THE EXISTING SITE CONDITIONS SHOWN ON THE FOLLOWING DRAWINGS HAVE BEEN INVESTIGATED BY LTS LOCKLEY. BEING REGISTERED SURVEYORS, THE INFORMATION IS SHOWN TO PROVIDE A BASIS FOR DESIGN. AT & L DOES NOT GUARANTEE THE ACCURACY OR COMPLETENESS OF THE SURVEY BASE OR ITS SUITABILITY AS A BASIS FOR CONSTRUCTION DRAWINGS.

SHOULD DISCREPANCIES BE ENCOUNTERED DURING CONSTRUCTION BETWEEN THE SURVEY DATA AND ACTUAL FIELD DATA, CONTACT AT & L.

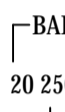

THE FOLLOWING NOTES HAVE BEEN TAKEN DIRECTLY FROM THE ORIGINAL SURVEY DOCUMENTS.

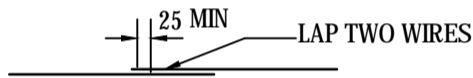
- NOTES
1. THE BOUNDARIES HAVE APPROXIMATELY BEEN SURVEYED IN ACCORDANCE WITH CLAUSE 9 OF THE SURVEYING & SPATIAL INFORMATION REGULATION 2017
2. ALL AREAS AND DIMENSIONS HAVE BEEN COMPILED FROM PLANS MADE AVAILABLE BY NSW LAND REGISTRY SERVICES AND ARE SUBJECT TO FINAL SURVEY
3. ORGIN OF COORDINATES HAS BEEN DERIVED USING GPS (GNSS) SURVEY FROM SSM33562
4. ORIGIN OF LEVELS ON A.H.D. IS TAKEN FROM SSM33562 R.L. 43.021 (A.H.D.) IN MAMRE ROAD USING GPS (GNSS) SURVEY METHODS.
5. CONTOUR INTERVAL 0.5 m
6. CONTOURS ARE INDICATIVE ONLY. ONLY SPOT LEVELS SHOULD BE USED FOR CALCULATIONS OF QUANTITIES WITH CAUTION
7. NO INVESTIGATION OF UNDERGROUND SERVICES HAS BEEN MADE. SERVICES HAVE BEEN PLOTTED FROM RELEVANT AUTHORITIES INFORMATION AND HAVE NOT BEEN SURVEYED. ALL RELEVANT AUTHORITIES SHOULD BE NOTIFIED PRIOR TO ANY EXCAVATION ON OR NEAR THE SITE
8. 8/ 47 DENOTES TREE SPREAD OF 8m, TRUNK DIAMETER OF 0.4m & APPROX HEIGHT OF 7m
9. SHOWS APPROXIMATE POSITION OF ROAD LINEMARKING AND IS INDICATIVE ONLY
10. BEARINGS SHOWN ARE MGA (MAP GRID OF AUSTRALIA) ADD APPROX. 1°00' FOR TRUE NORTH

CONCRETE NOTES

1. ALL WORKMANSHIP AND MATERIALS SHALL BE IN ACCORDANCE WITH AS 3600 CURRENT EDITION WITH AMENDMENTS, EXCEPT WHERE VARIED BY THE CONTRACT DOCUMENTS.
2. CONCRETE QUALITY
- ALL REQUIREMENTS OF THE CURRENT ACSE CONCRETE SPECIFICATION DOCUMENT 1 SHALL APPLY TO THE FORMWORK, REINFORCEMENT AND CONCRETE UNLESS NOTED OTHERWISE.

ELEMENT	AS 3600 F _c MPa AT 28 DAYS	SPECIFIED SLUMP	NOMINAL AGG. SIZE
VEHICULAR BASE	32	60	20
KERBS, PATHS, AND PITS	25	80	20

- CEMENT TYPE SHALL BE (ACSE SPECIFICATION) TYPE SL
- PROJECT CONTROL TESTING SHALL BE CARRIED OUT IN ACCORDANCE WITH AS 1379.
3. NO ADMIXTURES SHALL BE USED IN CONCRETE UNLESS APPROVED IN WRITING BY AT & L.
4. CLEAR CONCRETE COVER TO ALL REINFORCEMENT FOR DURABILITY SHALL BE 40mm TOP AND 70mm FOR EXTERNAL EDGES UNLESS NOTED OTHERWISE.
5. ALL REINFORCEMENT SHALL BE FIRMLY SUPPORTED ON MILD STEEL PLASTIC TIPPED CHAIRS, PLASTIC CHAIRS OR CONCRETE CHAIRS AT NOT GREATER THAN 1m CENTRES BOTH WAYS. BARS SHALL BE TIED AT ALTERNATE INTERSECTIONS.
6. THE FINISHED CONCRETE SHALL BE A DENSE HOMOGENEOUS MASS, COMPLETELY FILLING THE FORMWORK, THOROUGHLY EMBEDDING THE REINFORCEMENT AND FREE OF STONE POCKETS. ALL CONCRETE INCLUDING SLABS ON GROUND AND FOOTINGS SHALL BE COMPACTED AND CURED IN ACCORDANCE WITH R.M.S SPECIFICATION R83.
7. REINFORCEMENT SYMBOLS:
- N DENOTES GRADE 450 N BARS TO AS 1302 GRADE N
- R DENOTES 230 R HOT ROLLED PLAIN BARS TO AS 1302
- SL DENOTES HARD-DRAWN WIRE REINFORCING FABRIC TO AS 1304
- NUMBER OF BARS IN GROUP:  BAR GRADE AND TYPE
- 17 N 20 250
- NOMINAL BAR SIZE in mm  SPACING IN mm
- THE FIGURE FOLLOWING THE FABRIC SYMBOL SL IS THE REFERENCE NUMBER FOR FABRIC TO AS 1304.
8. FABRIC SHALL BE LAPPED IN ACCORDANCE WITH THE FOLLOWING DETAIL:



KERBING NOTES

1. ALL CONCRETE TO HAVE A MINIMUM COMPRESSIVE STRENGTH OF 20MPa U.N.O IN REINFORCED CONCRETE NOTES.
2. ALL KERBS, GUTTERS, DISH DRAINS AND CROSSINGS TO BE CONSTRUCTED ON MIN. 100mm GRANULAR BASECOURSE COMPACTED TO MINIMUM 95% MODIFIED DRY DENSITY (AS 1289 5.2.1).
3. EXPANSION JOINTS (E.J) TO BE FORMED FROM 100mm COMPRESSIBLE CORK FILLER BOARD FOR THE FULL DEPTH OF THE SECTION AND CUT TO PROFILE. EXPANSION JOINTS TO BE LOCATED AT DRAINAGE PITS, ON TANGENT POINTS OF CURVES AND ELSEWHERE AT MAX 12m CENTRES EXCEPT FOR INTEGRAL KERBS WHERE THE EXPANSION JOINTS ARE TO MATCH THE JOINT LOCATIONS IN THE SLABS.
4. WEAKENED PLANE JOINTS TO BE MIN 3mm WIDE AND LOCATED AT 3m CENTRES EXCEPT FOR INTEGRAL KERBS WHERE THE WEAKENED PLANE JOINTS ARE TO MATCH THE JOINT LOCATIONS IN THE SLABS.
5. BROOMED FINISH TO ALL RAMPED AND VEHICULAR CROSSINGS. ALL OTHER KERBING OR DISH DRAINS TO BE STEEL FLOAT FINISHED.
6. IN THE REPLACEMENT OF KERB AND GUTTER :- EXISTING ROAD PAVEMENT IS TO BE SAWCUT 900mm U.N.O FROM THE LIP OF GUTTER. UPON COMPLETION OF THE NEW KERB AND GUTTER NEW BASECOURSE AND SURFACE TO BE LAID 900mm WIDE U.N.O.
- EXISTING ALLOTMENT DRAINAGE PIPES ARE TO BE BUILT INTO THE NEW KERB AND GUTTER WITH 100mm DIA HOLE.
- EXISTING KERB AND GUTTER IS TO BE COMPLETELY REMOVED WHERE NEW KERB AND GUTTER IS SHOWN.

STORMWATER DRAINAGE NOTES

1. STORMWATER DESIGN CRITERIA:
- (A) AVERAGE RECURRENCE INTERVAL:-
- 1:100 YEARS MAJOR STORM (OVERLAND FLOW)
- 1:20 YEARS MINOR STORM (PIPED NETWORK)
- (B) RAINFALL INTENSITIES:
- TIME OF CONCENTRATION: 5 MINUTES
- 1:100 YEARS: 219 mm/hr
- 1:20 YEARS: 167 mm/hr
- (C) RUNOFF COEFFICIENTS:
- ROOF AREAS: C 100 =1.0
- EXTERNAL PAVEMENTS: C 100 =1.0
2. PIPES 300 DIA. AND LARGER TO BE REINFORCED CONCRETE CLASS '3' APPROVED SPIGOT AND SOCKET WITH RUBBER RING JOINTS. U.N.O.
3. PIPES UP TO 300 DIA SHALL BE SEWER GRADE uPVC WITH SOLVENT WELDED JOINTS.
4. EQUIVALENT STRENGTH VCP OR FRC PIPES MAY BE USED. SUBJECT TO THE APPROVAL OF PENRITH CITY COUNCIL.
5. ALL STORMWATER DRAINAGE LINES UNDER PROPOSED BUILDING SLABS TO BE uPVC PRESSURE PIPE GRADE 6. ENSURE ALL VERTICALS AND DOWNPIPES ARE uPVC PRESSURE PIPE. GRADE 6 FOR A MIN OF 3.0m IN HEIGHT.
6. PIPES TO BE INSTALLED TO TYPE HS1 SUPPORT IN ACCORDANCE WITH AS 3725 (2007) IN ALL CASES BACKFILL TRENCH WITH SAND TO 300mm ABOVE PIPE. WHERE PIPE IS UNDER PAVEMENTS BACKFILL REMAINDER OF TRENCH TO UNDERSIDE OF PAVEMENT WITH SAND OR APPROVED GRANULAR MATERIAL COMPACTED IN 150mm LAYERS TO MINIMUM 98% STANDARD MAXIMUM DRY DENSITY IN ACCORDANCE WITH AS 1289 5.2.1. (OR A DENSITY INDEX OF NOT LESS THAN 75)
7. ALL INTERNAL WORKS WITHIN PROPERTY BOUNDARIES ARE TO COMPLY WITH THE REQUIREMENTS OF AS 3500 3.1 (1998) AND AS/NZS 3500 3.2 (1998).
8. PRECAST PITS MAY BE USED EXTERNAL TO THE BUILDING SUBJECT TO APPROVAL BY AT & L.
9. ENLARGERS, CONNECTIONS AND JUNCTIONS TO BE PREFABRICATED FITTINGS WHERE PIPES ARE LESS THAN 300 DIA.
10. WHERE SUBSOIL DRAINS PASS UNDER FLOOR SLABS AND VEHICULAR PAVEMENTS, UNSLOTTED uPVC SEWER GRADE PIPE IS TO BE USED.
11. CARE IS TO BE TAKEN WITH LEVELS OF STORMWATER LINES. GRADES SHOWN ARE NOT TO BE REDUCED WITHOUT APPROVAL.
12. GRATES AND COVERS SHALL CONFORM TO AS 3996.
13. AT ALL TIMES DURING CONSTRUCTION OF STORMWATER PITS, ADEQUATE SAFETY PROCEDURES SHALL BE TAKEN TO ENSURE AGAINST THE POSSIBILITY OF PERSONNEL FALLING DOWN PITS.
14. ALL EXISTING STORMWATER DRAINAGE LINES AND PITS THAT ARE TO REMAIN ARE TO BE INSPECTED AND CLEANED. DURING THIS PROCESS ANY PART OF THE STORMWATER DRAINAGE SYSTEM THAT WARRANTS REPAIR SHALL BE REPORTED TO THE SUPERINTENDENT/ENGINEER FOR FURTHER DIRECTIONS.

EMBANKMENT CONSTRUCTION SEQUENCE

1. STRIP VEGETATION AND TOPSOIL FROM EMBANKMENT AREA AND STOCKPILE TOPSOIL FOR LATER USE. CUT BACK AREA TO FIRM GROUND.
2. CONSTRUCT EMBANKMENT IN PRESENCE OF QUALIFIED AND EXPERIENCED GEOTECHNICAL ENGINEER IF NOT ROCK.
3. IN THE CASE WHERE THE EMBANKMENT AREAS SLUSH, GROUTING AND DENTAL CONCRETE MAY BE REQUIRED, AS DIRECTED BY A QUALIFIED AND EXPERIENCED GEOTECHNICAL ENGINEER.
4. COMPACT CLAY STABILIZED WITH GYPSUM (3% BY DRY MASS, MINIMUM) AS APPROVED BY A QUALIFIED AND EXPERIENCED GEOTECHNICAL ENGINEER INTO THE CUT-OFF TRENCH OF LAYERS NOT EXCEEDING 150mm LOOSE THICKNESS TO A DRY DENSITY EQUIVALENT TO 98% OF THAT DETERMINED BY STANDARD COMPACTION (AS 1289 5.1.1) AND AT A MOISTURE CONTENT OF -2% TO +2% OF OPTIMUM MOISTURE CONTENT.
5. GYPSUM STABILIZED NATURAL SOILS EXPOSED IN EMBANKMENT AREA WITH MINIMUM 3% GYPSUM BY DRY MASS AND COMPACT AS FOR #4. ALL TO THE APPROVAL OF A QUALIFIED AND EXPERIENCED GEOTECHNICAL ENGINEER.
6. CONSTRUCT BODY OF EMBANKMENT WITH CLAYEY MATERIAL WON FROM SITE. COMPACT THE CLAYEY MATERIAL APPROVED BY A QUALIFIED AND EXPERIENCED GEOTECHNICAL ENGINEER IN LAYERS NOT EXCEEDING 150mm THICKNESS TO A DRY DENSITY EQUIVALENT TO 98% OF THAT DETERMINED BY STANDARD COMPACTION (AS 1289 5.1.1) AND AT A MOISTURE CONTENT OF -2% TO +2% OF OPTIMUM MOISTURE CONTENT. MOST IMPORTANTLY, IF SHRINKAGE CRACKS OCCUR, AS DIRECTED BY A QUALIFIED AND EXPERIENCED GEOTECHNICAL ENGINEER.
7. OVERFILL THE EMBANKMENT AND TRIM OFF, SO THAT THE ENTIRE BODY OF THE EMBANKMENT IS COMPACTED.
8. TRIM THE EMBANKMENTS BATTERS TO THE OVERFILLED MATERIAL. STABILIZE THE UPSTREAM CLAY BATTERS WITH WELL MIXED GYPSUM (3% BY DRY MASS, MINIMUM) AND COMPACT TO MIN. 98% STD -2% TO +2% OMC.
9. PLACE ROCK RIP-RAP AS SHOWN.
10. RECOVER TOPSOIL FROM STOCKPILE AND SPREAD OVER EMBANKMENT AND CUT BATTERS (A THIN COVER OF TOPSOIL ONLY HAS BEEN NOMINATED). ONLY LIGHTLY TRACK-ROLL THE TOPSOIL AND THEN LANDSCAPE IN ACCORDANCE WITH THE LANDSCAPE AREA DRAWINGS.
11. WATER AND FERTILIZE LANDSCAPE AS REQUIRED BY CLIMATIC CONDITIONS TO ENSURE THE LANDSCAPE IS SUCCESSFUL.
12. AT THE COMPLETION OF WORK WRITTEN CONFIRMATION & CERTIFICATION IS TO BE PROVIDED FROM A QUALIFIED & EXPERIENCED GEOTECHNICAL ENGINEER THAT THE EMBANKMENTS HAVE BEEN CONSTRUCTED IN ACCORDANCE WITH THESE DRAWINGS.

EROSION AND SEDIMENT CONTROL NOTES

GENERAL INSTRUCTIONS

1. THE SITE SUPERINTENDENT/ENGINEER WILL ENSURE THAT ALL SOIL AND WATER MANAGEMENT WORKS ARE LOCATED AS DOCUMENTED.
2. ALL WORK SHALL BE GENERALLY CARRIED OUT IN ACCORDANCE WITH
- a. LOCAL AUTHORITY REQUIREMENTS
- b. EPA REQUIREMENTS
- c. NSW DEPARTMENT OF HOUSING MANUAL "MANAGING URBAN STORMWATER, SOILS AND CONSTRUCTION", 4th EDITION, MARCH 2004.
3. MAINTAIN THE EROSION CONTROL DEVICES TO THE SATISFACTION OF THE SUPERINTENDENT AND THE LOCAL AUTHORITY.
4. WHEN STORMWATER PITS ARE CONSTRUCTED, PREVENT SITE RUNOFF ENTERING UNLESS SEDIMENT FENCES ARE ERECTED AROUND PITS.
5. CONTRACTOR IS TO ENSURE ALL EROSION & SEDIMENT CONTROL DEVICES ARE MAINTAINED IN GOOD WORKING ORDER AND OPERATE EFFECTIVELY. REPAIRS AND OR MAINTENANCE SHALL BE UNDERTAKEN AS REQUIRED, PARTICULARLY FOLLOWING STORM EVENTS.

LAND DISTURBANCE

6. WHERE PRACTICAL, THE SOIL EROSION HAZARD ON THE SITE WILL BE KEPT AS LOW AS POSSIBLE. TO THIS END, WORKS SHOULD BE UNDERTAKEN IN THE FOLLOWING SEQUENCE:
- (A) INSTALL A WIND FENCE ALONG THE BOUNDARIES AS SHOWN ON PLAN. REFER DETAIL.
- (B) INSTALL A SEDIMENT FENCE ALONG THE BOUNDARIES AS SHOWN ON PLAN. REFER DETAIL.
- (C) CONSTRUCT STABILISED CONSTRUCTION ENTRANCE TO LOCATION AS DETERMINED BY SUPERINTENDENT/ENGINEER. REFER DETAIL.
- (D) INSTALL SEDIMENT BASIN AS SHOWN ON PLAN
- (E) INSTALL SEDIMENT TRAPS AS SHOWN ON PLAN.
- (F) UNDERTAKE SITE DEVELOPMENT WORKS IN ACCORDANCE WITH THE ENGINEERING PLANS. WHERE POSSIBLE, PHASE DEVELOPMENT SO THAT LAND DISTURBANCE IS CONFINED TO AREAS OF WORKABLE SIZE.

EROSION CONTROL

7. DURING WINDY WEATHER, LARGE, UNPROTECTED AREAS WILL BE KEPT MOST (NOT WET) BY SPRINKLING WITH WATER TO KEEP DUST UNDER CONTROL.
8. FINAL SITE LANDSCAPING WILL BE UNDERTAKEN AS SOON AS POSSIBLE AND WITHIN 20 WORKING DAYS FROM COMPLETION OF CONSTRUCTION ACTIVITIES.

SEDIMENT CONTROL

9. STOCKPILES WILL NOT BE LOCATED WITHIN 2 METRES OF HAZARD AREAS, INCLUDING LIKELY AREAS OF CONCENTRATED OR HIGH VELOCITY FLOWS SUCH AS WATERWAYS. WHERE THEY ARE BETWEEN 2 AND 5 METRES FROM SUCH AREAS, SPECIAL SEDIMENT CONTROL MEASURES SHOULD BE TAKEN TO MINIMISE POSSIBLE POLLUTION TO DOWNSLOPE WATERS, E.G. THROUGH INSTALLATION OF SEDIMENT FENCING.
10. ANY SAND USED IN THE CONCRETE CURING PROCESS (SPREAD OVER THE SURFACE) WILL BE REMOVED AS SOON AS POSSIBLE AND WITHIN 10 WORKING DAYS FROM PLACEMENT.
11. WATER WILL BE PREVENTED FROM ENTERING THE PERMANENT DRAINAGE SYSTEM UNLESS IT IS RELATIVELY SEDIMENT FREE. I.E. THE CATCHMENT AREA HAS BEEN PERMANENTLY LANDSCAPED AND/OR ANY LIKELY SEDIMENT HAS BEEN FILTERED THROUGH AN APPROVED STRUCTURE.
12. TEMPORARY SOIL AND WATER MANAGEMENT STRUCTURES WILL BE REMOVED ONLY AFTER THE LANDS THEY ARE PROTECTING ARE REHABILITATED.

OTHER MATTERS

13. ACCEPTABLE RECEPTORS WILL BE PROVIDED FOR CONCRETE AND MORTAR SLURRIES, PAINTS, ACID WASHINGS, LIGHT-WEIGHT WASTE MATERIALS AND LITTER.
14. ANY EXISTING TREES WHICH FORM PART OF THE FINAL LANDSCAPING PLAN WILL BE PROTECTED FROM CONSTRUCTION ACTIVITIES BY:
- (A) PROTECTING THEM WITH BARRIER FENCING OR SIMILAR MATERIALS INSTALLED OUTSIDE THE DRIP LINE
- (B) ENSURING THAT NOTHING IS NAILED TO THEM
- (C) PROHIBITING PAVING, GRADING, SEDIMENT WASH OR PLACING OF STOCKPILES WITHIN THE DRIP LINE EXCEPT UNDER THE FOLLOWING CONDITIONS.
- (i) ENCROACHMENT ONLY OCCURS ON ONE SIDE AND NO CLOSER TO THE TRUNK THAN EITHER 1.5 METRES OR HALF THE DISTANCE BETWEEN THE OUTER EDGE OF THE DRIP LINE AND THE TRUNK, WHICHEVER IS THE GREATER
- (ii) A DRAINAGE SYSTEM THAT ALLOWS AIR AND WATER TO CIRCULATE THROUGH THE ROOT ZONE (E.G. A GRAVEL BED) IS PLACED UNDER ALL FILL LAYERS OF MORE THAN 300 MILLIMETRES DEPTH
- (iii) CARE IS TAKEN NOT TO CUT ROOTS UNNECESSARILY NOR TO COMPACT THE SOIL AROUND THEM.

EROSION AND SEDIMENT CONTROL NOTES CONTINUED

STAGING

SUITABLE EROSION AND SEDIMENT CONTROLS SHALL BE DESIGNED, PROVIDED AND MAINTAINED BY THE CONTRACTOR THROUGHOUT ALL STAGES OF WORKS, INCLUDING AT COMPLETION OF THE BULK EARTHWORKS WHERE SHOWN ON AT&L DRAWINGS OR WHERE DIRECTED BY THE SUPERINTENDENT OR PENRITH CITY COUNCIL'S ENGINEERS.

SEDIMENT AND EROSION CONTROLS ARE TO BE DESIGNED AND DOCUMENTED BY A SUITABLY QUALIFIED EXPERT ENGAGED BY THE CONTRACTOR AND APPROVED AS PART OF THE CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN PRIOR TO THE COMMENCEMENT OF CONSTRUCTION. SUCH CONTROLS SHALL BE IN ACCORDANCE WITH THE RELEVANT REQUIREMENTS IN THE LATEST VERSION OF 'THE MANAGING URBAN STORMWATER: SOILS AND CONSTRUCTION GUIDELINE (LANDCOM).

DEWATERING

ANY DEWATERING WORKS TO BE AS PER THE DEWATERING PROCEDURE AS CONTAINED WITHIN THE CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN (CEMP).

DECOMMISSIONING / DEMOLITION

DEMOLITION OF EXISTING DWELLING TO BE CONDUCTED IN ACCORDANCE WITH THE PROVISIONS OF AS2601:2001- DEMOLITION OF STRUCTURES BY CONTRACTORS EXPERIENCED IN THIS CLASS OF WORK AND HOLDING REQUIRED CURRENT PERMITS AND LICENSES AS REQUIRED.

EXISTING INTERNALS FENCING, CATTLE YARDS, UTILITIES AND OTHER REDUNDANT STRUCTURES TO BE DEMOLISHED AND REMOVED TO AN APPROVED WASTE MANAGEMENT FACILITY.

DAM DECOMMISSIONING TO BE COMPLETED AS PER THE DAM DECOMMISSIONING PROCEDURE AS CONTAINED WITHIN THE CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN (CEMP).

EXISTING UNDERGROUND SERVICES NOTES

THE LOCATIONS OF UNDERGROUND SERVICES SHOWN IN THIS SET OF DRAWINGS HAVE BEEN PLOTTED FROM SURVEY INFORMATION AND SERVICE AUTHORITY INFORMATION. THE SERVICE INFORMATION HAS BEEN PREPARED ONLY TO SHOW THE APPROXIMATE POSITIONS OF ANY KNOWN SERVICES AND MAY NOT BE AS CONSTRUCTED OR ACCURATE.

AT & L CAN NOT GUARANTEE THAT THE SERVICES INFORMATION SHOWN ON THESE DRAWINGS ACCURATELY INDICATES THE PRESENCE OR ABSENCE OF SERVICES OR THEIR LOCATION AND WILL ACCEPT NO LIABILITY FOR INACCURACIES IN THE SERVICES INFORMATION SHOWN FROM ANY CAUSE WHATSOEVER.

CONTRACTORS SHALL TAKE DUE CARE WHEN EXCAVATING ONSITE INCLUDING HAND EXCAVATION WHERE NECESSARY.

CONTRACTORS ARE TO CONTACT THE RELEVANT SERVICE AUTHORITY PRIOR TO COMMENCEMENT OF EXCAVATION WORKS.

CONTRACTORS ARE TO UNDERTAKE A SERVICES SEARCH, PRIOR TO COMMENCEMENT OF WORKS ON SITE. SEARCH RESULTS ARE TO BE KEPT ON SITE AT ALL TIMES.

BIO-RETENTION FILTER MEDIA SPECIFICATION

MATERIALS:

BIO-RETENTION FILTER MEDIA, TRANSITION LAYER AND DRAINAGE LAYERS TO BE IN ACCORDANCE WITH CURRENT VERSION OF FAWB DOCUMENT "STORMWATER BIO-FILTRATION SYSTEMS ADOPTION GUIDELINES" AND THE FOLLOWING.:

A) BIO-RETENTION FILTER MEDIA

1. BIO-RETENTION MEDIA IS TO BE FREE OF RUBBISH AND DELETERIOUS MATERIAL.
2. BIO-RETENTION FILTER MEDIA SATURATED HYDRAULIC CONDUCTIVITY TO BE 180mm/hr USING TEST METHOD ASTM F1815-06.

3. BIO-RETENTION FILTER MEDIA PARTICLE SIZE DISTRIBUTION IS TO BE AS FOLLOWS:

CLAY & SILT	<3%	(<0.05mm)
VERY FINE SAND	5-30%	(0.05-0.15mm)
FINE SAND	10-30%	(0.15-0.25mm)
MEDIUM TO COARSE SAND	40-60%	(0.25-1.0mm)
COARSE SAND	7-10%	(1.0-2.0mm)
FIN GRAVEL	<3%	(2.0-3.4mm)

THE COMBINED PERCENTAGE OF CLAY AND SILT MUST NOT EXCEED 3% (WW) UNDER ANY CIRCUMSTANCES.

4. BIO-RETENTION FILTER MEDIA IS TO BE TESTED AND COMPLY WITH THE FOLLOWING REQUIREMENTS:

- a) ORGANIC MATTER CONTENT IN ACCORDANCE WITH AS 4419 AT LEAST 3% (WW)
- b) TOTAL NITROGEN (TN) CONTENT <900mg/kg
- c) ORTHOPHOSPHATE (PO⁴⁻) CONTENT <30mg/kg WHERE PLANTS WITH MODERATE PHOSPHOROUS SENSITIVITY ARE TO BE USED, TOTAL PHOSPHOROUS CONCENTRATION SHOULD BE <20mg/kg.
- d) AS SPECIFIED FOR "NATURAL SOILS AND SOIL BLENDS" AS4419 - pH 5.5-7.5 (pH 1.5 IN WATER)
- e) ELECTRICAL CONDUCTIVITY (EC) AS SPECIFIED FOR "NATURAL SOILS AND SOILS BLENDS" AS4419 <124µm
- f) DISPENSABILITY - AS SPECIFIED FOR "NATURAL SOILS AND SOIL BLENDS" AS4419 CATEGORY 1 OR 2
- g) TEXTURE - LOAMY SAND AS PER AS4419

5. PRIOR TO PLACEMENT OF THE FILTER MEDIA A STATEMENT IS TO BE SUBMITTED FROM A QUALIFIED HORTICULTURIST CONFIRMING THAT THE SOIL IS CAPABLE OF SUPPORTING A HEALTHY VEGETABLE COMMUNITY.

6. TESTS CONFIRMING THE REQUIREMENTS OF ITEMS 1 TO 4 ARE TO BE SUBMITTED FOR APPROVAL PRIOR TO PLACEMENT OF FILTER MEDIA.

B) DRAINAGE LAYER A

DRAINAGE LAYER MATERIAL IS TO BE CLEAN, FINE GRAVEL, SUCH AS A 2 - 5mm WASHED SCREENING, THE PARTICLE SIZE DISTRIBUTION TO BE: D₁₅ (DRAINAGE LAYER) < 5 x D₈₅ (TRANSITION LAYER)

WHERE: D₁₅ (DRAINAGE LAYER) IS THE 15th PERCENTILE PARTICLE SIZE IN THE TRANSITION LAYER MATERIAL (i.e. 15% OF THE SAND IS SMALLER THAN D₁₅ mm), AND D₈₅ (TRANSITION LAYER) IS THE 85th PERCENTILE PARTICLE SIZE IN THE FILTER MEDIA.

C) DRAINAGE LAYER B

10-20mm CLEAN GRAVEL WITH 2% VOLUME FINE STRAW AND 4-6% VOLUME HARDWOOD CHIPS.

INSTALLATION:

FILTER MATERIAL IS TO BE LIGHTLY COMPACTED E.G. A SINGLE PASS WITH A DRUM LAWN ROLLER. UNDER NO CIRCUMSTANCES SHOULD HEAVY EQUIPMENT OR MULTIPLE PASSES BE MADE. FILTER MEDIA SHOULD BE INSTALLED IN TWO LIFTS UNLESS THE DEPTH IS LESS THAN 500mm.

FINISHED SURFACE LEVELS

1. ALL FINISHED SURFACE LEVELS ARE ±200mm U.N.O.



CONTRACTOR SHALL CALL;
DIAL BEFORE
YOU DIG 1100
PRIOR TO COMMENCEMENT OF WORK
TO OBTAIN ALL CURRENT SERVICE
AUTHORITY PLANS

B	ISSUED FOR DEVELOPMENT APPLICATION	19-04-21
A	ISSUED FOR DEVELOPMENT APPLICATION	22-12-20
Issue	Description	Date


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Client	

Scales	N.T.S.	Drawn	PDK
		Designed	PDK
Grid	GDA94 MGA56	Checked	TM
Height Datum	AHD	Approved	

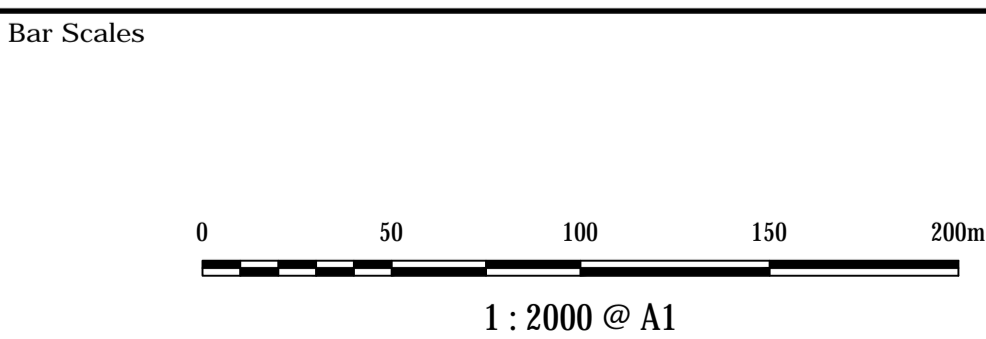
Project	PROPOSED INDUSTRIAL DEVELOPMENT ABBOTTS ROAD KEMPS CREEK
Title	GENERAL NOTES

Civil Engineers and Project Managers	
 Level 7, 153 Walker Street North Sydney NSW 2060 ABN 96 130 882 405 Tel: 02 9439 1777 Fax: 02 9923 1055 www.atl.net.au info@atl.net.au	
Status	PRELIMINARY NOT TO BE USED FOR CONSTRUCTION
Project - Drawing No.	20-748-C1002
Issue	B



ALL LEVELS SHOWN ± 2000mm U.N.O

B	ISSUED FOR DEVELOPMENT APPLICATION	19-04-21
A	ISSUED FOR DEVELOPMENT APPLICATION	22-12-20
Issue	Description	Date



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COPIED OR REPRODUCED IN
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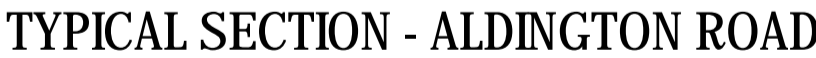
Scales	1 : 2000	Drawn	PDK
		Designed	PDK
Grid	GDA94 MGA56	Checked	TM
Height Datum	AHD	Approved	

Project	PROPOSED INDUSTRIAL DEVELOPMENT ABBOTTS ROAD KEMPS CREEK
Title	GENERAL ARRANGEMENT PLAN



Civil Engineers and Project Managers	
Level 7, 153 Walker Street North Sydney NSW 2060 ABN 96 130 882 405 Tel: 02 9439 1777 Fax: 02 9923 1055 www.atl.net.au info@atl.net.au	
Status	PRELIMINARY
NOT TO BE USED FOR CONSTRUCTION	
Project - Drawing No.	20-748-C1005
Issue	B





SCALE 1:50

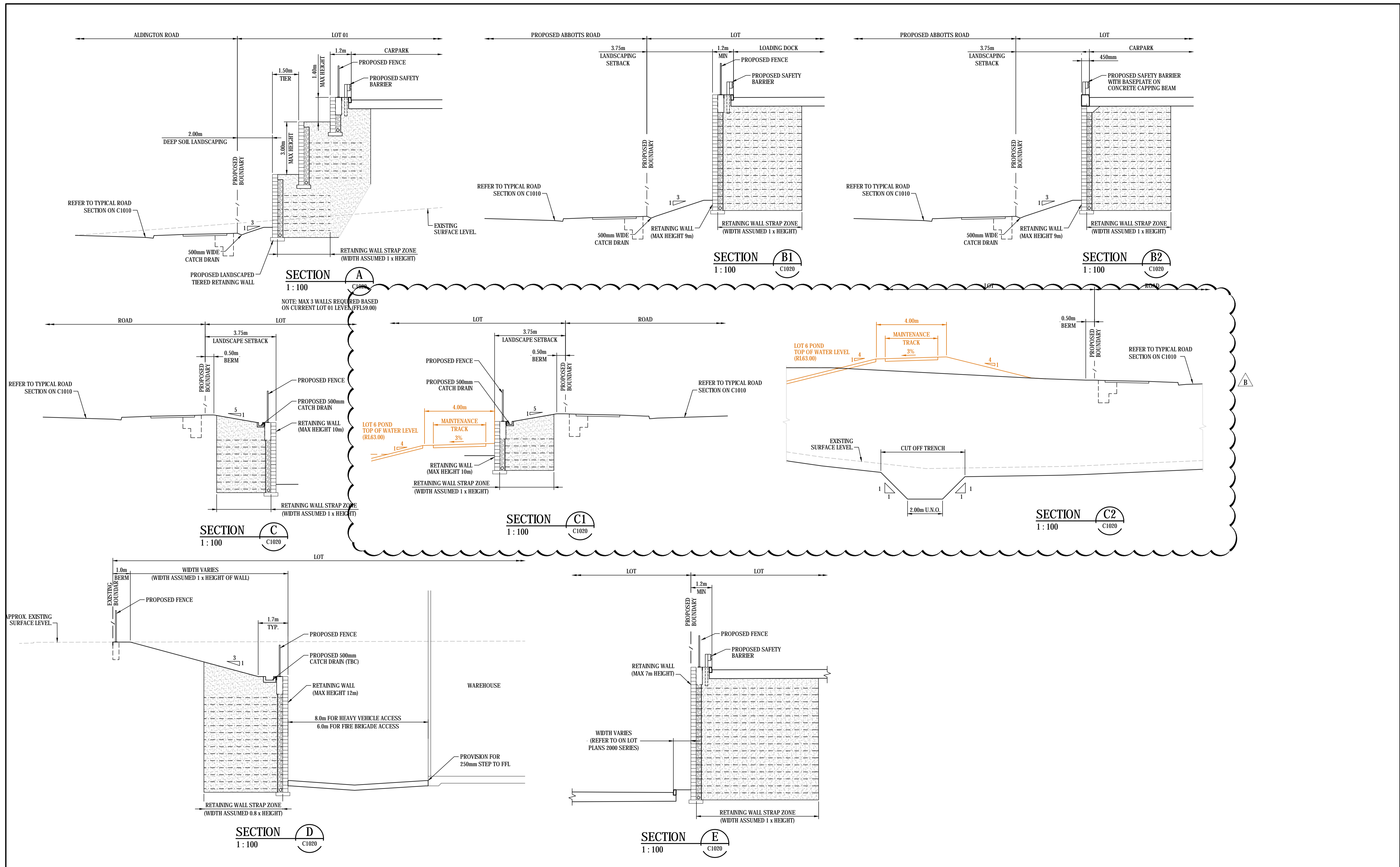


SCALE 1:50

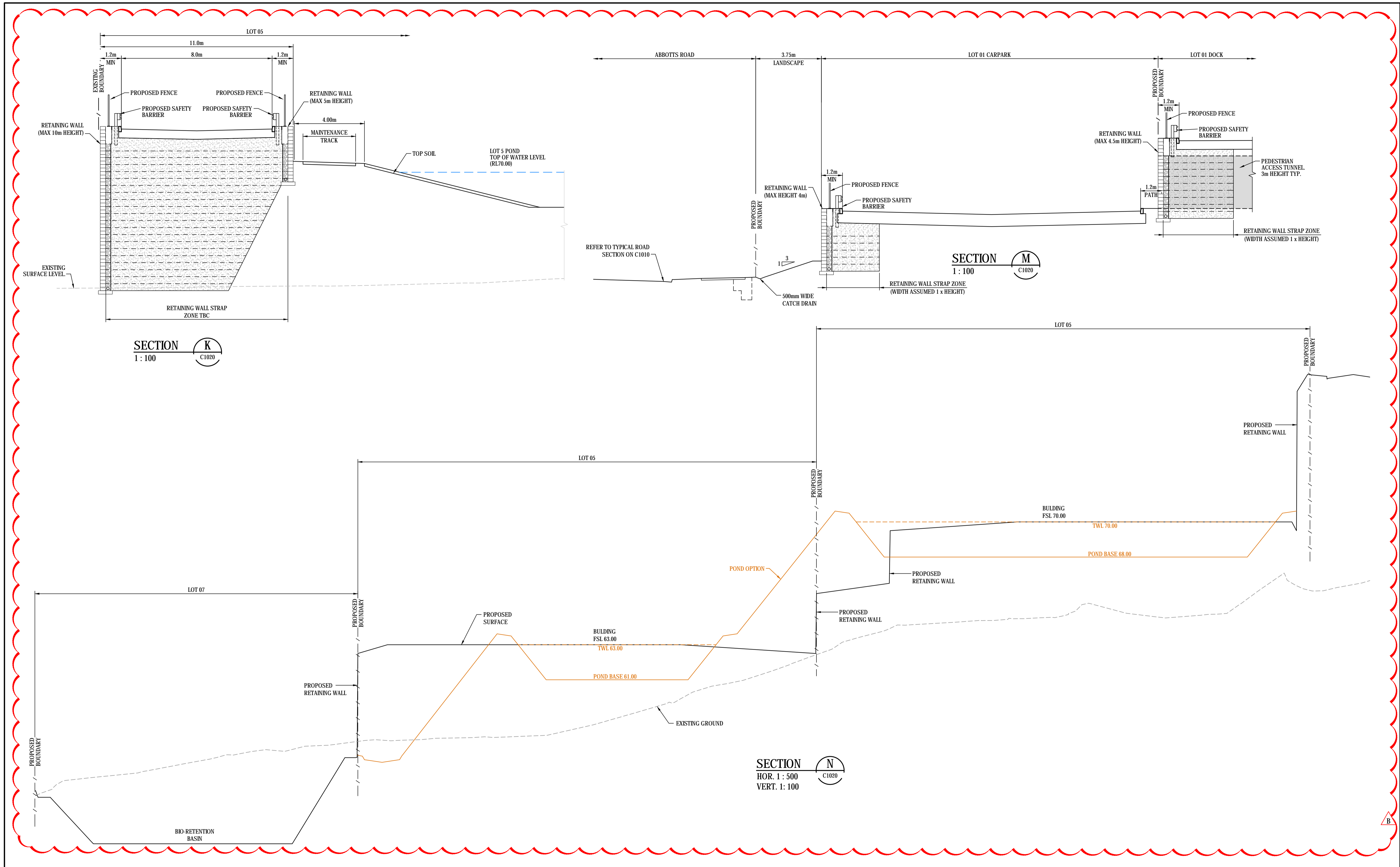
			Bar Scales	THIS DRAWING CANNOT BE COPIED OR REPRODUCED IN ANY FORM OR USED FOR ANY OTHER PURPOSE OTHER THAN THAT ORIGINALLY INTENDED WITHOUT THE WRITTEN PERMISSION OF AT&L	<div>Client</div> <div></div>	<div>Scales</div> <div>AS SHOWN</div>	<div>Drawn</div> <div>Designed</div>	<div>PDK</div> <div>PDK</div>	<div>Project</div> <div>PROPOSED INDUSTRIAL DEVELOPMENT ABBOTTS ROAD KEMPS CREEK</div>	<div>Civil Engineers and Project Managers</div> <div></div> <div>Level 7, 153 Walker Street North Sydney NSW 2060 ABN 96 130 882 405 Tel: 02 9439 1777 Fax: 02 9923 1055 www.atl.net.au info@atl.net.au</div>				
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											<div>Height Datum</div> <div>AHD</div>	<div>Approved</div>		
												<div>Title</div> <div>TYPICAL ROAD SECTIONS SHEET 1</div>		
B	ISSUED FOR DEVELOPMENT APPLICATION	19-04-21										<div>Status</div> <div>PRELIMINARY</div>	<div>A1</div>	
A	ISSUED FOR DEVELOPMENT APPLICATION	22-12-20										<div>NOT TO BE USED FOR CONSTRUCTION</div>		
Issue	Description	Date										<div>Project - Drawing No.</div> <div>20-748-C1010</div>		<div>Issue</div> <div>B</div>



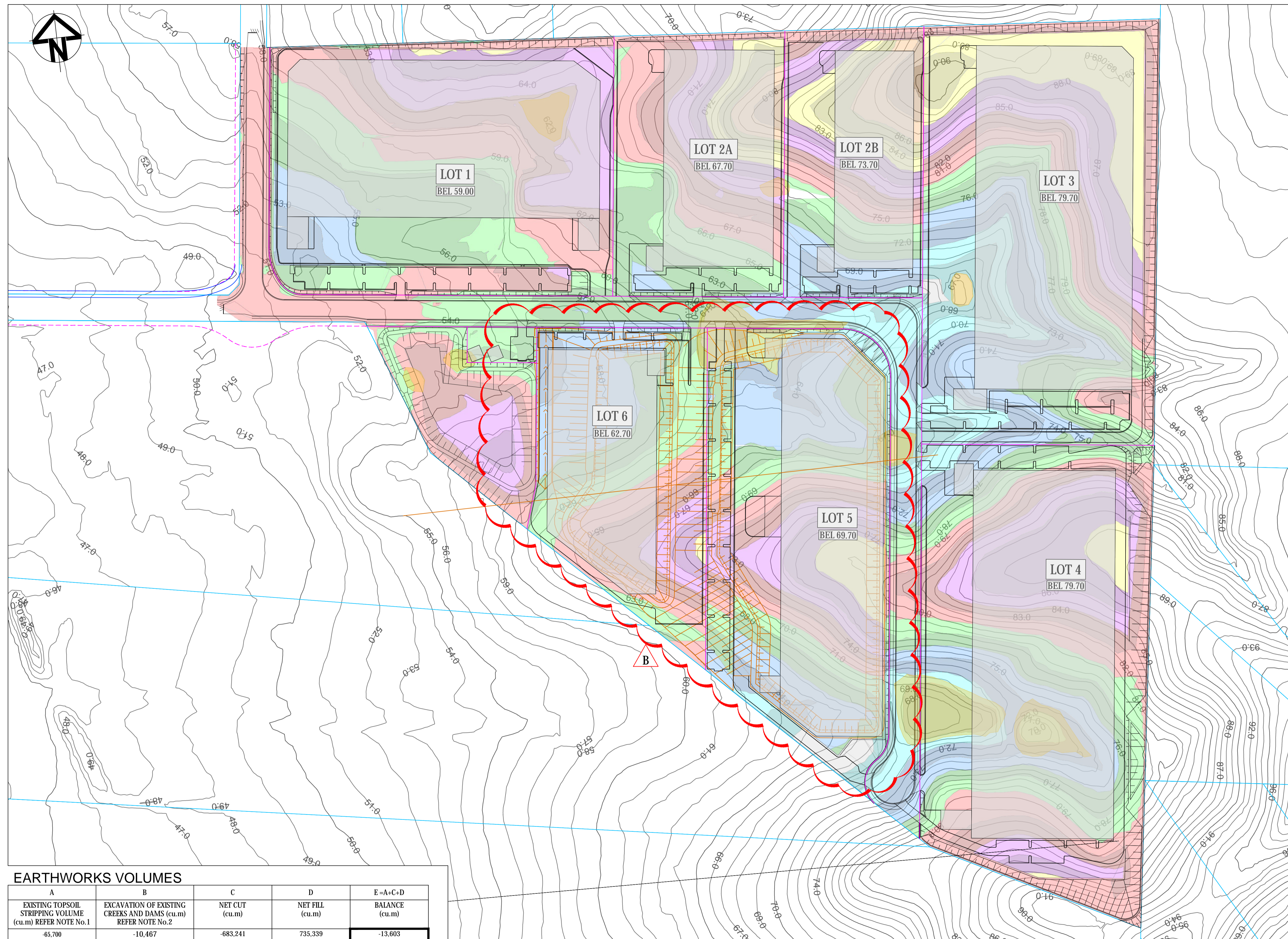
			Bar Scales	THIS DRAWING CANNOT BE COPIED OR REPRODUCED IN ANY FORM OR USED FOR ANY OTHER PURPOSE OTHER THAN THAT ORIGINALLY INTENDED WITHOUT THE WRITTEN PERMISSION OF AT&L	Client 	<table><tr><td rowspan="2">Scales</td><td rowspan="2">AS SHOWN</td><td>Drawn</td><td>PDK</td></tr><tr><td>Designed</td><td>PDK</td></tr><tr><td>Grid</td><td>GDA94 MGA56</td><td>Checked</td><td>TM</td></tr><tr><td>Height Datum</td><td>AHD</td><td>Approved</td><td></td></tr></table>	Scales	AS SHOWN	Drawn	PDK	Designed	PDK	Grid	GDA94 MGA56	Checked	TM	Height Datum	AHD	Approved		<table><tr><td rowspan="2">Project</td><td>PROPOSED INDUSTRIAL DEVELOPMENT ABBOTTS ROAD KEMPS CREEK</td></tr><tr><td>Title</td></tr></table>	Project	PROPOSED INDUSTRIAL DEVELOPMENT ABBOTTS ROAD KEMPS CREEK	Title	Civil Engineers and Project Managers  <div>Level 7, 153 Walker Street North Sydney NSW 2060 ABN 96 130 882 405 Tel: 02 9439 1777 Fax: 02 9923 1055 www.atl.net.au info@atl.net.au</div>
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B	ISSUED FOR DEVELOPMENT APPLICATION	19-04-21	<table><tr><td>Status</td><td>PRELIMINARY</td><td rowspan="2">A1</td></tr><tr><td colspan="2">NOT TO BE USED FOR CONSTRUCTION</td></tr><tr><td colspan="2">Project - Drawing No.</td><td>Issue</td></tr><tr><td colspan="2">20-748-C1011</td><td>B</td></tr></table>	Status	PRELIMINARY	A1	NOT TO BE USED FOR CONSTRUCTION		Project - Drawing No.		Issue	20-748-C1011		B											
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

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LEGEND	
<u>EXISTING</u>	EXISTING BOUNDARY
60.0	EXISTING CONTOUR
	EXTENT OF EXCAVATION OF EXISTING DAMS
<u>PROPOSED</u>	PROPOSED BOUNDARY
BEL 70.25	WAREHOUSE BULK EARTHWORKS PAD LEVEL
	INDICATIVE POND LAYOUT

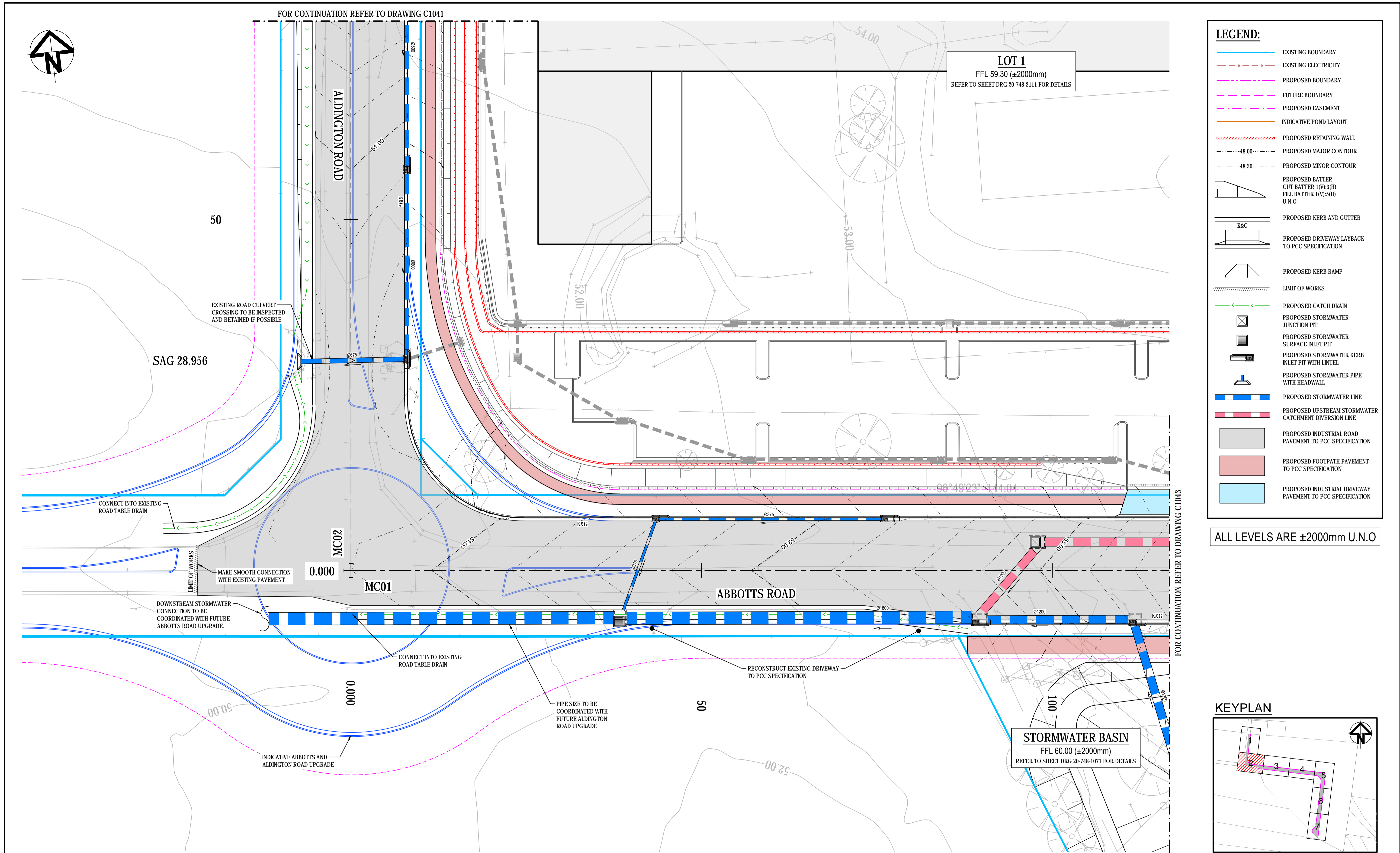
CUTFILL DEPTH RANGE			LEGEND
Lower_value		Upper_value	Colour
-18.0	to	-16.0 m	
-16.0	to	-14.0 m	
-14.0	to	-12.0 m	
-12.0	to	-10.0 m	
-10.0	to	-8.0 m	
-8.0	to	-6.0 m	
-6.0	to	-4.0 m	
-4.0	to	-2.0 m	
-2.0	to	0.0 m	
0.0	to	2.0 m	
2.0	to	4.0 m	
4.0	to	6.0 m	
6.0	to	8.0 m	
8.0	to	10.0 m	
10.0	to	12.0 m	
12.0	to	14.0 m	
14.0	to	16.0 m	
16.0	to	18.0 m	

- ## NOTES
1. EXISTING TOPSOIL STRIPPED 200mm
 2. ADDITIONAL EXCAVATION OF EXISTING DAMS WITHIN SITE AREA TO A DEPTH OF 1m BELOW EXISTING INVERT AND WIDTH OF EXISTING DAM EXTENT. VOLUMES ARE APPROXIMATE.
 3. EXCAVATED MATERIAL TO BE FARMED AND USED AS GENERAL FILL WITHIN FILL ZONES 2m BELOW FINAL SURFACE
 4. NEGATIVE BALANCE VOLUMES INDICATE EXCES OF MATERIAL. (EXPORT).
 4. ROAD PAVEMENT DEPTH ASSUMED 700mm.
 5. ON LOT PAVEMENT DEPTH ASSUMED 300mm
 6. THE VOLUMES DO NOT TAKE INTO ACCOUNT TH FOLLOWING:-
 - 6.1. BULKING FACTORS OF REMOVED CUT
 - 6.2. REMOVAL OF EXISTING BUILDING SLABS AND PAVEMENTS
 - 6.3. REMOVAL AND/OR REMEDIATION OF ANY EXISTING UNCONTROLLED FILL
 - 6.4. PROPOSED LANDSCAPING
 - 6.5. STORMWATER AND UTILITY TRENCHING
 - 6.6. EROSION AND SEDIMENTATION CONTROL SWALES AND BASINS.

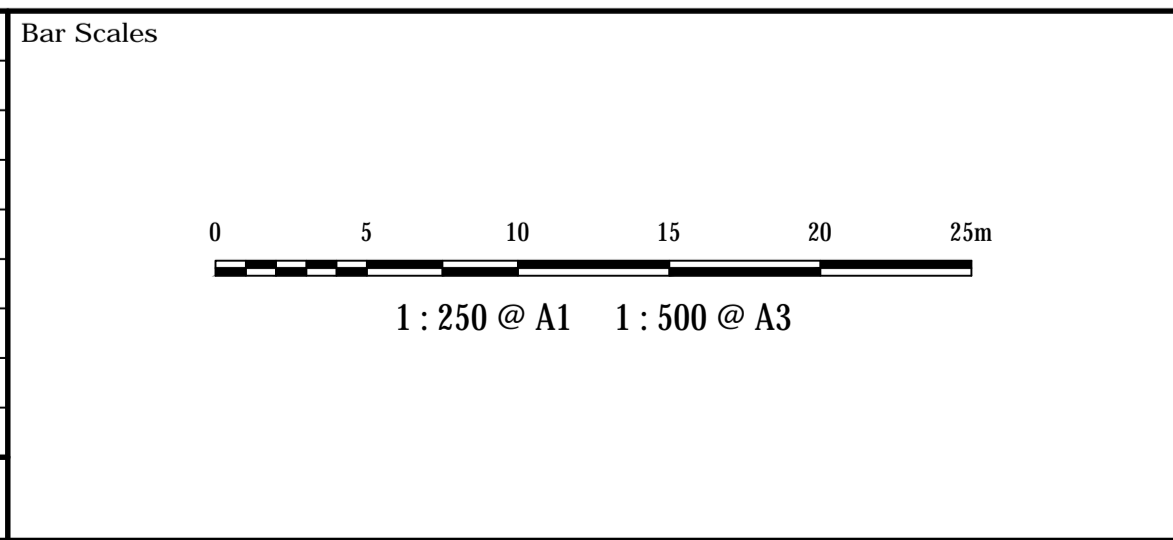
EARTHWORKS VOLUMES				
A	B	C	D	E = A+C+D
EXISTING TOPSOIL STRIPPING VOLUME (cu.m) REFER NOTE No.1	EXCAVATION OF EXISTING CREEKS AND DAMS (cu.m) REFER NOTE No.2	NET CUT (cu.m)	NET FILL (cu.m)	BALANCE (cu.m)
-65,700	-10,467	-683,241	735,339	-13,603

ALL LEVELS SHOWN ARE $\pm 2000\text{mm}$ U.N.C

[illegible]



B	ISSUED FOR DEVELOPMENT APPLICATION	19-04-21
A	ISSUED FOR DEVELOPMENT APPLICATION	22-12-20
Issue	Description	Date



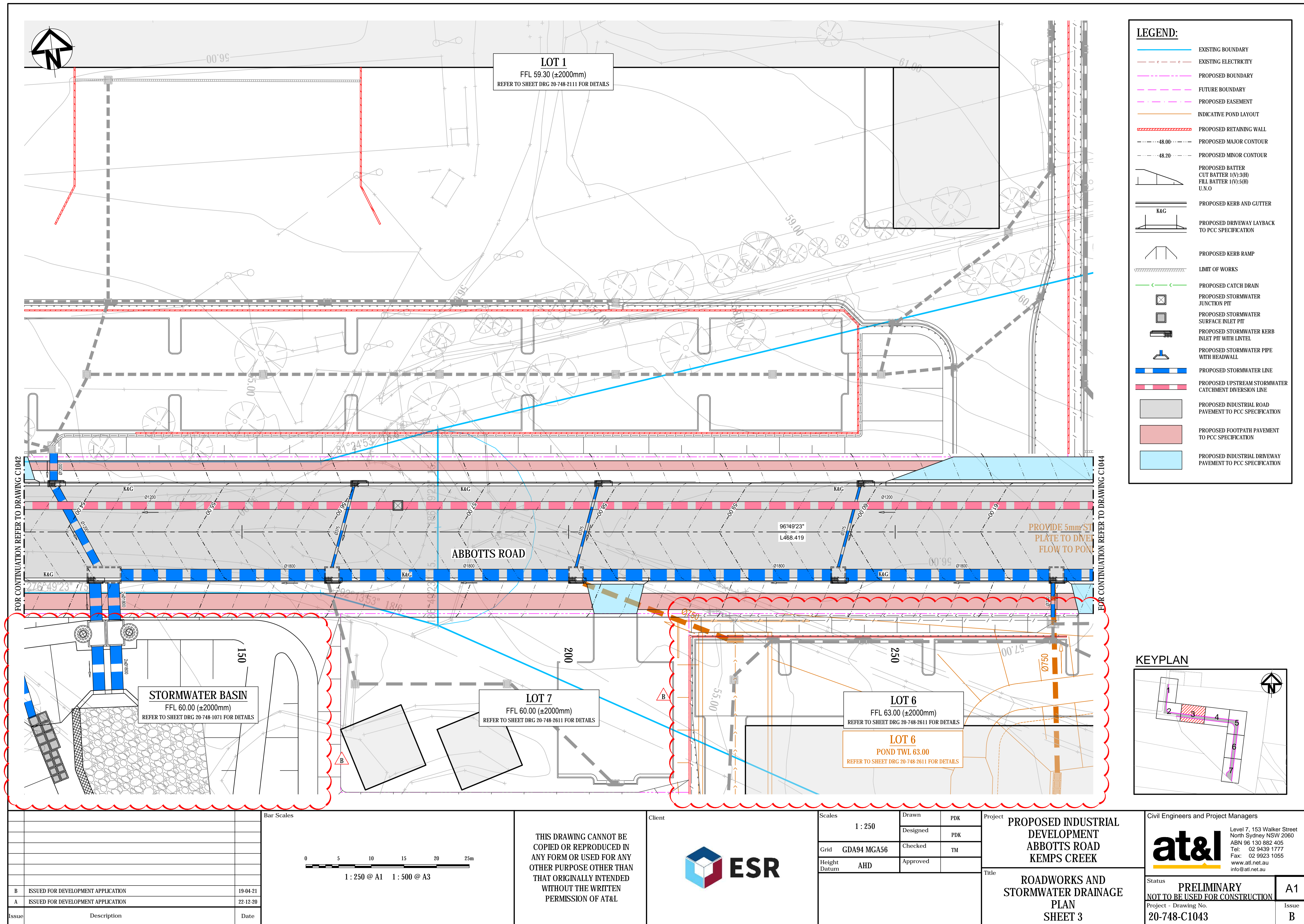
THIS DRAWING CANNOT BE COPIED OR REPRODUCED IN ANY FORM OR USED FOR ANY OTHER PURPOSE OTHER THAN THAT ORIGINALLY INTENDED WITHOUT THE WRITTEN PERMISSION OF AT&L

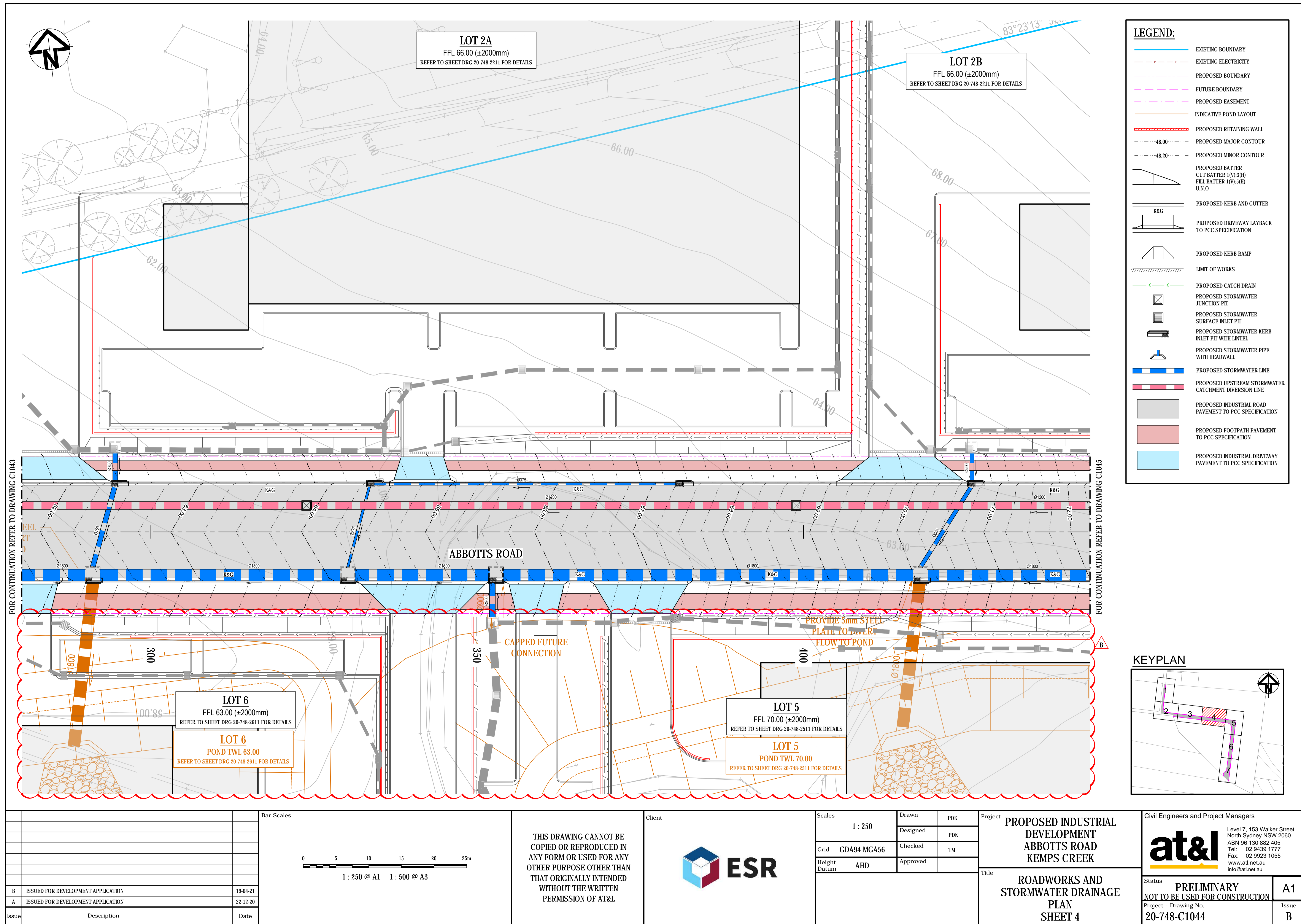


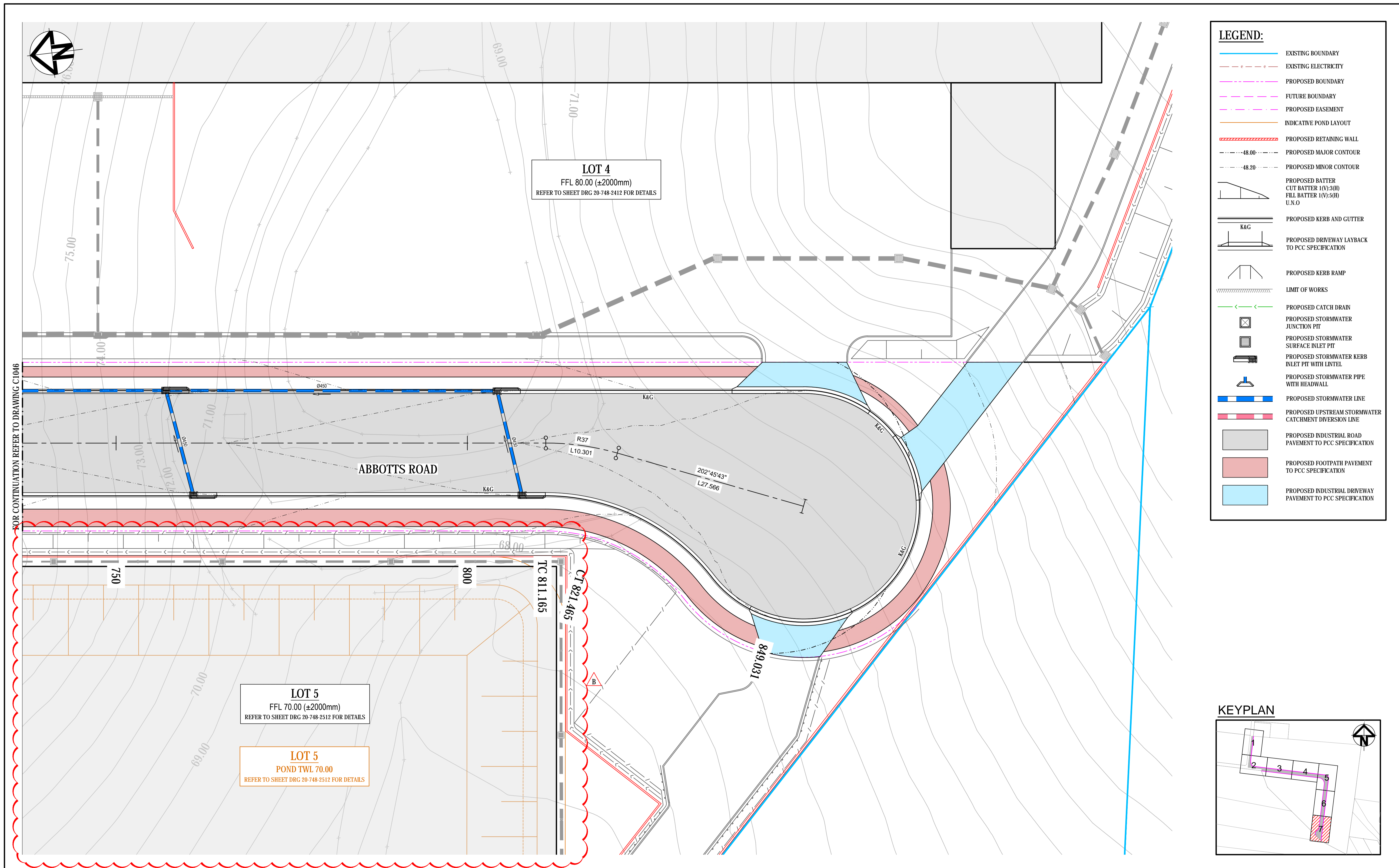
Scales	1 : 250	Drawn	PDK
		Designed	PDK
Grid	GDA94 MGA56	Checked	TM
Height Datum	AHD	Approved	



Project	PROPOSED INDUSTRIAL DEVELOPMENT ABBOTTS ROAD KEMPS CREEK
Title	ROADWORKS AND STORMWATER DRAINAGE PLAN SHEET 2

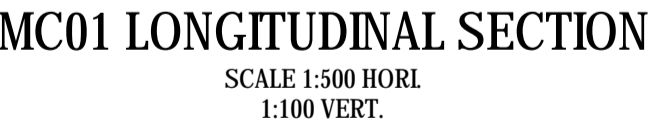
Civil Engineers and Project Managers		
Level 7, 153 Walker Street North Sydney NSW 2060 ABN 96 130 882 405 Tel: 02 9439 1777 Fax: 02 9923 1055 www.atl.net.au info@atl.net.au		
Status	PRELIMINARY NOT TO BE USED FOR CONSTRUCTION	A1
Project - Drawing No.	20-748-C1042	Issue B



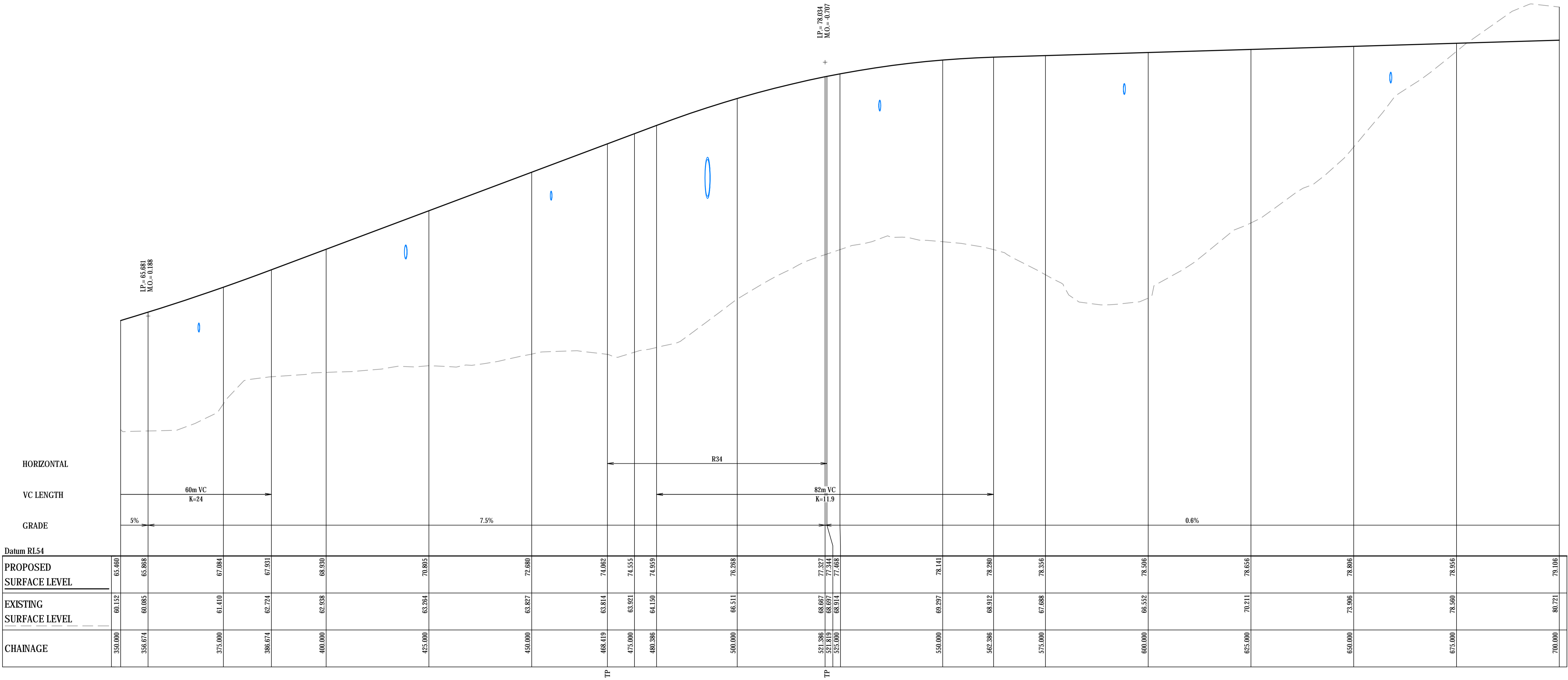




			Bar Scales	<p>THIS DRAWING CANNOT BE COPIED OR REPRODUCED IN ANY FORM OR USED FOR ANY OTHER PURPOSE OTHER THAN THAT ORIGINALLY INTENDED WITHOUT THE WRITTEN PERMISSION OF AT&L</p>	<p>Client</p> <div></div>	<table><tr><td rowspan="2">Scales</td><td rowspan="2">1 : 250</td><td>Drawn</td><td>PDK</td></tr><tr><td>Designed</td><td>PDK</td></tr><tr><td>Grid</td><td>GDA94 MGA56</td><td>Checked</td><td>TM</td></tr><tr><td>Height Datum</td><td>AHD</td><td>Approved</td><td></td></tr></table>	Scales	1 : 250	Drawn	PDK	Designed	PDK	Grid	GDA94 MGA56	Checked	TM	Height Datum	AHD	Approved		<table><tr><td>Project</td><td>PROPOSED INDUSTRIAL DEVELOPMENT ABBOTTS ROAD KEMPS CREEK</td></tr><tr><td>Title</td><td>ROADWORKS AND STORMWATER DRAINAGE PLAN SHEET 7</td></tr></table>	Project	PROPOSED INDUSTRIAL DEVELOPMENT ABBOTTS ROAD KEMPS CREEK	Title	ROADWORKS AND STORMWATER DRAINAGE PLAN SHEET 7	<p>Civil Engineers and Project Managers</p> <div><p>Level 7, 153 Walker Street North Sydney NSW 2060 ABN 96 130 882 405 Tel: 02 9439 1777 Fax: 02 9923 1055 www.atl.net.au info@atl.net.au</p></div>
Scales	1 : 250	Drawn	PDK																							
		Designed	PDK																							
Grid	GDA94 MGA56	Checked	TM																							
Height Datum	AHD	Approved																								
Project	PROPOSED INDUSTRIAL DEVELOPMENT ABBOTTS ROAD KEMPS CREEK																									
Title	ROADWORKS AND STORMWATER DRAINAGE PLAN SHEET 7																									
B	ISSUED FOR DEVELOPMENT APPLICATION	19-04-21																								
A	ISSUED FOR DEVELOPMENT APPLICATION	22-12-20																								
Issue	Description	Date																								
			<div><p>0 5 10 15 20 25m</p><p>1 : 250 @ A1 1 : 500 @ A3</p></div>																							



		Bar Scales	<div><div><div>0246810m</div><div>1 : 100 @ A1 1 : 200 @ A3</div></div><div><div>01020304050m</div><div>1 : 500 @ A1 1 : 1000 @ A3</div></div></div>	THIS DRAWING CANNOT BE COPIED OR REPRODUCED IN ANY FORM OR USED FOR ANY OTHER PURPOSE OTHER THAN THAT ORIGINALLY INTENDED WITHOUT THE WRITTEN PERMISSION OF AT&L	<div><div><div></div><div></div><div></div></div><div>ESR</div></div>	Client	Scales	1 : 100 V 1 : 500 H	Drawn	PDK	Project	PROPOSED INDUSTRIAL DEVELOPMENT ABBOTTS ROAD KEMPS CREEK	Civil Engineers and Project Managers	<div><div><div>at&l</div><div>Level 7, 153 Walker Street North Sydney NSW 2060 ABN 96 130 882 405 Tel: 02 9439 1777 Fax: 02 9923 1055 www.atl.net.au info@atl.net.au</div></div></div>	Title	ABBOTTS ROAD (MC01) LONGITUDINAL SECTION SHEET 1	Status	PRELIMINARY NOT TO BE USED FOR CONSTRUCTION	A1								
							Designed	PDK	Grid	GDA94 MGA56										Checked	TM	Height Datum	AHD	Project - Drawing No.	20-748-C1050	Issue	B
B	ISSUED FOR DEVELOPMENT APPLICATION						19-04-21																				
A	ISSUED FOR DEVELOPMENT APPLICATION	22-12-20																									
Issue	Description	Date																									



MC01 LONGITUDINAL SECTION
SCALE 1:500 HORL
1:100 VERT.

B	ISSUED FOR DEVELOPMENT APPLICATION	19-04-21
A	ISSUED FOR DEVELOPMENT APPLICATION	22-12-20
Issue	Description	Date

Bar Scales

0246810m

1 : 100 @ A1 1 : 200 @ A3

01020304050m

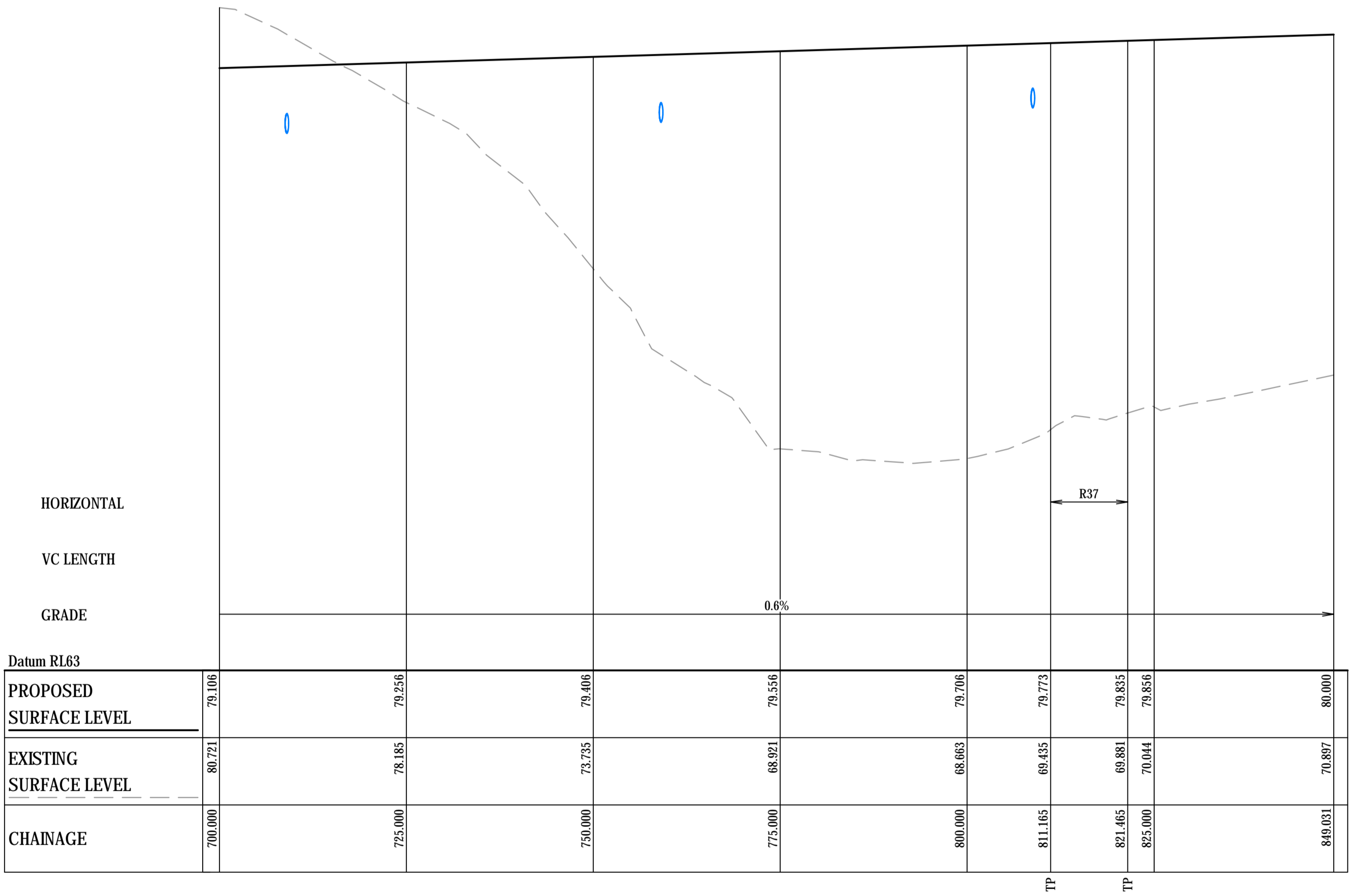
1 : 500 @ A1 1 : 1000 @ A3

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Client

Scales 1 : 100 V 1 : 500 H	Drawn	PDK
	Designed	PDK
Grid GDA94 MGA56	Checked	TM
Height Datum AHD	Approved	


Project PROPOSED INDUSTRIAL DEVELOPMENT ABBOTTS ROAD KEMPS CREEK	Civil Engineers and Project Managers	
	<div>Level 7, 153 Walker Street North Sydney NSW 2060 ABN 96 130 882 405 Tel: 02 9439 1777 Fax: 02 9923 1055 www.atl.net.au info@atl.net.au</div>	
Title ABBOTTS ROAD (MC01) LONGITUDINAL SECTION SHEET 2	Status PRELIMINARY NOT TO BE USED FOR CONSTRUCTION	A1
	Project - Drawing No. 20-748-C1051	Issue B

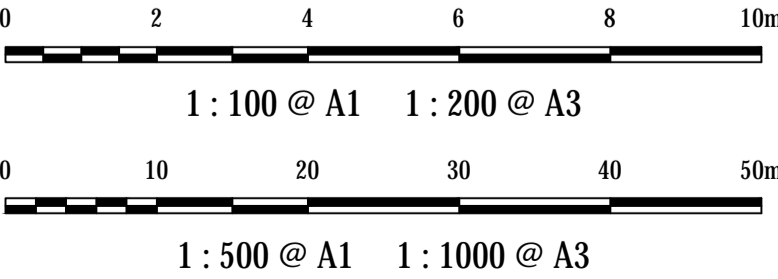


MC01 LONGITUDINAL SECTION

SCALE 1:500 HORI

1:100 VERT.

			Bar Scales	<p>THIS DRAWING CANNOT BE COPIED OR REPRODUCED IN ANY FORM OR USED FOR ANY OTHER PURPOSE OTHER THAN THAT ORIGINALLY INTENDED WITHOUT THE WRITTEN PERMISSION OF AT&L</p>	<div></div>	Scales	1 : 100 V	1 : 500 H	Drawn	PDK	Project	PROPOSED INDUSTRIAL DEVELOPMENT ABBOTTS ROAD KEMPS CREEK	Civil Engineers and Project Managers				
								Designed	PDK	Title				ABBOTTS ROAD (MC01) LONGITUDINAL SECTION SHEET 3	Status	PRELIMINARY	A1
								Checked	TM								
								Approved									
B	ISSUED FOR DEVELOPMENT APPLICATION	19-04-21															
A	ISSUED FOR DEVELOPMENT APPLICATION	22-12-20															
Issue	Description	Date															

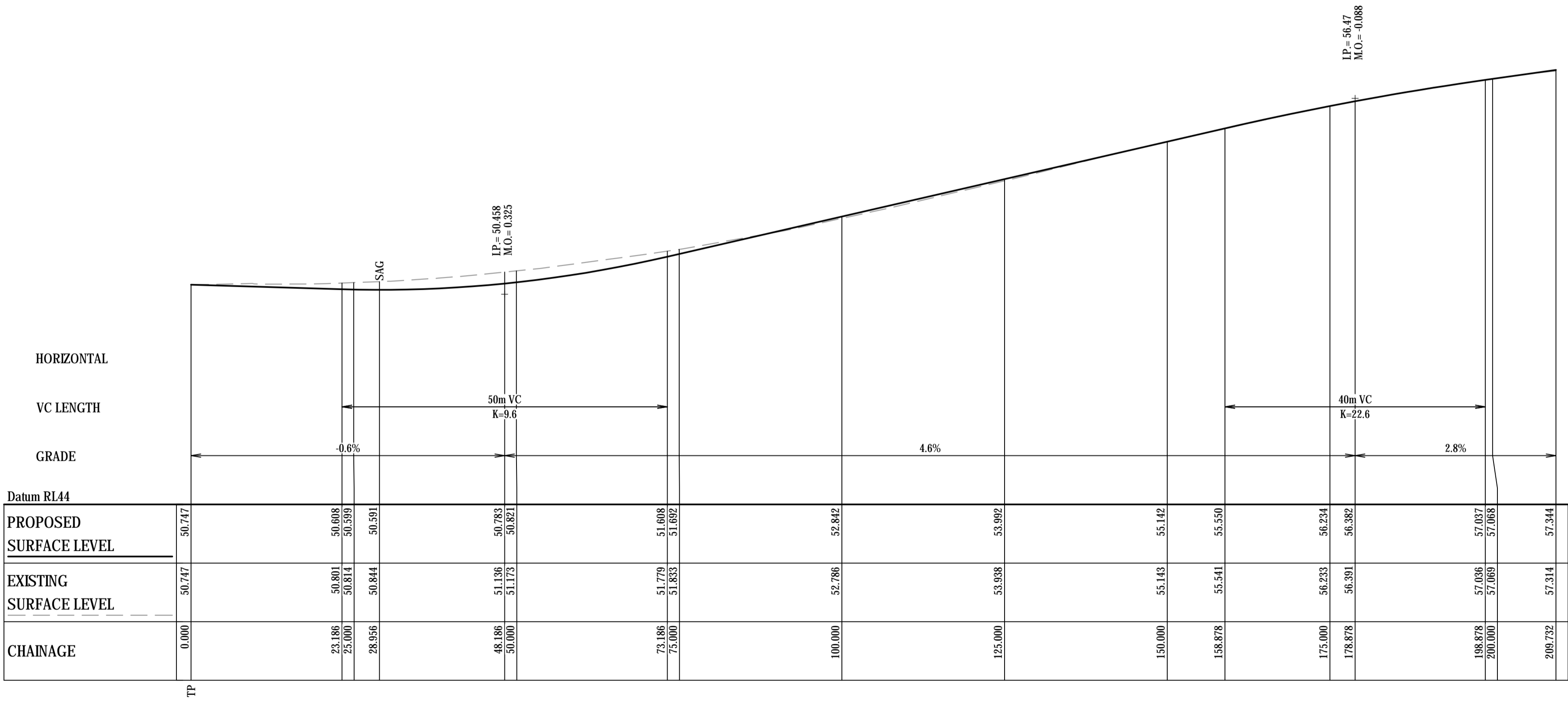


1 : 100 @ A1 1 : 200 @ A3



1 : 500 @ A1 1 : 1000 @ A3

100mm on Original

F:\20-748 ESR Mamre\6.0 Drgs\Civil\Final\SSDA\1000_INFRASTRUCTURE\20-748-C1052.dwg

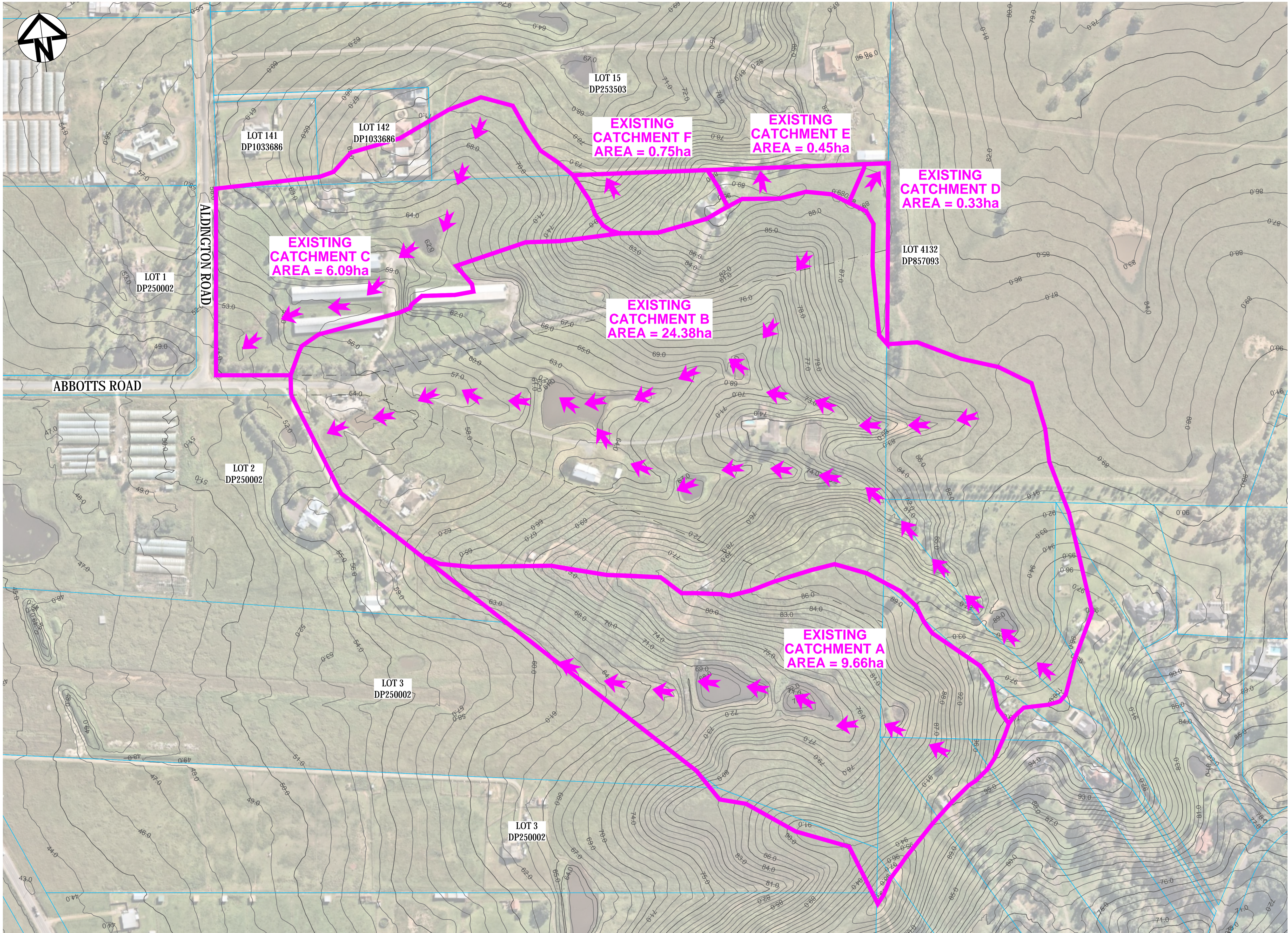


MC02 LONGITUDINAL SECTION
SCALE 1:500 HORIZ
1:100 VERT.

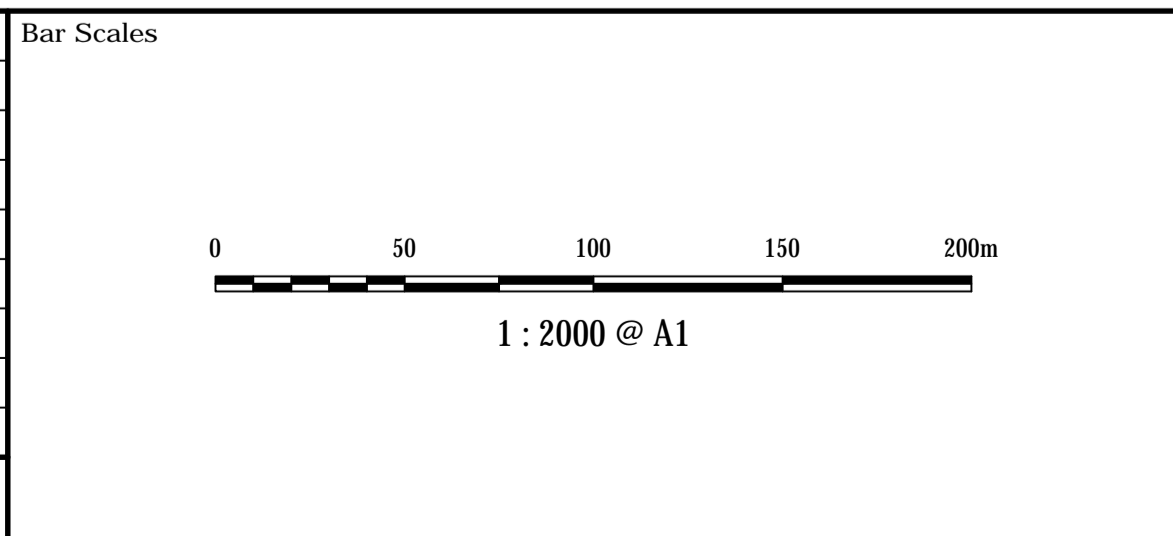
		Bar Scales		<p>THIS DRAWING CANNOT BE COPIED OR REPRODUCED IN ANY FORM OR USED FOR ANY OTHER PURPOSE OTHER THAN THAT ORIGINALLY INTENDED WITHOUT THE WRITTEN PERMISSION OF AT&L</p>	<p>Client</p> <div></div>	Scales 1 : 100 V 1 : 500 H		Drawn PDK	Project PROPOSED INDUSTRIAL DEVELOPMENT ABBOTTS ROAD KEMPS CREEK	Civil Engineers and Project Managers	
						Designed PDK	<div></div>	Level 7, 153 Walker Street North Sydney NSW 2060 ABN 96 130 882 405 Tel: 02 9439 1777 Fax: 02 9923 1055 www.atl.net.au info@atl.net.au			
						Checked TM		Status PRELIMINARY NOT TO BE USED FOR CONSTRUCTION		A1	
						Approved		Project - Drawing No. 20-748-C1055		Issue B	
Issue		Description				Date	Title ALDINGTON ROAD (MC02) LONGITUDINAL SECTION SHEET 1				

100mm on Original

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B	ISSUED FOR DEVELOPMENT APPLICATION	19-04-21
A	ISSUED FOR DEVELOPMENT APPLICATION	22-12-20
Issue	Description	Date



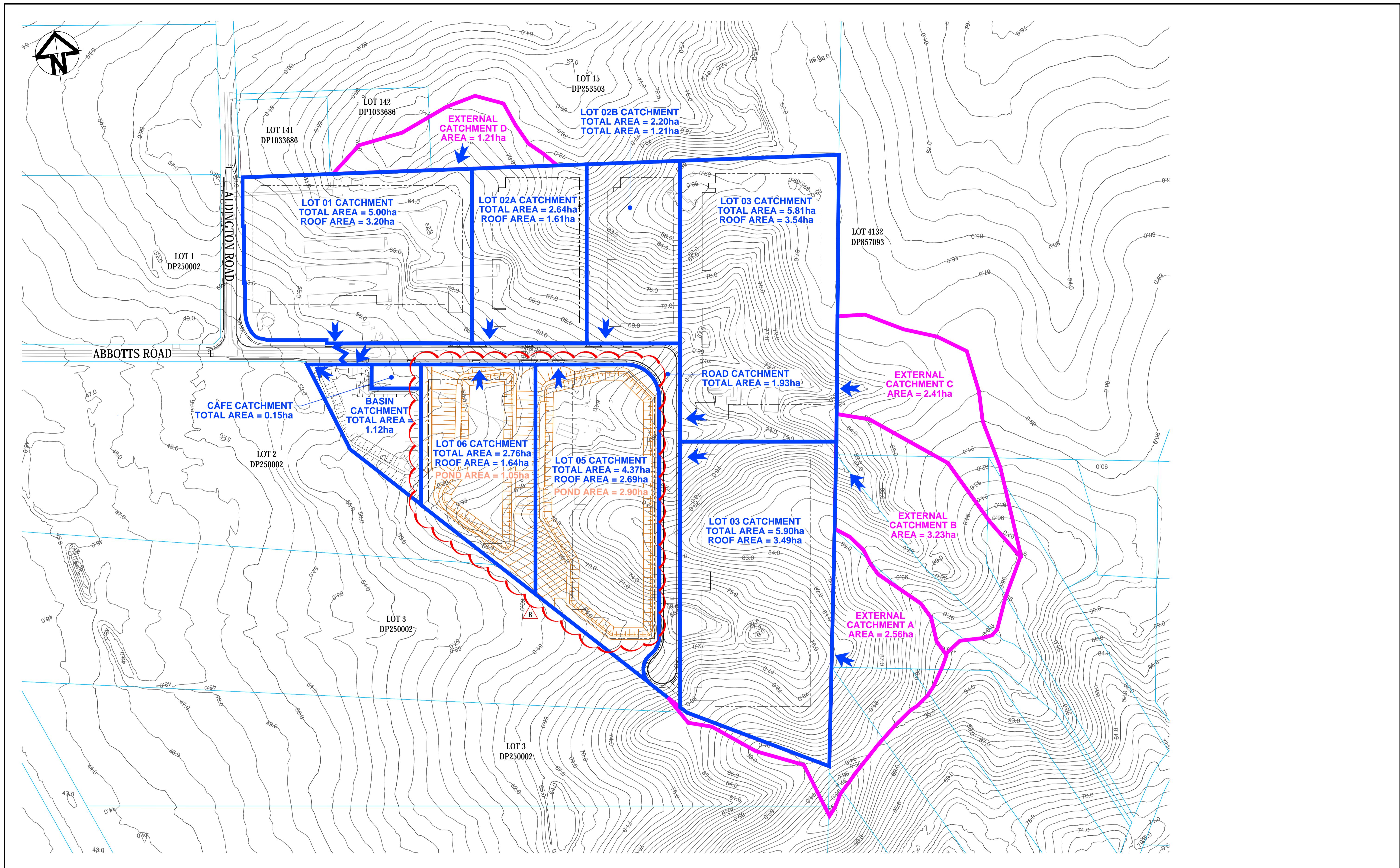
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ANY FORM OR USED FOR ANY
OTHER PURPOSE OTHER THAN
THAT ORIGINALLY INTENDED
WITHOUT THE WRITTEN
PERMISSION OF AT&L



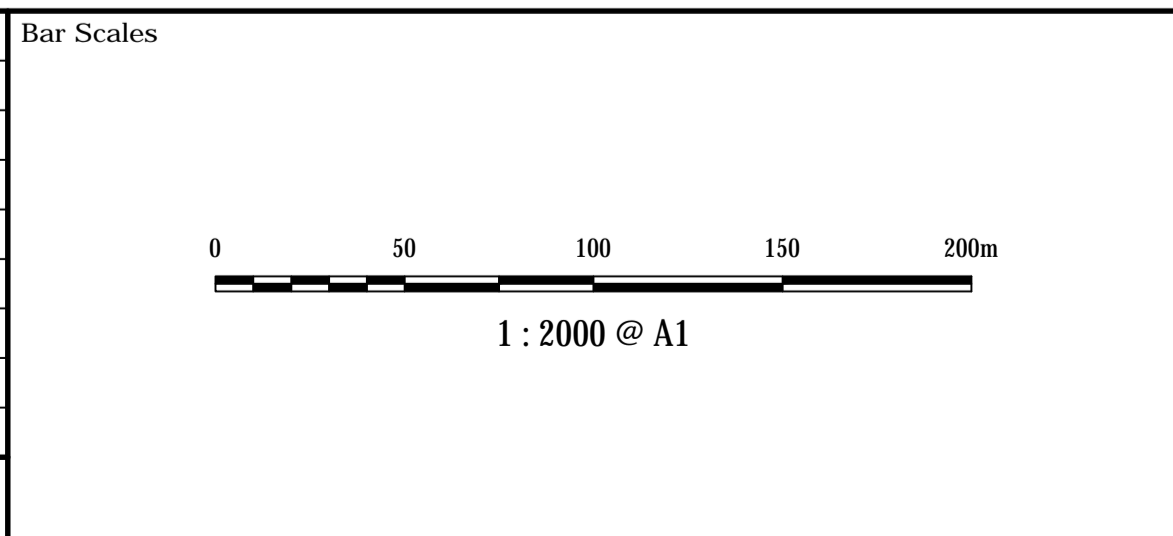
Scales	1 : 2000	Drawn	PDK
		Designed	PDK
Grid	GDA94 MGA56	Checked	TM
Height Datum	AHD	Approved	

Project	PROPOSED INDUSTRIAL DEVELOPMENT ABBOTTS ROAD KEMPS CREEK
Title	STORMWATER DRAINAGE CATCHMENT PLAN (PRE-DEVELOPED)

Civil Engineers and Project Managers		
Level 7, 153 Walker Street North Sydney NSW 2060 ABN 96 130 882 405 Tel: 02 9439 1777 Fax: 02 9923 1055 www.atl.net.au info@atl.net.au		
Status	PRELIMINARY NOT TO BE USED FOR CONSTRUCTION	A1
Project - Drawing No.	20-748-C1061	Issue B



B	ISSUED FOR DEVELOPMENT APPLICATION	19-04-21
A	ISSUED FOR DEVELOPMENT APPLICATION	22-12-20
Issue	Description	Date




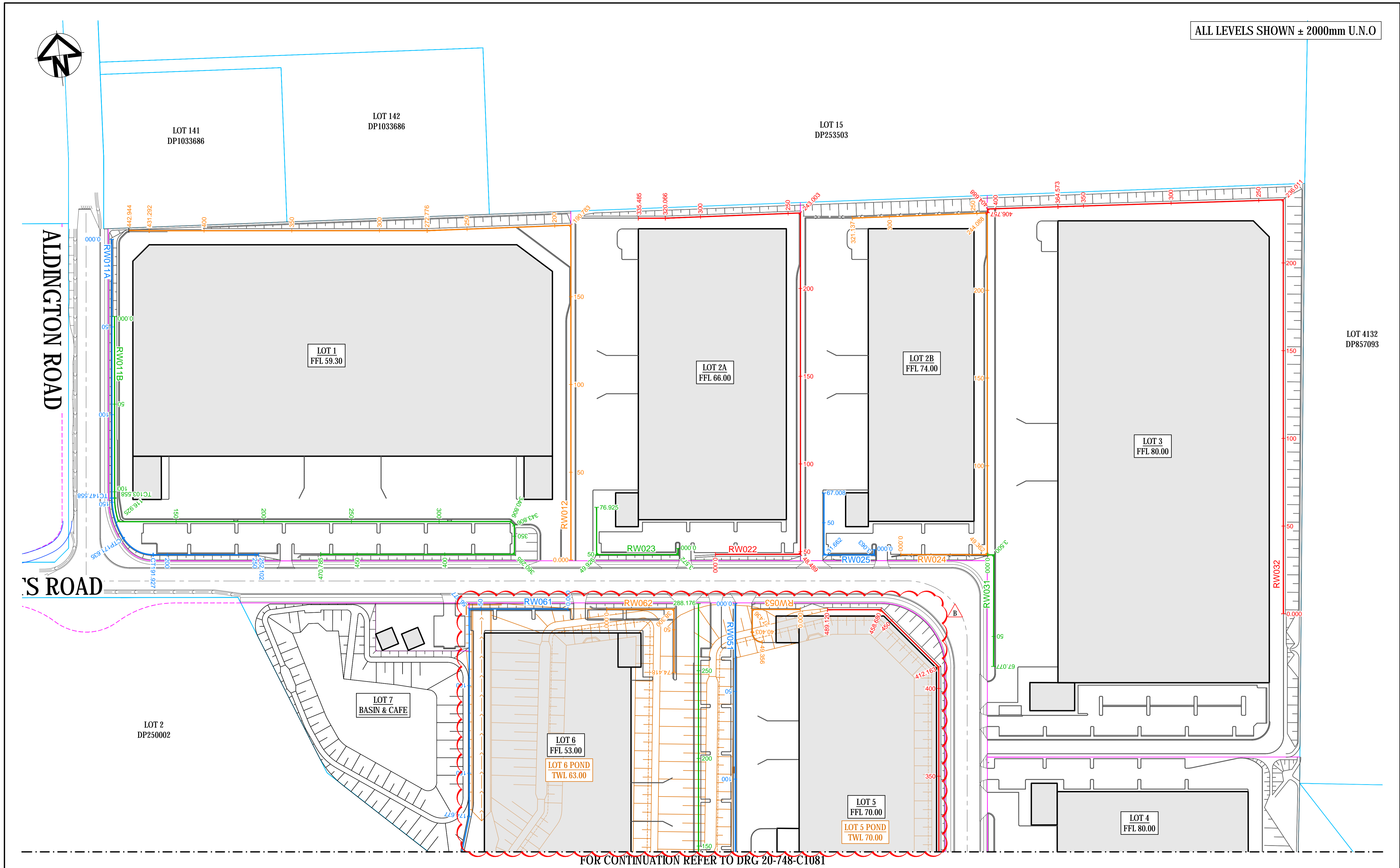
THIS DRAWING CANNOT BE COPIED OR REPRODUCED IN ANY FORM OR USED FOR ANY OTHER PURPOSE OTHER THAN THAT ORIGINALLY INTENDED WITHOUT THE WRITTEN PERMISSION OF AT&L



Scales	1 : 2000	Drawn	PDK
		Designed	PDK
Grid	GDA94 MGA56	Checked	TM
Height Datum	AHD	Approved	

Project	PROPOSED INDUSTRIAL DEVELOPMENT ABBOTTS ROAD KEMPS CREEK
Title	STORMWATER DRAINAGE CATCHMENT PLAN (POST-DEVELOPED)

Civil Engineers and Project Managers			
	Level 7, 153 Walker Street North Sydney NSW 2060 ABN 96 130 882 405 Tel: 02 9439 1777 Fax: 02 9923 1055 www.atl.net.au info@atl.net.au		
	Status	PRELIMINARY NOT TO BE USED FOR CONSTRUCTION	A1
	Project - Drawing No. 20-748-C1065		Issue B



B	ISSUED FOR DEVELOPMENT APPLICATION	19-04-21
A	ISSUED FOR DEVELOPMENT APPLICATION	22-12-20
Issue	Description	Date

Bar Scales

0 20 40 60 80 100m

1 : 1000 @ A1 1 : 2000 @ A3

THIS DRAWING CANNOT BE COPIED OR REPRODUCED IN ANY FORM OR USED FOR ANY OTHER PURPOSE OTHER THAN THAT ORIGINALLY INTENDED WITHOUT THE WRITTEN PERMISSION OF AT&L

Client

Scales	1 : 1000	Drawn	PDK
		Designed	PDK
Grid	GDA94 MGA56	Checked	TM
Height Datum	AHD	Approved	

Project

PROPOSED INDUSTRIAL DEVELOPMENT
ABBOTTS ROAD
KEMPS CREEK

Title

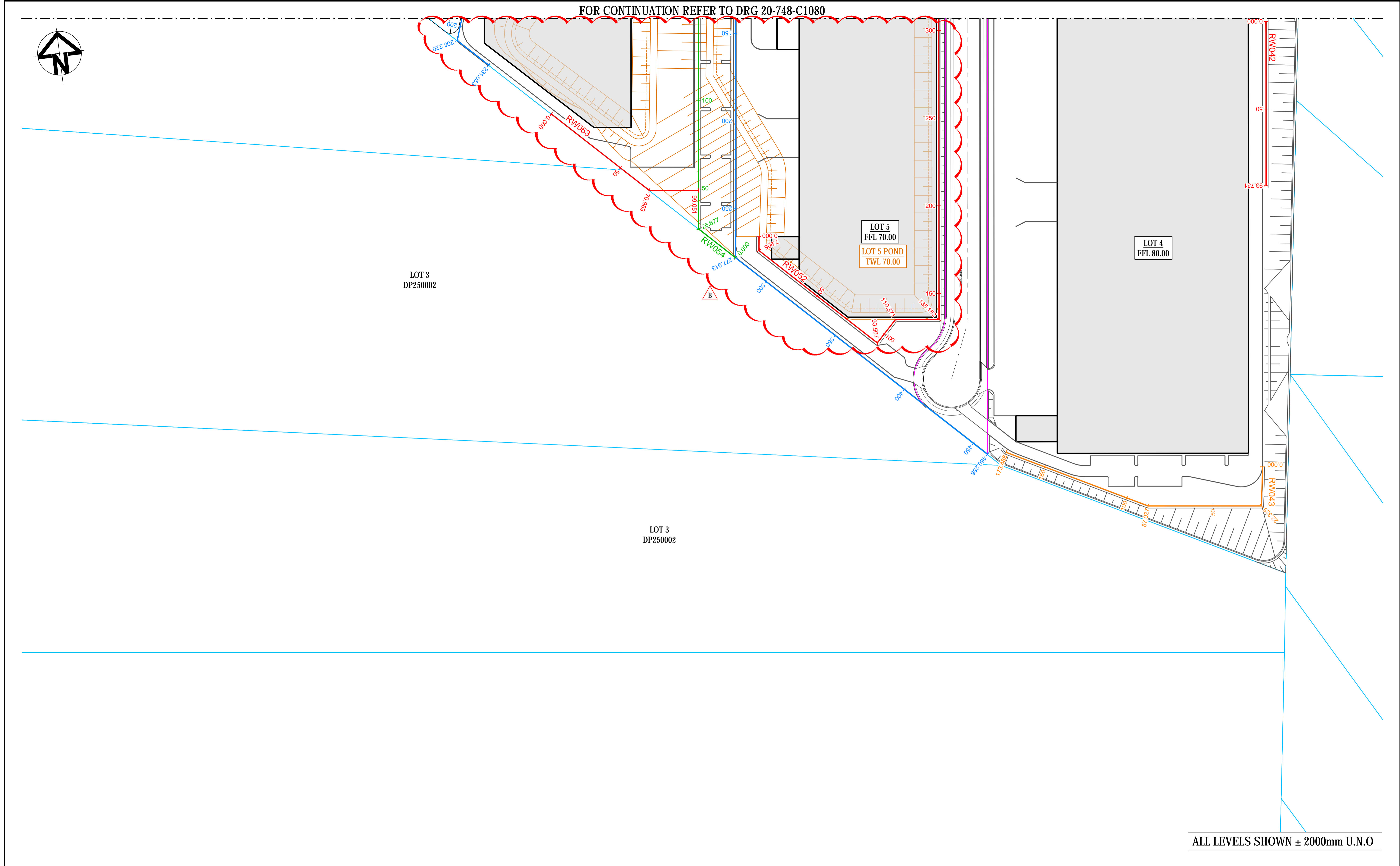
RETAINING WALL
GENERAL ARRANGEMENT
PLAN
SHEET 1

Civil Engineers and Project Managers

at&l

Level 7, 153 Walker Street
North Sydney NSW 2060
ABN 96 130 882 405
Tel: 02 9439 1777
Fax: 02 9923 1055
www.atl.net.au
info@atl.net.au

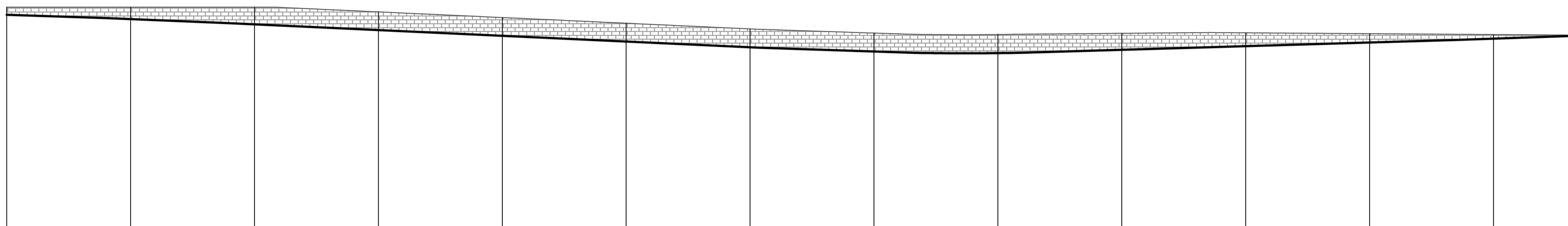
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Project - Drawing No.	20-748-C1080	Issue B



		<div>Bar Scales</div> 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NOTES:
ALL FINISHED LEVELS ARE $\pm 2000\text{mm}$ U.N.O
REFER TO DRG C1020 FOR TYPICAL WALL SECTIONS

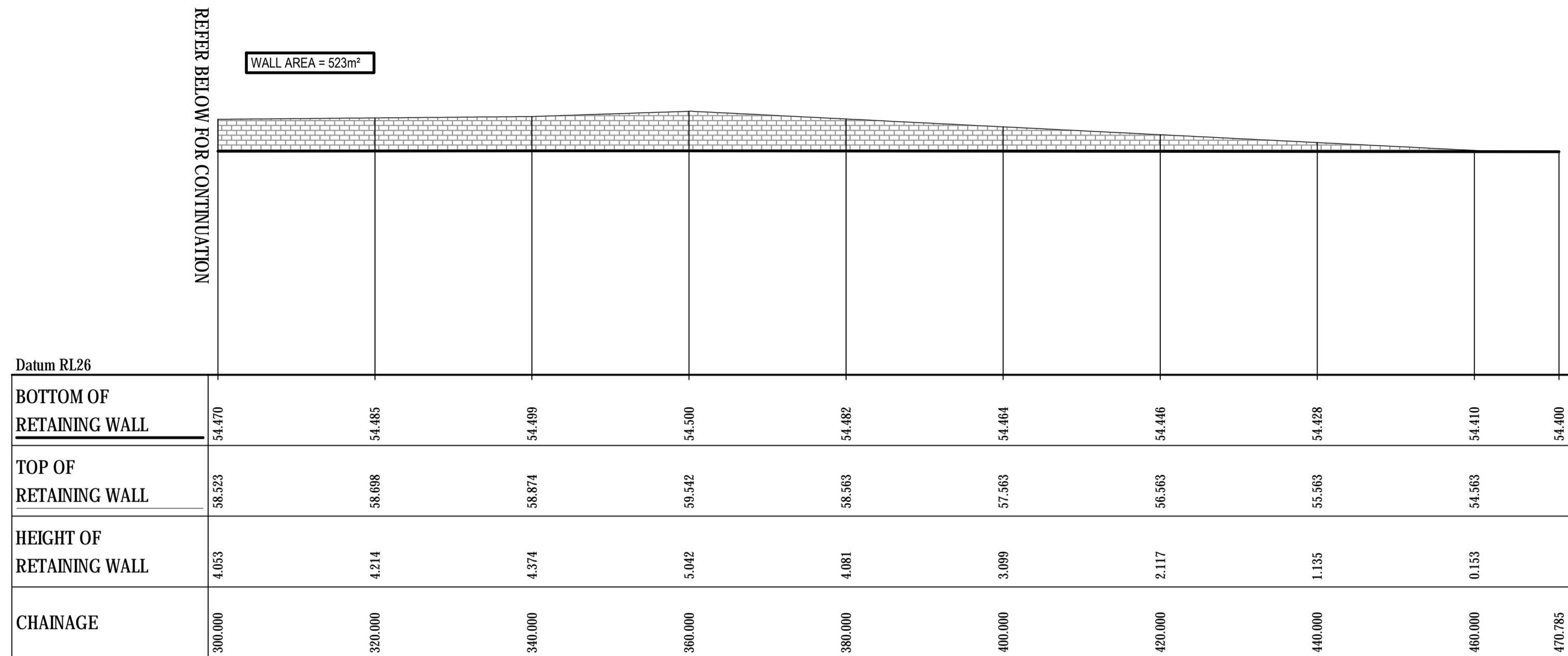
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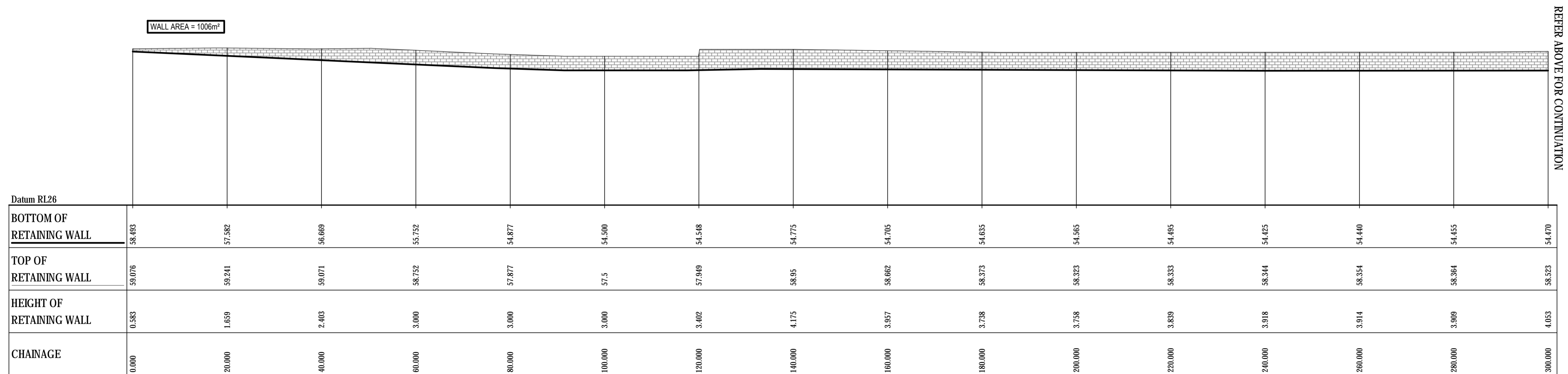
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F:\20-748 ESR Mamre\6.0 Drgs\Civil\Final\SSDA\1000 INFRASTRUCTURE\20-748-C1085.dwg

NOTES:
ALL FINISHED LEVELS ARE $\pm 2000\text{mm}$ U.N.O
REFER TO DRG C1020 FOR TYPICAL WALL SECTIONS



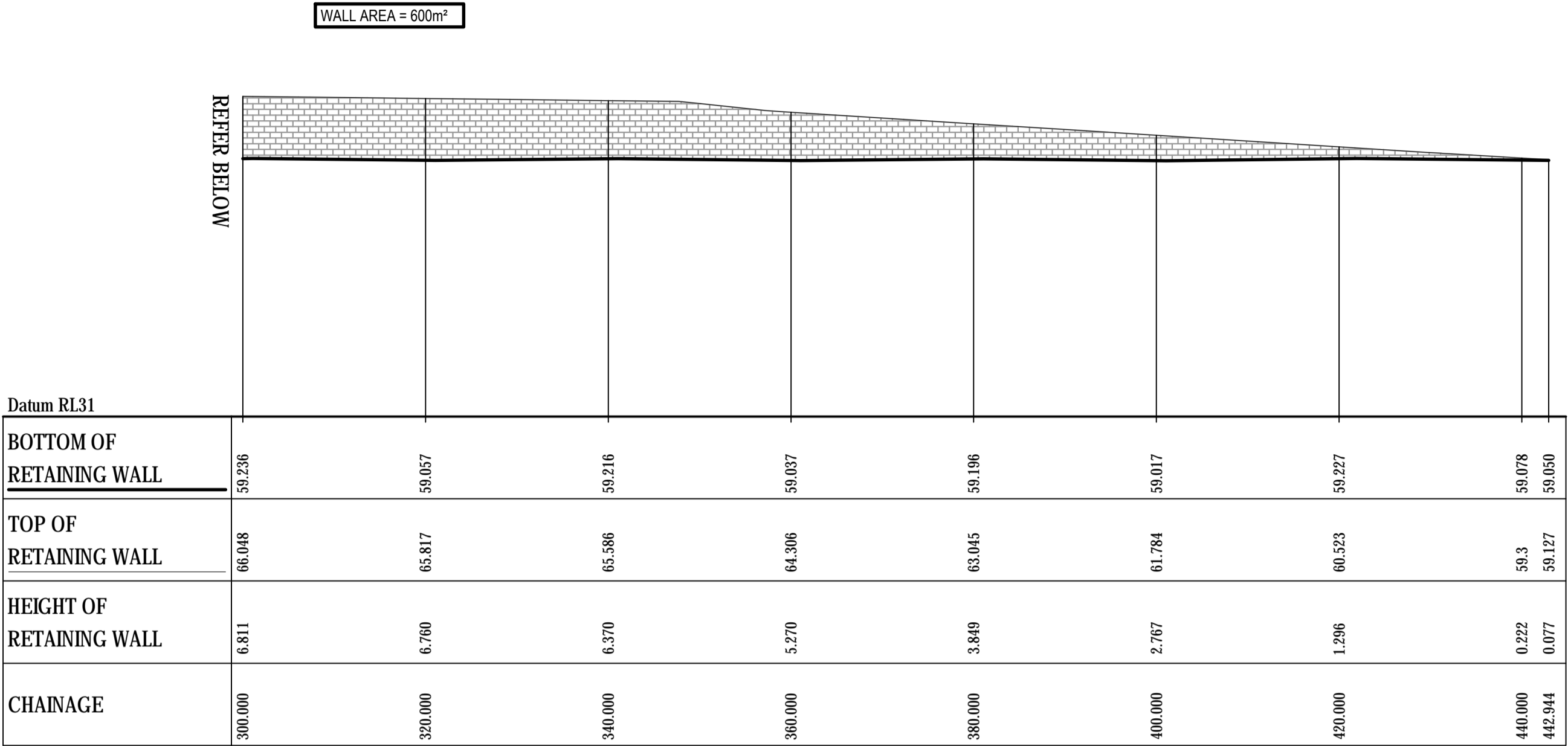
RETAINING WALL RW011B PROFILE
SCALE 1:500 HORI.
1:500 VERT.



RETAINING WALL RW011B PROFILE
SCALE 1:500 HORI.
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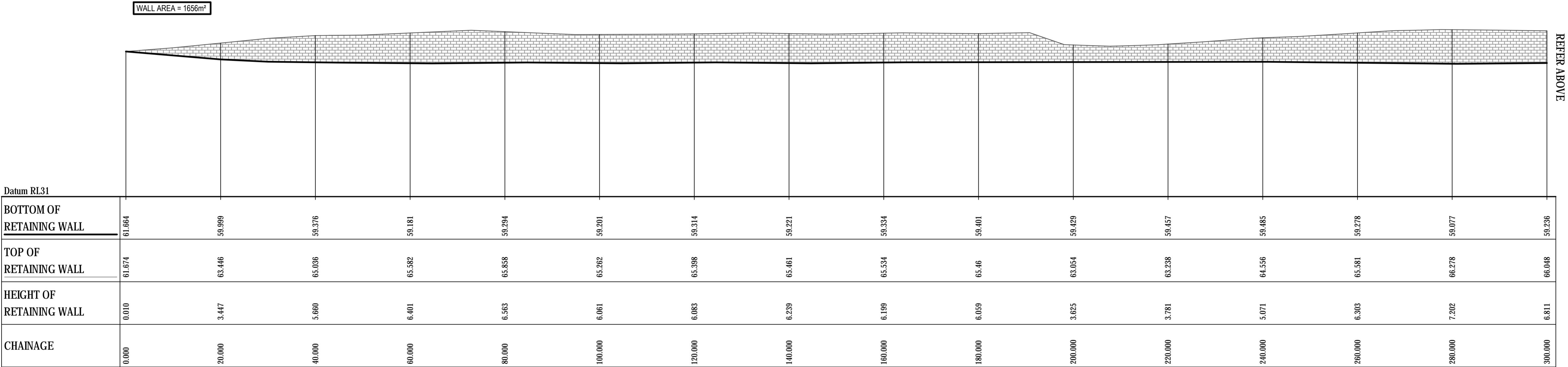
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NOTES:
ALL FINISHED LEVELS ARE ±2000mm U.N.O
REFER TO DRG C1020 FOR TYPICAL WALL SECTIONS



RETAINING WALL RW012 PROFILE

SCALE 1:500 HORI.
1:500 VERT.



RETAINING WALL RW012 PROFILE

SCALE 1:500 HORI.
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100mm on Original

F:\20-748 ESR Mamre\6.0 Drgs\Civil\Final\SSDA\1000_INFRASTRUCTURE\20-748-C1087.dwg

NOTES:
ALL FINISHED LEVELS ARE ±2000mm U.N.O
REFER TO DRG C1020 FOR TYPICAL WALL SECTIONS

WALL AREA = 84m²

REFER BELOW

Datum RL38			
BOTTOM OF RETAINING WALL	66.040	66.025	66.130
TOP OF RETAINING WALL	70.12	68.107	67.06
HEIGHT OF RETAINING WALL	4.080	2.082	0.930
CHAINAGE	300.000	320.000	335.485

RETAINING WALL RW022 PROFILE

SCALE 1:500 HORI
1:500 VERT.

WALL AREA = 132m²

Datum RL35					
BOTTOM OF RETAINING WALL	65.440	64.448	63.448	63.147	64.840
TOP OF RETAINING WALL		65.565	65.811	65.938	65.786
HEIGHT OF RETAINING WALL		1.117	2.363	2.791	0.946
CHAINAGE	0.000	20.000	40.000	60.000	76.925

RETAINING WALL RW023 PROFILE

SCALE 1:500 HORI
1:500 VERT.

WALL AREA = 1818m²

REFER ABOVE

Datum RL37																	
BOTTOM OF RETAINING WALL	65.496	65.979	65.996	65.822	65.929	65.920	65.949	65.940	65.969	65.960	65.989	65.935	66.035	65.971	66.009	66.040	
TOP OF RETAINING WALL	65.496	67.034	69.032	70.912	72.796	73.113	73.17	73.285	73.4	73.508	73.572	73.636	73.7	72.798	72.376	70.12	
HEIGHT OF RETAINING WALL	0.000	1.055	3.036	5.089	6.867	7.193	7.222	7.345	7.431	7.548	7.583	7.701	7.865	6.827	6.367	4.080	
CHAINAGE	0.000	20.000	40.000	60.000	80.000	100.000	120.000	140.000	160.000	180.000	200.000	220.000	240.000	260.000	280.000	300.000	

RETAINING WALL RW022 PROFILE

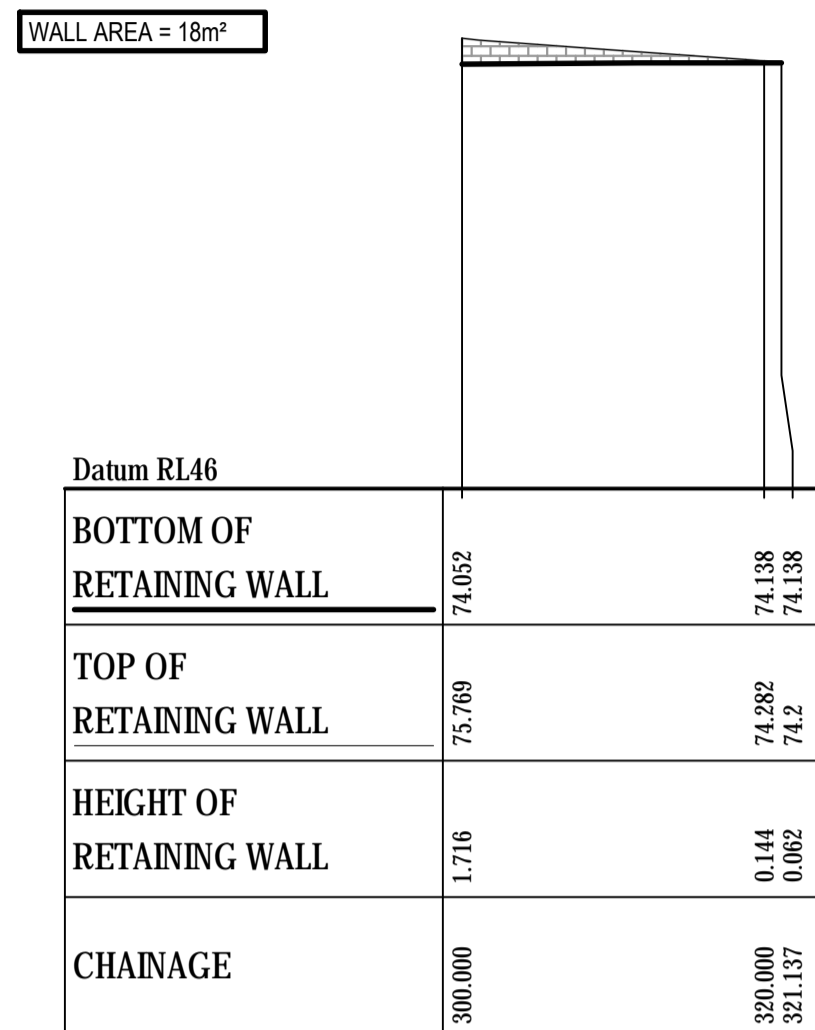
SCALE 1:500 HORI
1:500 VERT.

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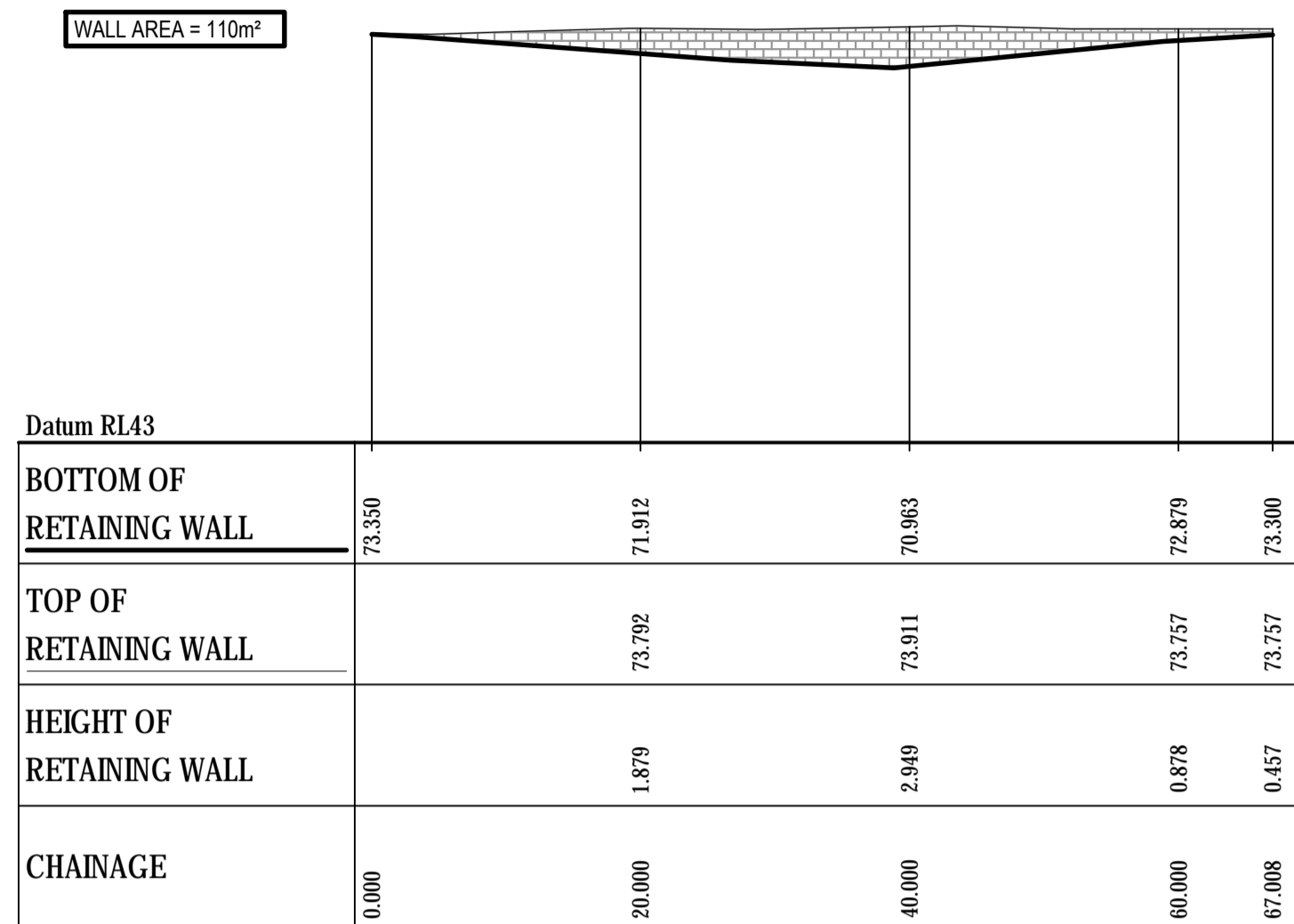
100mm on Original

F:\20-748 ESR Mamre\6.0 Drgs\Civil\Final\SSDA\1000_INFRASTRUCTURE\20-748-C1088.dwg

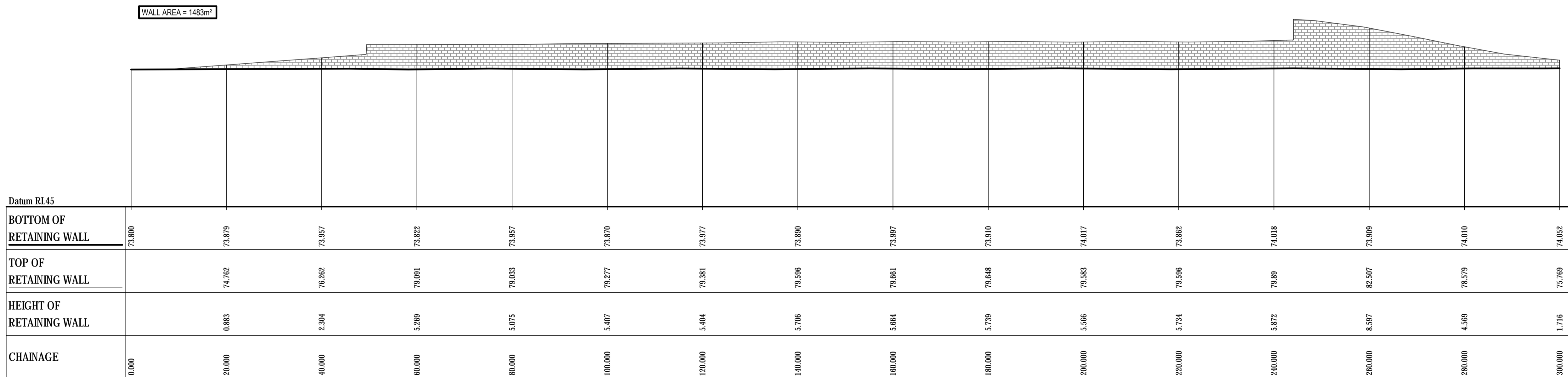
NOTES:
ALL FINISHED LEVELS ARE $\pm 2000\text{mm}$ U.N.O
REFER TO DRG C1020 FOR TYPICAL WALL SECTIONS



RETAINING WALL RW024 PROFILE
SCALE 1:500 HORI.
1:500 VERT.



RETAINING WALL RW025 PROFILE



RETAINING WALL RW024 PROFILE
SCALE 1:500 HORI
1:500 VERT.

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NOTES:
ALL FINISHED LEVELS ARE ±2000mm U.N.O
REFER TO DRG C1020 FOR TYPICAL WALL SECTIONS

WALL AREA = 544m²

REFER BELOW FOR CONTINUATION

Datum RL52							
BOTTOM OF RETAINING WALL	79.839	79.725	79.819	79.705	79.782	79.782	80.012
TOP OF RETAINING WALL	85.351	85.133	84.348	84.281	85.217	85.331	84.343
HEIGHT OF RETAINING WALL	5.512	5.408	4.529	4.576	5.435	5.549	4.531
CHAINAGE	300.000	320.000	340.000	360.000	380.000	400.000	406.757

RETAINING WALL RW032 PROFILE

SCALE 1:500 HORI
1:500 VERT.

WALL AREA = 87m²

Datum RL49				
BOTTOM OF RETAINING WALL	76.976	77.439	77.901	78.446
TOP OF RETAINING WALL	79.102	79.012	79.035	79.063
HEIGHT OF RETAINING WALL	2.126	1.573	1.134	0.617
CHAINAGE	0.000	20.000	40.000	60.000

RETAINING WALL RW031 PROFILE

SCALE 1:500 HORI
1:500 VERT.

WALL AREA = 1382m²

REFER ABOVE FOR CONTINUATION

Datum RL52																	
BOTTOM OF RETAINING WALL	79.940	79.831	79.881	79.851	79.901	79.859	79.889	79.839	79.869	79.819	79.849	79.834	79.745	79.871	79.745	79.839	
TOP OF RETAINING WALL	79.748	81.723	83.845	84.764	84.889	84.939	85.038	85.065	84.909	84.721	84.533	84.501	85.149	85.266	84.919	85.351	
HEIGHT OF RETAINING WALL	-0.192	1.892	3.764	4.913	4.988	5.080	5.149	5.226	5.039	4.902	4.684	4.668	5.404	5.395	5.173	5.512	
CHAINAGE	0.000	20.000	40.000	60.000	80.000	100.000	120.000	140.000	160.000	180.000	200.000	220.000	240.000	260.000	280.000	300.000	

RETAINING WALL RW032 PROFILE

SCALE 1:500 HORI
1:500 VERT.

B	ISSUED FOR DEVELOPMENT APPLICATION	19-04-21
A	ISSUED FOR DEVELOPMENT APPLICATION	22-12-20
Issue	Description	Date

Bar Scales

0246810m


1 : 100 @ A1 1 : 200 @ A3

01020304050m

1 : 500 @ A1 1 : 1000 @ A3

THIS DRAWING CANNOT BE COPIED OR REPRODUCED IN ANY FORM OR USED FOR ANY OTHER PURPOSE OTHER THAN THAT ORIGINALLY INTENDED WITHOUT THE WRITTEN PERMISSION OF AT&L

Client



Scales	1 : 500	Drawn	PDK
		Designed	PDK
Grid	GDA94 MGA56	Checked	TM
Height Datum	AHD	Approved	

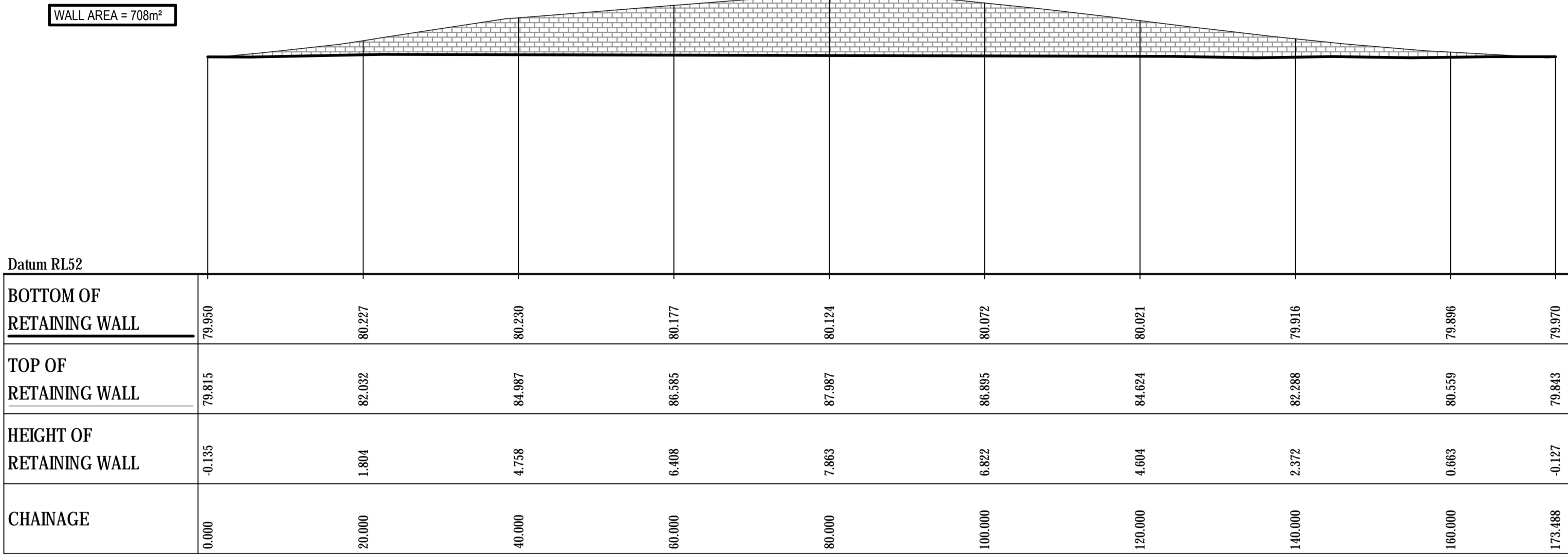
Project	PROPOSED INDUSTRIAL DEVELOPMENT ABBOTTS ROAD KEMPS CREEK	Civil Engineers and Project Managers
Title		
RETAINING WALL PROFILES SHEET 6		

Status	PRELIMINARY	A1
NOT TO BE USED FOR CONSTRUCTION		
Project - Drawing No.		Issue
20-748-C1090		B

100mm on Original

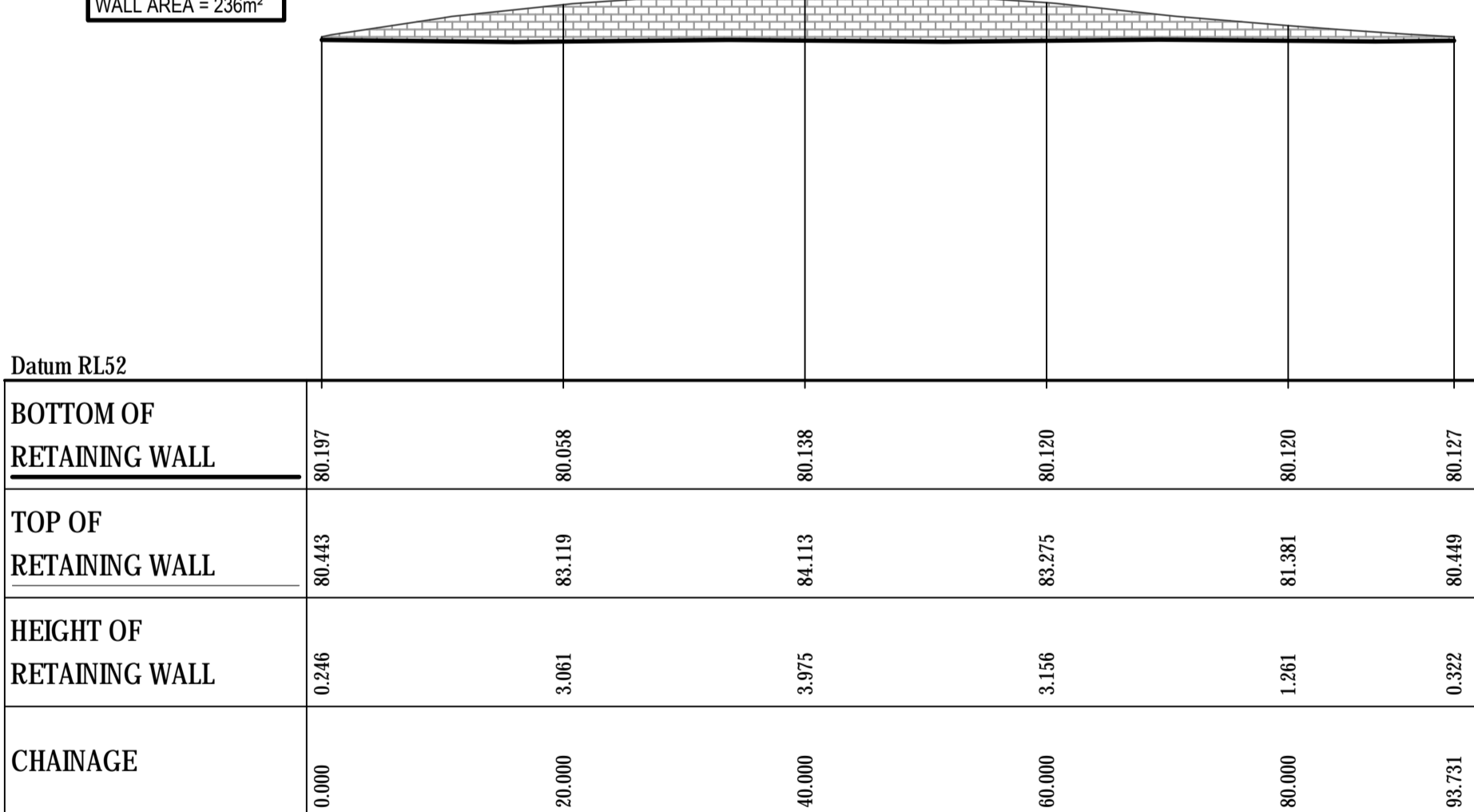
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NOTES:
ALL FINISHED LEVELS ARE $\pm 2000\text{mm}$ U.N.O
REFER TO DRG C1020 FOR TYPICAL WALL SECTIONS



RETAINING WALL RW043 PROFIL

SCALE 1:500 HO
1:500 VERT.



RETAINING WALL RW042 PROFIL

SCALE 1:500 HO
1:500 VERT.

[illegible]

F:\20-748 ESR Mamre\6.0 Drgs\Civil\Final\SSDA\1000 INFRASTRUCTURE\20-748-C1091.dwg

NOTES:
ALL FINISHED LEVELS ARE ±2000mm U.N.O
REFER TO DRG C1020 FOR TYPICAL WALL SECTIONS

WALL AREA = 1561m²

REFER BELOW

Datum RL34										
BOTTOM OF RETAINING WALL	62.083	62.889	63.651	65.480	67.497	69.462	72.289	75.897	80.391	80.437
TOP OF RETAINING WALL	71.613	74.012	76.411	78.81	79.988	80.205	80.113	80.276	80.434	80.437
HEIGHT OF RETAINING WALL	9.610	11.203	12.760	13.329	12.491	10.743	7.844	4.379	0.044	-0.000
CHAINAGE	300.000	320.000	340.000	360.000	380.000	400.000	420.000	440.000	460.000	460.256

RETAINING WALL RW051 PROFILE

SCALE 1:500 HORL
1:500 VERT.

WALL AREA = 1032m²

REFER ABOVE

Datum RL33																				
BOTTOM OF RETAINING WALL	66.761	66.415	66.143	66.225	66.206	66.154	66.213	66.295	66.256	66.204	66.282	66.357	66.305	66.160	61.383	62.003				
TOP OF RETAINING WALL	66.778	68.55	69.015	69.114	69.264	69.461	69.71	69.934	69.487	69.039	69.187	69.315	69.44	69.564	70.07	71.613				
HEIGHT OF RETAINING WALL	0.017	2.135	2.872	2.888	3.058	3.307	3.497	3.640	3.230	2.834	2.906	2.959	3.135	3.403	8.686	9.610				
CHAINAGE	0.000	20.000	40.000	60.000	80.000	100.000	120.000	140.000	160.000	180.000	200.000	220.000	240.000	260.000	280.000	300.000				

RETAINING WALL RW051 PROFILE

SCALE 1:500 HORL
1:500 VERT.

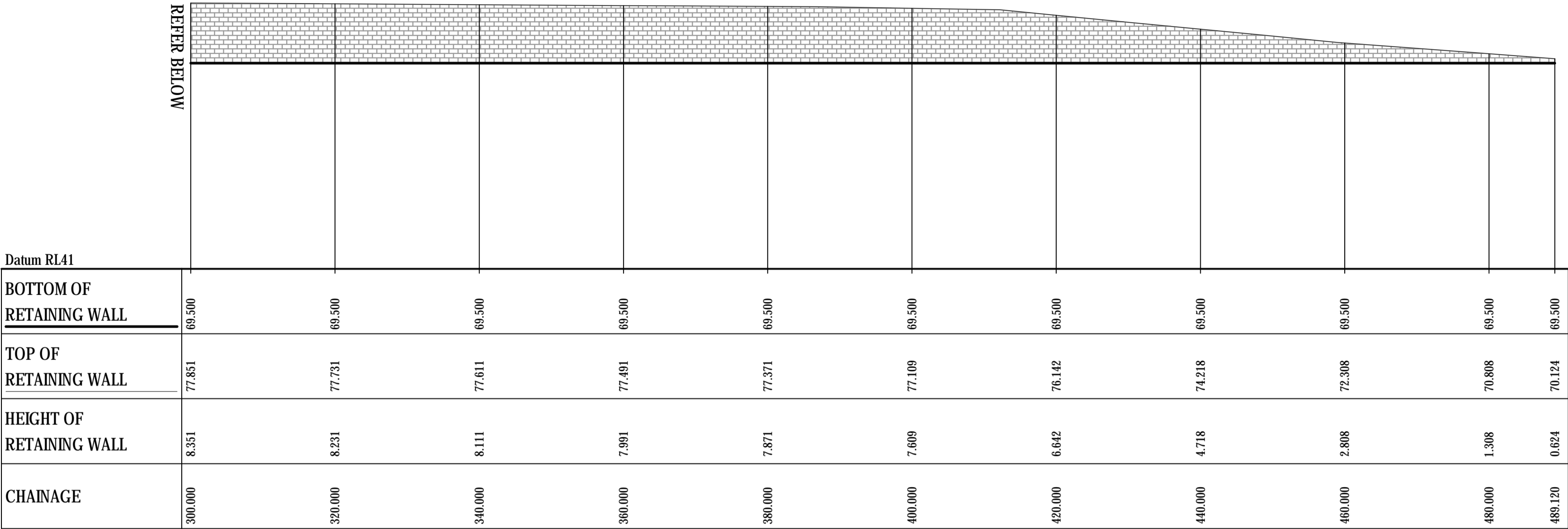
			Bar Scales		Client	Scales	Drawn	PDK	Project	Civil Engineers and Project Managers
			<div><div><div>0246810m</div><div>1 : 100 @ A11 : 200 @ A3</div></div><div><div>01020304050m</div><div>1 : 500 @ A11 : 1000 @ A3</div></div></div>	THIS DRAWING CANNOT BE COPIED OR REPRODUCED IN ANY FORM OR USED FOR ANY OTHER PURPOSE OTHER THAN THAT ORIGINALLY INTENDED WITHOUT THE WRITTEN PERMISSION OF AT&L	<div><div><div></div><div>ESR</div></div></div>	1 : 500	Designed	PDK	PROPOSED INDUSTRIAL DEVELOPMENT ABBOTTS ROAD KEMPS CREEK	Level 7, 153 Walker Street North Sydney NSW 2060 ABN 96 130 882 405 Tel: 02 9439 1777 Fax: 02 9923 1055 www.atl.net.au info@atl.net.au
						Grid GDA94 MGA56	Checked	TM		
						Height Datum AHD	Approved			
									RETAINING WALL PROFILES SHEET 8	PRELIMINARY NOT TO BE USED FOR CONSTRUCTION Project - Drawing No. 20-748-C1092
B	ISSUED FOR DEVELOPMENT APPLICATION	19-04-21								A1
A	ISSUED FOR DEVELOPMENT APPLICATION	22-12-20								B
Issue	Description	Date								

100mm on Original

F:\20-748 ESR Mamre\6.0 Drgs\Civil\Final\SSDA\1000_INFRASTRUCTURE\20-748-C1092.dwg

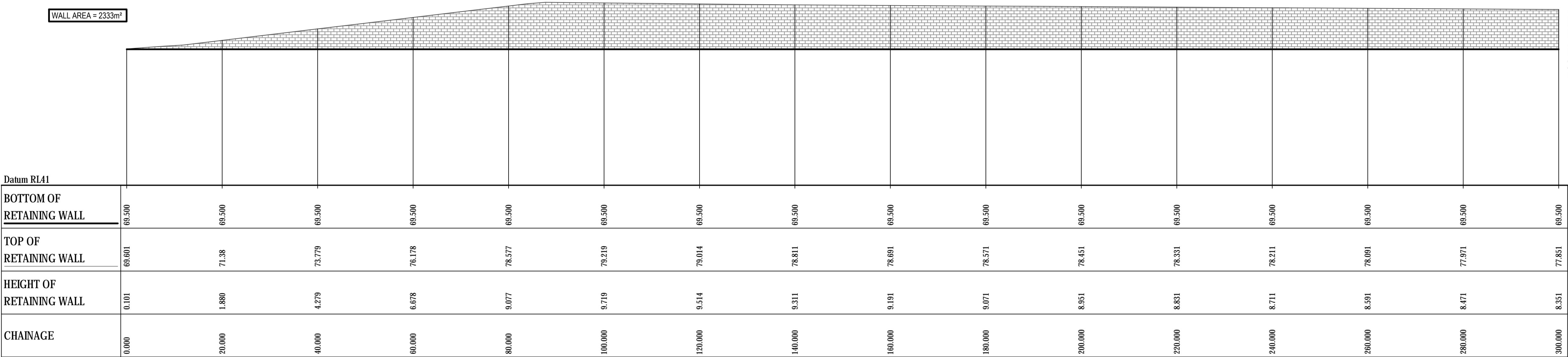
NOTES:
ALL FINISHED LEVELS ARE ±2000mm U.N.O
REFER TO DRG C1020 FOR TYPICAL WALL SECTIONS

WALL AREA = 1180m²



RETAINING WALL RW052 PROFILE
SCALE 1:500 HORI.
1:500 VERT.

WALL AREA = 2333m²

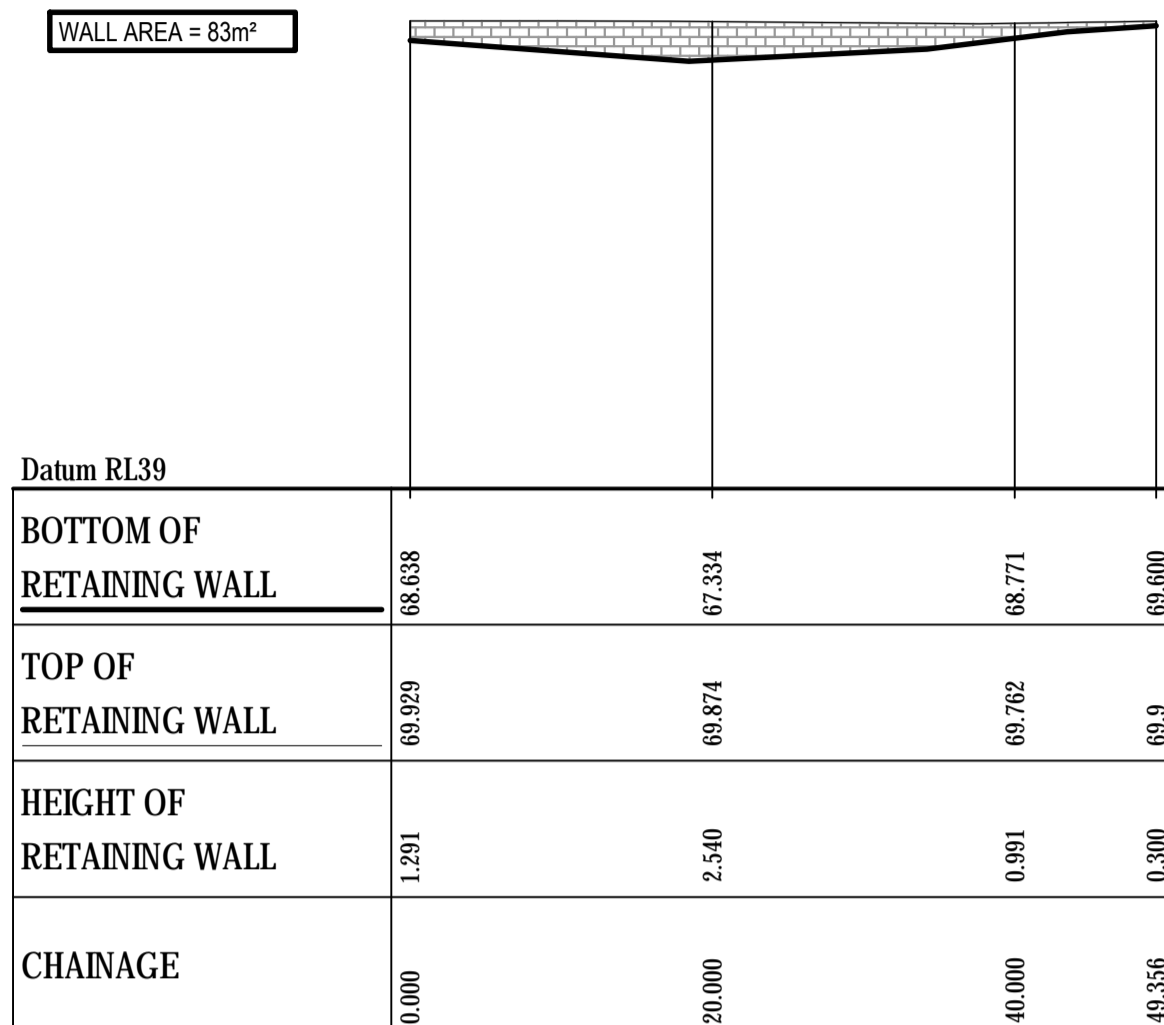


RETAINING WALL RW052 PROFILE
SCALE 1:500 HORI.
1:500 VERT.

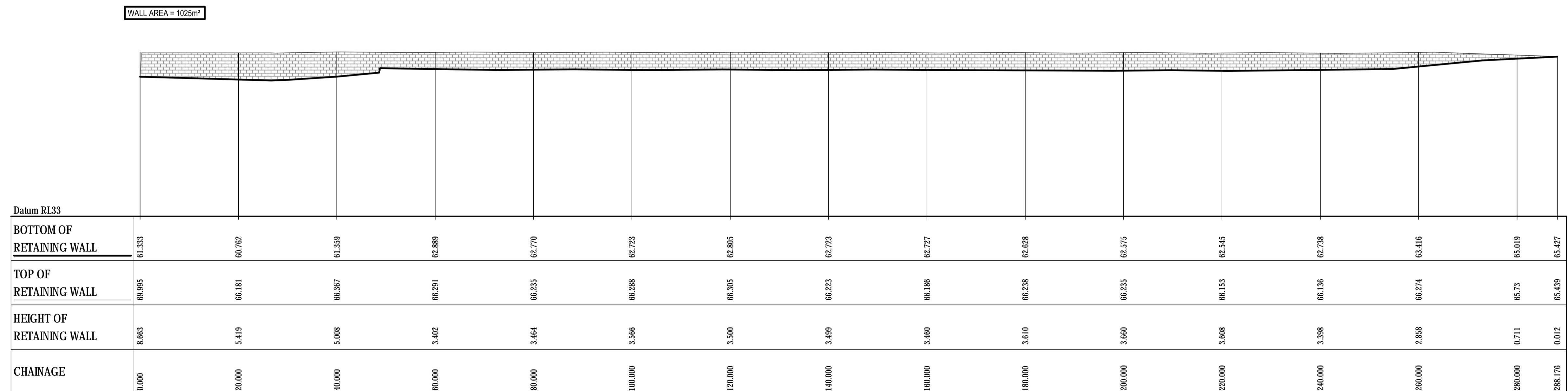
			Bar Scales		THIS DRAWING CANNOT BE COPIED OR REPRODUCED IN ANY FORM OR USED FOR ANY OTHER PURPOSE OTHER THAN THAT ORIGINALLY INTENDED WITHOUT THE WRITTEN PERMISSION OF AT&L	Client 	Scales 1 : 500		Drawn Designed	PDK	Project PROPOSED INDUSTRIAL DEVELOPMENT ABBOTTS ROAD KEMPS CREEK	Civil Engineers and Project Managers Level 7, 153 Walker Street North Sydney NSW 2060 ABN 96 130 882 405 Tel: 02 9439 1777 Fax: 02 9923 1055 www.atl.net.au info@atl.net.au		
							Grid GDA94 MGA56	Checked	TM	Title RETAINING WALL PROFILES SHEET 9			Status PRELIMINARY NOT TO BE USED FOR CONSTRUCTION	A1
							Height Datum AHD	Approved						
B	ISSUED FOR DEVELOPMENT APPLICATION	19-04-21											Project - Drawing No. 20-748-C1093	Issue B
A	ISSUED FOR DEVELOPMENT APPLICATION	22-12-20												
Issue	Description	Date												

100mm on Original

NOTES:
ALL FINISHED LEVELS ARE $\pm 2000\text{mm}$ U.N.O
REFER TO DRG C1020 FOR TYPICAL WALL SECTIONS



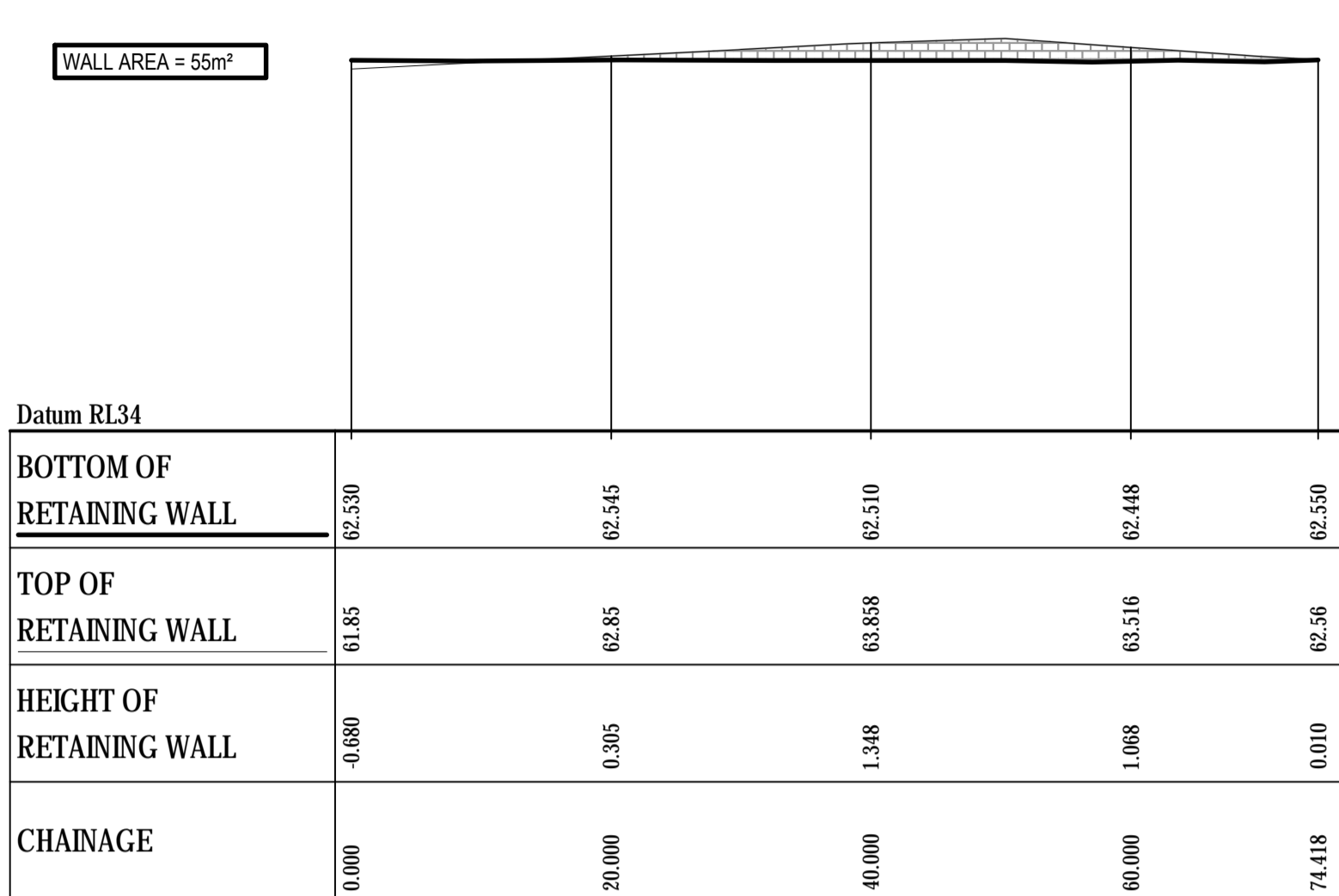
RETAINING WALL RW053 PROFILE
SCALE 1:500 HORL
1:500 VERT.



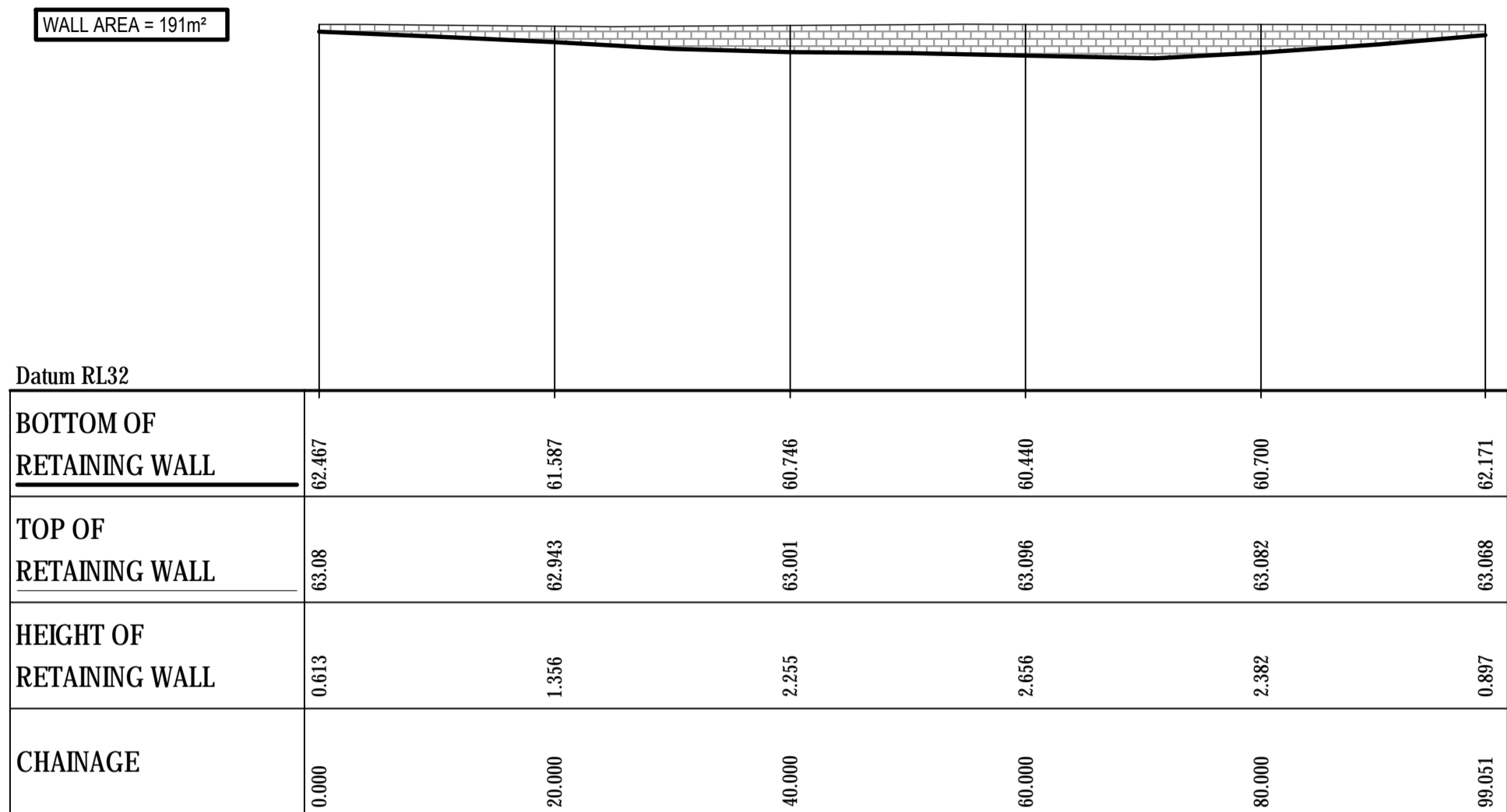
RETAINING WALL RW054 PROFILE
SCALE 1:500 HORI.
1:500 VERT.

			Bar Scales	<div><div><div>0246810m</div><div>1 : 100 @ A1 1 : 200 @ A3</div></div><div><div>01020304050m</div><div>1 : 500 @ A1 1 : 1000 @ A3</div></div></div>	<div>THIS DRAWING CANNOT BE COPIED OR REPRODUCED IN ANY FORM OR USED FOR ANY OTHER PURPOSE OTHER THAN THAT ORIGINALLY INTENDED WITHOUT THE WRITTEN PERMISSION OF AT&L</div>	Client <div><div><div></div><div>ESR</div></div></div>	<div><div><div>Scales1 : 500</div><div>GridGDA94 MGA56</div><div>Height DatumAHD</div></div><div><div>DrawnDesigned</div><div>Checked</div><div>Approved</div></div><div><div>PDK</div><div>TM</div><div></div></div></div>	<div><div>ProjectPROPOSED INDUSTRIAL DEVELOPMENT ABBOTTS ROAD KEMPS CREEK</div><div>TitleRETAINING WALL PROFILES SHEET 10</div></div>	<div><div>Civil Engineers and Project Managers</div><div><div>at&l</div><div>Level 7, 153 Walker Street North Sydney NSW 2060 ABN 96 130 882 405 Tel: 02 9439 1777 Fax: 02 9923 1055 www.atl.net.au info@atl.net.au</div></div><div><div>StatusPRELIMINARY NOT TO BE USED FOR CONSTRUCTION</div><div>Project - Drawing No. 20-748-C1094</div></div><div><div>A1</div><div>Issue B</div></div></div>																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
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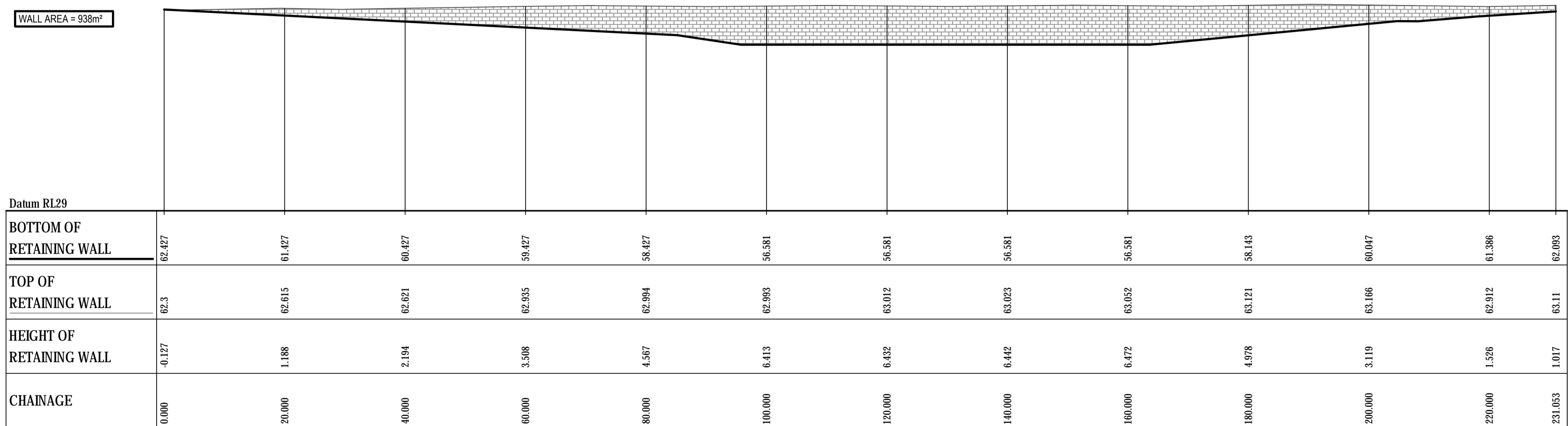
NOTES:
ALL FINISHED LEVELS ARE ±2000mm U.N.O
REFER TO DRG C1020 FOR TYPICAL WALL SECTIONS





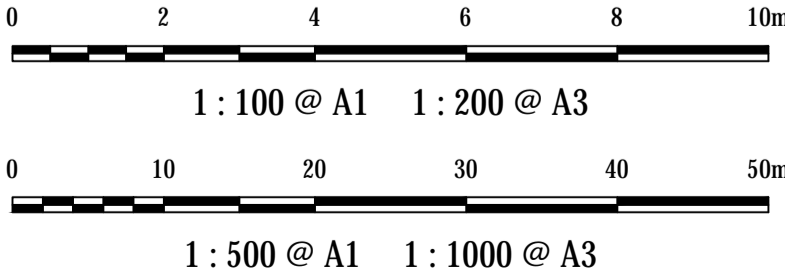
RETAINING WALL RW062 PROFILE
SCALE 1:500 HORI.
1:500 VERT.



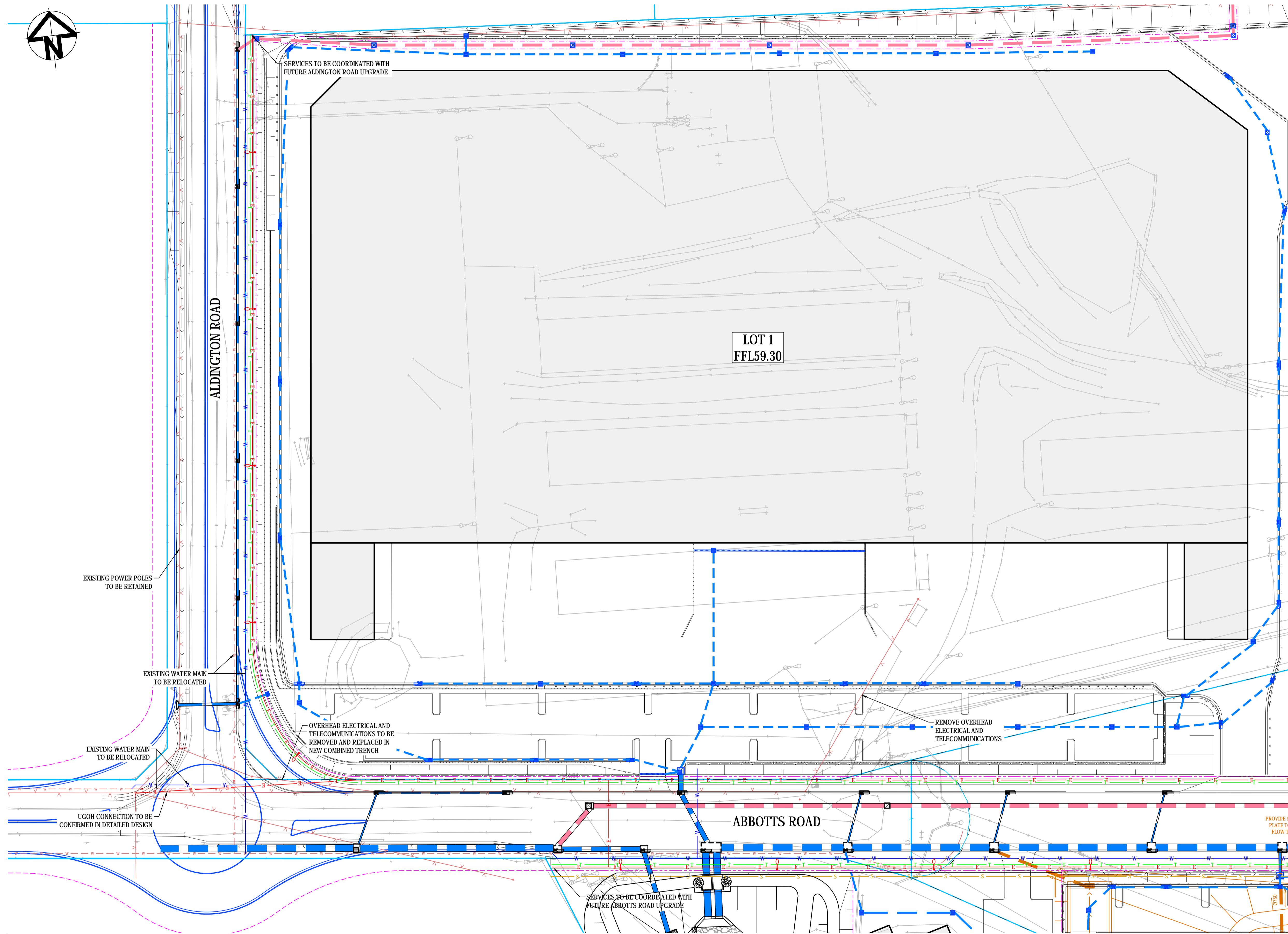
RETAINING WALL RW063 PROFILE
SCALE 1:500 HORI.
1:500 VERT.



RETAINING WALL RW061 PROFILE
SCALE 1:500 HORI.
1:500 VERT.

			Bar Scales	<p>THIS DRAWING CANNOT BE COPIED OR REPRODUCED IN ANY FORM OR USED FOR ANY OTHER PURPOSE OTHER THAN THAT ORIGINALLY INTENDED WITHOUT THE WRITTEN PERMISSION OF AT&L</p>	<p>Client</p> 	Scales	Drawn	PDK	<p>Project</p> <p>PROPOSED INDUSTRIAL DEVELOPMENT ABBOTTS ROAD KEMPS CREEK</p>	<p>Civil Engineers and Project Managers</p>  <p>Level 7, 153 Walker Street North Sydney NSW 2060 ABN 96 130 882 405 Tel: 02 9439 1777 Fax: 02 9923 1055 www.atl.net.au info@atl.net.au</p>						
						Grid	GDA94 MGA56	Designed			PDK	<p>Title</p> <p>RETAINING WALL PROFILES SHEET 11</p>	<p>Status</p> <p>PRELIMINARY NOT TO BE USED FOR CONSTRUCTION</p>	<p>A1</p>		
						Height Datum	AHD	Checked			TM				<p>Project - Drawing No.</p> <p>20-748-C1095</p>	<p>Issue</p> <p>B</p>
								Approved								
B	ISSUED FOR DEVELOPMENT APPLICATION	19-04-21														
A	ISSUED FOR DEVELOPMENT APPLICATION	22-12-20														
Issue	Description	Date														

100mm on Original



SERVICES LEGEND

EXISTING SERVICES

WATER MAIN

ELECTRICITY OVERHEAD

PROPOSED SERVICES

ELECTRICITY

TELECOMMUNICATION CONDUITS

WATER MAIN

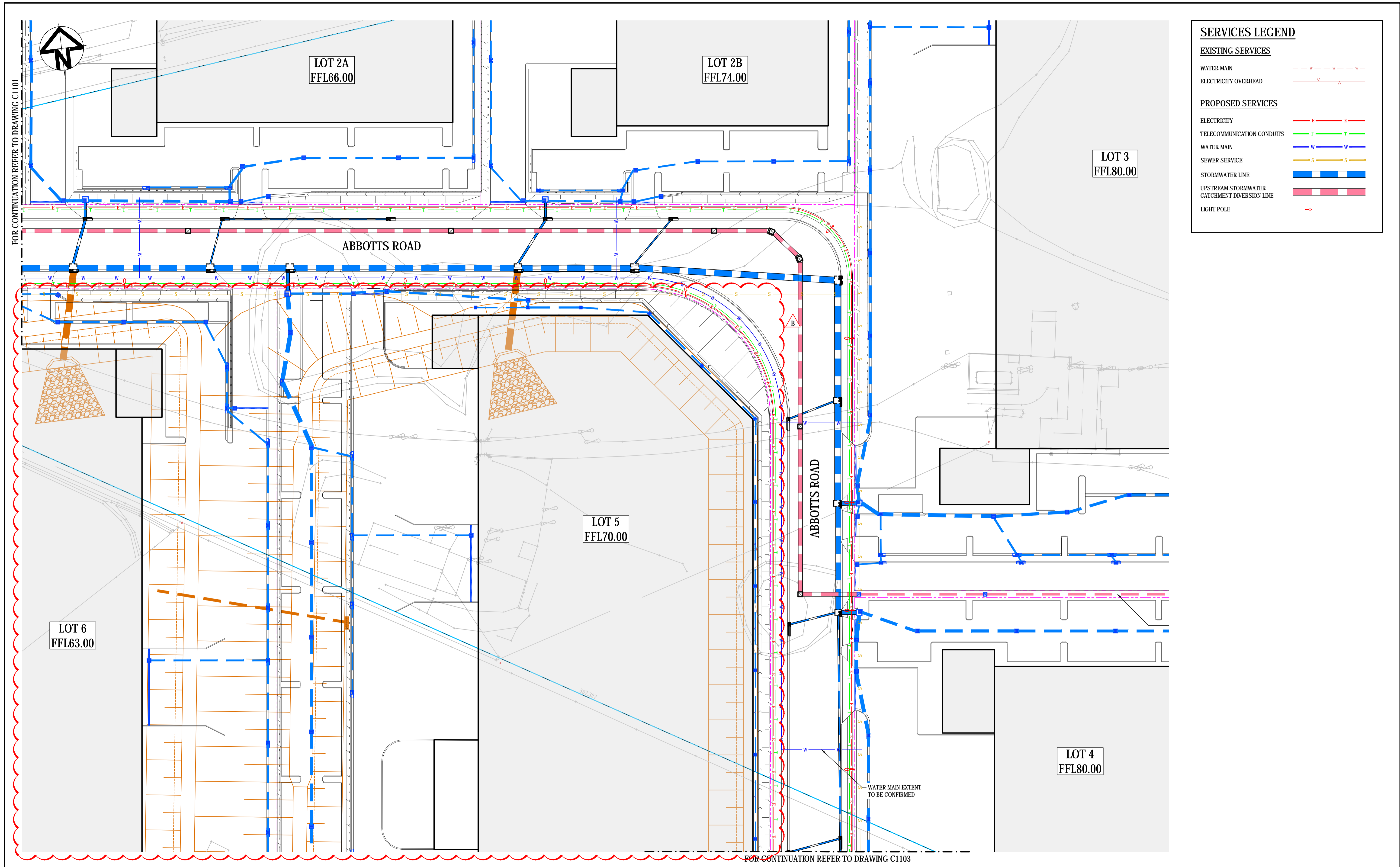
SEWER SERVICE




STORMWATER LINE

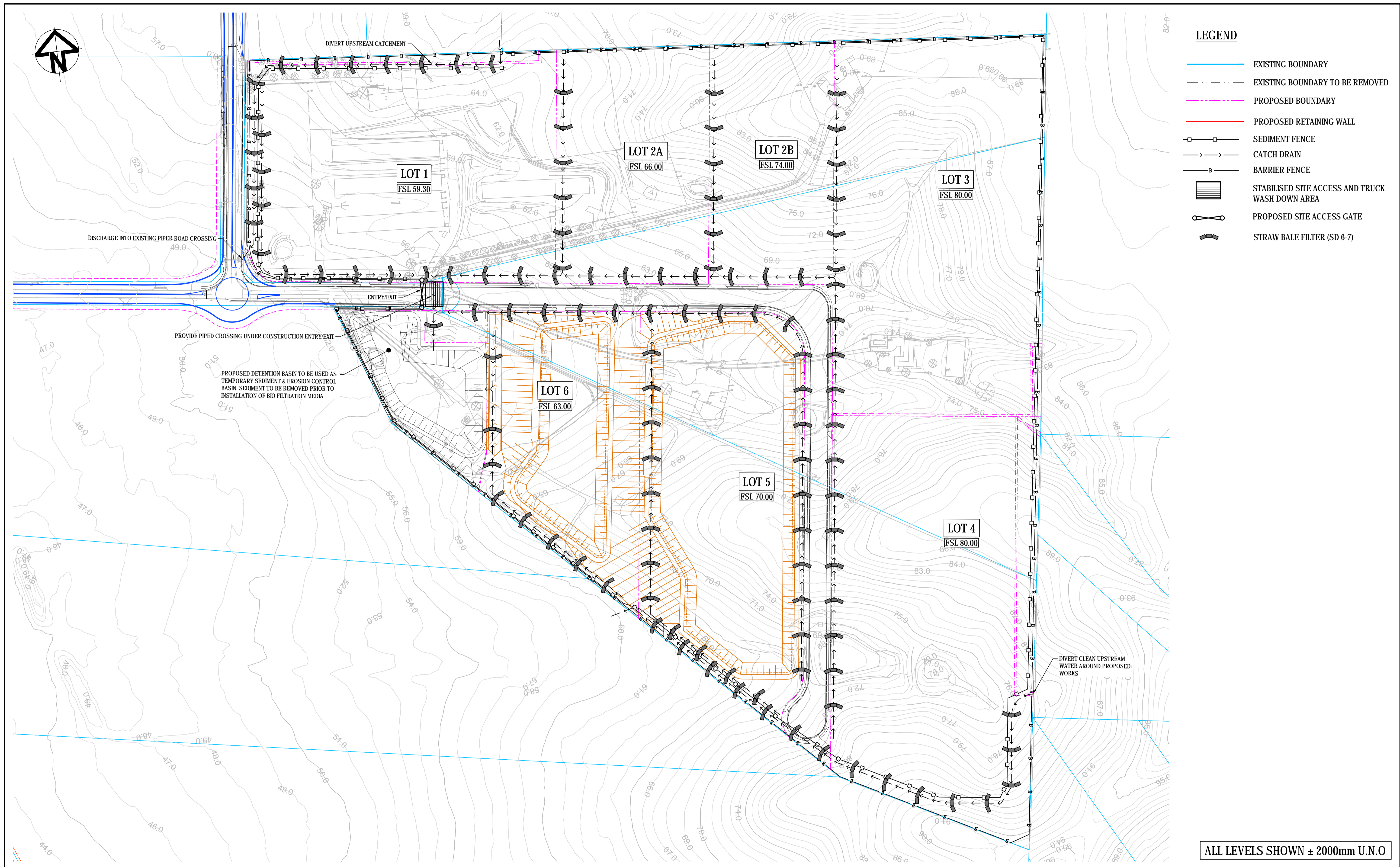
UPSTREAM STORMWATER
CATCHMENT DIVERSION LINE

LIGHT POLE

[illegible]



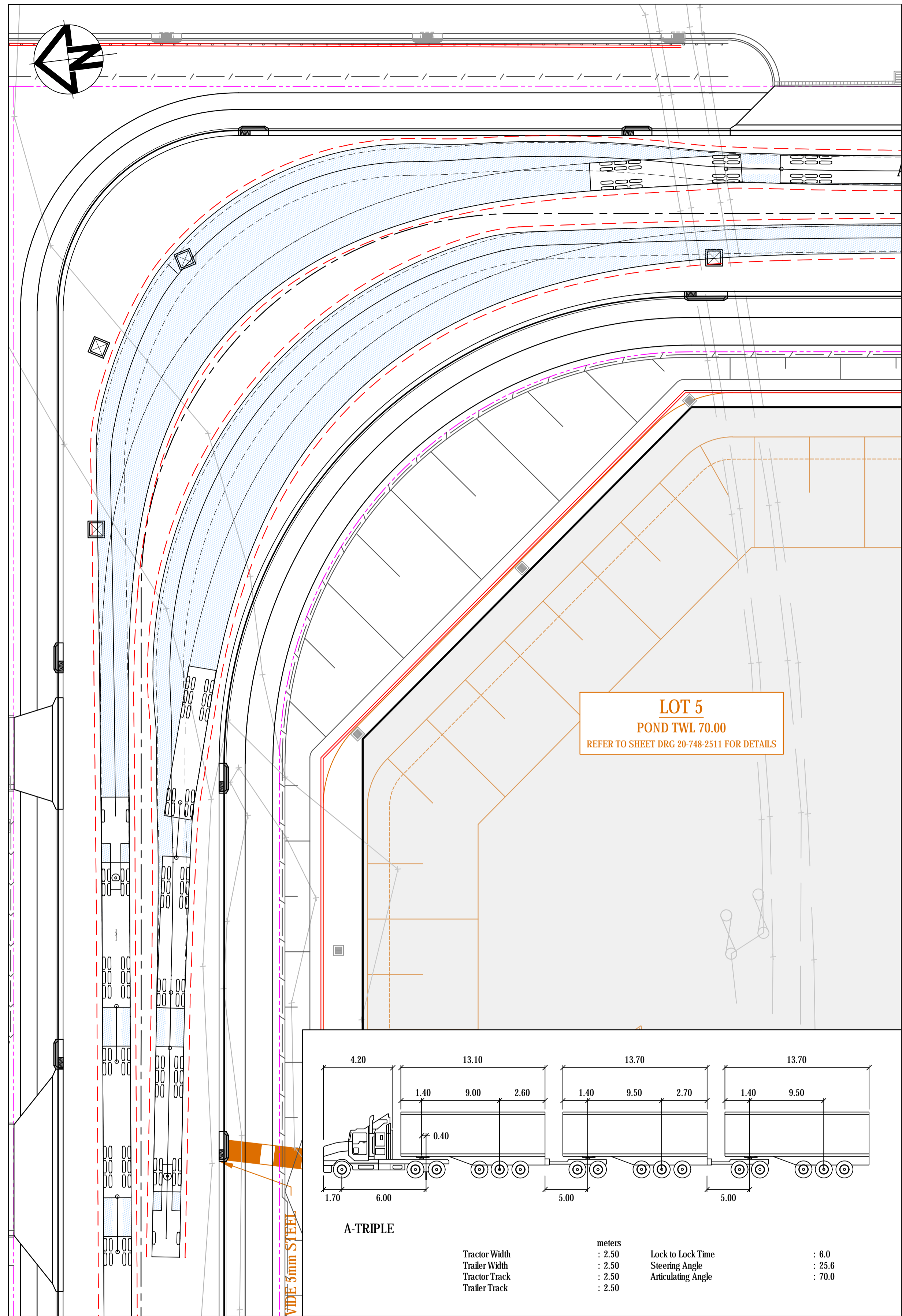
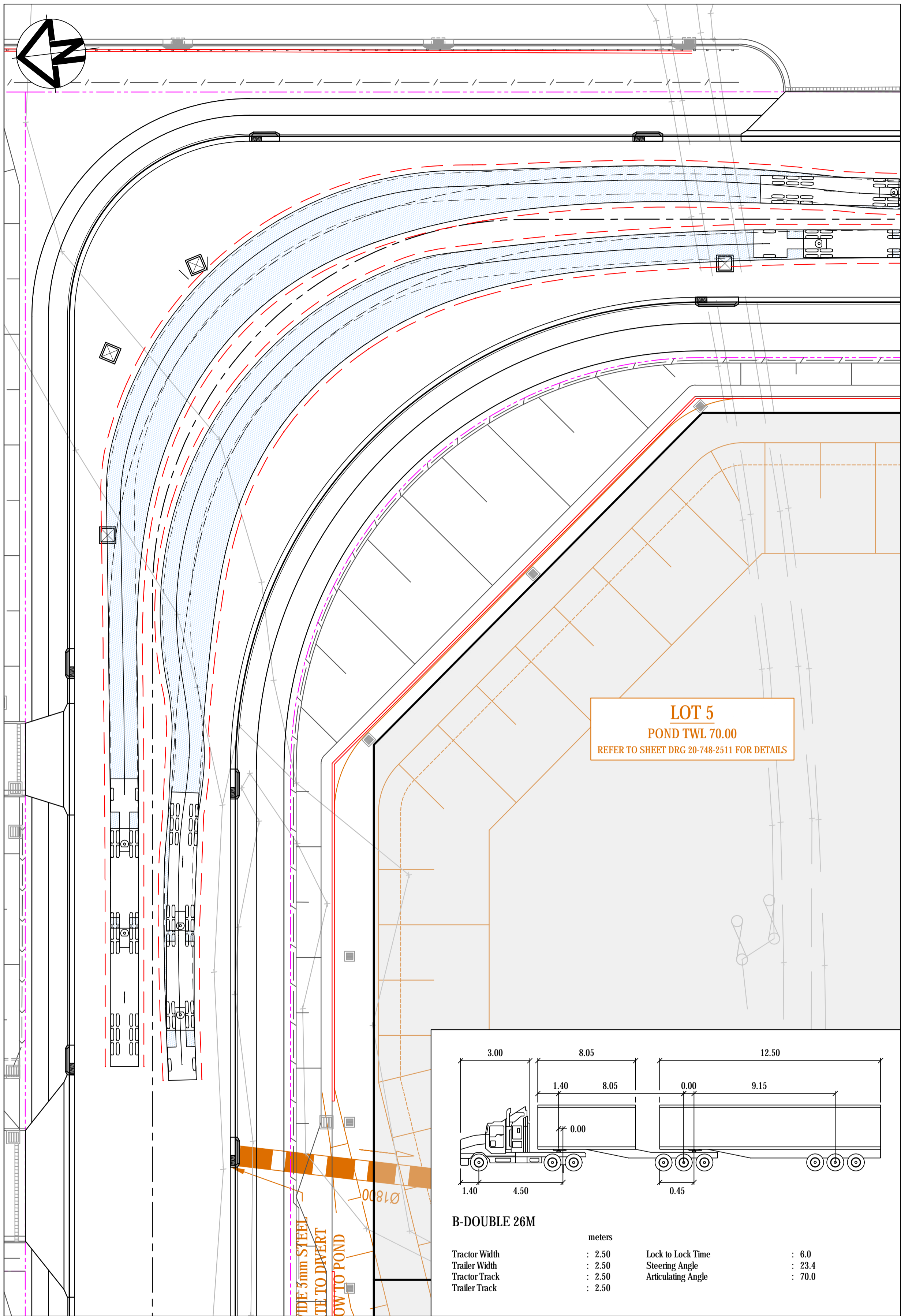
		Bar Scales		<p>THIS DRAWING CANNOT BE COPIED OR REPRODUCED IN ANY FORM OR USED FOR ANY OTHER PURPOSE OTHER THAN THAT ORIGINALLY INTENDED WITHOUT THE WRITTEN PERMISSION OF AT&L</p>	<p>Client</p> <div></div>	Scales		Drawn		Project		Civil Engineers and Project Managers	
						1 : 500		Designed		PROPOSED INDUSTRIAL DEVELOPMENT ABBOTTS ROAD KEMPS CREEK		<div><div>Level 7, 153 Walker Street North Sydney NSW 2060 ABN 96 130 882 405 Tel: 02 9439 1777 Fax: 02 9923 1055 www.atl.net.au info@atl.net.au</div></div>	
		 <p>1 : 500 @ A1 1 : 1000 @ A3</p>				Grid GDA94 MGA56		Checked		TM			
						Height Datum AHD		Approved					
B		ISSUED FOR DEVELOPMENT APPLICATION				19-04-21		<div><p>SERVICES AND UTILITIES COORDINATION PLAN SHEET 2</p><p>Title</p></div>					
A		ISSUED FOR DEVELOPMENT APPLICATION		22-12-20									
Issue		Description		Date									
						<div><p>Status PRELIMINARY</p><p>NOT TO BE USED FOR CONSTRUCTION</p><p>Project - Drawing No. 20-748-C1102</p></div>							
						<div><p>A1</p><p>Issue B</p></div>							



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LEGEND:

VEHICLE BODY ENVELOPE

0.5m VEHICLE BODY CLEARANCE ENVELOPE

B	ISSUED FOR DEVELOPMENT APPLICATION	19-04-21
A	ISSUED FOR DEVELOPMENT APPLICATION	22-12-20
Issue	Description	Date

Bar Scales

0 5 10 15 20 25m

1 : 250 @ A1 1 : 500 @ A3

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Client

Scales	1 : 250	Drawn	PDK
		Designed	PDK
Grid	GDA94 MGA56	Checked	TM
Height Datum	AHD	Approved	

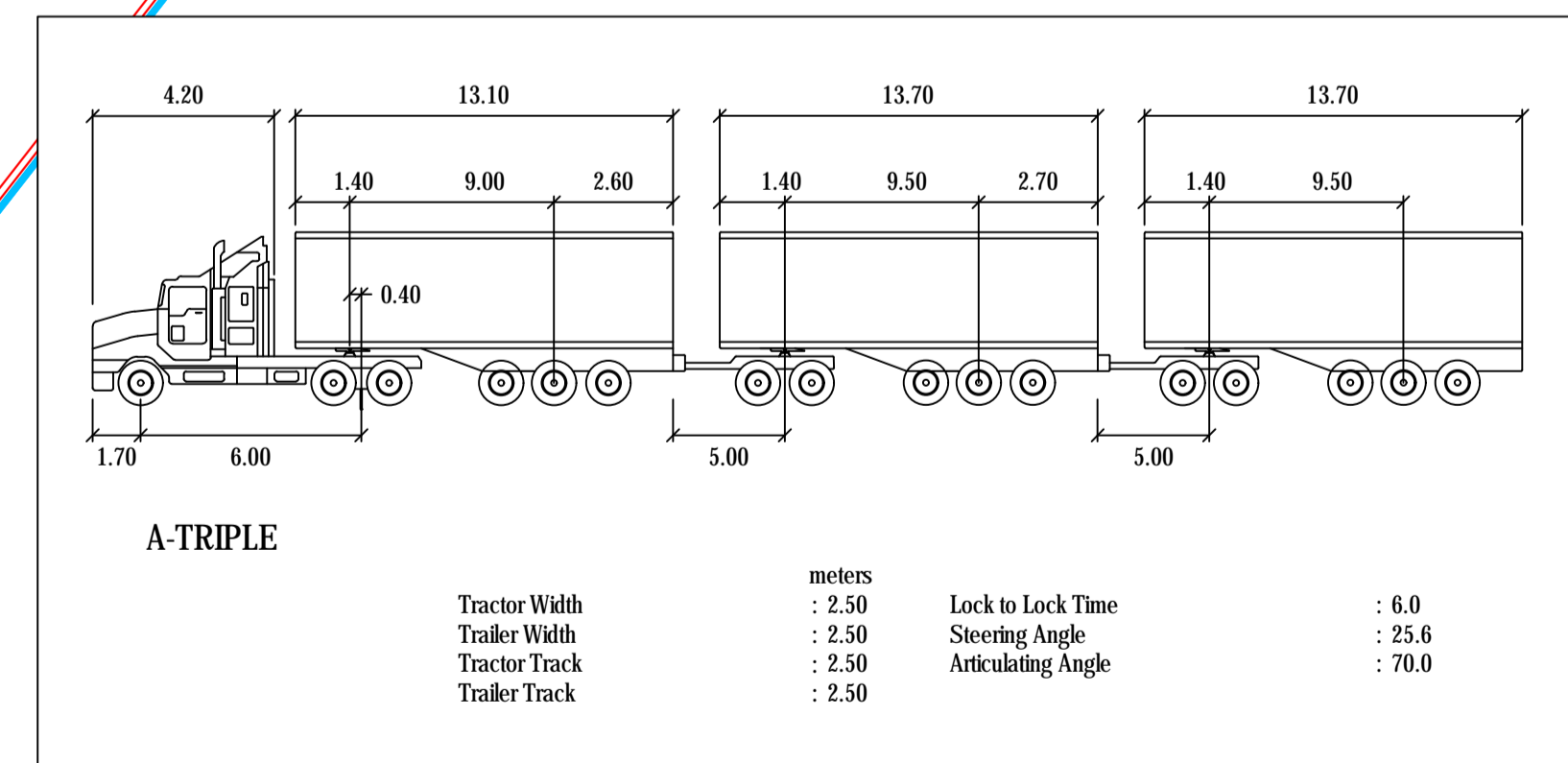
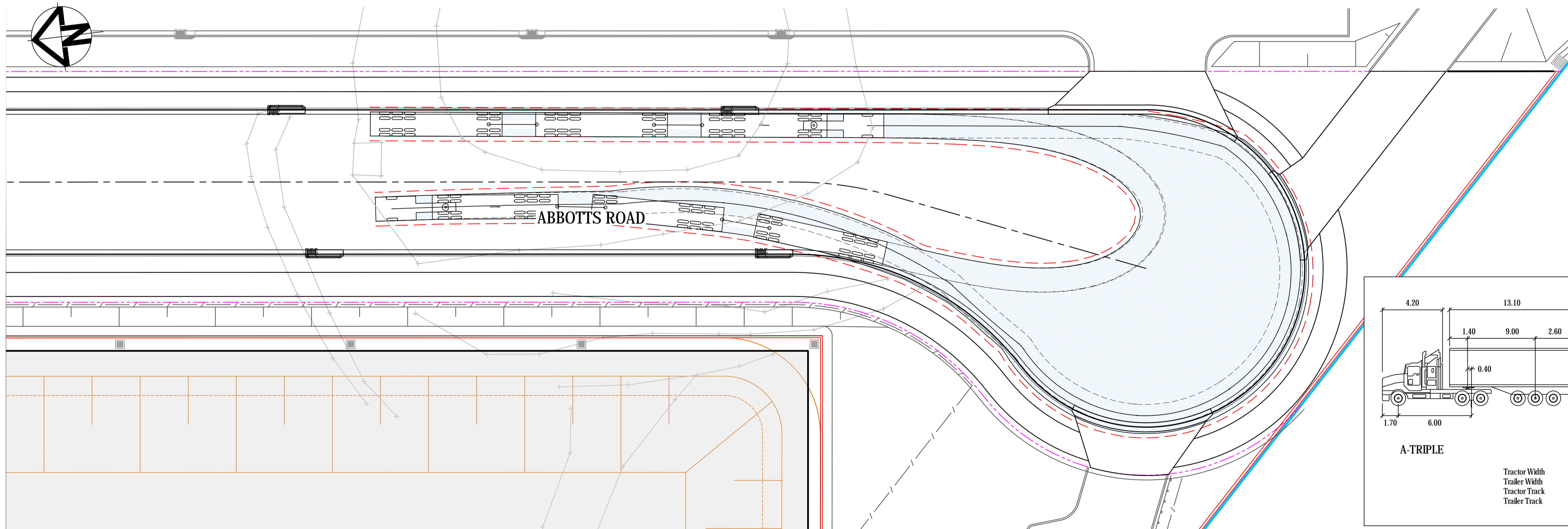
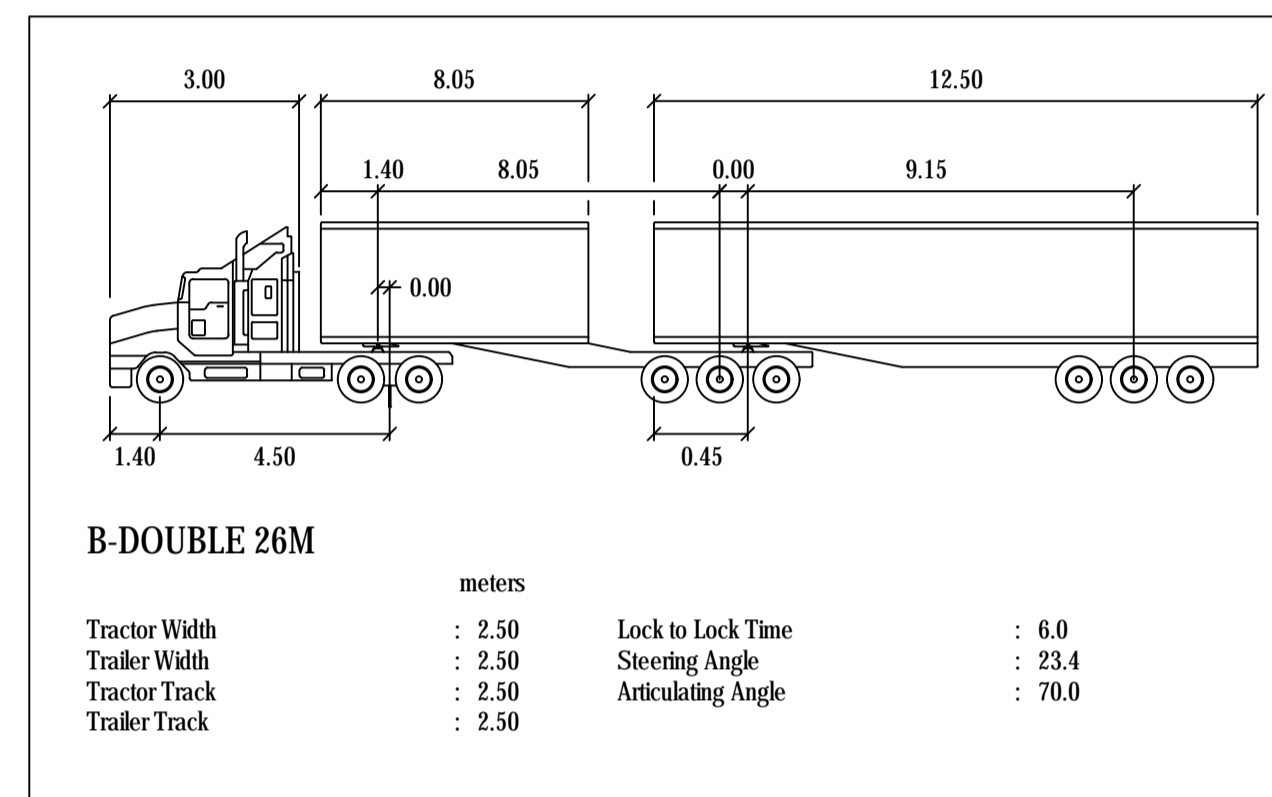
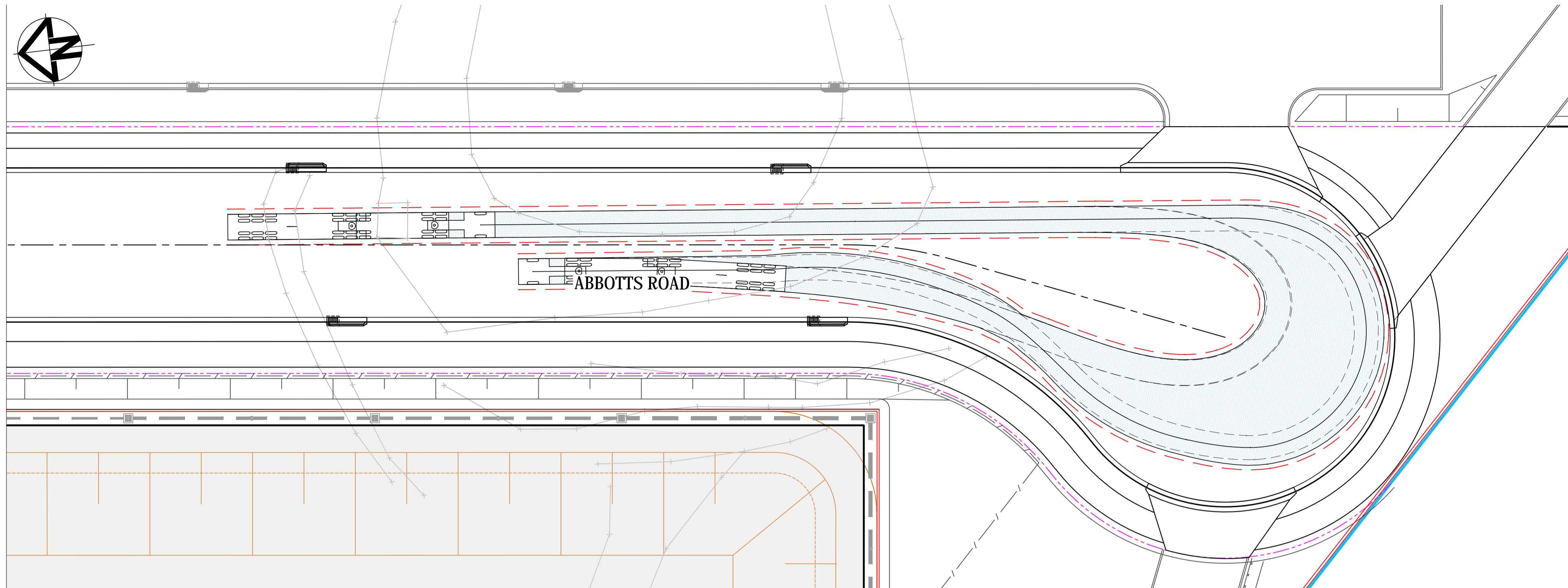
Project **PROPOSED INDUSTRIAL DEVELOPMENT ABBOTTS ROAD KEMPS CREEK**

Title **VEHICLE TURNPATH PLAN SHEET 1**

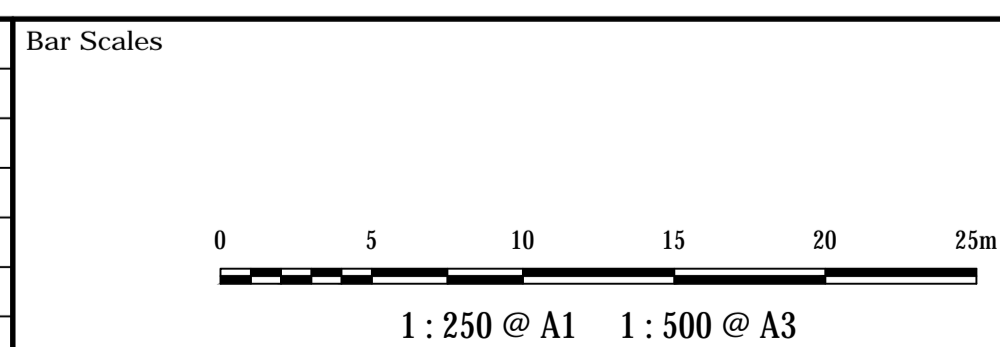
Civil Engineers and Project Managers

Level 7, 153 Walker Street
North Sydney NSW 2060
ABN 96 130 882 405
Tel: 02 9439 1777
Fax: 02 9923 1055
www.atl.net.au
info@atl.net.au

Status PRELIMINARY	A1
Project - Drawing No. 20-748-C1311	
Issue B	



B	ISSUED FOR DEVELOPMENT APPLICATION	19-04-21
A	ISSUED FOR DEVELOPMENT APPLICATION	22-12-20
Issue	Description	Date



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Client	
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	Designed	PDK
Grid GDA94 MGA56	Checked	TM
Height Datum AHD	Approved	

[illegible]

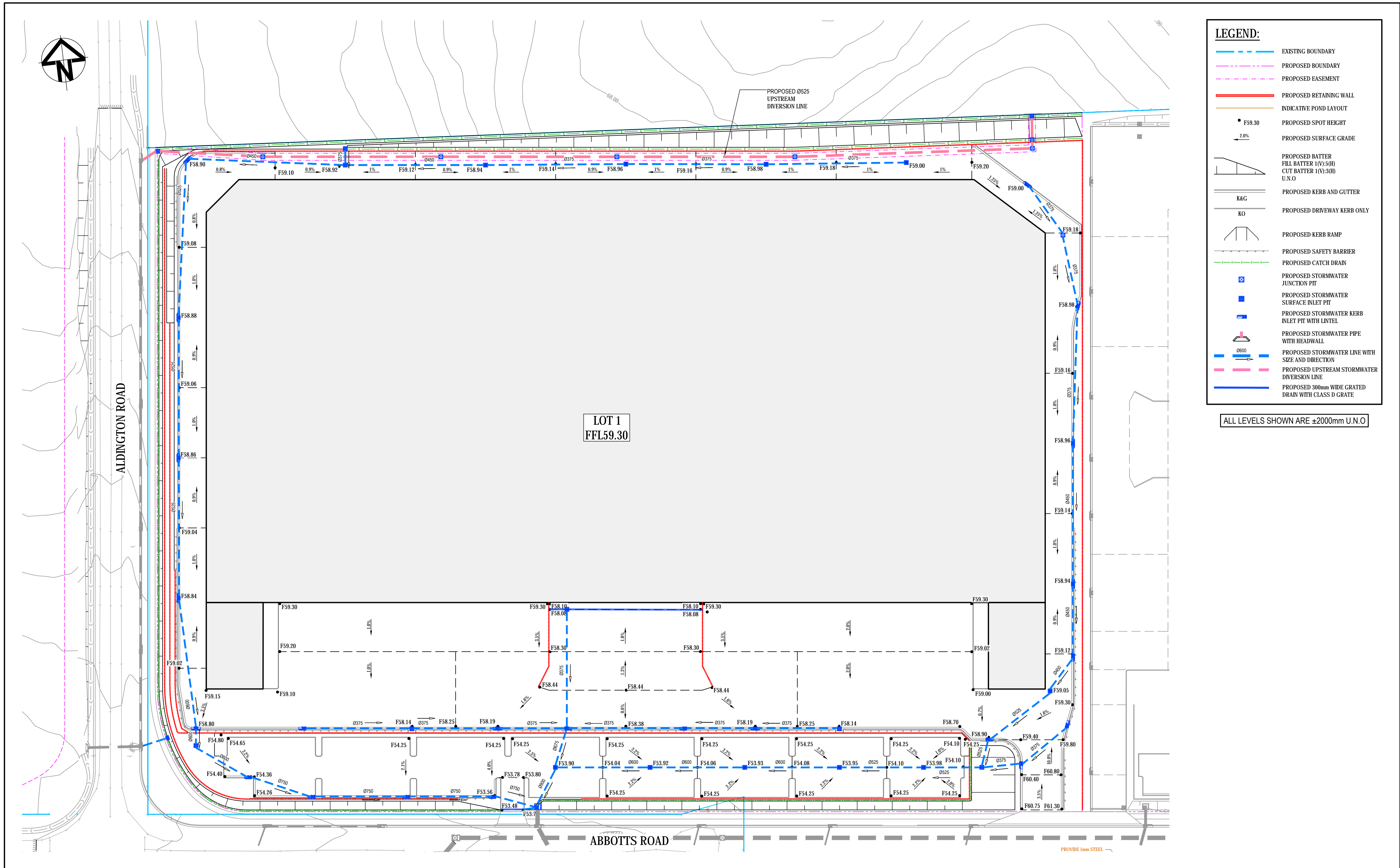
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Civil Engineers and Project Managers

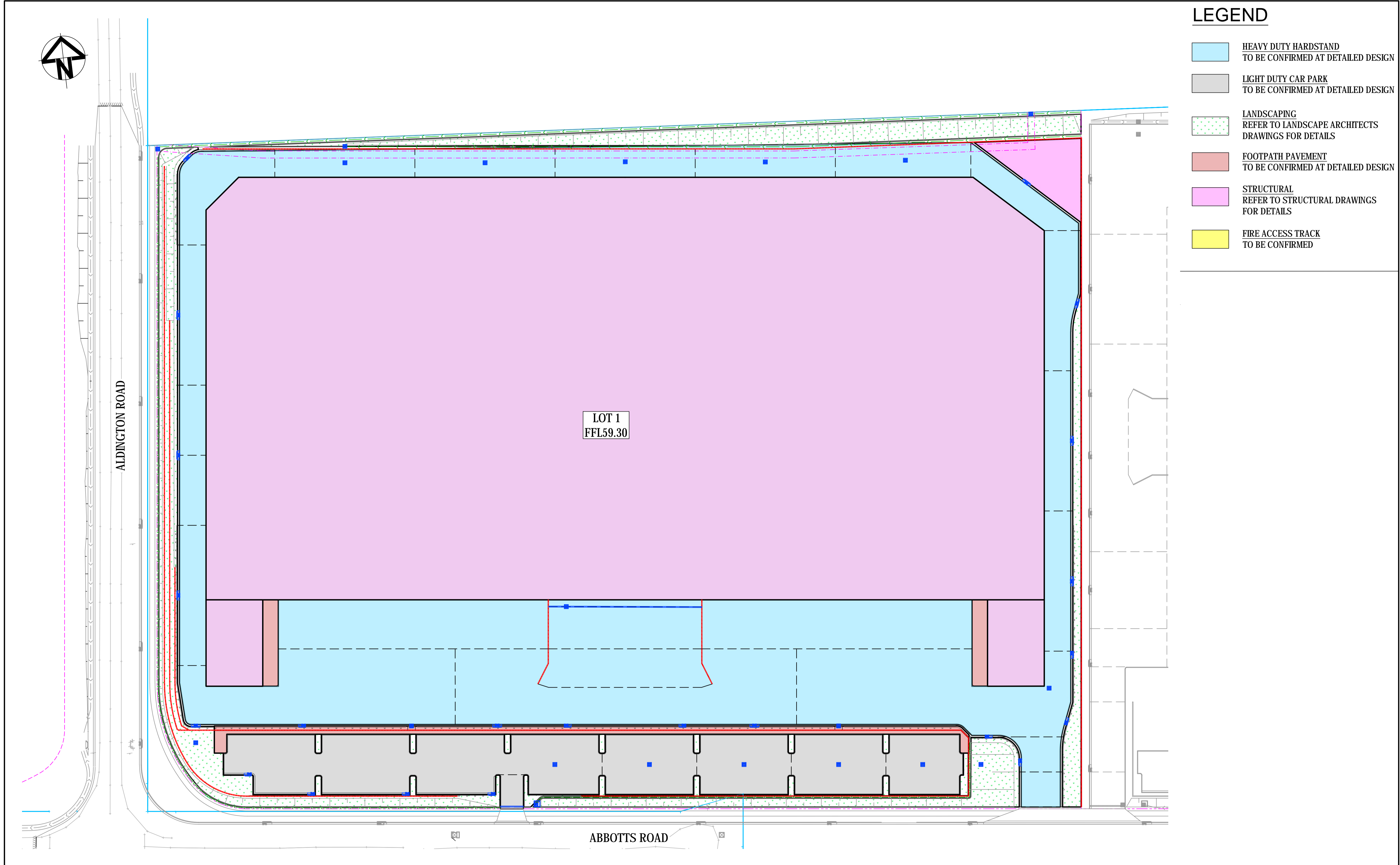


Status **PRELIMINARY**
NOT TO BE USED FOR CONSTRUCTION
Project - Drawing No.
20-748-C1312

A1	Issue
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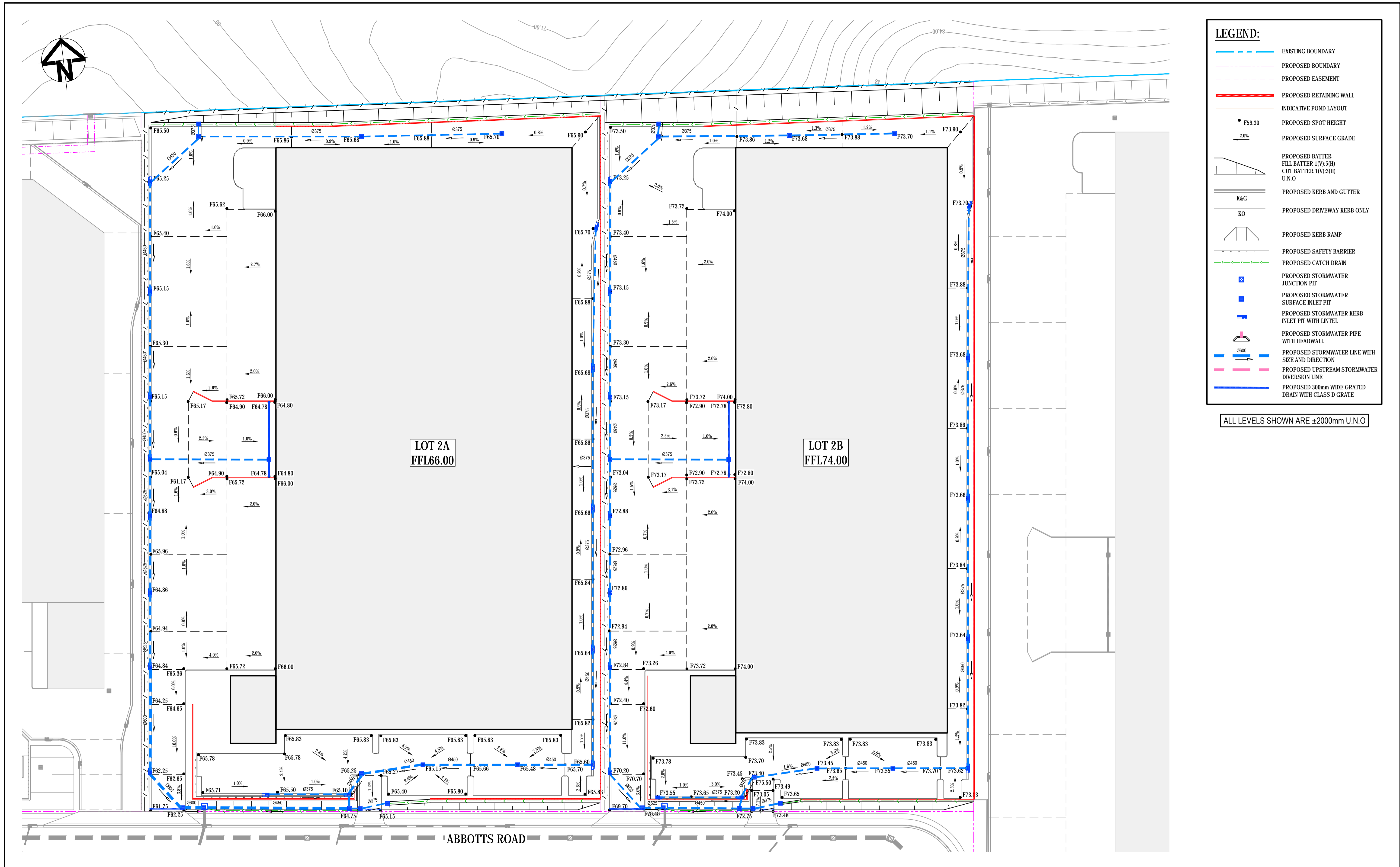


		<div>Bar Scales</div> 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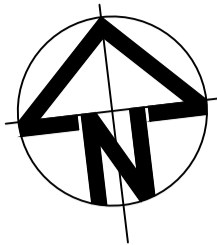


- LEGEND**
- HEAVY DUTY HARDSTAND
TO BE CONFIRMED AT DETAILED DESIGN
 - LIGHT DUTY CAR PARK
TO BE CONFIRMED AT DETAILED DESIGN
 - LANDSCAPING
REFER TO LANDSCAPE ARCHITECTS
DRAWINGS FOR DETAILS
 - FOOTPATH PAVEMENT
TO BE CONFIRMED AT DETAILED DESIGN
 - STRUCTURAL
REFER TO STRUCTURAL DRAWINGS
FOR DETAILS
 - FIRE ACCESS TRACK
TO BE CONFIRMED

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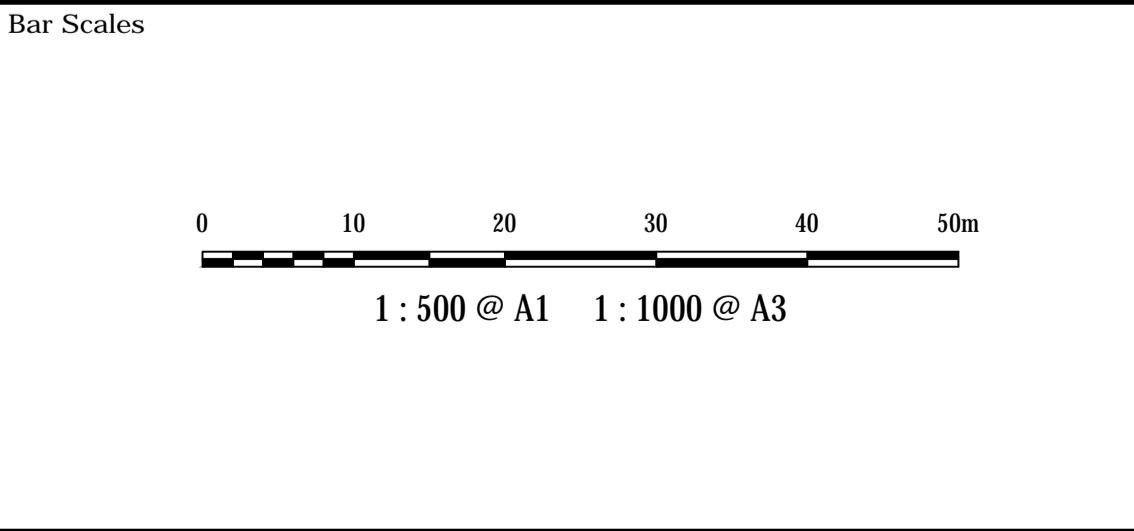
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LEGEND

- HEAVY DUTY HARDSTAND
TO BE CONFIRMED AT DETAILED DESIGN
- LIGHT DUTY CAR PARK
TO BE CONFIRMED AT DETAILED DESIGN
- LANDSCAPING
REFER TO LANDSCAPE ARCHITECTS
DRAWINGS FOR DETAILS
- FOOTPATH PAVEMENT
TO BE CONFIRMED AT DETAILED DESIGN
- STRUCTURAL
REFER TO STRUCTURAL DRAWINGS
FOR DETAILS
- FIRE ACCESS TRACK
TO BE CONFIRMED

B	ISSUED FOR DEVELOPMENT APPLICATION	19-04-21
A	ISSUED FOR DEVELOPMENT APPLICATION	22-12-20
Issue	Description	Date



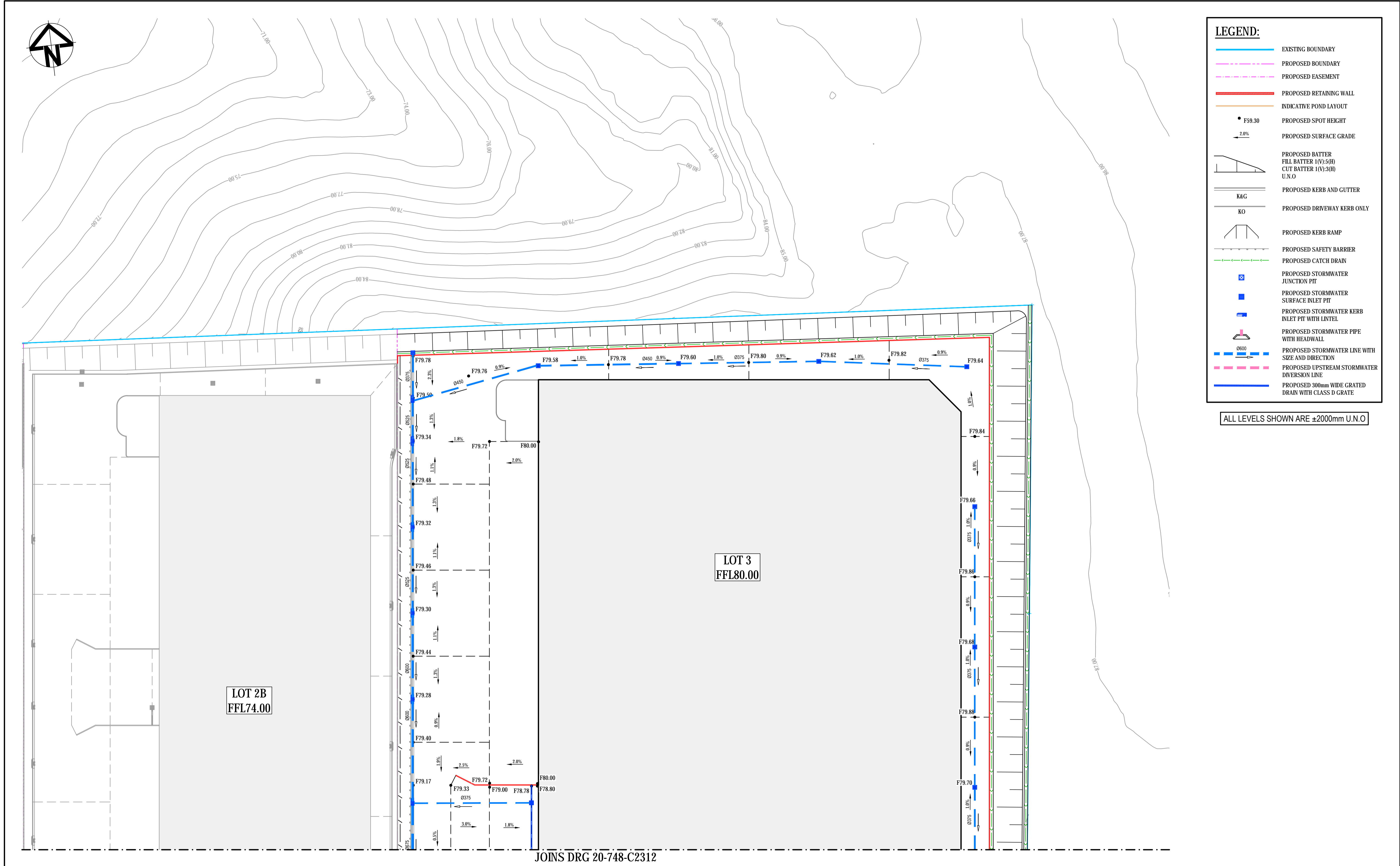
THIS DRAWING CANNOT BE
COPIED OR REPRODUCED IN
ANY FORM OR USED FOR ANY
OTHER PURPOSE OTHER THAN
THAT ORIGINALLY INTENDED
WITHOUT THE WRITTEN
PERMISSION OF AT&L



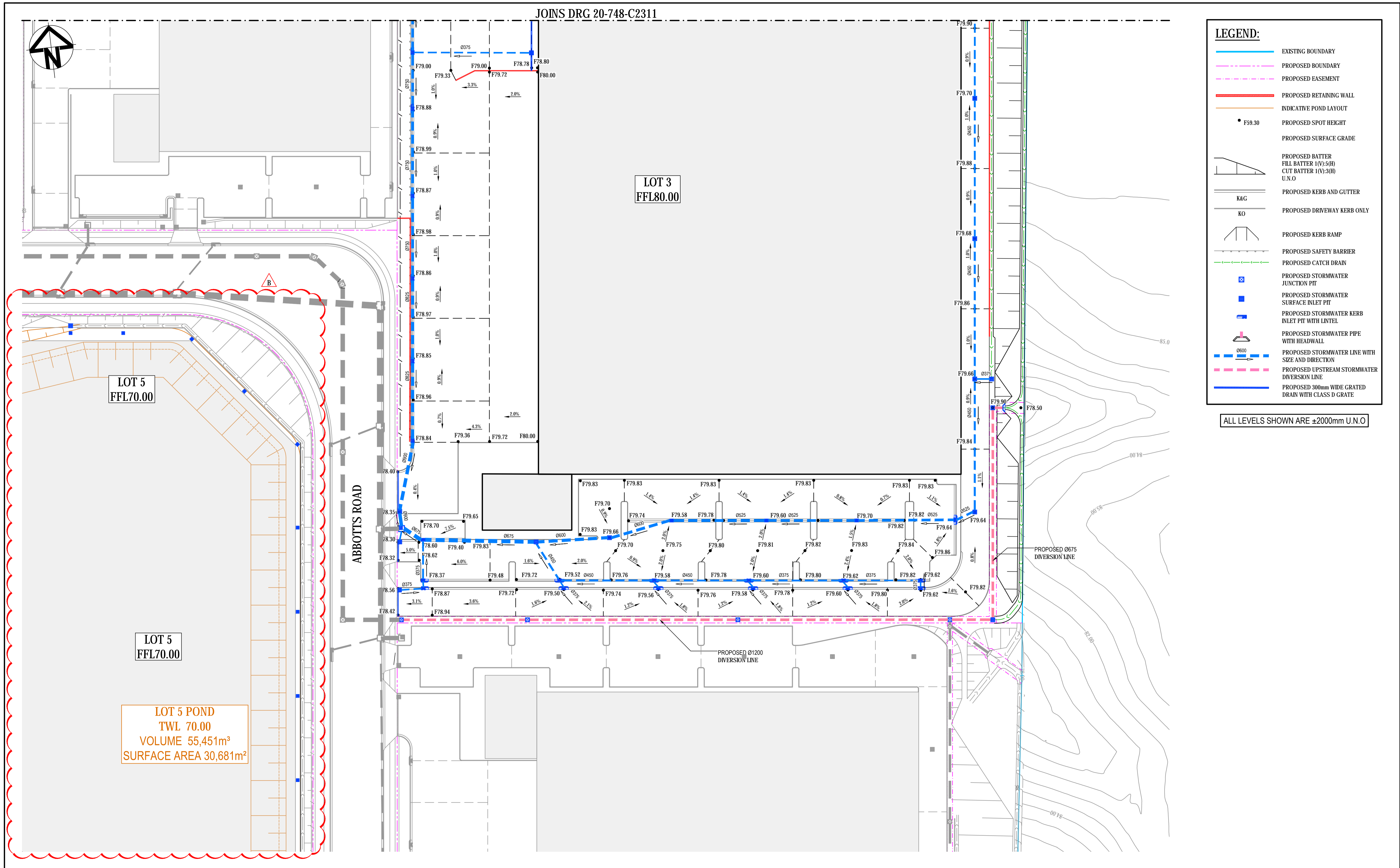
Scales	1:500	Drawn	PDK
		Designed	PDK
Grid	GDA94 MGA56	Checked	TM
Height Datum	AHD	Approved	

Project	PROPOSED INDUSTRIAL DEVELOPMENT ABBOTTS ROAD KEMPS CREEK
Title	LOT 02A & LOT 2B PAVEMENT PLAN

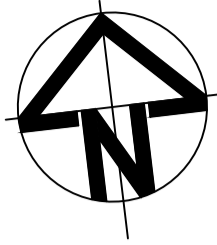
Civil Engineers and Project Managers		
Level 7, 153 Walker Street North Sydney NSW 2060 ABN 96 130 882 405 Tel: 02 9439 1777 Fax: 02 9923 1055 www.atl.net.au info@atl.net.au		
Status	PRELIMINARY NOT TO BE USED FOR CONSTRUCTION	A1
Project - Drawing No.	20-748-C2221	Issue B



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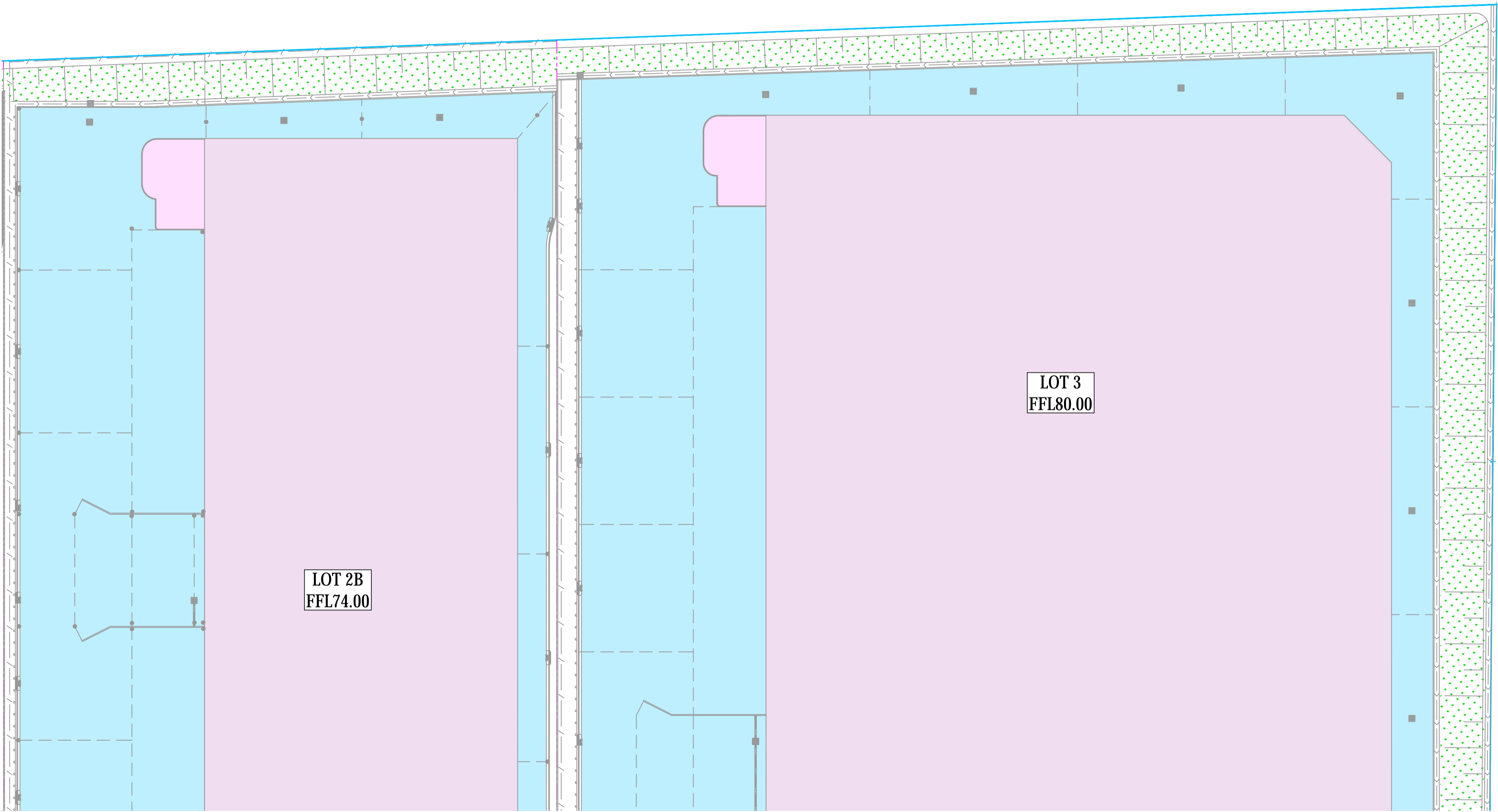


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LEGEND

- HEAVY DUTY HARDSTAND
TO BE CONFIRMED AT DETAILED DESIGN
- LIGHT DUTY CAR PARK
TO BE CONFIRMED AT DETAILED DESIGN
- LANDSCAPING
REFER TO LANDSCAPE ARCHITECTS
DRAWINGS FOR DETAILS
- FOOTPATH PAVEMENT
TO BE CONFIRMED AT DETAILED DESIGN
- STRUCTURAL
REFER TO STRUCTURAL DRAWINGS
FOR DETAILS
- FIRE ACCESS TRACK
TO BE CONFIRMED



B	ISSUED FOR DEVELOPMENT APPLICATION	19-04-21
A	ISSUED FOR DEVELOPMENT APPLICATION	22-12-20
Issue	Description	Date

Bar Scales
<div><div><div></div><div>0</div></div><div><div></div><div>10</div></div><div><div></div><div>20</div></div><div><div></div><div>30</div></div><div><div></div><div>40</div></div><div><div></div><div>50m</div></div></div> <div>1 : 500 @ A1 1 : 1000 @ A3</div>

THIS DRAWING CANNOT BE
COPIED OR REPRODUCED IN
ANY FORM OR USED FOR ANY
OTHER PURPOSE OTHER THAN
THAT ORIGINALLY INTENDED
WITHOUT THE WRITTEN
PERMISSION OF AT&L


Client



Scales	1:500	Drawn	PDK
		Designed	PDK
Grid	GDA94 MGA56	Checked	TM
Height Datum	AHD	Approved	

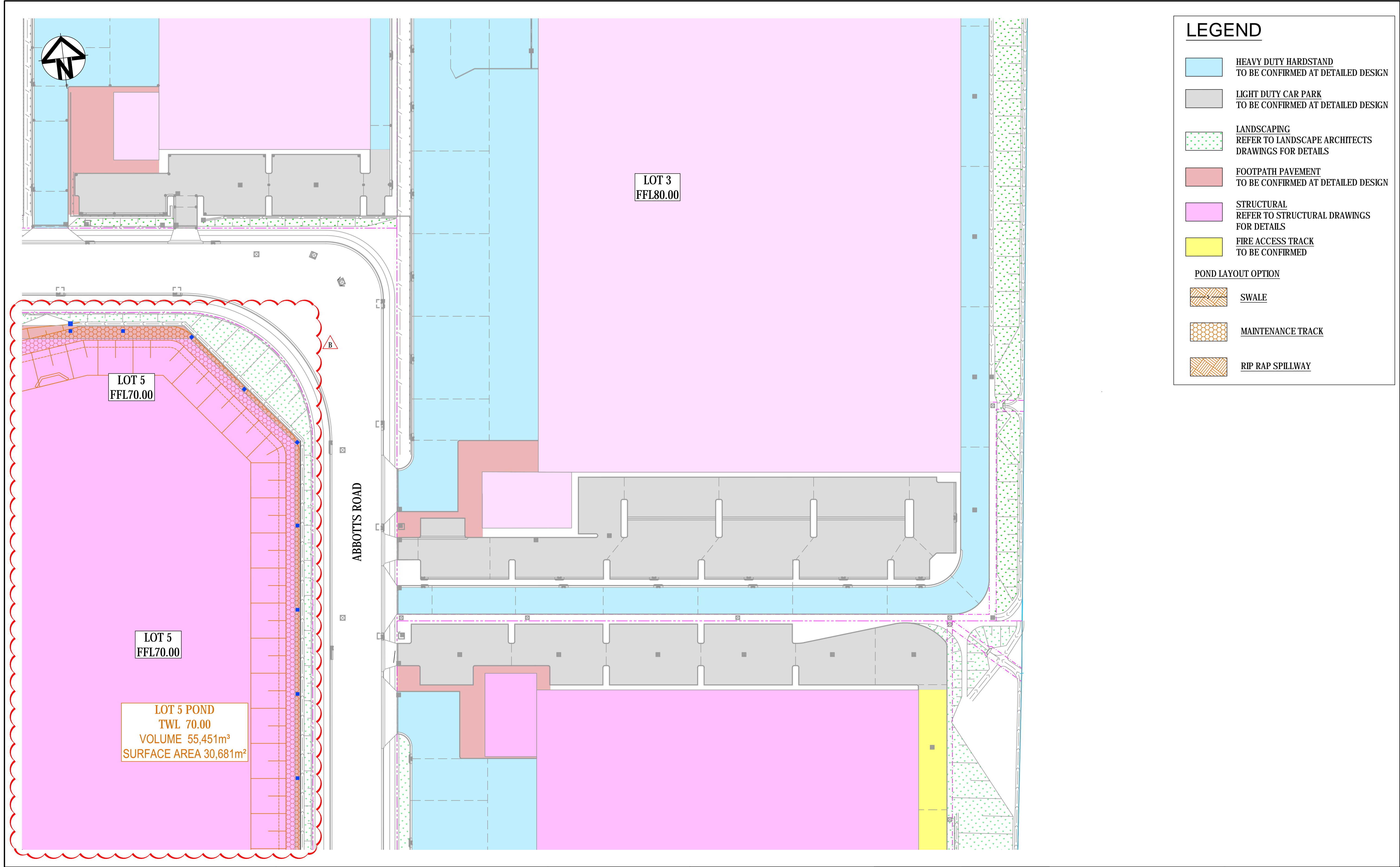
Project	PROPOSED INDUSTRIAL DEVELOPMENT ABBOTTS ROAD KEMPS CREEK
Title	LOT 03 PAVEMENT PLAN SHEET 1

Civil Engineers and Project Managers

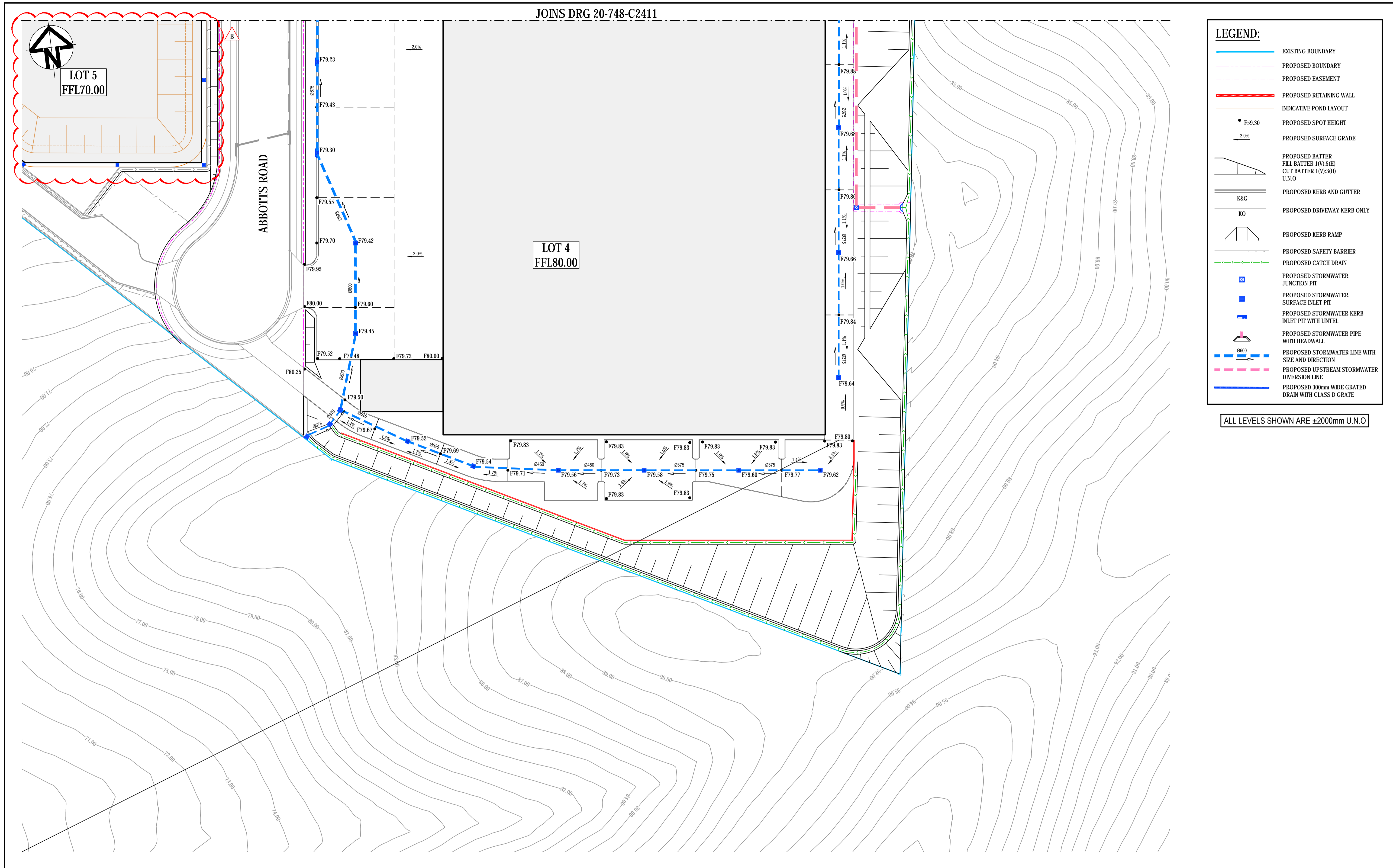


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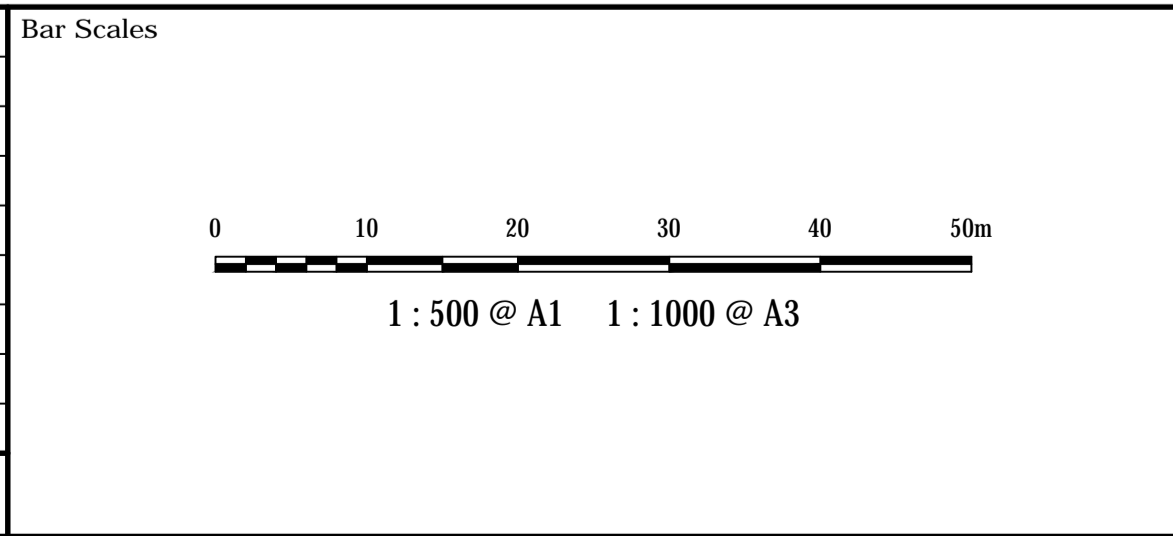
Status	PRELIMINARY NOT TO BE USED FOR CONSTRUCTION	A1
Project - Drawing No.	20-748-C2321	Issue B



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B	ISSUED FOR DEVELOPMENT APPLICATION	19-04-21
A	ISSUED FOR DEVELOPMENT APPLICATION	22-12-20
Issue	Description	Date



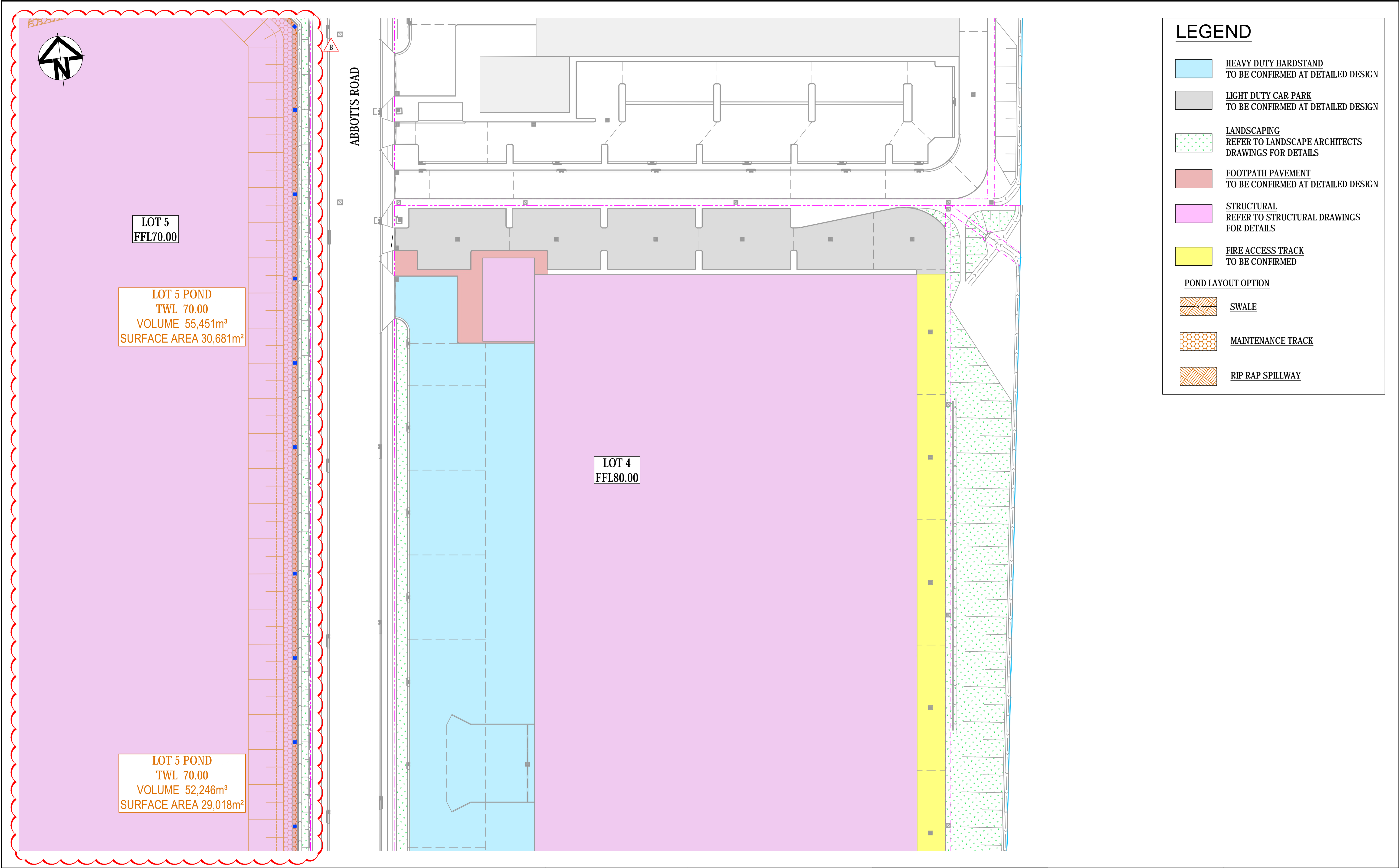
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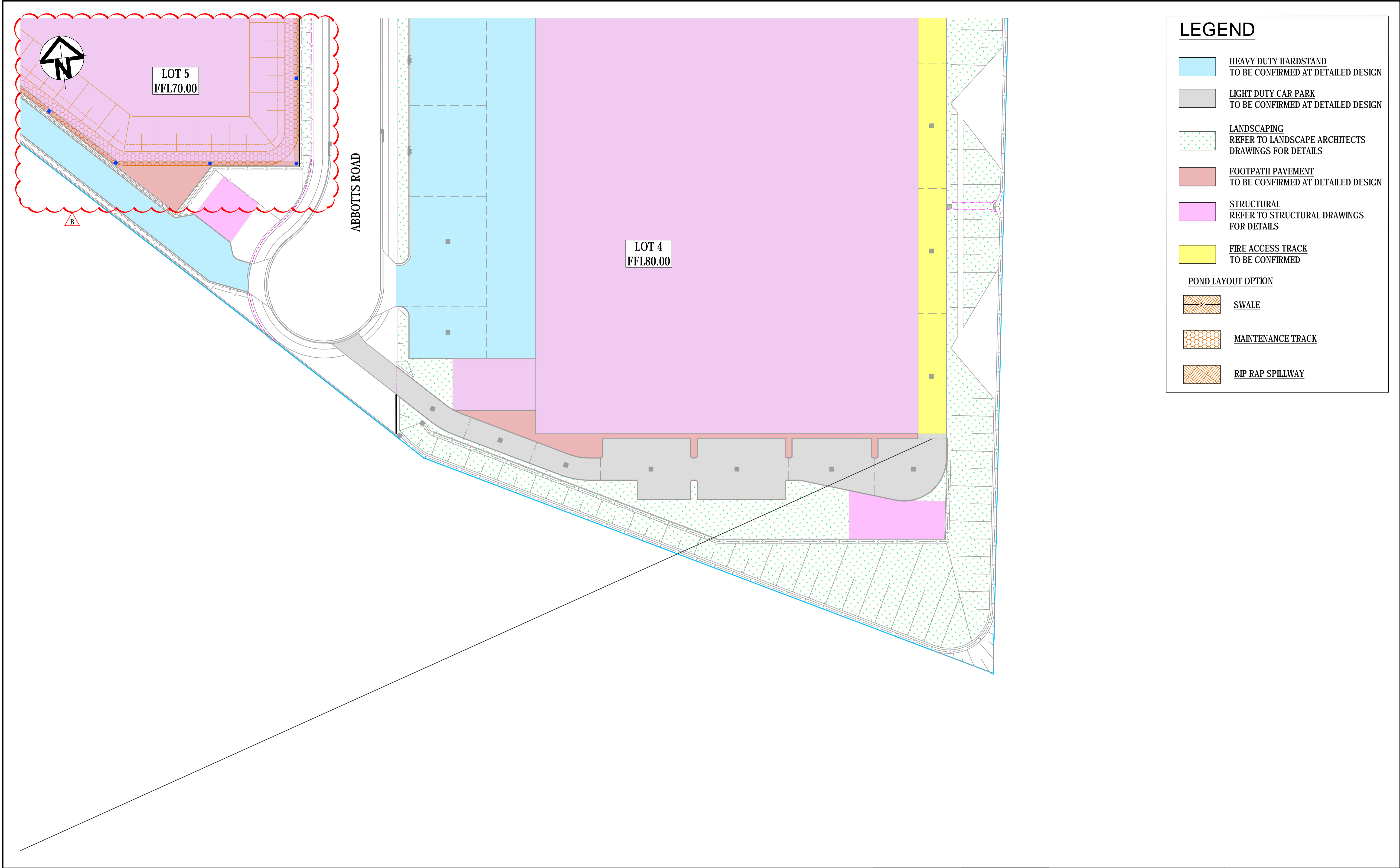
Scales	1 : 500	Drawn	PDK
		Designed	PDK
Grid	GDA94 MGA56	Checked	TM
Height Datum	AHD	Approved	


Project	PROPOSED INDUSTRIAL DEVELOPMENT ABBOTTS ROAD KEMPS CREEK
Title	LOT 04 SITEWORKS AND STORMWATER DRAINAGE PLAN SHEET 2

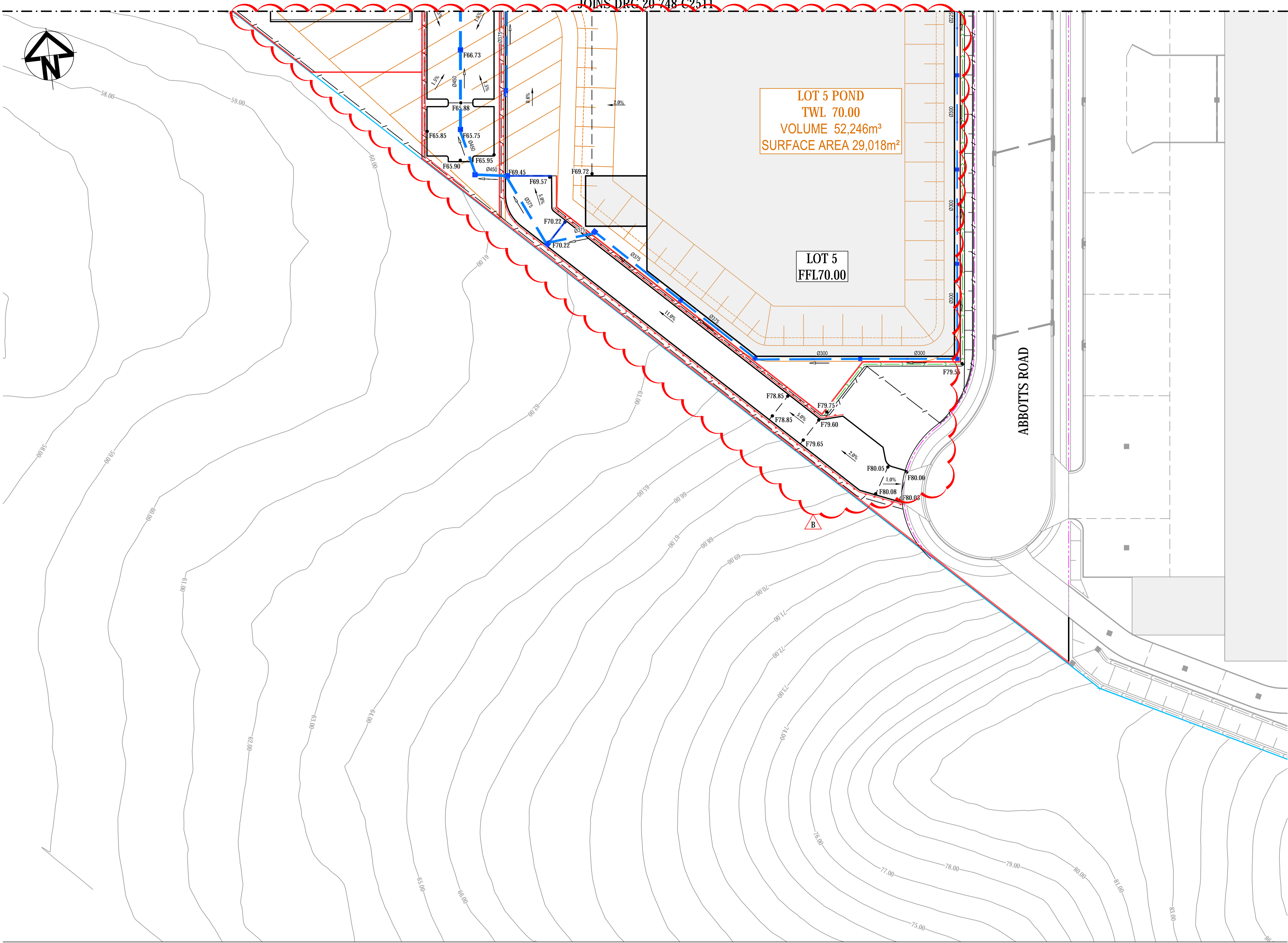
Civil Engineers and Project Managers		
Level 7, 153 Walker Street North Sydney NSW 2060 ABN 96 130 882 405 Tel: 02 9439 1777 Fax: 02 9923 1055 www.atl.net.au info@atl.net.au		
Status	PRELIMINARY NOT TO BE USED FOR CONSTRUCTION	A1
Project - Drawing No.	20-748-C2412	Issue B



			Bar Scales		THIS DRAWING CANNOT BE COPIED OR REPRODUCED IN ANY FORM OR USED FOR ANY OTHER PURPOSE OTHER THAN THAT ORIGINALLY INTENDED WITHOUT THE WRITTEN PERMISSION OF AT&L	<div>Client</div> <div></div>	Scales		Drawn	PDK	Project PROPOSED INDUSTRIAL DEVELOPMENT ABBOTTS ROAD KEMPS CREEK	Civil Engineers and Project Managers						
			1:500				Grid	GDA94 MGA56	Designed	PDK			Level 7, 153 Walker Street North Sydney NSW 2060 ABN 96 130 882 405 Tel: 02 9439 1777 Fax: 02 9923 1055 www.atl.net.au info@atl.net.au	A1				
									Checked	TM								
			Height Datum						Approved									
											Title	LOT 04 & LOT 5 PAVEMENT PLAN SHEET 1						
											Status PRELIMINARY NOT TO BE USED FOR CONSTRUCTION							
											Project - Drawing No. 20-748-C2421							
											Issue B							
											</							



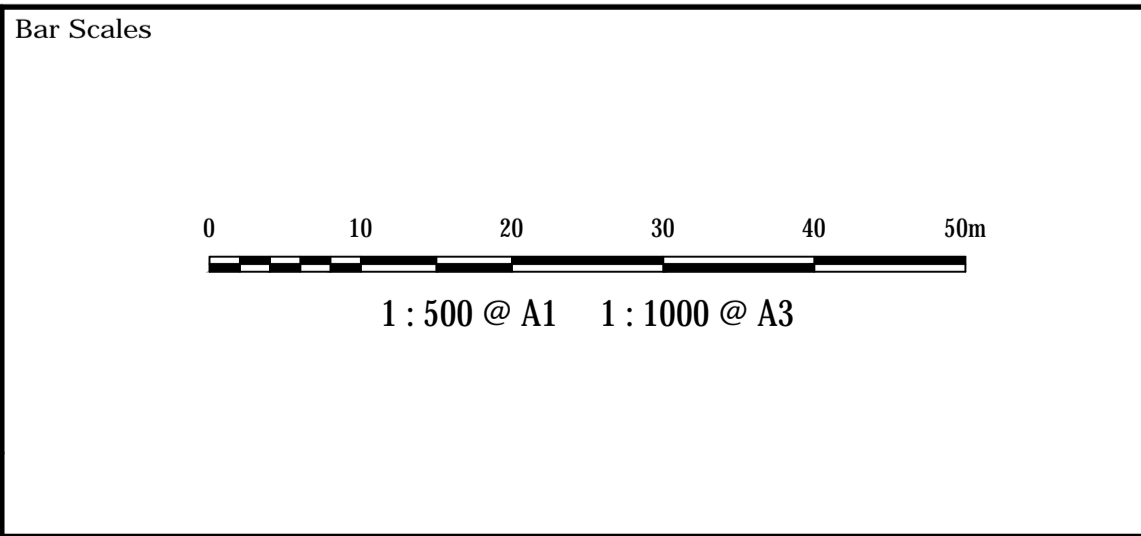
		Bar Scales		<p>THIS DRAWING CANNOT BE COPIED OR REPRODUCED IN ANY FORM OR USED FOR ANY OTHER PURPOSE OTHER THAN THAT ORIGINALLY INTENDED WITHOUT THE WRITTEN PERMISSION OF AT&L</p>	<p>Client</p> <div></div>	Scales		Drawn	PDK	<p>Project</p> <p>PROPOSED INDUSTRIAL DEVELOPMENT ABBOTTS ROAD KEMPS CREEK</p>	Civil Engineers and Project Managers			
		1:500				Designed	PDK	<p>Title</p> <p>LOT 04 & LOT 5 PAVEMENT PLAN SHEET 2</p>			<p>Status</p> <p>PRELIMINARY NOT TO BE USED FOR CONSTRUCTION</p> <p>Project - Drawing No. 20-748-C2422</p>		<p>A1</p> <p>Issue B</p>	
		Grid GDA94 MGA56				Checked	TM							
		Height Datum AHD				Approved								



- LEGEND:**
- EXISTING BOUNDARY
 - PROPOSED BOUNDARY
 - PROPOSED EASEMENT
 - PROPOSED RETAINING WALL
 - INDICATIVE POND LAYOUT
 - PROPOSED SPOT HEIGHT
 - PROPOSED SURFACE GRADE
 - PROPOSED BATTER
FILL BATTER 1(V):5(H)
CUT BATTER 1(V):3(H)
U.N.O
 - PROPOSED KERB AND GUTTER
 - PROPOSED DRIVEWAY KERB ONLY
 - PROPOSED KERB RAMP
 - PROPOSED SAFETY BARRIER
 - PROPOSED CATCH DRAIN
 - PROPOSED STORMWATER JUNCTION PIT
 - PROPOSED STORMWATER SURFACE INLET PIT
 - PROPOSED STORMWATER KERB INLET PIT WITH LINTEL
 - PROPOSED STORMWATER PIPE WITH HEADWALL
 - PROPOSED STORMWATER LINE WITH SIZE AND DIRECTION
 - PROPOSED UPSTREAM STORMWATER DIVERSION LINE
 - PROPOSED 300mm WIDE GRATED DRAIN WITH CLASS D GRATE

ALL LEVELS SHOWN ARE ±2000mm U.N.O

B	ISSUED FOR DEVELOPMENT APPLICATION	19-04-21
A	ISSUED FOR DEVELOPMENT APPLICATION	22-12-20
Issue	Description	Date




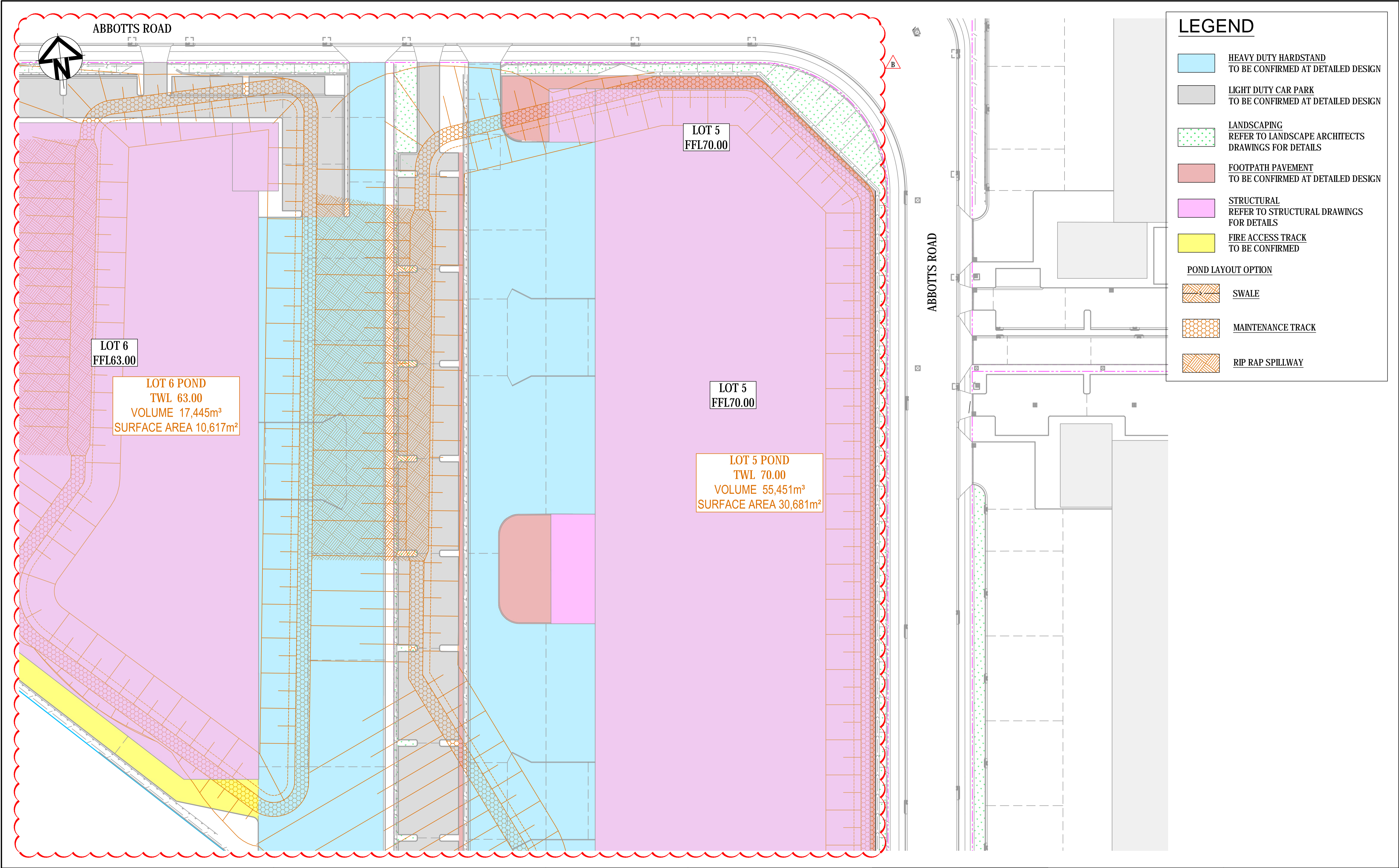
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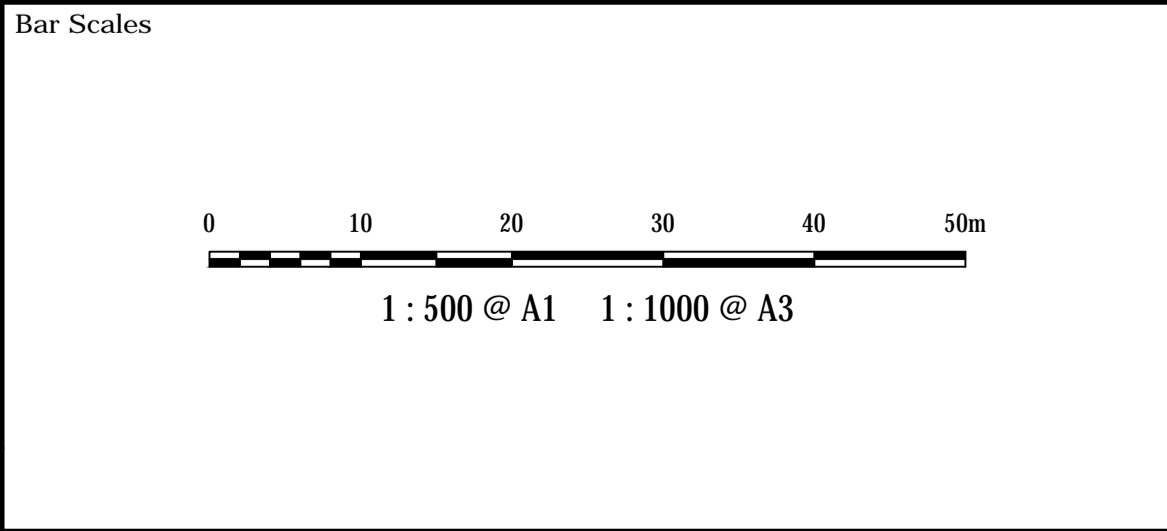
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Grid	GDA94 MGA56	Checked	TM
Height Datum	AHD	Approved	

Project	PROPOSED INDUSTRIAL DEVELOPMENT ABBOTTS ROAD KEMPS CREEK
Title	LOT 05 SITEWORKS AND STORMWATER DRAINAGE PLAN SHEET 2

Civil Engineers and Project Managers		
	Level 7, 153 Walker Street North Sydney NSW 2060	
	ABN 96 130 882 405	
	Tel: 02 9439 1777	
	Fax: 02 9923 1055	
	www.atl.net.au info@atl.net.au	
Status	PRELIMINARY NOT TO BE USED FOR CONSTRUCTION	A1
Project - Drawing No.	20-748-C2512	Issue B



B	ISSUED FOR DEVELOPMENT APPLICATION	19-04-21
A	ISSUED FOR DEVELOPMENT APPLICATION	22-12-20
Issue	Description	Date



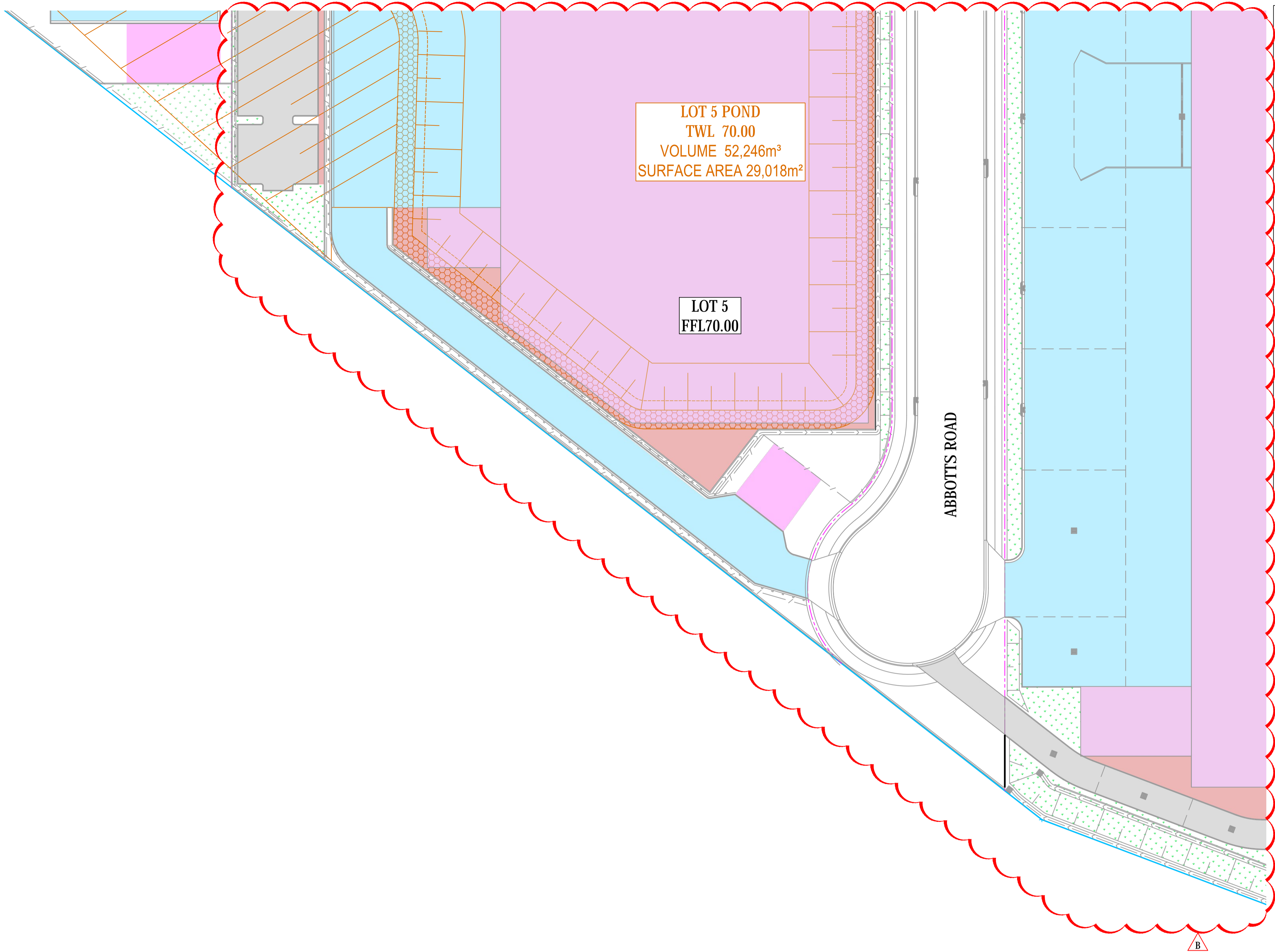
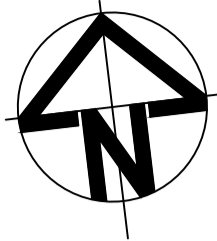
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Scales	1:500	Drawn	PDK
		Designed	PDK
Grid	GDA94 MGA56	Checked	TM
Height Datum	AHD	Approved	

Project	PROPOSED INDUSTRIAL DEVELOPMENT ABBOTTS ROAD KEMPS CREEK
Title	LOT 05 & LOT 06 PAVEMENT PLAN SHEET 1

Civil Engineers and Project Managers		
at&l		
Level 7, 153 Walker Street North Sydney NSW 2060 ABN 96 130 882 405 Tel: 02 9439 1777 Fax: 02 9923 1055 www.atl.net.au info@atl.net.au		
Status	PRELIMINARY NOT TO BE USED FOR CONSTRUCTION	A1
Project - Drawing No.	20-748-C2521	Issue B



LEGEND

- HEAVY DUTY HARDSTAND**
TO BE CONFIRMED AT DETAILED DESIGN
- LIGHT DUTY CAR PARK**
TO BE CONFIRMED AT DETAILED DESIGN
- LANDSCAPING**
REFER TO LANDSCAPE ARCHITECTS
DRAWINGS FOR DETAILS
- FOOTPATH PAVEMENT**
TO BE CONFIRMED AT DETAILED DESIGN
- STRUCTURAL**
REFER TO STRUCTURAL DRAWINGS
FOR DETAILS
- FIRE ACCESS TRACK**
TO BE CONFIRMED
- POND LAYOUT OPTION**
 - SWALE**
 - MAINTENANCE TRACK**
 - RIP RAP SPILLWAY**

B	ISSUED FOR DEVELOPMENT APPLICATION	19-04-21
A	ISSUED FOR DEVELOPMENT APPLICATION	22-12-20
Issue	Description	Date

Bar Scales
1 : 500 @ A1 1 : 1000 @ A3

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Client

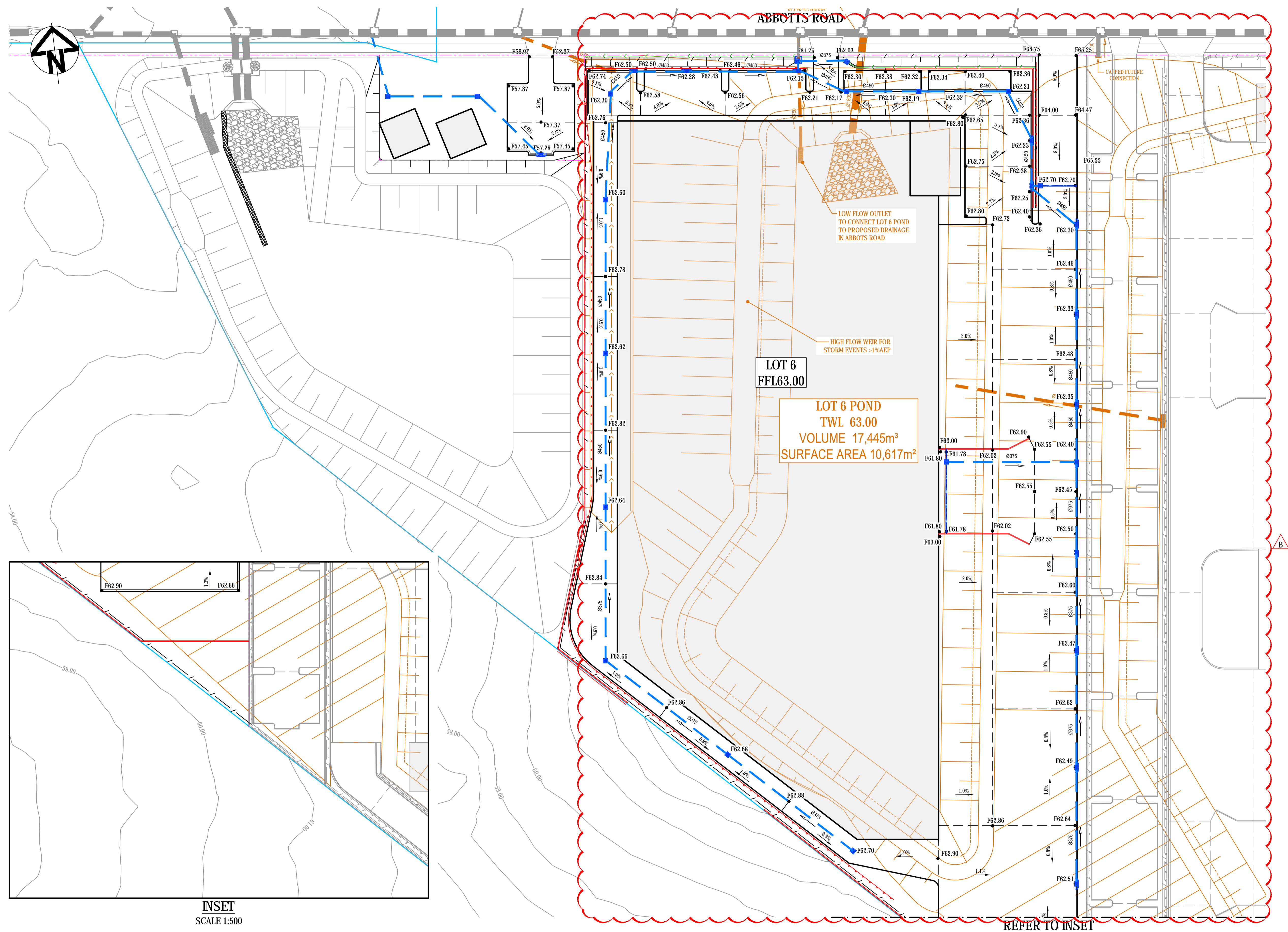
Scales	1:500	Drawn	PDK
		Designed	PDK
Grid	GDA94 MGA56	Checked	TM
Height Datum	AHD	Approved	

Project	PROPOSED INDUSTRIAL DEVELOPMENT ABBOTTS ROAD KEMPS CREEK
Title	LOT 05 PAVEMENT PLAN SHEET 2

Civil Engineers and Project Managers

Level 7, 153 Walker Street
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www.atl.net.au
info@atl.net.au

Status	PRELIMINARY NOT TO BE USED FOR CONSTRUCTION	A1
Project - Drawing No.	20-748-C2522	Issue B



LEGEND:	
	EXISTING BOUNDARY
	PROPOSED BOUNDARY
	PROPOSED EASEMENT
	PROPOSED RETAINING WALL
	INDICATIVE POND LAYOUT
	F59.30
	2.0%
	PROPOSED SURFACE GRADE
	PROPOSED BATTER FILL BATTER 1(V):5(H) CUT BATTER 1(V):3(H) U.N.O
	PROPOSED KERB AND GUTTER
	PROPOSED DRIVEWAY KERB ONLY
	PROPOSED KERB RAMP
	PROPOSED SAFETY BARRIER
	PROPOSED CATCH DRAIN
	PROPOSED STORMWATER JUNCTION PIT
	PROPOSED STORMWATER SURFACE INLET PIT
	PROPOSED STORMWATER KERB INLET PIT WITH LINTEL
	PROPOSED STORMWATER PIPE WITH HEADWALL
	PROPOSED STORMWATER LINE WITH SIZE AND DIRECTION
	PROPOSED UPSTREAM STORMWATER DIVERSION LINE
	PROPOSED 300mm WIDE GRATED DRAIN WITH CLASS D GRATE

ALL LEVELS SHOWN ARE $\pm 2000\text{mm}$ U.N.O

[illegible]

