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Aspect Industrial Estate – Mod 3
Groundwater Management Plan Cover Letter
Our Ref: 30130654_L02_1
Date: 28 July 2022

Dear Russell,

1 Introduction

Arcadis Australia Pacific Pty Ltd (**Arcadis**) was engaged by Mirvac Projects Pty Ltd (**Mirvac**) to prepare a Groundwater Management Plan (**GMP**) (Arcadis, *Groundwater Management Plan – Aspect Industrial Estate, Mamre Road, Kemps Creek, NSW – Rev 4 Final,* 2 May 2022) for proposed Aspect Industrial Estate, located at lots 54 to 58 DP259135 Mamre Road, Kemps Creek (**the Site**).

The site comprises an approximate area of 56.3 ha and is located within the Penrith City Council Local Government Area (**LGA**). The Site is currently zoned as IN1 General Industrial land within the Broader Western Sydney Employment Area stipulated within State Environmental Planning Policy (Western Sydney Employment Area) 2009 (**SEPP WSEA**), updated 11 June 2022.

A copy of the GMP is provided as ***Attachment A***.

Arcadis understands that Mirvac has prepared a modification package (**Mod 3**) that requires this cover letter to address the Secretary's Environmental Assessment Requirements (**SEARs**) for the Site.

2 Modification 3 (Mod 3)

Information provided on the proposed redevelopment gleaned from the Mod 3 drawings package (AT&L. 2022. *Aspect Industrial Estate, Stage 1 Civil Works Package Stage Significant Development Mod 3 Application – Rev* J) includes the following:

- Reduction in overall lot numbers from 11 to 9.
- Relocation and shortening of Access Road 4.
- Reconfiguration of warehouse lots 6-11 into 6-9.
- Amendments to warehouse footprints and heights, hardstand locations, car parking, estate landscaping.
- Change in boundary condition to the south including orientation of warehouse hardstand for Warehouse 9 to south (rather than north).
- Reduction in area of Lot 6 Warehouse to 16,160m^2 and Lot 7 Warehouse to 14,945m^2.
- Increase in area of Lot 8 Warehouse to 38,865 m^2 and Lot 9 Warehouse to 64,195m^2.
- New hardstand areas east of Warehouse 6, west of Warehouse 7, south of Warehouse 8 and north and south of Warehouse 9.
- Reconfiguration of carpark areas to support modified warehouse layout.

- Revised vehicular and truck access of Access Road 1, 3 and 4.

The above Mod 3 package design changes result in estate-wide impacts associated with the management of stormwater, traffic generation, amenity, noise, earthworks and landscaping. However, they do not significantly impact the scope, findings or overall validity of the Arcadis 2022 GMP. Therefore, Arcadis considers that the Arcadis 2022 GMP remains appropriate to address SEARs requirements for the Mod 3 package and design changes, as detailed above.

For completeness, Arcadis have revised the Bulk Earthworks Level comparted to the highest recorded groundwater depth table (Table 2-2 of the GMP) in light of Mod 3 design changes as presented below.

Table 2-1 Bulk Earthworks Level compared to highest recorded groundwater depth (mAHD)

Future Lot	Finish Level (m AHD)	Highest Groundwater Contour Level (m AHD)	Groundwater Interception Risk (<2.0 m)
1	48.10	44.00	No
2	48.30	46.00	No
3	49.30	49.00	Yes
4	57.30	56.00	Yes
5	57.30	56.00	Yes
6	56.30	53.00	No
7	50.30	51.00**	Yes
8	52.00	51.00	Yes
9	52.30	53.00**	Yes

Notes:
Groundwater levels were obtained from groundwater contouring undertaken as part of the DSI. Groundwater levels area therefore indicative only.
** indicates groudnwater levels are within 0.2 m of the finish level or above the finish level.

Based on the revised bulk earthworks levels and the inferred groundwater contours, Lots 3, 4, 5, 7, 8 and 9 have the potential to encounter groundwater during site development (based on final site level and/or presence of service trenches).

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Aspect Industrial Estate – Warehouse 9 SSD
Groundwater Management Plan Cover Letter

Our Ref: 30130654_L06_0
Date: 5 August 2022

Dear Russell,

1 Introduction

Arcadis Australia Pacific Pty Ltd (**Arcadis**) was engaged by Mirvac Projects Pty Ltd (**Mirvac**) to prepare a Groundwater Management Plan (**GMP**) (Arcadis. 2022. *Groundwater Management Plan – Rev 4 Final*) for the proposed Aspect Industrial Estate, located at lots 54 to 58 DP259135 Mamre Road, Kemps Creek NSW (**the Site**).

The Site comprises an approximate area of 56.3 ha and is located within the Penrith City Council Local Government Area (**LGA**). The Site is currently zoned as IN1 General Industrial land within the Broader Western Sydney Employment Area stipulated within NSW Government. 2022. *State Environmental Planning Policy (Western Sydney Employment Area) 2009* (as updated 2022)(**SEPP WSEA**).

Arcadis understands that Mirvac requires this cover letter to address the Secretary's Environmental Assessment Requirements (**SEARs**) for the Warehouse 9 State Significant Development (**SSD**) (SSD-46516461) application which is located on the Site.

A copy of the Arcadis 2022 GMP is provided as ***Attachment A***.

2 Warehouse 9 SSD

Information provided on the proposed redevelopment gleaned from the Warehouse 9 Drawings Package (SBA Architects. 2022. *Aspect Industrial Estate, Lots 54-58 Mamre Road, Kemps Creek – Rev L* and AT&L. 2022. *Aspect Industrial Estate, Stage 1 Civil Works Package Stage Significant Development Mod 3 Application – Rev* J), includes the following:

- Warehouse 9 - A new 64,725 m^2 warehouse and distribution facility on Lot 9 (facilitated by SSD-10448 MOD3) which includes:
  - A 1,350 m^2 ancillary office and two (2) dock offices totalling 266m^2;
  - A car park;
  - On lot landscaping and stormwater management;
  - Construction of internal truck access driveways to Access Road 3 (ingress) and access Road 4 (egress)
- The warehouse facility will be operational 24 hours a day / 7 days a week.

The above Warehouse 9 design results in impacts associated with the management of stormwater, traffic generation, amenity, noise, earthworks and landscaping. However, they do not significantly impact the scope, findings or overall validity of the Arcadis 2022 GMP. Therefore, Arcadis considers

that the Arcadis 2022 GMP remains appropriate to address SEARs requirements for the Warehouse 9 SSD, as detailed above.

For completeness, Arcadis have reviewed the revised the Bulk Earthworks Level (proposed final site level) compared to the highest recorded groundwater depth table (Table 2-2 of the GMP) in light of Warehouse 9 design changes as presented below.

Table 2-1 Bulk Earthworks Level Compared to Highest Recorded Groundwater Depth

Future Lot	Final Site Level (mAHD)	Highest Groundwater Contour Level (mAHD)	Groundwater Interception Risk (<2.0 m)
9	51.80	53.00**	Yes

Notes
Groundwater levels were obtained from groundwater contouring undertaken as part of the DSI. Groundwater levels area therefore indicative only.
** indicates groundwater levels are within 0.2 m of the finish level or above the finish level.

Based on the revised bulk earthworks levels and the inferred groundwater contours, Lot 9 (Warehouse 9) has the potential to encounter groundwater during site development (based on the proposed final site level and/or presence of service trenches which are expected to extend deeper than the proposed final site level). This is consistent with the findings of the Arcadis 2022 GMP for this part of the Site.

The Warehouse 9 Drawings Package is provided as ***Attachment B***.

3 Closing

Arcadis completed a detailed review of Warehouse 9 SSD drawings for the Aspect Industrial Estate and considers the existing Arcadis 2022 GMP appropriate to address the SEARs requirements for the Site.

We trust the addition of this cover letter to the Arcadis 2022 GMP meets your requirements for the project. Should you have any queries or wish to discuss any points further, please do not hesitate to contact the undersigned.

Kind regards,

Arcadis Australia Pacific Pty Ltd

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Enclosures:

Attachment A – Groundwater Management Plan
Attachment B – Warehouse 9 Drawings Package

3 Closing

Arcadis completed a detailed review of Mod 3 design changes for the Aspect Industrial Estate and considers the existing Arcadis 2022 GMP appropriate to address the SEARs requirements for the Site.

We trust the additional of this cover letter to the Arcadis 2022 GMP meets your requirements for the project. Should you have any queries or wish to discuss any points further, please do not hesitate to contact the undersigned.

Kind regards,

Arcadis Australia Pacific Pty Ltd

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Enclosures:

Attachment A – Groundwater Management Plan
Attachment B – Aspect Industrial Estate Stage 1 Civil Works Package (Mod 3) Application

Attachment A

Groundwater Management Plan

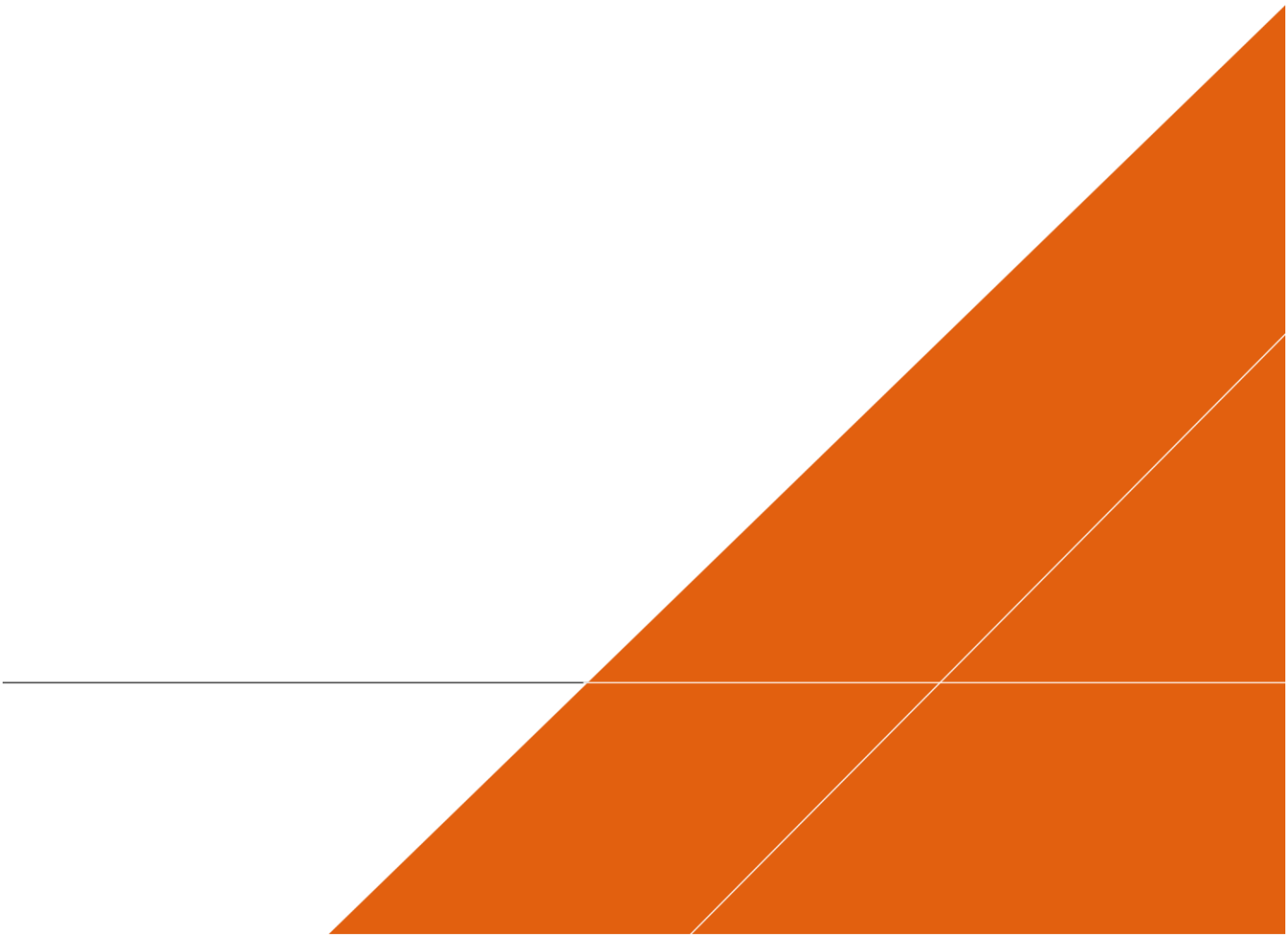
ARCADIS Design & Consultancy for natural and built assets

GROUNDWATER MANAGEMENT PLAN – REV 4

Aspect Industrial Estate, Mamre Road, Kemps Creek, NSW

Prepared for Mirvac Projects Pty Ltd

02 MAY 2022



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GROUNDWATER MANAGEMENT PLAN

Aspect Industrial Estate, Mamre Road, Kemps Creek, NSW

Rev 4

Author	Maddy Phillips	
Checker	Matthew Gibbs	
Approver	Simon Spyrdz	

Report No	10035157_GMP
Date	2/05/2022
Revision Text	Rev 4

This report has been prepared for Mirvac Office and Industrial Pty Ltd in accordance with the terms and conditions of appointment in the Consultant Agreement for Lots 54-58 (DP 259135) Mamre Road, Kemps Creek – Phase 2 DSI, FIP, UFP, Dam Decommissioning Strategy, Groundwater Management Plan dated 24 September 2019. Arcadis Australia Pacific Pty Limited (ABN 76 104 485 289) cannot accept any responsibility for any use of or reliance on the contents of this report by any third party.

REVISIONS

Revision	Date	Description	Prepared by	Approved by
A	1/11/2019	Draft for client review	PM	DT
B	12/05/2020	Draft for client review	CL	CL
C	9/10/2020	Review of Legislation Amendment	BK	BV
Rev 4	02/05/2022	Updated with revised bulk earthworks levels and PSM 2021 data	MP	SS

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1 INTRODUCTION

Arcadis Australia Pacific (Arcadis) was engaged by Mirvac Office and Industrial (Mirvac) to prepare a Groundwater Management Plan (GMP) to support the proposed Aspect Industrial Estate development located at Lots 54-58 DP259135 Mamre Road, Kemps Creek, NSW 2178 (the site). The location of the site is illustrated in Figure 1, Appendix A.

The site comprises an approximate area of 56.3 ha and is located within the Penrith City Council Local Government Area (LGA). The site is currently zoned as RU2 Rural residential land under Penrith City Council Local Environmental Plan (LEP) 2010.

The site is currently unzoned within the Broader Western Sydney Employment Area stipulated within State Environmental Planning Policy (Western Sydney Employment Area) 2009 (SEPP WSEA). Arcadis is anecdotally aware that the strategic intent is for this land to be zoned for employment purposes.

Mirvac require the following documentation to support a State Significant Development (SSD) application relevant to the site:

- Detailed Site Investigation (DSI).
- Fill Importation Protocol (FIP).
- Unexpected Finds Protocol (UFP).
- Dam Decommissioning Strategy (DDS).
- Groundwater Management Plan (GMP).

This GMP is one of five reports that Arcadis has prepared for submission to Mirvac to support the industrial redevelopment.

A remediation action plan (RAP) may also be required under the Secretary's Environmental Assessment Requirements (SEARs).

1.1 Background

The site has approx. 950 m of frontage to Mamre Road, with a proposed signalised intersection providing vehicular access via Mamre Road to the M4 Motorway and the Great Western Highway to the north and Elizabeth Drive to the south. Known historical land uses at the site include: rural residential, grazing, dairy farming, poultry farming and horticulture.

Ministerial Local Planning Direction 3.5 precludes future residential development of the site due to its proximity to the Western Sydney Airport ANEF 20 noise contour. However, future land uses relevant to employment generating purposes are consistent with the approved 2020 amendment to the SEPP WSEA and the 2018 Western Sydney Aerotropolis Land Use and Infrastructure Implementation Plan (LUIIP) Stage 1: Initial Precincts.

The proposed redevelopment of the site will facilitate land uses consistent with commercial and industrial use, as prescribed in the National Environmental Protection Measure as amended in 2013 (NEPC, 2013) and will involve the following activities:

- Demolition and removal of existing rural structures.
- Heritage salvage works (if applicable).
- Clearing of existing vegetation on the subject site and associated dam dewatering and decommissioning.
- Realignment of existing creek.
- On-site bulk earthworks including any required ground dewatering.
- Importation, placement and compaction of soil material, consisting of;
  - Virgin Excavated Natural Material (VENM) within the meaning of the POEO Act; and/or

  - Excavated Natural Material (ENM) within the meaning of the NSW Environmental Protection Agency's (EPA) Resource Recovery Exemption under Part 9, Clauses 91 and 92 of the POEO (Waste) Regulation 2014 – The Excavated Natural Material Order 2014; and/or
  - Materials covered by a specific NSW EPA Resource Recovery Order and Exemption which are suitable for their proposed use.
- Boundary retaining walls.
- Catchment level stormwater infrastructure, trunk services connections, utility infrastructure, roads and access infrastructure (signalised intersection with Mamre Road) associated with Stage 1.
- Construction fit out and 24 hours a day / 7 day per week use of industrial warehouse and distribution buildings within Stage 1.
- Detailed earthworks, stormwater, services and utility infrastructure associated with the construction of industrial logistics and warehouse buildings within Stage 1.
- Boundary stormwater management, fencing and landscaping.
- Staged subdivision of Stage 1.

Information provided to Arcadis by Orion Consulting (Orion), on behalf of Mirvac, indicates that earthworks undertaken as part of site redevelopment works will not require importation of significant volumes of fill material, as the bulk earthworks plan has been designed to achieve an overall cut/fill net balance for the development, whilst taking into consideration possible future planning modifications.

1.2 Purpose of this document

The purpose of this GMP is to describe the requirements for ongoing management at the Site which is proposed to undergo development for industrial and/or commercial land uses. It is expected that this GMP will form part of an overarching Construction Environmental Management Plan (CEMP) that will manage environmental considerations during the construction phase.

This GMP has been prepared with due consideration of the results from a site investigation undertaken at the site in October 2019 (Arcadis 2019).

1.3 Objectives

The objectives of the GMP are to document a procedure that ensures that exposure of identified receptors to impacted groundwater is minimised, and to comply with regulatory requirements. Specifically, the objectives are:

- Outline the geology and hydrogeology of the site;
- Assess if groundwater dewatering will be required during the re-development;
- If dewatering is to occur develop a dewatering strategy that meets the requirements of relevant policy and legislation;
- Outline any licensing requirements;
- Estimate the volume of groundwater that may be extracted during the redevelopment; and
- Assess whether there are any further investigations required to assess potential groundwater impacts.

1.4 Scope of Work

To complete the objectives, Arcadis undertook the following scope to develop the GMP:

- Reviewed relevant reports to establish site characteristics relevant to groundwater considerations, reviewed the baseline groundwater analytical data and determined the likely groundwater flow direction;
- Reviewed concept architectural drawings and preliminary design plans;

- Review geotechnical investigation letter report (PCM, 2019);
- Reviewed the groundwater results from the DSI (Arcadis, 2019);
- Prepared a site-specific Groundwater Management Plan (GMP) detailing the following:
  - Entity responsible for ensuring the GMP is implemented;
  - The location and frequency of monitoring;
  - The Chemicals of Potential Concern (CoPC) which require ongoing analysis; and
  - The triggers and contingency plans for additional monitoring/remediation.
- Development of this GMP.

1.5 Proposed Redevelopment

The proposed site development will change the land-use from rural residential and farming to commercial and industrial use. Arcadis understands that the redevelopment will involve demolition of all infrastructure at the site including buildings, sheds, chicken coups, fencing and farm dams.

The new buildings to be constructed are understood to be single storey industrial warehouses built on a concrete slab. It is further understood that the slabs are to be elevated above the existing ground level founded on reworked soil from the site, negating the requirement to excavate for building foundations. Orion, on behalf of Mirvac, has indicated that significant volumes of imported fill will not be required for the earthworks undertaken as part of the site redevelopment works. No basements are to be excavated.

2 SITE IDENTIFICATION

The location and layout of the site are shown in Figures 1 and 2, Appendix A. The site details are provided in Table 2-1 below and described in detail in the following sections.

Table 2-1 Site Detail Summary

Item	Details
Address	804-882 Mamre Road, Kemps Creek, NSW, 2178
Lot and plan	Lots 54 to 58 DP259135
Local government area	Penrith City Council
Current land use	Rural residential properties
Current zoning	IN2: General Industrial
Proposed land use	Site is proposed to be redeveloped to an industrial and/or commercial land use (employment purposes)
Site coordinates Approx. centre of site (GDA 2020 UTM 56 H)	293603 m E 6250023 m S
Land area (m^2)	Approx. 563,000 m^2 (57 ha)

An overview of the site condition and surrounding environment is provided in Section 4. Site history information is provided in Section 5.

2.1 Current Site Use

The site was historically used for light agricultural purposes (i.e. grazing, historical dairy farming, poultry farming and horticulture). Arcadis understands, the site was purchased by Mirvac Projects Pty Ltd to be redeveloped into an industrial/commercial property for employment purposes.

2.2 Proposed Site Use

The site is proposed to be redeveloped into a warehouse and distribution centres, including 11 warehouse and office combined compounds.

Bulk earthworks, including both cutting and filling of the site, will be required as part of the proposed industrial development.

2.3 Surrounding Land Use

The following current land uses have been identified immediately surrounding the site:

- North – rural residential properties,
- South – rural residential properties, market gardens
- East – rural residential properties
- West – Mamre road, with rural residential properties located immediately west of Mamre Road

3 SITE CONDITION AND SURROUNDING ENVIRONMENT

3.1 Topography

The site slopes down to the south west and has an elevation of approx. 37 to 50 m relative level to the Australian Height Datum (RL mAHD). The site exists within a generally flat alluvial plain with localised undulating rises/falls, generally sloping toward Kemps Creek/South Creek to the west.

3.2 Geology

The 1:100,000 Geological Survey of NSW map of Sydney indicates the site is underlain by Bringelly Shale of the Wianamatta Group. This is described as comprising shales, carbonaceous clay, laminate and coal.

The eSPADE NSW Soil and Land Information database indicates that the site is underlain by Blacktown and Luddenham Soil Landscapes.

The soils encountered during fieldwork conducted by Arcadis in October 2019 aligned with the above descriptions and were described as:

- Fill material generally comprising topsoil and brown silty clay to a typical depth of 0.2m below ground level (m bgl) and a maximum depth of 1.2m bgl (in TP110 and MW01); and
- Natural material generally comprising slightly stiff, orange to brown clay with grey mottling turning into grey to brown weathered shale.

3.3 Hydrogeology

Groundwater is present within the Bringelly Shale. Typically, the Bringelly yields low volumes of saline groundwater. Shale generally has low water transmitting properties, displaying a very low primary porosity with most of the flow being via saturated structural features such as fractures, joints and laminations. Groundwater can be perched at the base of the weathered soil profile along the interface with fresh bedrock. The regional aquifer within the shale is often confined or partially confined and rises once intersected in a borehole.

A review of NSW Department of Primary Industries Office of Water records for groundwater bores within a 2,000 m radius of the site did not identify groundwater boreholes around the site. This is consistent with the groundwater within the shale being of moderate salinity, low yielding and a general abundance of surface water.

3.4 Hydrology

A generally north south oriented drainage line bisects the site along which the five dams have been constructed.

Observations were made during field work conducted in October 2019. The five dams were being used for stock watering and irrigation of crops and chicken sheds.

The site is predominately surfaced with grass cover, and as such, it is anticipated surface water generated during periods of rainfall will likely infiltrate at a rate reflective of the silty clay topsoil permeability. During periods of heavy or prolonged rainfall, excess water is likely to result in overland flow and traverse south-west towards Kemps Creek, following the topographic gradient. A portion of the overland flow is also likely to be captured by the existing on-site dams.

The nearest surface water bodies include several small dams on neighbouring properties and Kemps Creek, which is located approx. 600 m to the west of the site. Kemps Creek drains into South Creek approx. 900 m west of the site, before ultimately discharging into the Hawksbury River located approx. 26 km north of the site.

3.5 Acid Sulfate Soil Risk

Acid sulfate soils (ASS) are generally associated with low-lying coastal areas, including estuarine flood plains, rivers and creeks.

JBS&G, 2019 stated that since the site is not located near the coast and the elevation is in excess of 40 m AHD the likelihood of ASS within the study area is low.

Salts are naturally present in soil, bedrock and groundwater. In western Sydney salts naturally occur within the Ashfield Shale and are mobilised in the subsurface by the movement of groundwater. When saline groundwater is present close to the surface the salts can precipitate on the ground as the saline groundwater is drawn to the surface by fluctuating water tables combined with capillary action. Seepage of saline groundwater can cause corrosion of building materials, inhibit growth of most plant species except for highly salt tolerant vegetation, contributing to increased soil erosion. Salinity hazard mapping indicates the site is of moderate salinity potential due to the site being located on Ashfield Shale (DIPNR, 2012). Off site adjacent to drainage lines the salinity potential is considered high as the saline groundwater becomes shallower with an increased potential of the water table intersecting the ground surface.

3.6 Summary of Previous Investigations and Design Information

3.6.1 Preliminary Site Investigation (JBS&G 2019)

In January 2019, JBS&G conducted a Preliminary Site Investigation (PSI) with limited soil sampling at the site.

The JBS&G review of the site history indicated that the site was historically used for light agricultural purposes (i.e. grazing, historical dairy farming, poultry farming and horticulture).

The findings of the desktop study (confirmed by detailed site inspections completed by JBS&G on 30 November 2018 and 16 January 2019) identified current and potential historical sources of on-site contamination. The sources of potential contamination were associated with the following storage, handling and uses on the site:

- Pesticides/herbicides used in former and current market gardens;
- Potential biological impacts from livestock/poultry farming;
- Potential use of hazardous building materials (asbestos, lead based paints, PCBs) in historic and current site structures resulting in localised impacts to soils in proximity to the location of site structures;
- Potential hydrocarbon and pesticide contamination from the storage of materials and consumables at various locations across the site area (former and current sheds).
- Fill materials of unknown origin; and
- Potential asbestos containing materials (ACM) in irrigation lines (conduits).

JBS&G collected soil samples from a total of 38 locations across the site (29 soil boreholes, two test pits and seven stockpiles). The results from the samples collected by JBS&G have been summarised below:

- Elevated Total Recoverable Hydrocarbon (TRH) concentrations were identified in stained soils below a fuel drum (sample BH10 at 0.1m). This impact was limited in lateral extent and did not appear to migrate vertically, based on visual observations of stained soil;
- A small number of heavy metal impacts to surface soils were also identified but were not considered to pose unacceptable ecological health risks under the proposed land use;
- Anthropogenic materials at some locations were present in quantities that may pose an aesthetic concern for sensitive land uses. JBS&G however noted that with the proposed land use (commercial/industrial), these materials may be retained beneath hardstand without any further management. The impacts identified were typical of historical land uses; and

- Trace level friable asbestos was identified at one location (HA13) adjacent to historical structures, which were observed to contain possible ACM sheet board. JBS&G noted that there was the potential for ACM to be present within site structures and in soil in the vicinity of the structures.

JBS&G concluded that whilst the investigation identified localised surficial soil impacts at the site, the investigation did not identify widespread contamination which may preclude future redevelopment of the site. Identified soil impacts are considered representative of common contaminants and historical land use activities which can be readily dealt with during the DA stage for redevelopment and assessment for site suitability. JBS&G also recommended that a Hazardous Building Material Survey (HBMS) be undertaken prior to any demolition of existing site structures.

3.6.2 Detailed Site Investigation (Arcadis 2019)

During October 2019, Arcadis undertook a Detailed Site Investigation (DSI) which involved intrusive works to assess soil, groundwater and surface water on site for contaminants of potential concern (CoPC) identified in the PSI.

Review of previous site reports, observations from site walk overs on 8th, 9th, 16th and 23rd October 2019 and analytical results from soil, surface water, groundwater and potentially asbestos containing material (PACM) indicated that impact at the site is unlikely to be wide-spread. Observations were consistent with the JBS&G findings.

The results from the samples collected by Arcadis have been summarised below:

- Soil samples were taken from 15 test pits and six monitoring wells. One sample reported an outlier exceedance of benzo(a)pyrene at MW02_2.0, however this exceedance was considered an anomaly and does not represent the concentration of benzo(a)pyrene in natural soil materials, nor does it present a risk when compared to ecological screening levels.
- Three soil samples collected from areas adjacent to treated timber posts were assessed, with one sample (SO01) which exceed the NSW EPA General Solid Waste CT1 criteria for nickel.
- Groundwater was encountered in groundwater well at depths ranging from 37.9 m AHD to 57.2 m AHD across the site. Is it anticipated that the higher groundwater table is perched and localised.
- All surface waters reported analytes below the adopted criteria.
- Surface waters reported elevated pH and electrical conductivity when compared to the adopted criteria.
- A small number of heavy metal impacts to groundwater were observed and these were attributed to the elevated background concentrations of metals in on-site clay soils.
- Potential asbestos containing material (PACM) reported positive identification of asbestos at three out of four samples locations. No PACM was observed on roads or access tracks, with identified material adjacent current or former structures.

Based on the findings of the DSI, the site was deemed suitable from a contamination perspective for the proposed development as an industrial estate, pending the removal of identified asbestos containing material and the issuing of a clearance certificate to soil surfaces. Arcadis recommended that a HAZMAT survey and an asbestos register should be developed for the site prior to demolition works, asbestos removal works should be undertaken and a clearance certificate issued post demolition and that a site unexpected finds protocol should be implemented prior to any intrusive works. Arcadis also recommended that on-site surface water should be measured after a significant rainfall event and compared to previously recorded the observations to observed water quality prior to dam de-watering. Accordingly, there is potential for unexpected finds, including contamination or waste, which may be encountered during demolition or earthworks at the site.

3.6.3 Geotechnical Investigation (PSM, 2020)

Pells Sullivan Meynink (PSM) prepared a Geotechnical Investigation Letter Report (PSM, 2020), which included an additional three geotechnical investigations undertaken 30 November 2018, 04 December 2018 and 16 January 2019.

- The geotechnical investigations comprised an inspection of site conditions including:
  - Geology
  - Surface conditions
  - Subsurface conditions
  - Groundwater
- Excavation of 19 test pits to depths of between 1.6 m and 3.5 m.
- Drilling of eight boreholes to depths of between 3.7 m and 15.0 m.
- Five bulk soil samples were recovered for California Bearing Ratio (CBR)
- Twenty-one samples were analysed for:
  - Cation Exchange Capacity (CEC) of calcium, magnesium, potassium and sodium
  - Exchange sodium percentage (ESP)
  - Salinity
  - Soil pH
  - Chlorides
  - Sulphates
  - Resistivity

A summary of results from the investigation indicate the following:

- pH of the soil samples ranged from 5.0 to 9.0, with an average of 6.6
- The electrical conductivity ($EC_{1.5}$) of the soil samples was in the range of 27 µS/cm to 1,400 µS/cm.
- Concentrations of chlorides in samples were in the range of 130 mg/kg to 2,460 mg/kg.
- Concentrations of soluble sulfate in samples were in the range of <100 mg/kg to 930 mg/kg.
- CEC in samples was in the range of <0.2 meq/100g to 26.6 meq/100g.
- ESP was in the range of 5.6% to 53.4 %.
- The majority of soils on site were classified as “on-saline to moderately saline” except for one sample from TP8 that is very saline. TP8 is located within a fill area.
- Groundwater was observed a 3.0 m bgl in BH5 and at 3.0 m in TP1, TP32 and TP35. It is considered that there may possibly be perched water tables. Groundwater was not observed at any other location.

3.6.4 Additional Geotechnical Investigation (PSM, 2021)

PSM prepared an Additional Geotechnical Investigation Letter Report (PSM, 2021) which included advancement of 11 boreholes (**BHs**) to a maximum depth of 17.0 mbgl undertaken between 10 and 15 November 2021.

A summary of results from the additional geotechnical investigation include:

- Water seepage observed at BH06 at 3.5 mbgl (prior to rock coring).
- Water seepage observed at BH11 at 9.0 mbgl.

Arcadis notes that BH06 and BH11 are located in future Lots 7 and 4 respectively, in areas where between 8.0 and 10.0 m of cut is required.

The remaining nine (9) BHs advanced by PSM did not encounter groundwater and were located in the area of future Lots 4, 5, 6, 7, 8 and 11.

3.6.5 Civil Infrastructure Drawings

The Aspect Industrial Estate stage 1 Civil Works Package drawings were initially reviewed to assess proposed cut and fill locations against groundwater depths to determine potential groundwater interference.

Arcadis understands bulk earthworks levels were revised to achieve a balanced cut to fill development, whilst taking into consideration possible future planning modifications. Revised bulk earthworks levels are shown in the following drawings provided to Arcadis by Orion Consulting, on behalf of Mirvac, on 22 March 2022:

- AT&L, *Mirvac-Aspect Industrial Estate-Mamre Road, Kemps Creek Stage 1-Comparison Bulk Earthworks Cut/Fill Plan – Drawing No. 18-596-SKC121,*16 February 2022.
- AT&L, *Mirvac-Aspect Industrial Estate-Mamre Road, Kemps Creek Stage 1-Bulk Earthworks Contour Plan – Drawing No. 18-596-C1020,* 10 February 2022.
- AT&L, *Mirvac-Aspect Industrial Estate-Mamre Road, Kemps Creek Stage 1-Bulk Earthworks Cut/Fill Plan – Drawing No. 18-596-C1025,* 10 February 2022.

Copies of these drawings showing the revised bulk earthworks levels are provided as **Appendix A**.

A summary review of the design plans indicates proposed cutting beneath existing ground level at the following locations:

- Typical Road Sections Sheet 2: Utility footing excavations to 1200mm
- Typical Sections Sheet 1: Section 3 – cut beneath existing surface.
- Typical Sections Sheet 2: Future Lot 4 – Section 8
- Typical Sections Sheet 3: Future Lot 4 – Section 9
- Typical Sections Sheet 3: Future Lot 5 – Sections 10, 11 and 12
- Typical Sections Sheet 4: Future Lot 7 – Section 13
- Typical Sections Sheet 4: Future Lot 5 – Section 14
- Typical Sections Sheet 4: Future Lot 9 – Section 16
- Bulk Earthworks Cut/Fill Plan – Cut on Lots 3, 4, 6, 7, 8, 9, 10 and 11[1]

The finished level for the proposed future lots ranges from approx. RL 47.80 to 52.60 m AHD. Table 3-1 below presents the bulk earthworks level at each lot (Bulk Earthworks Cut/Fill Plan) along with the highest groundwater contour level available (Figure 2, Appendix A).

Table 3-1 Bulk Earthworks Level compared to highest recorded groundwater depth (mAHD)

Future Lot	Finish Level (m AHD)	Highest Groundwater Contour Level (m AHD)	Groundwater Interception Risk (<2.0 m)
1	47.80	44.00	No
2	48.20	46.00	No
3	49.00	49.00*	Yes
4**	57.00	56.00	Yes

[1] Arcadis notes that the revised Bulk Earthworks Cut/Fill Plan show an overall Cut/Fill balance of -5,614 m^3 for the development of the Site.

Future Lot	Finish Level (m AHD)	Highest Groundwater Contour Level (m AHD)	Groundwater Interception Risk (<2.0 m)
5	57.00	56.00	Yes
6	56.00	53.00	No
7**	52.60	53.00*	Yes
8	50.00	51.00*	Yes
9	51.60	46.00	No
10	52.30	49.00	No
11	52.60	52.00	Yes

Notes

Groundwater levels were obtained from groundwater contouring undertaken as part of the DSI. Groundwater levels area therefore indicative only.

* Indicates groundwater levels are within 0.2 m of the finish level or above the finish level.

** Indicates groundwater (perched water and/or contiguous aquifer) was encountered during PSM 2021 Additional Geotechnical Investigation within this Future Lot.

The groundwater data set used during this assessment was that from Arcadis (2019) and PSM (2019). It should be noted that these investigations were not comprehensive hydrogeological studies.

4 CONCEPTUAL SITE MODEL

A Conceptual Site Model (CSM) describes the potential environmental and human health risks of identified areas of possible soil and groundwater contamination. The CSM outlines the complete and/or potential pathways between the known or potential source(s) and the receptor(s).

Based on the information available for the site from the JBS&G PSI (January 2019) and the Arcadis DSI (October 2019), the following preliminary CSM has been prepared.

4.1 Source

Potential sources of contamination at the site and the associated contaminants of potential concern (CoPC) are listed below in Table 3-1.

Table 4-1 Potential On-Site Contaminant Sources

Source	Associated Chemicals	CoPC
Historic and current market gardens and livestock/poultry farming	Pesticides, herbicides	Pesticides, herbicides
Hazardous building materials in historic and current site structures and in the irrigation lines (conduits)	Asbestos containing materials (ACM), lead based paints, electrical components containing Polychlorinated Biphenyls (PCBs)	Asbestos, lead, PCBs
Storage of various materials (such as fuel drums) and consumables in historic and current sheds across the site	Total Recoverable Hydrocarbons (TRHs), pesticides, herbicides	TRHs, pesticides, herbicides
Fill materials of unknown origin	Asbestos, ash, slag, construction waste, demolition waste	Heavy metals, TRH, BTEX, PAHs, organochlorine pesticides (OCPs), organophosphate pesticides (OPPs), polychlorinated biphenyls (PCBs), phenols and asbestos

Note

* From the results of the groundwater samples collected in October 2019, it was found that some wells exceeded the ANZG (2018) (95% protection for Fresh Water) and the NEPC (2013) (GILs for Fresh Waters) for some metals. These metals were determined to be of background origin and are not considered a potential contaminant source.

4.2 Potentially Affected Media

The potentially affected media at the site includes:

- Soil;
- Groundwater; and
- Surface water (in the dams).

4.3 Pathways

Pathways or transport mechanisms by which receptors may be exposed to contamination on and off-site include:

- Direct contact with contaminated soil/groundwater;
- Ingestion of dust/abstracted groundwater;
- Inhalation of asbestos fibres; and
- Groundwater flow off-site.

4.4 Receptors

Potential receptors to contamination include:

- Demolition/construction workers;
- Future site users;
- Surrounding residents;
- Environmental receptors (Kemps Creek and South Creek); and
- Groundwater use (off-site).

4.5 Exposure Assessment

Based on the preliminary CSM discussed in Section 3.1 to Section 3.4, the potential for contamination to be present at the site is considered to be **Moderate**. This level of contamination risk can be minimised or removed if precautionary measures are taken. The potentially complete and incomplete pathways are discussed in more detail in the Table 3-2 below.

Table 4-2 Exposure Assessment

Source	Pathway	Receptor	Exposure Assessment	Pathway completeness
Market gardens and livestock/poultry farming	Direct contact	Demolition/ construction workers, future site users	Demolition and construction workers developing the site will come into contact with potentially contaminated soil. Workers in service trenches may also encounter groundwater. Depending on the landscaping of the proposed developed on the site, future site workers may be directly exposed to potentially contaminated soil via open grass areas.	**Based on the DSI results presented herein, this pathway is incomplete. An UFP Is required during construction works.**
		Surrounding residents	Surrounding residents will not come into direct contact with any potentially contaminated soil or groundwater. No groundwater abstraction wells were noted around the site.	**The pathway is incomplete.**
	Ingestion	Demolition/ construction workers, surrounding residents, future site user	Demolition/construction workers and surrounding residents have the potential to be exposed to dust and/or groundwater during the construction phase of the proposed development. Depending on the landscaping of the proposed developed on the site, future site workers may also be directly exposed to potentially contaminated dust via open grass areas.	**The pathway is potentially complete and should be managed during construction works with a CEMP and UFP.**
Hazardous building materials	Direct contact, inhalation of asbestos fibres	Demolition/ construction workers	If any hazardous building materials are present in the currently existing structures, demolition/construction workers may be exposed during demolition works.	**The pathway is potentially complete and should be managed through a CEMP during construction works as well as a HAZMAT Assessment**.
		Surrounding residents, future site residents	Surrounding residents will not be allowed access onto the site and therefore will not come into contact with any hazardous building materials. Additionally, hazardous materials should be removed from the site before the construction of the proposed boarding home, therefore future residents will not be exposed.	**The pathway is incomplete.**
	Ingestion	Demolition/ construction workers	Demolition/construction workers may be at risk of ingesting hazardous materials during intrusive site construction works.	**Based on the DSI results presented herein, this pathway is incomplete.**
		Surrounding residents, future site residents	These receptors will not come into contact with any hazardous building materials during or after construction.	**The pathway is incomplete.**

Source	Pathway	Receptor	Exposure Assessment	Pathway completeness
Storage of various materials (such as fuel drums) and consumables	Direct contact, ingestion	Demolition/ construction workers, future site users	Demolition and construction workers developing the site will come into contact with potentially contaminated soil. Additionally, future site workers may be directly exposed to potentially contaminated soil via open grass areas.	**The pathway is potentially complete and should be managed through a CEMP during construction works.**
		Surrounding residents	Surrounding residents will not come into direct contact with any potentially contaminated soil or groundwater. No groundwater abstraction wells were noted around the site.	**The pathway is incomplete.**
Fill materials	Direct contact, ingestion	Demolition/ construction workers, future site users, surrounding residents	Demolition and construction workers developing the site will come into contact with underlying fill during the construction phase. Depending on the landscaping of the proposed developed on the site, future site workers may be directly exposed to potentially contaminated soil via open grass areas. Surrounding residents have the potential to be exposed to dust during the construction phase.	**Based on the results presented herein, this pathway is incomplete.**
	Inhalation of asbestos fibres	Demolition/ construction workers	Demolition/construction workers may be exposed to fragments of asbestos in the fill material during demolition works. If the fill is still present and/or exposed on the site after completion of the proposed development, future site workers may also be exposed via open grassed areas.	**The pathway is potentially complete and should be managed during construction works through an UFP and a CEMP. HAZMAT assessment prior to demolition is recommended.**
		Surrounding residents	Surrounding residents will not come into contact with any fill material during or after construction.	**The pathway is incomplete.**
Contaminated groundwater	Direct contact	Demolition/ construction workers	Demolition and construction workers developing the site may come into contact with potentially contaminated groundwater during excavation of service trenches and/or during earthworks.	**The pathway is potentially complete**.
	Ingestion	Future site users, surrounding residents	Future site users and surrounding residents will not come into contact with any groundwater during or after construction, as groundwater is not to be extracted on-site.	**The pathway is incomplete.**

Source	Pathway	Receptor	Exposure Assessment	Pathway completeness
	Groundwater flow	Environmental receptors (e.g. Kemps Creek and South Creek)	Kemps Creek and South Creek are located down gradient of the site and therefore are potential receptors to contaminated groundwater.	**The pathway is potentially complete.**
		Off-site groundwater users	No groundwater boreholes were present within a 2000m radius of the site; therefore, it is unlikely that off-site receptors will come into contact with any potentially contaminated groundwater.	**The pathway is incomplete.**

5 LEGISLATION AND POLICY

5.1 Legislative Framework

Groundwater in NSW is regulated by DPIE-Water under the *Water Act 1912* (NSW) (Water Act), the *Water Management Act 2000* (NSW) (WMA, 2000) and Water Management (General) Regulation, 2011. The WMA, 2000 is gradually replacing the planning and management frameworks in the Water Act, although some provisions of the Water Act remain in operation. The WMA, 2000 regulates groundwater extraction under the NSW Aquifer Interference Policy (AIP), 2012.

- A water access licence to take water.
- A water supply works approval to construct a work.
- A water use approval to use the water.

The AIP (NSW DPI, 2012 and NoW 2012) explains the process of administering water policy under the WM Act for activities that interfere with the aquifer. In accordance with the AIP an activity that results in the loss of water from the environment, a water access licence (WAL) is required, unless the activities are considered to be of 'minimal impact'.

Under the AIP groundwater inflows are considered as a minimal impact activity in the construction of trenching and costeaning. In addition, very small water takes up to 3 ML/year are also considered minimal impact activities as long as the water volume can be substantiated (Dent, et al., 2015).

The project is located in the *Greater Metropolitan Region Groundwater Source Water Sharing Plan* (the Plan) (NoW 2011) which commenced on 1 July 2011. Within the Plan, the project footprint is subject to the rules of the Sydney Basin Central Groundwater Source which outline the recommended management approaches of surface and groundwater connectivity and protection of water quality.

5.2 Assessment Criteria

Groundwater quality is screened against the following guidelines:

- ANZG (2018) Guidelines for Fresh and Marine Water Quality - 95% protection for Fresh Water;
- NEPC (2013) Guideline on Investigation Levels for Soil and Groundwater – Groundwater Investigation Level for Fresh Waters; and
- NHMRC (2008) Guidelines for Managing Risks in Recreational Water – Primary Contact Recreation.

6 2019 GROUNDWATER MONITORING EVENT

A summary of the information collected during the groundwater monitoring event conducted by Arcadis in October 2019 is provided in this section.

6.1 Groundwater Levels and Flow Direction

Groundwater standing water levels were measured in newly installed wells (monitoring wells MW01 to MW06) constructed across the site (Arcadis, 2019). Groundwater levels measured in October 2019 ranged between 2.52 and 8.31 metres below ground level. Review of this data indicates that the standing water levels are shallowest along the central drainage line and as expected becomes deeper higher in the catchment to the east and west. During the drilling program groundwater was intersected at depths deeper than the measured standing water levels (ranging between 2.3 and 6.8 metres). The difference between the standing water level and water strike indicates the groundwater within the shale is partially confined. Consequently, excavations across the site are likely to intersect groundwater at depths deeper than the measured standing water levels.

Reduced standing water levels ranged from 37.98 and 57.18 mAHD. These groundwater elevations indicate groundwater flow is towards the northwest, in the direction of Kemps Creek. Groundwater contours and flow direction are presented in Figure 2, Appendix A.

Groundwater level observations are summarised in Table 6-1. The monitoring wells are screened within the shale and weathered shale.

Table 6-1 Groundwater Monitoring Well Observations

Well	Date	X (UTM 56 – GDA94)	Y (UTM 56 - GDA94)	Elevation (m TOC-AHD)	Depth to water (m TOC)	DTB (TOC)	Standing Water Level (m AHD)
MW01	16.10.19	6253425	294732.3	42.198	4.220	9.057	37.978
MW02	16.10.19	6253413	295305.1	51.525	3.249	11.795	48.276
MW03	23.10.19	6252758	294943.7	61.429	8.310	11.100	53.119
MW04	16.10.19	6252998	295177.3	51.168	3.636	9.045	47.532
MW05	16.10.19	6253089	295271.7	49.925	2.527	9.458	47.398
MW06	16.10.19	6253158	295551.8	62.123	4.946	11.390	57.177

Notes
Top of casing (TOC)
Australian Height Datum (AHD)
Geocentric Datum of Australia 1994 (GDA94)
Universal Transverse Mercator (UTM) [Zone 56]

6.1.1 Groundwater Level Fluctuations

Fluctuations in groundwater must also be considered as a rise in groundwater level will increase the risk of groundwater being encountered during the site redevelopment works. It is noted Western Sydney is experiencing drought conditions and consequently groundwater levels would be expected to be lower than usual. No historical groundwater level monitoring is known to have been undertaken at the site.

Groundwater level fluctuations within the Bringelly Shale would be expected to naturally fluctuate between 0.5 and 1 metre. Thus, following prologued heavy rainfall groundwater levels would be expected to rise. However due to the clayey hard pan nature of the weathered shale soil profile and the low water transmitting properties of the shale groundwater infiltration will be limited, restricting groundwater level rises.

6.2 Groundwater Quality

Groundwater extracted during sampling was observed to be of moderate to low turbidity at most locations. One exception was MW06, which displayed very low turbidity.

No sheens or odours were observed in purged groundwater except MW01 which held a biogenic sheen. These sheens are often naturally associated with groundwater derived from shale and rare due to the organic content within the shale, rather than being indicative of hydrocarbon contamination. No wells were purged dry and well recharge was observed to be adequate for peristaltic pump sampling.

6.2.1 Physico-Chemical Parameters

Water quality parameters recorded during the groundwater sampling are provided in the following table.

Table 6-2 Groundwater Monitoring Well Field Quality Parameters

Well	pH	Temperature (ºC)	Electrical Conductivity (uS/cm)	Dissolved Oxygen (mg/L)	Redox Potential (mV)*	Comments
MW01	6.921	15.5	14,068	1.22	346.1	Biogenic sheen, no odour
MW02	6.81	17.8	19,646	1.06	328.6	No sheen, no odour
MW03	6.68	21.1	21,256	7.48	364.6	No sheen, no odour
MW04	6.44	19.2	18,636	1.58	347.1	No sheen, no odour
MW05	6.55	19.2	19,783	0.64	357.1	No sheen, no odour
MW06	6.96	20.3	16,288	3.2	324.1	Clear, no sheen, no odour

Notes
*199mV has been added to all redox field measurements to convert to standard hydrogen electrode (SHE)

Based on the physico-chemical data collected during groundwater sampling, the following conclusions have been made:

- pH values indicate that the groundwater is neutral;
- Electrical conductivity ranged from 14,068–21,256 µS/cm, indicating brackish water;
- Dissolved oxygen ranges from 0.64 to 7.48 mg/L, indicating a low level of dissolved oxygen within the groundwater aquifer.
- Oxygen reduction potential (ORP) ranged between 324.1 mV and 364.6 mV, indicating a moderate to high (positive) ORP, suggesting an oxidative environment.

6.2.2 Analytical Results

The groundwater analytical results are provided in Table 6-3.

Table 6-3 Groundwater Exceedance Analytical Results

Analyte	Guideline Value (mg/kg)	Min (µg/L)	Max (µg/L	Locations Exceeding Adopted Criteria
Cadmium	0.2 (DGVs, GILs)	<0.2	0.3	MW03, MW04
Copper	1.4 (DGVs, GILs)	<1	2	MW03
Zinc	8 (DGVs, GILs)	<5	47	MW02, MW03, MW04, MW06

Exceedances of the adopted groundwater quality criteria (as specified in Section 5.2) were identified for cadmium, copper and zinc. Total recoverable hydrocarbons C_{10}-C_{16} and >C_{10}-C_{16} less naphthalene (F2) reported 70 µg/L, above the Limits of Reporting (LOR) of 50 µg/L. All other analytes (filtered metals, TRHs, BTEX, PAHs, PCBs and OC & OP pesticides) reported less than LOR.

The minor exceedances for dissolved metals is typical of natural background levels and consistent with previous groundwater monitoring from the Bringelly Shale conducted at Badgerys Creek (PPK, 1998).

Summary tables displaying reported analyte concentrations screened against the adopted criteria are provided in Error! Reference source not found.**.** Laboratory reports are provided in **Appendix C.**

6.3 Measurement of Hydraulic Conductivity

Rising head slug tests were conducted as part of the DSI (Arcadis, 2019) to measure the hydraulic conductivity of the shale. The tests were conducted in monitoring wells MW01 and MW02, located in the north of the site. The results are presented in **Error! Reference source not found.** and confirm t he Bringelly Shale has low water transmitting properties. These low values of hydraulic conductivity are consistent with other measurements within the Bringelly Shale (PPK, 1998).

The slug test methodology, analysis and results are provided in the DSI (Arcadis, 2019).

Table 6-4 Aquifer Hydraulic Conductivity

Well	Hydraulic Conductivity using Bouwer & Rice (m/d)	Hydraulic Conductivity using Hvorslev (m/d)
MW01	2.03×10^{-1}	2.60×10^{-1}
MW02	7.16×10^{-2}	9.02×10^{-2}

6.4 Expected Volume of Groundwater to be Extracted

With a knowledge of the local hydrogeology (Sections 6.1 and 6.2) and the general building construction plans the volume of groundwater to be extracted can be estimated.

Standing groundwater levels measured at the site in October 2019 are known to range between 2.52 and 8.31 metres below ground level (mbgl). Once details of the buildings design are known, standing water levels beneath the buildings can be estimated with more confidence. During the drilling program groundwater was intersected at depths deeper than the measured standing water levels (ranging between 2.3 and 6.8 metres).

The only other known intrusive works likely to be conducted at the site are the installation of service trenches to install utilities such as stormwater, sewer, electricity, power, gas and telecommunications. Typically, these service trenches are excavated no deeper than two metres.

Based on the revised bulk earthworks levels, the inferred groundwater contours and the PSM 2021 geotechnical investigation, Lots 3, 4, 5, 7, 8, and 11 have the potential to encounter groundwater (either perched or contiguous aquifer) during site development (based on final site level and/or presence of service trenches/footings, which may extend up to 2.0 m below final bulk earthworks level).

In the event that groundwater is encountered the groundwater inflow is dependent upon a number of factors including the depth of the water table intersected, the hydraulic conductivity of the shale, length of the trench/excavation and the duration the excavation is open. Given that the water table is known to be low compared to the base of the trenches and the hydraulic conductivity of the shale is low groundwater inflows would be expected to be low. The length of the trenches is currently unknown but wouldn't be expected to be more than two kilometres. Similarly, the duration that the trench is open is dependent upon the speed of the construction workers but wouldn't be expected to be open for more than 4 weeks.

In the event that groundwater is encountered the extracted groundwater volume would be required to be measured with a flow meter. The groundwater would be collected and directed to a water storage pond where upon on-site reuse options would be considered as outlined in Section 8.1.1.

As outlined in Section 4.1, a WAL will only be required if groundwater is intersected and exceeds the inflow criteria of 3ML/year.

7 ROLES AND RESPONSIBILITIES

The roles and responsibilities regarding the implementation of this GMP on the site is summarised in the table below.

Table 7-1 Roles and Responsibilities

Entity	Role	Responsibility
NSW Department of Natural Resources	Approves the development of the site.	• Provide approval for the GMP • Undertake the steps outlined in this GMP
Mirvac (and Mirvac sub-contractors)	Land developer	• Developer of the site • Ensure that the requirements outlined within this GMP for the ongoing management of the Site are complied with
Nominated Environmental Consultant (if required)	Provision of environmental expertise.	• Carry out groundwater scope of works • Provision of report to Mirvac and Department of Natural Resources
DPIE Water*	To provide water obstruction licensing.	• To provide water obstruction licensing if greater than 3ML/year of groundwater is intersected and removed from the site.

Note

*This entity will only need to undertake their roles and responsibilities if groundwater is encountered at the site in excess of 3ML/year.

8 GROUNDWATER MANAGEMENT

Based on the outcomes of the DSI (Arcadis, 2019) and Arcadis' understanding of the redevelopment works groundwater has the potential to be intersected for certain lots as outlined in Table 3-1.

In event that groundwater is intersected during Stage 1 of the redevelopment works, the following management measures should be applied.

8.1 During Construction

A review of the known redevelopment construction strategy indicates that groundwater has the potential to be encountered based on revised bulk earthworks levels and the construction of service trenches. In this event the following management measures as outlined in Table 8-1 are recommended.

Table 8-1 Management Measures for Intersected Groundwater During Construction

Management Measure	Description
Pump groundwater from the excavated area	Intersected groundwater should be pumped from the excavated service trenches and stored in a discharge basin on-site.
Monitor volume of extracted groundwater	The volume of groundwater extracted should be monitored and recorded to assess if the volume extracted does not exceed the 3 ML/year where a WAL is required. If groundwater volumes are higher than expected and it appears that the 3ML/year criteria may be exceeded a WAL application should be completed and submitted to DPIE Water.
Monitor groundwater quality of the extracted groundwater	To assess if the removed groundwater is suitable for on-site re-use, groundwater quality should be monitored for the following parameters: • pH; • Salinity; and • Metals. Groundwater will be screened against the adopted guidelines which are outlined in Section 4 of this report. Groundwater treatment may be required before re-using on site to reduce the pH or salinity. The pH is likely to approach neutral due to aeration caused by pumping. Salinity can be lowered by mixing with dam water. Alternatively, the groundwater could be discharged to stormwater or sewer once this infrastructure is installed with appropriate authorisation from Council or Sydney Water respectively.
Monitor groundwater in the existing groundwater wells around the site	If groundwater is intersected during construction works, a round of groundwater level monitoring of the groundwater wells on-site should be triggered to assess any impacts on the water table.

8.1.1 Intersected Groundwater Re-Use

Groundwater re-use options, subject to meeting the adopted groundwater quality guidelines are presented in Table 8-2. These re-use options are consistent with the surface water re-use options as outlined in the Dam Decommissioning Strategy report.

Table 8-2 Intersected Groundwater Re-Use Options

Option	Name	Option Description
1	Dust suppression	The intersected groundwater can be used to spray water across the site for dust suppression during the earthworks and construction phases.
2	On-site irrigation	The groundwater can be circulated around the site for irrigation purposes.
3	Wheel washing	The groundwater can be utilised to spray trucks down before they leave the site to reduce tracking of mud and dirt off-site.
4	Topping up neighbouring dams	The groundwater from the on-site dams can be pumped into off-site neighbouring dams, subject to the dam owner's approval.
5	Discharge to the on-site sediment basin	As a contingency, if there is excess groundwater, an option is to discharge to the on-site sediment basin. The water will have to be flocculated and the water quality monitored. If the water is in accordance with the Australian and New Zealand Guidelines for Fresh Water Quality 95% species protection (ANZG 2018), then the water can be discharged to South Creek via Kemps Creek.

Note
These re-use options are viable only if the groundwater meets the adopted criteria.

8.1.2 Intersected Groundwater Treatment or Disposal

If, however, the intersected groundwater does not meet the water quality adopted criteria it must be managed appropriately. Groundwater treatment or disposal options are outlined in Table 8-3.

It should also be noted that groundwater will not be extracted for water management purposes during or after construction.

Table 8-3 Intersected Groundwater Treatment or Disposal Options

	Option	Option Description
1	Treatment (for turbidity)	For excess turbidity issues, the groundwater should be treated by allowing it to settle in the sedimentation pond and then flocculating if the suspended solids do not precipitate out.
2	Treatment (for pH)	If the intersected groundwater has an acidic pH value, lime should be added as a treatment. For alkaline pH aerating the water is likely to reduce the pH.
3	Treatment (for saline groundwater)	If the intersected groundwater is saline, then it can be mixed with onsite surface water from the dams in order to dilute the salinity.
4	Disposal	If treatment options are not suitable, the intersected groundwater (likely to be of low volume) could be tanked offsite for disposal. Alternatively, the groundwater could be detained onsite for discharge to either stormwater or sewer once this infrastructure has been installed on-site and authorisation from Council or Sydney Water respectively is provided.

8.1.3 Records

The following records relating to groundwater management and monitoring are to be maintained by Mirvac or their on-site representative:

- Spill or incident reports;
- Groundwater inflows into excavations;
- Intersected groundwater quality;
- Groundwater treatment (if necessary);
- Groundwater disposal (if necessary); and

- Groundwater level monitoring if triggered.

All records are to be maintained in compliance with record keeping requirements as outlined in the CEMP.

8.2 Post Construction

Based on revised bulk earthworks levels, the inferred groundwater contours, and the PSM 2021 geotechnical investigation, Lots 3, 4, 5, 7, 8 and 11 have the potential to encounter groundwater (either perched or contiguous aquifer) during site development (based on final site level and/or presence of service trenches/footings, which may extend up to 2.0 m below final bulk earthworks levels). In light of this, consideration should be given to permanent/ongoing groundwater management approaches including civil engineering (drainage, groundwater management system, etc.) and building and foundation design including subsurface infrastructure.

Consideration should be given to ongoing impacts to the local hydrogeological regime which may need to be managed in accordance with the requirements set out by Water NSW and relevant NSW regulations, including but not limited to *Water Act 1912* (NSW) (Water Act), the *Water Management Act 2000* (NSW) (WMA, 2000) and Water Management (General) Regulation, 2011.

Further assessment of groundwater and/or hydrogeological modelling should be considered to provide a better understanding on likelihood of encountering groundwater and volume of water ingress.

9 REFERENCES

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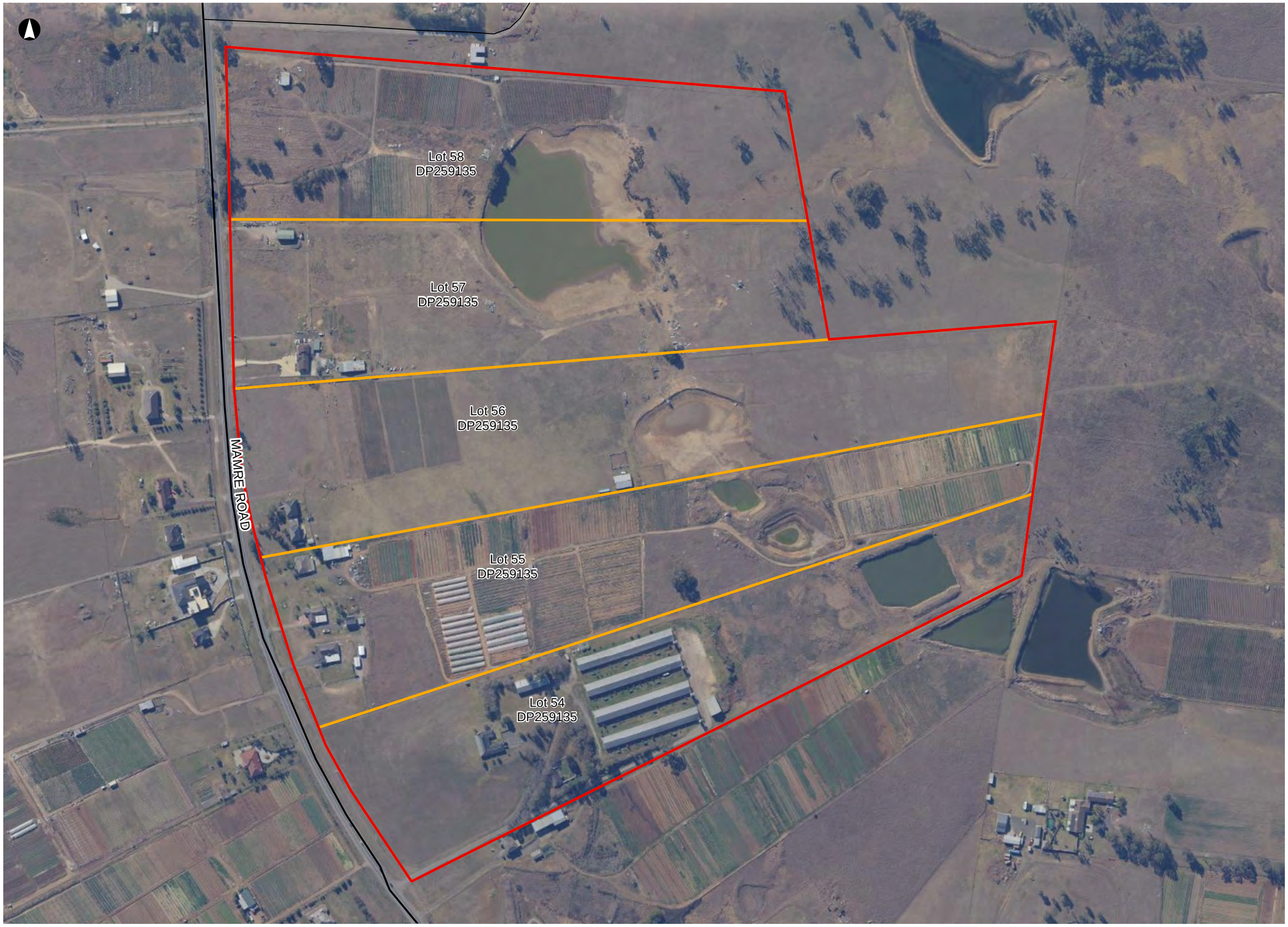
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PSM (2022), *Mirvac Aspect Industrial Estate – 788-904 Mamre Road, Kemps Creek Results of Additional Geotechnical Investigation – Southern PAD, RW21 and RW22 (Factual Report)*

APPENDIX A FIGURES



Legend

- Site Boundary
- Lot Boundaries

1:4,130 at A3

ARCADIS AUSTRALIA PACIFIC PTY LTD
ABN 76 104 485 289
Level 16, 580 George St | Sydney NSW 2000
P: +61 (0) 2 8907 9000 | F: +61 (0) 2 8907 9001

Coordinate System: GDA 1994 MGA Zone 56
Date issued: October 24, 2019

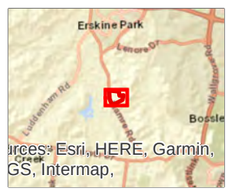
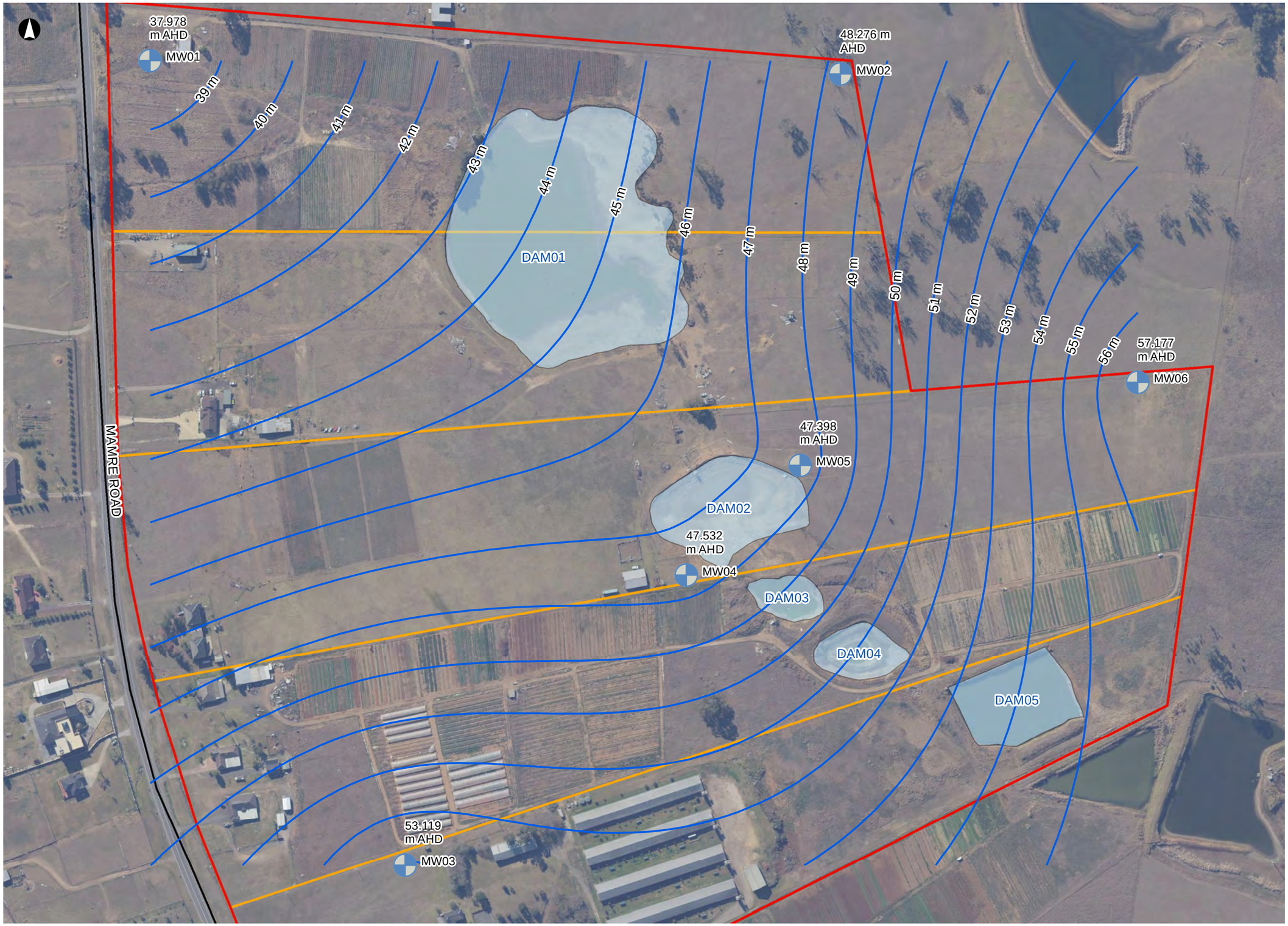


Figure 1 - Site Overview

0 40 80 160 240 320
m

Date: 24/10/2019 Path: H:\AAP_ER_GIS\Projects\10035157\DS\Figure 1 - Site Overview.mxd
Created by : Environmental Restoration
QA by : Environmental Restoration



Legend

- Groundwater Wells
- Groundwater Contours (m AHD)
- Dams
- Site Boundary
- Lot Boundaries

1:3,100 at A3

ARCADIS AUSTRALIA PACIFIC PTY LTD
ABN 76 104 485 289
Level 16, 580 George St | Sydney NSW 2000
P: +61 (0) 2 8907 9000 | F: +61 (0) 2 8907 9001

Coordinate System: GDA 1994 MGA Zone 56
Date issued: October 24, 2019

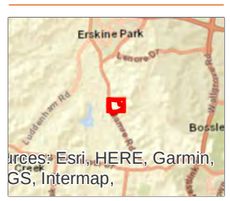
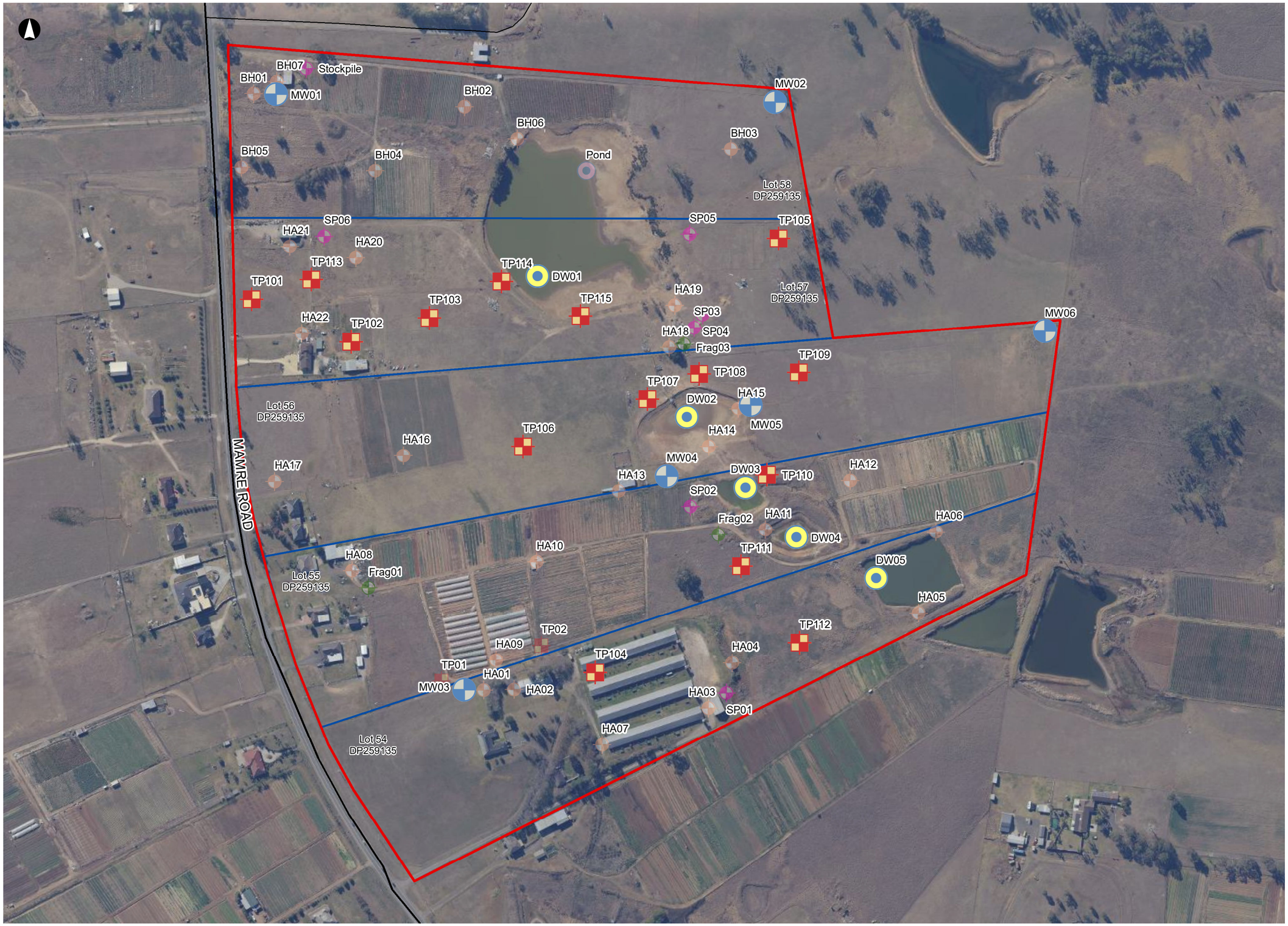


Figure 2 - Groundwater Contours

0 30 60 120 180 240
m

Date: 24/10/2019 Path: H:\AAP_ER_GIS\Projects\10035157\DSI\Figure 4 - Groundwater Contours.mxd
Created by : Environmental Restoration
QA by : Environmental Restoration

10035157 - Aspect Industrial Estate - Groundwater Management Plan



Legend

Current Sample Locations

Type

- Monitoring Well
- Surface Water Sample
- Test Pit

Previous Sample Locations

Type

- Borehole
- Fragment
- Hand Auger
- Stockpile
- Surface Water
- Test Pit
- Lots
- Site Boundary

1:4,128 at A3

mirvac

ARCADIS Design & Consultancy for natural and built assets

ARCADIS AUSTRALIA PACIFIC PTY LTD
ABN 76 104 485 289
Level 16, 580 George St | Sydney NSW 2000
P: +61 (0) 2 8907 9000 | F: +61 (0) 2 8907 9001

Coordinate System: GDA 1994 MGA Zone 56
Date issued: October 2, 2019

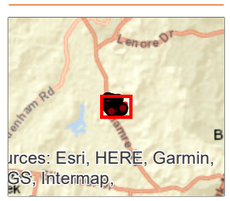
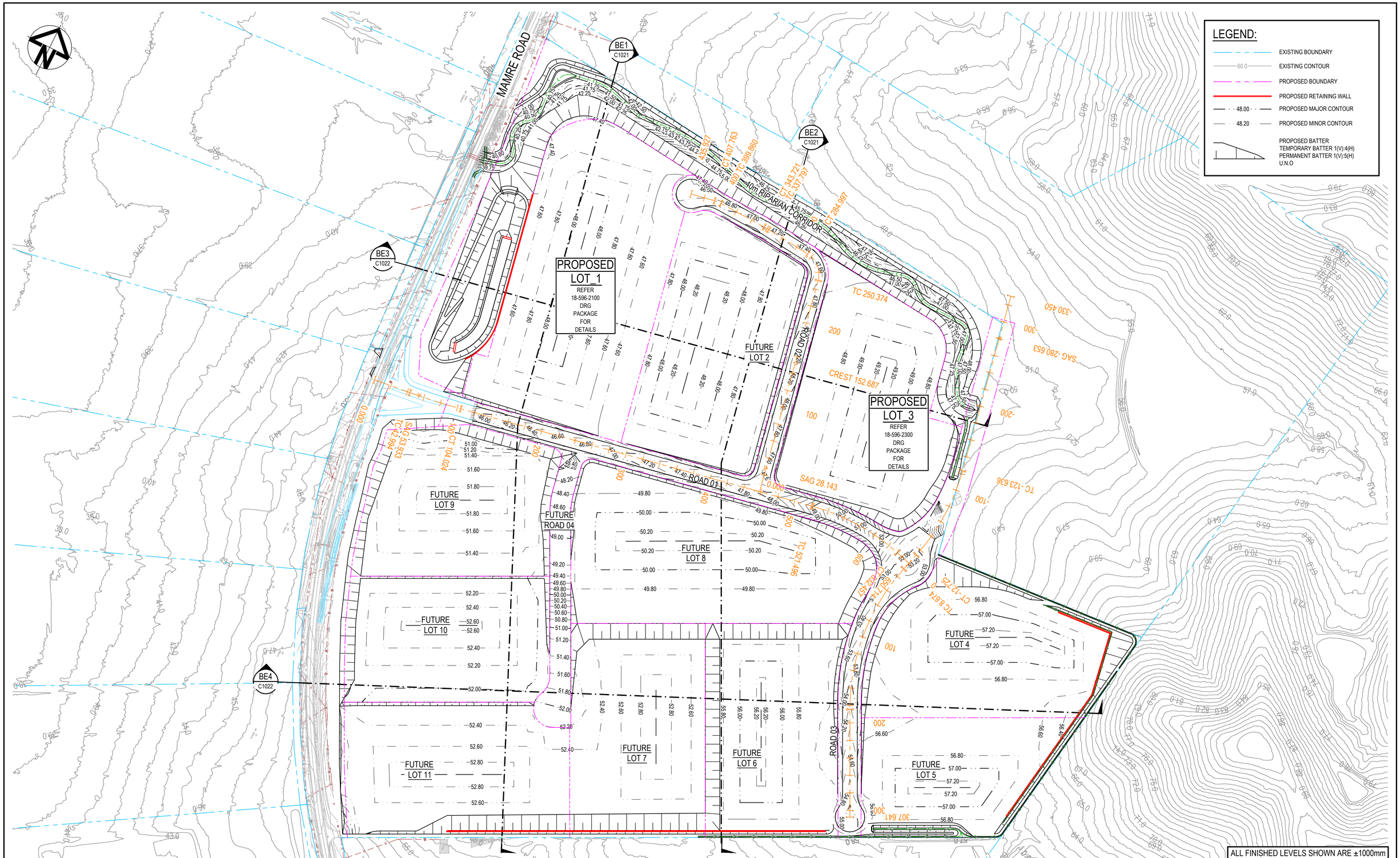


Figure 3 - Previous and Current Sample Locations

0 40 80 160 240 320
m

Date: 2/10/2019 Path: C:\Arc Templates\Temporary Projects\Proposals\Mirvac Kemps Creek\Previous Sample Locations.mxd
Created by : Environmental Restoration
QA by : Environmental Restoration



Issue	Description	Date
F	ISSUED FOR DEVELOPMENT APPLICATION	10-02-22
E	ISSUED FOR DEVELOPMENT APPLICATION	03-02-22
D	ISSUED FOR DEVELOPMENT APPLICATION	08-10-21
C	ISSUED FOR DEVELOPMENT APPLICATION	15-10-20
B	ISSUED FOR DEVELOPMENT APPLICATION	12-10-20
A	ISSUED FOR DEVELOPMENT APPLICATION	15-05-20

100mm on Original

Bar Scales

0 50 100 150 200m

1 : 2000 @ A1

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Client

mirvac

Scales	1:2000	Drawn	PDK
		Designed	PDK
Grid	MGA	Checked	AT
Height Datum	AHD	Approved	AM

Project

ASPECT INDUSTIAL ESTATE
MAMRE ROAD,
KEMPS CREEK
STAGE 1

Title

BULK EARTHWORKS
CONTOUR PLAN

Civil Engineers and Project Managers

at&l

Level 7, 153 Walker Street
North Sydney NSW 20060
ABN 96 130 882 405
Tel: 02 9439 1777
Fax: 02 9923 1055
www.atl.net.au
info@atl.net.au

Status: FOR APPROVAL
NOT TO BE USED FOR CONSTRUCTION

A1

Project - Drawing No.: 18-596-C1020

Issue: F

F:\18-596 Mamre Road\6.0 Drgs\Civil\Final\SSD\1000_STAGE 1 SSD\18-596-C1020.dwg

EARTHWORKS VOLUMES

A	B	C	D	E = A+B+C+D	F
EXISTING TOPSOIL STRIPPING VOLUME (cu.m) REFER NOTE No.1	EXCAVATION OF EXISTING CREEKS AND DAMS (cu.m) REFER NOTE No.3	NET CUT (cu.m)	NET FILL (cu.m)	BALANCE (cu.m)	APPROXIMATE VOLUME OF SELECT MATERIAL IMPORT FOR RETAINING WALLS
-107,567	-29,947	-998,571	1,130,471	-5,614	28,008

CUT/FILL DEPTH RANGE LEGEND

Lower_value		Upper_value		Colour
-10.0	to	-8.0	m	
-8.0	to	-7.0	m	
-7.0	to	-6.0	m	
-6.0	to	-5.0	m	
-5.0	to	-4.0	m	
-4.0	to	-3.0	m	
-3.0	to	-2.0	m	
-2.0	to	-1.0	m	
-1.0	to	0.0	m	
0.0	to	1.0	m	
1.0	to	2.0	m	
2.0	to	3.0	m	
3.0	to	4.0	m	
4.0	to	5.0	m	
5.0	to	6.0	m	
6.0	to	7.0	m	
7.0	to	8.0	m	
8.0	to	10.0	m	

EARTHWORKS AREAS

CUT (ha)	17.8
FILL (ha)	38.0
FARM DAMS (ha)	3.0
TOTAL (ha)	58.8

MAMRE ROAD

40m RIPARIAN CORRIDOR

ROAD 02

ROAD 01

ROAD 03

BEL 47.80 (±1000mm)
PROPOSED LOT_1
REFER 18-596-2100 DRG PACKAGE FOR DETAILS

BEL 48.20 (±1000mm)
FUTURE LOT 2

BEL 49.00 (±1000mm)
PROPOSED LOT_3
REFER 18-596-2300 DRG PACKAGE FOR DETAILS

BEL 51.60 (±1000mm)
FUTURE LOT 9

FUTURE ROAD 04

FUTURE LOT 8
BEL 50.00 (±1000mm)

FUTURE LOT 10
BEL 52.30 (±1000mm)

FUTURE LOT 11
BEL 52.60 (±1000mm)

FUTURE LOT 7
BEL 52.60 (±1000mm)

FUTURE LOT 6
BEL 56.00 (±1000mm)

FUTURE LOT 4
BEL 57.00 (±1000mm)

FUTURE LOT 5
BEL 57.00 (±1000mm)

LEGEND:

- EXISTING BOUNDARY
- 60.0 EXISTING CONTOUR
- PROPOSED BOUNDARY
- PROPOSED RETAINING WALL
- PROPOSED BATTER TEMPORARY BATTER 1(V):4(H) PERMANENT BATTER 1(V):5(H) U.N.O
- EXTENT OF EXCAVATION OF EXISTING CREEKS AND DAMS (REFER NOTE No.3)

NOTES

1. EXISTING TOPSOIL STRIPPED 150mm SITEWIDE. 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.
2. ALLOWANCE HAS BEEN MADE FOR RETAINING WALL BACKFILL MATERIAL (IMPORT).
3. ADDITIONAL EXCAVATION OF EXISTING CREEKS AND DAMS WITHIN SITE AREA TO A DEPTH 1m BELOW EXISTING INVERT AND WIDTH OF EXISTING CREEK/DAM EXTENT. VOLUMES ARE APPROXIMATE.
   DEPTH OF DAMS HAS BEEN ASSUMED AT 2.5m DEEP. EXCAVATED MATERIAL TO BE FARMED AND USED AS GENERAL FILL WITHIN FILL ZONES 1m BELOW FINAL SURFACE (GEOTECHNICAL ENGINEER TO CONFIRM SUITABILITY OF MATERIAL).
4. NEGATIVE BALANCE VOLUMES INDICATE EXCESS OF MATERIAL REQUIRED (EXPORT).
5. THE VOLUMES DO NOT TAKE INTO ACCOUNT THE FOLLOWING :-
   - BULKING FACTORS OF REMOVED CUT
   - REMOVAL OF EXISTING BUILDING SLABS AND PAVEMENTS
   - REMOVAL AND\OR REMEDIATION OF ANY EXISTING UNCONTROLLED FILL
   - PROPOSED LANDSCAPING
   - STORMWATER AND UTILITY TRENCHING
   - EROSION AND SEDIMENTATION CONTROL SWALES AND BASINS
6. BUILDING PADS HAVE BEEN GRADED AT MINIMUM 0.5% GRADE
7. PROPOSED PAVEMENT BOX OUT HAS BEEN SHOWN AT 700mm DEPTH. PAVEMENT DEPTH TO CONFIRMED DURING DETAILED DESIGN.

Issue	Description	Date
F	ISSUED FOR DEVELOPMENT APPLICATION	10-02-22
E	ISSUED FOR DEVELOPMENT APPLICATION	03-02-22
D	ISSUED FOR DEVELOPMENT APPLICATION	15-10-20
C	ISSUED FOR DEVELOPMENT APPLICATION	12-10-20
B	ISSUED FOR DEVELOPMENT APPLICATION	22-05-20
A	ISSUED FOR DEVELOPMENT APPLICATION	15-05-20

Bar Scales

0 50 100 150 200m

1 : 2000 @ A1

100mm on Original

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Client: mirvac

Scales: 1:2000

Grid: MGA

Height Datum: AHD

Drawn: PDK

Designed: PDK

Checked: AT

Approved: AM

Project: ASPECT INDUSTIAL ESTATE
MAMRE ROAD,
KEMPS CREEK
STAGE 1

Title: BULK EARTHWORKS CUT/FILL PLAN

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: FOR APPROVAL
NOT TO BE USED FOR CONSTRUCTION

A1

Project - Drawing No.: 18-596-C1025

Issue: F

F:\18-596 Mamre Road\6.0 Drgs\Civil\Final\SSD\1000_STAGE 1 SSD\18-596-C1025.dwg

EARTHWORKS VOLUMES

A	B	C = A+B
NET CUT (cu.m)	NET FILL (cu.m)	BALANCE (cu.m)
-283,907	92,088	-191,918

CUT/FILL DEPTH RANGE LEGEND

Lower_value		Upper_value		Colour
-10.0	to	-8.0	m	
-8.0	to	-7.0	m	
-7.0	to	-6.0	m	
-6.0	to	-5.0	m	
-5.0	to	-4.0	m	
-4.0	to	-3.0	m	
-3.0	to	-2.0	m	
-2.0	to	-1.0	m	
-1.0	to	0.0	m	
0.0	to	1.0	m	
1.0	to	2.0	m	
2.0	to	3.0	m	
3.0	to	4.0	m	
4.0	to	5.0	m	
5.0	to	6.0	m	
6.0	to	7.0	m	
7.0	to	8.0	m	
8.0	to	10.0	m	

MAMRE ROAD

40m RIPARIAN CORRIDOR

ROAD 02

ROAD 01

ROAD 03

FUTURE ROAD 04

BEL 47.80 (±1000mm)

PROPOSED LOT_1
REFER 18-596-2100 DRG PACKAGE FOR DETAILS

BEL 48.20 (±1000mm)
FUTURE LOT 2

BEL 49.00 (±1000mm)

PROPOSED LOT_3
REFER 18-596-2300 DRG PACKAGE FOR DETAILS

PREVIOUS SSDA BEL 49.00

BEL 51.60 (±1000mm)
FUTURE LOT 9

FUTURE LOT 8
BEL 50.00 (±1000mm)

FUTURE LOT 10
BEL 52.30 (±1000mm)

PREVIOUS SSDA BEL 54.00

FUTURE LOT 7
BEL 52.60 (±1000mm)

PREVIOUS SSDA BEL 56.00

FUTURE LOT 11
BEL 52.60 (±1000mm)

PREVIOUS SSDA BEL 56.00

FUTURE LOT 6
BEL 56.00 (±1000mm)

FUTURE LOT 4
BEL 57.00 (±1000mm)

FUTURE LOT 5
BEL 57.00 (±1000mm)

LEGEND:

- EXISTING BOUNDARY
- 60.0 EXISTING CONTOUR
- PROPOSED BOUNDARY
- PROPOSED RETAINING WALL
- PROPOSED BATTER
  TEMPORARY BATTER 1(V):4(H)
  PERMANENT BATTER 1(V):5(H)
  U.N.O
- EXTENT OF EXCAVATION OF EXISTING CREEKS AND DAMS (REFER NOTE No.3)

NOTES

1. VOLUMES ARE CALCULATED FROM ORIGINAL SSDA SURFACE DATING 15-10-20 TO THE UPDATED SSDA SURFACE
2. EXISTING TOPSOIL STRIPPED 150mm SITEWIDE. 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.
3. ALLOWANCE HAS BEEN MADE FOR RETAINING WALL BACKFILL MATERIAL (IMPORT).
4. NEGATIVE BALANCE VOLUMES INDICATE EXCESS OF MATERIAL REQUIRED (EXPORT).
5. THE VOLUMES DO NOT TAKE INTO ACCOUNT THE FOLLOWING :-
   - BULKING FACTORS OF REMOVED CUT
   - REMOVAL OF EXISTING BUILDING SLABS AND PAVEMENTS
   - REMOVAL AND\OR REMEDIATION OF ANY EXISTING UNCONTROLLED FILL
   - PROPOSED LANDSCAPING
   - STORMWATER AND UTILITY TRENCHING
   - EROSION AND SEDIMENTATION CONTROL SWALES AND BASINS
6. BUILDING PADS HAVE BEEN GRADED AT MINIMUM 0.5% GRADE
7. PROPOSED PAVEMENT BOX OUT HAS BEEN SHOWN AT 700mm DEPTH. PAVEMENT DEPTH TO CONFIRMED DURING DETAILED DESIGN.

Issue	Description	Date
P1	ISSUED FOR INFORMATION	16-02-22

Bar Scales

0 50 100 150 200m

1 : 2000 @ A1

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Client: mirvac

Scales	1:2000	Drawn	KR
		Designed	KR
Grid	MGA	Checked	DS
Height Datum	AHD	Approved	AM

Project
ASPECT INDUSTIAL ESTATE
MAMRE ROAD,
KEMPS CREEK
STAGE 1

Title
COMPARISION
BULK EARTHWORKS
CUT/FILL PLAN

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: FOR AINFORMATION
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A1

Project - Drawing No.: 18-596-SKC121

Issue: P1

100mm on Original

F:\18-596 Mamre Road\6.0 Drgs\Civil\Sketches\18-596-SKC121-SSD COMPARISION EW VOLUMES.dwg

APPENDIX B ANALYTICAL TABLES

Aspect Industrial Estate
10035157

Summary of Analytical Results - Groundwater

ARCADIS Design & Consultancy for natural and built assets

		Metals																TPH					TRH						
		Arsenic	Arsenic (Filtered)	Cadmium	Cadmium (Filtered)	Chromium (III+VI)	Chromium (III+VI) (Filtered)	Copper	Copper (Filtered)	Lead	Lead (Filtered)	Mercury	Mercury (Filtered)	Nickel	Nickel (Filtered)	Zinc	Zinc (Filtered)	C6-C9	C10-C14	C15-C28	C29-C36	C10-C36 (Sum of total)	C6-C10	>C6-C10 less BTEX (F1)	C10-C16	>C10-C16 less Naphthalene (F2)	C16-C34	C34-C40	>C10 - C40 (Sum of total)
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
EQL		1	1	0.2	0.2	1	1	1	1	1	1	0.1	0.1	1	1	5	5	20	50	100	100	100	20	20	50	50	100	100	100
ANZG (2018) Freshwater 95% toxicant DGVs				0.2[#1]	0.2[#1]			1.4[#1]	1.4[#1]	3.4[#2]	3.4[#2]	0.6[#3]	0.06[#3 #7]	11[#3]	11[#3]	8[#4]	8[#4]													
NHMRC 2008 Primary Contact Recreation		100[#5]	100[#5]	20[#5]	20[#5]	500[#6]	500[#6]	20000[#5]	20000[#5]	100[#5]	100[#5]	10[#5]	10[#5]	200[#5]	200[#5]															
NEPM 2013 Table 1C GILs, Fresh Waters				0.2[#8]	0.2[#8]			1.4[#8]	1.4[#8]	3.4[#8]	3.4[#8]	0.06[#9]	0.06[#9]	11[#8]	11[#8]	8[#8]	8[#8]													
Field_ID	**Sampled_Date_Time**																													
MW01	16-Oct-19	-	<1	-	<0.2	-	<1	-	<1	-	<1	-	<0.1	-	<1	-	<5	<20	<50	<100	<100	<100	<20	<20	<50	<50	<100	<100	<100
MW02	16-Oct-19	-	<1	-	<0.2	-	<1	-	<1	-	<1	-	<0.1	-	9	-	10	<20	<50	<100	<100	<100	<20	<20	<50	<50	<100	<100	<100
MW03	23-Oct-19	-	<1	-	0.3	-	<1	-	2	-	<1	-	<0.1	-	4	-	12	<20	<50	<100	<100	<100	<20	<20	70	70	<100	<100	<100
MW04	16-Oct-19	-	<1	-	0.3	-	<1	-	<1	-	<1	-	<0.1	-	3	-	9	<20	<50	<100	<100	<100	<20	<20	<50	<50	<100	<100	<100
MW05	16-Oct-19	-	<1	-	<0.2	-	<1	-	<1	-	<1	-	<0.1	-	<1	-	<5	<20	<50	<100	<100	<100	<20	<20	<50	<50	<100	<100	<100
MW06	16-Oct-19	-	3	-	<0.2	-	<1	-	<1	-	<1	-	<0.1	-	2	-	47	<20	<50	<100	<100	<100	<20	<20	<50	<50	<100	<100	<100
Statistical Summary																														
Number of Results		0	6	0	6	0	6	0	6	0	6	0	6	0	6	0	6	6	6	6	6	6	6	6	6	6	6	6	6
Number of Detects		0	1	0	2	0	0	0	1	0	0	0	0	0	4	0	4	0	0	0	0	0	0	0	1	1	0	0	0
Minimum Concentration		ND	<1	ND	<0.2	ND	<1	ND	<1	ND	<1	ND	<0.1	ND	<1	ND	<5	<20	<50	<100	<100	<100	<20	<20	<50	<50	<100	<100	<100
Minimum Detect		ND	3	ND	0.3	ND	ND	ND	2	ND	ND	ND	ND	ND	2	ND	9	ND	ND	ND	ND	ND	ND	ND	70	70	ND	ND	ND
Maximum Concentration		0	3	0	0.3	0	<1	0	2	0	<1	0	<0.1	0	9	0	47	<20	<50	<100	<100	<100	<20	<20	70	70	<100	<100	<100
Maximum Detect		ND	3	ND	0.3	ND	ND	ND	2	ND	ND	ND	ND	ND	9	ND	47	ND	ND	ND	ND	ND	ND	ND	70	70	ND	ND	ND
Average Concentration			0.92		0.17		0.5		0.75		0.5		0.05		3.2		14	10	25	50	50	50	10	10	33	33	50	50	50
Median Concentration			0.5		0.1		0.5		0.5		0.5		0.05		2.5		9.5	10	25	50	50	50	10	10	25	25	50	50	50
Standard Deviation			1		0.1		0		0.61		0		0		3.2		17	0	0	0	0	0	0	0	18	18	0	0	0
Number of Guideline Exceedances		0	0	0	6	0	0	0	1	0	0	0	6	0	1	0	6	0	0	0	0	0	0	0	0	0	0	0	0
Number of Guideline Exceedances(Detects Only)		0	0	0	2	0	0	0	1	0	0	0	0	0	1	0	4	0	0	0	0	0	0	0	0	0	0	0	0

Env Stds Description

NEPM 2013 Table 1C GILs, Fresh Waters:A Apply to typical slightly-moderately disturbed systems
B From ADWG
C May not protect key species from chronic toxicity

Env Stds Comments

#1:Very high reliability
#2:Moderate reliability
#3:Low reliability
#4:High reliability
#5:ADWG 2015 Health
#6:NHMRC 2008 Risk in Recreational Water
#7: ANZG (2018) Freshwater 99% toxicant DGVs
#8:Values calculated using hardness of 30 mg/L CaCO3. Refer ANZECC & ARMCANZ (2000) for site specific hardness guidance
#9:Chemical for which possible bioaccumulation and secondary poisoning effects should be considered, refer to ANZECC & ARMCANZ (2000) for further guidance.
#10:Figure may not protect key species from chronic toxicity, refer to ANZECC & ARMCANZ (2000) for further guidance.

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Summary of Analytical Results - Groundwater

ARCADIS Design & Consultancy for natural and built assets

	BTEX						PAH																	Phenols
	Benzene	Toluene	Ethylbenzene	Xylene (m & p)	Xylene (o)	Xylene Total	Acenaphthene	Acenaphthylene	Anthracene	Benz(a)anthracene	Benzo(a) pyrene	Benzo(g,h,i)perylene	Benzo(b+j)fluoranthene	Benzo(k)fluoranthene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Naphthalene	Phenanthrene	Pyrene	PAHs (Sum of total)	Phenolics Total
	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	ug/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
EQL	1	1	1	2	1	3	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	50
ANZG (2018) Freshwater 95% toxicant DGVs	950[#2]				350[#3]															16[#3]				
NHMRC 2008 Primary Contact Recreation	10[#5]	8000[#5]	3000[#5]			6000[#5]				0.12[#7]	0.1[#6]													
NEPM 2013 Table 1C GILs, Fresh Waters	950				350															16				
Field_ID **Sampled_Date_Time**																								
MW01 16-Oct-19	<1	<1	<1	<2	<1	<3	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-
MW02 16-Oct-19	<1	<1	<1	<2	<1	<3	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-
MW03 23-Oct-19	<1	<1	<1	<2	<1	<3	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-
MW04 16-Oct-19	<1	<1	<1	<2	<1	<3	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-
MW05 16-Oct-19	<1	<1	<1	<2	<1	<3	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-
MW06 16-Oct-19	<1	<1	<1	<2	<1	<3	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-
Statistical Summary																								
Number of Results	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	0
Number of Detects	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Minimum Concentration	<1	<1	<1	<2	<1	<3	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	ND
Minimum Detect	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Maximum Concentration	<1	<1	<1	<2	<1	<3	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0
Maximum Detect	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Average Concentration	0.5	0.5	0.5	1	0.5	1.5	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	
Median Concentration	0.5	0.5	0.5	1	0.5	1.5	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	
Standard Deviation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Number of Guideline Exceedances	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Number of Guideline Exceedances(Detects Only)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Env Stds Description

NEPM 2013 Table 1C GILs, Fresh Waters:A Apply to typ
B From ADWG
C May not protect key species from chronic toxicity

Env Stds Comments

#1:Very high reliability
#2:Moderate reliability
#3:Low reliability
#4:High reliability
#5:ADWG 2015 Health
#6:NHMRC 2008 Risk in Recreational Water
#7: ANZG (2018) Freshwater 99% toxicant DGVs
#8:Values calculated using hardness of 30 mg/L CaCO3
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Summary of Analytical Results - Groundwater

		PCBs								Organochlorine Pesticides																								
		Arochlor 1016	Arochlor 1221	Arochlor 1232	Arochlor 1242	Arochlor 1248	Arochlor 1254	Arochlor 1260	PCBs (Sum of total)	a-BHC	Aldrin	Dieldrin	Aldrin + Dieldrin	b-BHC	chlordane	d-BHC	DDD	4,4-DDE	DDT	DDT+DDE+DDD	Endrin ketone	Endosulfan I	Endosulfan II	Endosulfan sulphate	Endrin	Endrin aldehyde	g-BHC (Lindane)	Heptachlor	Heptachlor epoxide	Methoxychlor	Toxaphene	Organochlorine pesticides EPAVic	Other organochlorine pesticides EPAVic
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	ug/L	ug/L	ug/L
EQL		1	1	1	1	1	1	1	1	0.1	0.1	0.1	0.1	0.1	1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	10	1	1
ANZG (2018) Freshwater 95% toxicant DGVs					0.6[#3]		0.03[#2]								0.08[#2]				0.01[#2]						0.02[#2]		0.2[#2]	0.09[#2]			0.2[#2]		
NHMRC 2008 Primary Contact Recreation													3[#5]		20[#5]				90[#5]								100[#5]	3[#5]					
NEPM 2013 Table 1C GILs, Fresh Waters					0.3[#9]		0.01[#9]								0.03[#9]				0.006[#9]						0.01[#9]		0.2	0.01[#9]			0.1[#9]		
Field_ID	**Sampled_Date_Time**																																	
MW01	16-Oct-19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW02	16-Oct-19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW03	23-Oct-19	<5	<1	<5	<5	<5	<5	<5	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<10	<1	<1
MW04	16-Oct-19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW05	16-Oct-19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW06	16-Oct-19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Statistical Summary																																		
Number of Results		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Number of Detects		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Minimum Concentration		<5	<1	<5	<5	<5	<5	<5	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<10	<1	<1
Minimum Detect		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Maximum Concentration		<5	<1	<5	<5	<5	<5	<5	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<10	<1	<1
Maximum Detect		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Average Concentration																																		
Median Concentration		2.5	0.5	2.5	2.5	2.5	2.5	2.5	0.5	0.05	0.05	0.05	0.05	0.05	0.5	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	5	0.5	0.5
Standard Deviation																																		
Number of Guideline Exceedances		1	1	1	1	1	1	1	1	1	1	1	0	0	1	0	0	0	1	0	0	0	0	0	1	0	1	1	1	0	1	0	0	
Number of Guideline Exceedances(Detects Only)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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NEPM 2013 Table 1C GILs, Fresh Waters:A Apply to typ
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Summary of Analytical Results - Groundwater

ARCADIS Design & Consultancy for natural and built assets

	Organophosphorous Pesticides																														Pesticides	Herbicides	Halogenated Benzenes
	Azinophos methyl	Bolstar (Sulprofos)	Chlorfenvinphos	Chlorpyrifos	Chlorpyrifos-methyl	Coumaphos	Demeton-O	Demeton-S	Diazinon	Dichlorvos	Dimethoate	Disulfoton	Ethoprop	Ethion	Fensulfothion	Fenitrothion	Fenthion	EPN	Malathion	Merphos	Methyl parathion	Mevinphos (Phosdrin)	Naled (Dibrom)	Monocrotophos	Omethoate	Parathion	Phorate	Pyrazophos	Ronnel	Terbufos	Trichloronate	Tetrachlorvinphos	Pirimiphos-methyl	Tokuthion	Hexachlorobenzene
	µg/L	µg/L	µg/L	µg/L	ug/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	ug/L	mg/L	µg/L
EQL	2	2	2	20	2	20	2	20	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	20	0.002	0.1
ANZG (2018) Freshwater 95% toxicant DGVs	0.02[#2]			0.01[#3]					0.01[#2]		0.15[#3]					0.2[#2]			0.05[#2]						0.004[#2]									
NHMRC 2008 Primary Contact Recreation	300[#5]	100[#5]	20[#5]	100[#5]					40[#5]	50[#5]	70[#5]	40[#5]	10[#5]	40[#5]	100[#5]	70[#5]	70[#5]		700[#5]		7[#5]	50[#5]		20[#5]	10[#5]	200[#5]		200[#5]		9[#5]		1000[#5]	900[#5]		
NEPM 2013 Table 1C GILs, Fresh Waters				0.01[#9]					0.01		0.15					0.2			0.05							0.004[#10]								

Field_ID	Sampled_Date_Time																																		
MW01	16-Oct-19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW02	16-Oct-19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW03	23-Oct-19	<2	<2	<2	<20	<2	<20	<2	<20	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<20	<0.002	<0.1
MW04	16-Oct-19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW05	16-Oct-19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW06	16-Oct-19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Statistical Summary

Number of Results	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Number of Detects	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Minimum Concentration	<2	<2	<2	<20	<2	<20	<2	<20	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<20	<0.002	<0.1
Minimum Detect	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Maximum Concentration	<2	<2	<2	<20	<2	<20	<2	<20	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<20	<0.002	<0.1
Maximum Detect	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Average Concentration																																			
Median Concentration	1	1	1	10	1	10	1	10	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	10	0.001	0.05	
Standard Deviation																																			
Number of Guideline Exceedances	1	0	0	1	0	0	0	0	1	0	1	0	1	0	0	1	0	1	1	0	1	0	0	0	1	1	0	0	0	1	0	0	0	0	1
Number of Guideline Exceedances(Detects Only)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Env Stds Description

NEPM 2013 Table 1C GILs, Fresh Waters:A Apply to typ
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#9:Chemical for which possible bioaccumulation and se
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APPENDIX C LABORATORY REPORTS

Arcadis Australia
Lvl 16/580 George Street
Sydney
NSW 2000

NATA Accredited
Accreditation Number 1261
Site Number 18217

Accredited for compliance with ISO/IEC 17025 – Testing
The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

Attention: **Jack Palma**

Report **683212-W**
Project name MIRVAC - KEMPS CREEK
Project ID 10035157
Received Date Oct 17, 2019

Client Sample ID			**MW01**	**MW02**	**MW04**	**MW05**
Sample Matrix			**Water**	**Water**	**Water**	**Water**
Eurofins Sample No.			**S19-Oc26968**	**S19-Oc26969**	**S19-Oc26970**	**S19-Oc26971**
Date Sampled			**Oct 16, 2019**	**Oct 16, 2019**	**Oct 16, 2019**	**Oct 16, 2019**
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene[N02]	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
TRH C6-C10	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH C6-C10 less BTEX (F1)[N04]	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH >C10-C16	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH >C10-C16 less Naphthalene (F2)[N01]	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH >C16-C34	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH >C34-C40	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH >C10-C40 (total)*	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
Total Recoverable Hydrocarbons - 1999 NEPM Fractions						
TRH C6-C9	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH C10-C14	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH C15-C28	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH C29-C36	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH C10-C36 (Total)	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
BTEX						
Benzene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Toluene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Ethylbenzene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
m&p-Xylenes	0.002	mg/L	< 0.002	< 0.002	< 0.002	< 0.002
o-Xylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Xylenes - Total	0.003	mg/L	< 0.003	< 0.003	< 0.003	< 0.003
4-Bromofluorobenzene (surr.)	1	%	82	87	89	89
Polycyclic Aromatic Hydrocarbons (Trace level)						
Acenaphthene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Acenaphthylene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Anthracene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Benz(a)anthracene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Benzo(a)pyrene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Benzo(b&j)fluoranthene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Benzo(g.h.i)perylene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Benzo(k)fluoranthene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Chrysene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Dibenz(a.h)anthracene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Fluoranthene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Fluorene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001

Client Sample ID			MW01	MW02	MW04	MW05
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			S19-Oc26968	S19-Oc26969	S19-Oc26970	S19-Oc26971
Date Sampled			Oct 16, 2019	Oct 16, 2019	Oct 16, 2019	Oct 16, 2019
Test/Reference	LOR	Unit				
Polycyclic Aromatic Hydrocarbons (Trace level)						
Indeno(1.2.3-cd)pyrene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Naphthalene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Phenanthrene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Pyrene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Total PAH*	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
2-Fluorobiphenyl (surr.)	1	%	63	63	68	67
p-Terphenyl-d14 (surr.)	1	%	75	54	86	60
Heavy Metals						
Arsenic (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Cadmium (filtered)	0.0002	mg/L	< 0.0002	< 0.0002	0.0003	< 0.0002
Chromium (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Copper (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Lead (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Mercury (filtered)	0.0001	mg/L	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Nickel (filtered)	0.001	mg/L	< 0.001	0.009	0.003	< 0.001
Zinc (filtered)	0.005	mg/L	< 0.005	0.010	0.009	< 0.005

Client Sample ID			MW06	DW01	DW02	DW03
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			S19-Oc26972	S19-Oc26973	S19-Oc26974	S19-Oc26975
Date Sampled			Oct 16, 2019	Oct 16, 2019	Oct 16, 2019	Oct 16, 2019
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene[N02]	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
TRH C6-C10	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH C6-C10 less BTEX (F1)[N04]	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH >C10-C16	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH >C10-C16 less Naphthalene (F2)[N01]	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH >C16-C34	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH >C34-C40	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH >C10-C40 (total)*	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
Total Recoverable Hydrocarbons - 1999 NEPM Fractions						
TRH C6-C9	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH C10-C14	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH C15-C28	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH C29-C36	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH C10-C36 (Total)	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
BTEX						
Benzene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Toluene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Ethylbenzene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
m&p-Xylenes	0.002	mg/L	< 0.002	< 0.002	< 0.002	< 0.002
o-Xylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Xylenes - Total	0.003	mg/L	< 0.003	< 0.003	< 0.003	< 0.003
4-Bromofluorobenzene (surr.)	1	%	97	94	93	96

Client Sample ID			MW06	DW01	DW02	DW03
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			S19-Oc26972	S19-Oc26973	S19-Oc26974	S19-Oc26975
Date Sampled			Oct 16, 2019	Oct 16, 2019	Oct 16, 2019	Oct 16, 2019
Test/Reference	LOR	Unit				
Organochlorine Pesticides						
Chlordanes - Total	0.001	mg/L	-	< 0.001	< 0.001	< 0.001
4.4'-DDD	0.0001	mg/L	-	< 0.0001	< 0.0001	< 0.0001
4.4'-DDE	0.0001	mg/L	-	< 0.0001	< 0.0001	< 0.0001
4.4'-DDT	0.0001	mg/L	-	< 0.0001	< 0.0001	< 0.0001
a-BHC	0.0001	mg/L	-	< 0.0001	< 0.0001	< 0.0001
Aldrin	0.0001	mg/L	-	< 0.0001	< 0.0001	< 0.0001
b-BHC	0.0001	mg/L	-	< 0.0001	< 0.0001	< 0.0001
d-BHC	0.0001	mg/L	-	< 0.0001	< 0.0001	< 0.0001
Dieldrin	0.0001	mg/L	-	< 0.0001	< 0.0001	< 0.0001
Endosulfan I	0.0001	mg/L	-	< 0.0001	< 0.0001	< 0.0001
Endosulfan II	0.0001	mg/L	-	< 0.0001	< 0.0001	< 0.0001
Endosulfan sulphate	0.0001	mg/L	-	< 0.0001	< 0.0001	< 0.0001
Endrin	0.0001	mg/L	-	< 0.0001	< 0.0001	< 0.0001
Endrin aldehyde	0.0001	mg/L	-	< 0.0001	< 0.0001	< 0.0001
Endrin ketone	0.0001	mg/L	-	< 0.0001	< 0.0001	< 0.0001
g-BHC (Lindane)	0.0001	mg/L	-	< 0.0001	< 0.0001	< 0.0001
Heptachlor	0.0001	mg/L	-	< 0.0001	< 0.0001	< 0.0001
Heptachlor epoxide	0.0001	mg/L	-	< 0.0001	< 0.0001	< 0.0001
Hexachlorobenzene	0.0001	mg/L	-	< 0.0001	< 0.0001	< 0.0001
Methoxychlor	0.0001	mg/L	-	< 0.0001	< 0.0001	< 0.0001
Toxaphene	0.01	mg/L	-	< 0.01	< 0.01	< 0.01
Aldrin and Dieldrin (Total)*	0.0001	mg/L	-	< 0.0001	< 0.0001	< 0.0001
DDT + DDE + DDD (Total)*	0.0001	mg/L	-	< 0.0001	< 0.0001	< 0.0001
Vic EPA IWRG 621 OCP (Total)*	0.001	mg/L	-	< 0.001	< 0.001	< 0.001
Vic EPA IWRG 621 Other OCP (Total)*	0.001	mg/L	-	< 0.001	< 0.001	< 0.001
Dibutylchlorendate (surr.)	1	%	-	83	67	54
Tetrachloro-m-xylene (surr.)	1	%	-	58	94	82
Organophosphorus Pesticides						
Azinphos-methyl	0.002	mg/L	-	< 0.002	< 0.002	< 0.002
Bolstar	0.002	mg/L	-	< 0.002	< 0.002	< 0.002
Chlorfenvinphos	0.002	mg/L	-	< 0.002	< 0.002	< 0.002
Chlorpyrifos	0.02	mg/L	-	< 0.02	< 0.02	< 0.02
Chlorpyrifos-methyl	0.002	mg/L	-	< 0.002	< 0.002	< 0.002
Coumaphos	0.02	mg/L	-	< 0.02	< 0.02	< 0.02
Demeton-S	0.02	mg/L	-	< 0.02	< 0.02	< 0.02
Demeton-O	0.002	mg/L	-	< 0.002	< 0.002	< 0.002
Diazinon	0.002	mg/L	-	< 0.002	< 0.002	< 0.002
Dichlorvos	0.002	mg/L	-	< 0.002	< 0.002	< 0.002
Dimethoate	0.002	mg/L	-	< 0.002	< 0.002	< 0.002
Disulfoton	0.002	mg/L	-	< 0.002	< 0.002	< 0.002
EPN	0.002	mg/L	-	< 0.002	< 0.002	< 0.002
Ethion	0.002	mg/L	-	< 0.002	< 0.002	< 0.002
Ethoprop	0.002	mg/L	-	< 0.002	< 0.002	< 0.002
Ethyl parathion	0.002	mg/L	-	< 0.002	< 0.002	< 0.002
Fenitrothion	0.002	mg/L	-	< 0.002	< 0.002	< 0.002
Fensulfothion	0.002	mg/L	-	< 0.002	< 0.002	< 0.002
Fenthion	0.002	mg/L	-	< 0.002	< 0.002	< 0.002
Malathion	0.002	mg/L	-	< 0.002	< 0.002	< 0.002
Merphos	0.002	mg/L	-	< 0.002	< 0.002	< 0.002

Client Sample ID			MW06	DW01	DW02	DW03
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			S19-Oc26972	S19-Oc26973	S19-Oc26974	S19-Oc26975
Date Sampled			Oct 16, 2019	Oct 16, 2019	Oct 16, 2019	Oct 16, 2019
Test/Reference	LOR	Unit				
Organophosphorus Pesticides						
Methyl parathion	0.002	mg/L	-	< 0.002	< 0.002	< 0.002
Mevinphos	0.002	mg/L	-	< 0.002	< 0.002	< 0.002
Monocrotophos	0.002	mg/L	-	< 0.002	< 0.002	< 0.002
Naled	0.002	mg/L	-	< 0.002	< 0.002	< 0.002
Omethoate	0.002	mg/L	-	< 0.002	< 0.002	< 0.002
Phorate	0.002	mg/L	-	< 0.002	< 0.002	< 0.002
Pirimiphos-methyl	0.02	mg/L	-	< 0.02	< 0.02	< 0.02
Pyrazophos	0.002	mg/L	-	< 0.002	< 0.002	< 0.002
Ronnel	0.002	mg/L	-	< 0.002	< 0.002	< 0.002
Terbufos	0.002	mg/L	-	< 0.002	< 0.002	< 0.002
Tetrachlorvinphos	0.002	mg/L	-	< 0.002	< 0.002	< 0.002
Tokuthion	0.002	mg/L	-	< 0.002	< 0.002	< 0.002
Trichloronate	0.002	mg/L	-	< 0.002	< 0.002	< 0.002
Triphenylphosphate (surr.)	1	%	-	69	77	81
Polychlorinated Biphenyls						
Aroclor-1016	0.001	mg/L	-	< 0.001	< 0.001	< 0.001
Aroclor-1221	0.001	mg/L	-	< 0.001	< 0.001	< 0.001
Aroclor-1232	0.001	mg/L	-	< 0.001	< 0.001	< 0.001
Aroclor-1242	0.001	mg/L	-	< 0.001	< 0.001	< 0.001
Aroclor-1248	0.001	mg/L	-	< 0.001	< 0.001	< 0.001
Aroclor-1254	0.001	mg/L	-	< 0.001	< 0.001	< 0.001
Aroclor-1260	0.001	mg/L	-	< 0.001	< 0.001	< 0.001
Total PCB*	0.001	mg/L	-	< 0.001	< 0.001	< 0.001
Dibutylchlorendate (surr.)	1	%	-	83	67	54
Tetrachloro-m-xylene (surr.)	1	%	-	58	94	82
Polycyclic Aromatic Hydrocarbons (Trace level)						
Acenaphthene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Acenaphthylene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Anthracene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Benz(a)anthracene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Benzo(a)pyrene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Benzo(b&j)fluoranthene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Benzo(g.h.i)perylene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Benzo(k)fluoranthene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Chrysene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Dibenz(a.h)anthracene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Fluoranthene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Fluorene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Indeno(1.2.3-cd)pyrene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Naphthalene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Phenanthrene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Pyrene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Total PAH*	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
2-Fluorobiphenyl (surr.)	1	%	78	93	78	66
p-Terphenyl-d14 (surr.)	1	%	64	90	73	74
Phenolics (total)	0.05	mg/L	-	< 0.05	< 0.05	< 0.05

Client Sample ID			MW06	DW01	DW02	DW03
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			S19-Oc26972	S19-Oc26973	S19-Oc26974	S19-Oc26975
Date Sampled			Oct 16, 2019	Oct 16, 2019	Oct 16, 2019	Oct 16, 2019
Test/Reference	LOR	Unit				
Heavy Metals						
Arsenic (filtered)	0.001	mg/L	0.003	0.001	0.002	0.002
Cadmium (filtered)	0.0002	mg/L	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Chromium (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Copper (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Lead (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Mercury (filtered)	0.0001	mg/L	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Nickel (filtered)	0.001	mg/L	0.002	< 0.001	0.002	0.002
Zinc (filtered)	0.005	mg/L	0.047	< 0.005	< 0.005	< 0.005

Client Sample ID			DW04	DW05	QA1	RINSATE
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			S19-Oc26976	S19-Oc26977	S19-Oc26978	S19-Oc26979
Date Sampled			Oct 16, 2019	Oct 16, 2019	Oct 16, 2019	Oct 16, 2019
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene[N02]	0.01	mg/L	< 0.01	< 0.01	< 0.01	-
TRH C6-C10	0.02	mg/L	< 0.02	< 0.02	< 0.02	-
TRH C6-C10 less BTEX (F1)[N04]	0.02	mg/L	< 0.02	< 0.02	< 0.02	-
TRH >C10-C16	0.05	mg/L	< 0.05	< 0.05	< 0.05	-
TRH >C10-C16 less Naphthalene (F2)[N01]	0.05	mg/L	< 0.05	< 0.05	< 0.05	-
TRH >C16-C34	0.1	mg/L	< 0.1	< 0.1	< 0.1	-
TRH >C34-C40	0.1	mg/L	< 0.1	< 0.1	< 0.1	-
TRH >C10-C40 (total)*	0.1	mg/L	< 0.1	< 0.1	< 0.1	-
Total Recoverable Hydrocarbons - 1999 NEPM Fractions						
TRH C6-C9	0.02	mg/L	< 0.02	< 0.02	< 0.02	-
TRH C10-C14	0.05	mg/L	< 0.05	< 0.05	< 0.05	-
TRH C15-C28	0.1	mg/L	< 0.1	< 0.1	< 0.1	-
TRH C29-C36	0.1	mg/L	< 0.1	< 0.1	< 0.1	-
TRH C10-C36 (Total)	0.1	mg/L	< 0.1	< 0.1	< 0.1	-
BTEX						
Benzene	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
Toluene	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
Ethylbenzene	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
m&p-Xylenes	0.002	mg/L	< 0.002	< 0.002	< 0.002	-
o-Xylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
Xylenes - Total	0.003	mg/L	< 0.003	< 0.003	< 0.003	-
4-Bromofluorobenzene (surr.)	1	%	95	81	87	-
Organochlorine Pesticides						
Chlordanes - Total	0.001	mg/L	< 0.001	< 0.001	-	-
4.4'-DDD	0.0001	mg/L	< 0.0001	< 0.0001	-	-
4.4'-DDE	0.0001	mg/L	< 0.0001	< 0.0001	-	-
4.4'-DDT	0.0001	mg/L	< 0.0001	< 0.0001	-	-
a-BHC	0.0001	mg/L	< 0.0001	< 0.0001	-	-
Aldrin	0.0001	mg/L	< 0.0001	< 0.0001	-	-
b-BHC	0.0001	mg/L	< 0.0001	< 0.0001	-	-
d-BHC	0.0001	mg/L	< 0.0001	< 0.0001	-	-
Dieldrin	0.0001	mg/L	< 0.0001	< 0.0001	-	-
Endosulfan I	0.0001	mg/L	< 0.0001	< 0.0001	-	-

Client Sample ID			DW04	DW05	QA1	RINSATE
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			S19-Oc26976	S19-Oc26977	S19-Oc26978	S19-Oc26979
Date Sampled			Oct 16, 2019	Oct 16, 2019	Oct 16, 2019	Oct 16, 2019
Test/Reference	LOR	Unit				
Organochlorine Pesticides						
Endosulfan II	0.0001	mg/L	< 0.0001	< 0.0001	-	-
Endosulfan sulphate	0.0001	mg/L	< 0.0001	< 0.0001	-	-
Endrin	0.0001	mg/L	< 0.0001	< 0.0001	-	-
Endrin aldehyde	0.0001	mg/L	< 0.0001	< 0.0001	-	-
Endrin ketone	0.0001	mg/L	< 0.0001	< 0.0001	-	-
g-BHC (Lindane)	0.0001	mg/L	< 0.0001	< 0.0001	-	-
Heptachlor	0.0001	mg/L	< 0.0001	< 0.0001	-	-
Heptachlor epoxide	0.0001	mg/L	< 0.0001	< 0.0001	-	-
Hexachlorobenzene	0.0001	mg/L	< 0.0001	< 0.0001	-	-
Methoxychlor	0.0001	mg/L	< 0.0001	< 0.0001	-	-
Toxaphene	0.01	mg/L	< 0.01	< 0.01	-	-
Aldrin and Dieldrin (Total)*	0.0001	mg/L	< 0.0001	< 0.0001	-	-
DDT + DDE + DDD (Total)*	0.0001	mg/L	< 0.0001	< 0.0001	-	-
Vic EPA IWRG 621 OCP (Total)*	0.001	mg/L	< 0.001	< 0.001	-	-
Vic EPA IWRG 621 Other OCP (Total)*	0.001	mg/L	< 0.001	< 0.001	-	-
Dibutylchlorendate (surr.)	1	%	114	58	-	-
Tetrachloro-m-xylene (surr.)	1	%	78	82	-	-
Organophosphorus Pesticides						
Azinphos-methyl	0.002	mg/L	< 0.002	< 0.002	-	-
Bolstar	0.002	mg/L	< 0.002	< 0.002	-	-
Chlorfenvinphos	0.002	mg/L	< 0.002	< 0.002	-	-
Chlorpyrifos	0.02	mg/L	< 0.02	< 0.02	-	-
Chlorpyrifos-methyl	0.002	mg/L	< 0.002	< 0.002	-	-
Coumaphos	0.02	mg/L	< 0.02	< 0.02	-	-
Demeton-S	0.02	mg/L	< 0.02	< 0.02	-	-
Demeton-O	0.002	mg/L	< 0.002	< 0.002	-	-
Diazinon	0.002	mg/L	< 0.002	< 0.002	-	-
Dichlorvos	0.002	mg/L	< 0.002	< 0.002	-	-
Dimethoate	0.002	mg/L	< 0.002	< 0.002	-	-
Disulfoton	0.002	mg/L	< 0.002	< 0.002	-	-
EPN	0.002	mg/L	< 0.002	< 0.002	-	-
Ethion	0.002	mg/L	< 0.002	< 0.002	-	-
Ethoprop	0.002	mg/L	< 0.002	< 0.002	-	-
Ethyl parathion	0.002	mg/L	< 0.002	< 0.002	-	-
Fenitrothion	0.002	mg/L	< 0.002	< 0.002	-	-
Fensulfothion	0.002	mg/L	< 0.002	< 0.002	-	-
Fenthion	0.002	mg/L	< 0.002	< 0.002	-	-
Malathion	0.002	mg/L	< 0.002	< 0.002	-	-
Merphos	0.002	mg/L	< 0.002	< 0.002	-	-
Methyl parathion	0.002	mg/L	< 0.002	< 0.002	-	-
Mevinphos	0.002	mg/L	< 0.002	< 0.002	-	-
Monocrotophos	0.002	mg/L	< 0.002	< 0.002	-	-
Naled	0.002	mg/L	< 0.002	< 0.002	-	-
Omethoate	0.002	mg/L	< 0.002	< 0.002	-	-
Phorate	0.002	mg/L	< 0.002	< 0.002	-	-
Pirimiphos-methyl	0.02	mg/L	< 0.02	< 0.02	-	-
Pyrazophos	0.002	mg/L	< 0.002	< 0.002	-	-
Ronnel	0.002	mg/L	< 0.002	< 0.002	-	-
Terbufos	0.002	mg/L	< 0.002	< 0.002	-	-

Client Sample ID			DW04	DW05	QA1	RINSATE
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			S19-Oc26976	S19-Oc26977	S19-Oc26978	S19-Oc26979
Date Sampled			Oct 16, 2019	Oct 16, 2019	Oct 16, 2019	Oct 16, 2019
Test/Reference	LOR	Unit				
Organophosphorus Pesticides						
Tetrachlorvinphos	0.002	mg/L	< 0.002	< 0.002	-	-
Tokuthion	0.002	mg/L	< 0.002	< 0.002	-	-
Trichloronate	0.002	mg/L	< 0.002	< 0.002	-	-
Triphenylphosphate (surr.)	1	%	88	60	-	-
Polychlorinated Biphenyls						
Aroclor-1016	0.001	mg/L	< 0.001	< 0.001	-	-
Aroclor-1221	0.001	mg/L	< 0.001	< 0.001	-	-
Aroclor-1232	0.001	mg/L	< 0.001	< 0.001	-	-
Aroclor-1242	0.001	mg/L	< 0.001	< 0.001	-	-
Aroclor-1248	0.001	mg/L	< 0.001	< 0.001	-	-
Aroclor-1254	0.001	mg/L	< 0.001	< 0.001	-	-
Aroclor-1260	0.001	mg/L	< 0.001	< 0.001	-	-
Total PCB*	0.001	mg/L	< 0.001	< 0.001	-	-
Dibutylchlorendate (surr.)	1	%	114	58	-	-
Tetrachloro-m-xylene (surr.)	1	%	78	82	-	-
Polycyclic Aromatic Hydrocarbons (Trace level)						
Acenaphthene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	-
Acenaphthylene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	-
Anthracene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	-
Benz(a)anthracene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	-
Benzo(a)pyrene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	-
Benzo(b&j)fluoranthene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	-
Benzo(g.h.i)perylene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	-
Benzo(k)fluoranthene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	-
Chrysene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	-
Dibenz(a.h)anthracene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	-
Fluoranthene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	-
Fluorene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	-
Indeno(1.2.3-cd)pyrene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	-
Naphthalene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	-
Phenanthrene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	-
Pyrene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	-
Total PAH*	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	-
2-Fluorobiphenyl (surr.)	1	%	67	66	89	-
p-Terphenyl-d14 (surr.)	1	%	56	61	70	-
Phenolics (total)	0.05	mg/L	< 0.05	< 0.05	-	-
Heavy Metals						
Arsenic	0.001	mg/L	-	-	0.004	< 0.001
Arsenic (filtered)	0.001	mg/L	0.001	0.002	-	-
Cadmium	0.0002	mg/L	-	-	< 0.0002	< 0.0002
Cadmium (filtered)	0.0002	mg/L	< 0.0002	< 0.0002	-	-
Chromium	0.001	mg/L	-	-	< 0.001	< 0.001
Chromium (filtered)	0.001	mg/L	< 0.001	< 0.001	-	-
Copper	0.001	mg/L	-	-	< 0.001	< 0.001
Copper (filtered)	0.001	mg/L	< 0.001	< 0.001	-	-
Lead	0.001	mg/L	-	-	< 0.001	< 0.001
Lead (filtered)	0.001	mg/L	< 0.001	< 0.001	-	-
Mercury	0.0001	mg/L	-	-	< 0.0001	< 0.0001

Client Sample ID			DW04	DW05	QA1	RINSATE
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			S19-Oc26976	S19-Oc26977	S19-Oc26978	S19-Oc26979
Date Sampled			Oct 16, 2019	Oct 16, 2019	Oct 16, 2019	Oct 16, 2019
Test/Reference	LOR	Unit				
Heavy Metals						
Mercury (filtered)	0.0001	mg/L	< 0.0001	< 0.0001	-	-
Nickel	0.001	mg/L	-	-	0.004	< 0.001
Nickel (filtered)	0.001	mg/L	0.001	0.002	-	-
Zinc	0.005	mg/L	-	-	0.032	< 0.005
Zinc (filtered)	0.005	mg/L	< 0.005	< 0.005	-	-

Client Sample ID			[R20]TS	TB
Sample Matrix			Water	Water
Eurofins Sample No.			S19-Oc26980	S19-Oc26981
Date Sampled			Oct 16, 2019	Oct 16, 2019
Test/Reference	LOR	Unit		
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				
Naphthalene[N02]	0.01	mg/L	88	< 0.01
TRH C6-C10	0.02	mg/L	72	< 0.02
TRH C6-C10 less BTEX (F1)[N04]	0.02	mg/L	-	< 0.02
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				
TRH C6-C9	0.02	mg/L	71	< 0.02
BTEX				
Benzene	0.001	mg/L	93	< 0.001
Toluene	0.001	mg/L	95	< 0.001
Ethylbenzene	0.001	mg/L	91	< 0.001
m&p-Xylenes	0.002	mg/L	88	< 0.002
o-Xylene	0.001	mg/L	95	< 0.001
Xylenes - Total	0.003	mg/L	90	< 0.003
4-Bromofluorobenzene (surr.)	1	%	98	87

Sample History

Where samples are submitted/analysed over several days, the last date of extraction and analysis is reported.
A recent review of our LIMS has resulted in the correction or clarification of some method identifications. Due to this, some of the method reference information on reports has changed. However, no substantive change has been made to our laboratory methods, and as such there is no change in the validity of current or previous results.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Total Recoverable Hydrocarbons	Melbourne	Oct 21, 2019	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Eurofins | mgt Suite B7 (filtered metals/PAH trace level)			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Melbourne	Oct 21, 2019	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Melbourne	Oct 21, 2019	
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons - 1999 NEPM Fractions	Melbourne	Oct 21, 2019	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
BTEX	Melbourne	Oct 21, 2019	14 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Polycyclic Aromatic Hydrocarbons (Trace level)	Melbourne	Oct 21, 2019	7 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water (trace)			
Metals M8 filtered	Melbourne	Oct 21, 2019	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Eurofins | mgt Suite B15			
Organochlorine Pesticides	Melbourne	Oct 21, 2019	7 Days
- Method: LTM-ORG-2220 OCP & PCB in Soil and Water (USEPA 8270)			
Organophosphorus Pesticides	Melbourne	Oct 21, 2019	7 Days
- Method: LTM-ORG-2200 Organophosphorus Pesticides by GC-MS (USEPA 8081)			
Polychlorinated Biphenyls	Melbourne	Oct 21, 2019	7 Days
- Method: LTM-ORG-2220 OCP & PCB in Soil and Water (USEPA 8082)			
Phenolics (total)	Melbourne	Oct 21, 2019	7 Days
- Method: LTM-INO-4050 Total Phenolics in Waters and solids by CFA			
Eurofins | mgt Suite B7 (PAH trace level)			
Metals M8	Melbourne	Oct 21, 2019	180 Days
- Method:			

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Site # 23736

Company Name: Arcadis Australia
Address: Lvl 16/580 George Street
Sydney
NSW 2000

Project Name: MIRVAC - KEMPS CREEK
Project ID: 10035157

Order No.:
Report #: 683212
Phone: 02 8907 9000
Fax:

Received: Oct 17, 2019 4:33 PM
Due: Oct 24, 2019
Priority: 5 Day
Contact Name: Jack Palma

Eurofins Analytical Services Manager : Ursula Long

Sample Detail						Asbestos Absence /Presence	HOLD	Phenolics (total)	Metals M7	Metals M8	Eurofins | mgt Suite B15	Moisture Set	BTEXN and Volatile TRH	Eurofins | mgt Suite B7 (PAH trace level)	Eurofins | mgt Suite B7 (filtered metals/PAH trace level)
Melbourne Laboratory - NATA Site # 1254 & 14271							X	X	X	X	X	X	X	X	X
Sydney Laboratory - NATA Site # 18217						X									
Brisbane Laboratory - NATA Site # 20794															
Perth Laboratory - NATA Site # 23736															
External Laboratory															
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**										
1	MW01	Oct 16, 2019		Water	S19-Oc26968										X
2	MW02	Oct 16, 2019		Water	S19-Oc26969										X
3	MW04	Oct 16, 2019		Water	S19-Oc26970										X
4	MW05	Oct 16, 2019		Water	S19-Oc26971										X
5	MW06	Oct 16, 2019		Water	S19-Oc26972										X
6	DW01	Oct 16, 2019		Water	S19-Oc26973			X			X				X
7	DW02	Oct 16, 2019		Water	S19-Oc26974			X			X				X
8	DW03	Oct 16, 2019		Water	S19-Oc26975			X			X				X
9	DW04	Oct 16, 2019		Water	S19-Oc26976			X			X				X

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Melbourne Laboratory - NATA Site # 1254 & 14271							X	X	X	X	X	X	X	X	X
Sydney Laboratory - NATA Site # 18217						X									
Brisbane Laboratory - NATA Site # 20794															
Perth Laboratory - NATA Site # 23736															
10	DW05	Oct 16, 2019		Water	S19-Oc26977			X			X				X
11	QA1	Oct 16, 2019		Water	S19-Oc26978									X	
12	RINSATE	Oct 16, 2019		Water	S19-Oc26979					X					
13	TS	Oct 16, 2019		Water	S19-Oc26980								X		
14	TB	Oct 16, 2019		Water	S19-Oc26981								X		
15	SO01	Oct 16, 2019		Soil	S19-Oc26982				X			X			
16	SO02	Oct 16, 2019		Soil	S19-Oc26983		X								
17	SO03	Oct 16, 2019		Soil	S19-Oc26984				X			X			
18	SO04	Oct 16, 2019		Soil	S19-Oc26985				X			X			
19	SO05	Oct 16, 2019		Soil	S19-Oc26986		X								
20	ASB01	Oct 16, 2019		Building Materials	S19-Oc26987	X									

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Sample Detail						Asbestos Absence /Presence	HOLD	Phenolics (total)	Metals M7	Metals M8	Eurofins | mgt Suite B15	Moisture Set	BTEXN and Volatile TRH	Eurofins | mgt Suite B7 (PAH trace level)	Eurofins | mgt Suite B7 (filtered metals/PAH trace level)
Melbourne Laboratory - NATA Site # 1254 & 14271							X	X	X	X	X	X	X	X	X
Sydney Laboratory - NATA Site # 18217						X									
Brisbane Laboratory - NATA Site # 20794															
Perth Laboratory - NATA Site # 23736															
21	ASB02	Oct 16, 2019		Building Materials	S19-Oc26988	X									
22	ASB03	Oct 16, 2019		Building Materials	S19-Oc26989	X									
23	ASB04	Oct 16, 2019		Building Materials	S19-Oc26990	X									
Test Counts						4	2	5	3	1	5	3	2	1	10

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
3. All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. Information identified on this report with blue colour, indicates data provided by customer, that may have an impact on the results.
9. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether the holding time is 7 days however for all other VOCs such as BTEX or C6-10 TRH then the holding time is 14 days.

****NOTE:** pH duplicates are reported as a range NOT as RPD

Units

mg/kg: milligrams per kilogram
mg/L: milligrams per litre
ug/L: micrograms per litre
ppm: Parts per million
ppb: Parts per billion
%: Percentage
org/100mL: Organisms per 100 millilitres
NTU: Nephelometric Turbidity Units
MPN/100mL: Most Probable Number of organisms per 100 millilitres

Terms

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
LCS	Laboratory Control Sample - reported as percent recovery.
CRM	Certified Reference Material - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
USEPA	United States Environmental Protection Agency
APHA	American Public Health Association
TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
QSM	US Department of Defense Quality Systems Manual Version 5.3
CP	Client Parent - QC was performed on samples pertaining to this report
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
TEQ	Toxic Equivalency Quotient

QC - Acceptance Criteria

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR : No Limit

Results between 10-20 times the LOR : RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

Surrogate Recoveries: Recoveries must lie between 20-130% Phenols & 50-150% PFASs

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.3 where no positive PFAS results have been reported have been reviewed and no data was affected.

WA DWER (n=10): PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. Organochlorine Pesticide analysis - where reporting LCS data, Toxaphene & Chlordane are not added to the LCS.
4. Organochlorine Pesticide analysis - where reporting Spike data, Toxaphene is not added to the Spike.
5. Total Recoverable Hydrocarbons - where reporting Spike & LCS data, a single spike of commercial Hydrocarbon products in the range of C12-C30 is added and it's Total Recovery is reported in the C10-C14 cell of the Report.
6. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling.Therefore laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
7. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of Recovery the term "INT" appears against that analyte.
8. Polychlorinated Biphenyls are spiked only using Aroclor 1260 in Matrix Spikes and LCS.
9. For Matrix Spikes and LCS results a dash " -" in the report means that the specific analyte was not added to the QC sample.
10. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
Naphthalene	mg/L	< 0.01			0.01	Pass	
TRH C6-C10	mg/L	< 0.02			0.02	Pass	
TRH >C10-C16	mg/L	< 0.05			0.05	Pass	
TRH >C16-C34	mg/L	< 0.1			0.1	Pass	
TRH >C34-C40	mg/L	< 0.1			0.1	Pass	
Method Blank							
Total Recoverable Hydrocarbons - 1999 NEPM Fractions							
TRH C6-C9	mg/L	< 0.02			0.02	Pass	
TRH C10-C14	mg/L	< 0.05			0.05	Pass	
TRH C15-C28	mg/L	< 0.1			0.1	Pass	
TRH C29-C36	mg/L	< 0.1			0.1	Pass	
Method Blank							
BTEX							
Benzene	mg/L	< 0.001			0.001	Pass	
Toluene	mg/L	< 0.001			0.001	Pass	
Ethylbenzene	mg/L	< 0.001			0.001	Pass	
m&p-Xylenes	mg/L	< 0.002			0.002	Pass	
o-Xylene	mg/L	< 0.001			0.001	Pass	
Xylenes - Total	mg/L	< 0.003			0.003	Pass	
Method Blank							
Organochlorine Pesticides							
Chlordanes - Total	mg/L	< 0.001			0.001	Pass	
4.4'-DDD	mg/L	< 0.0001			0.0001	Pass	
4.4'-DDE	mg/L	< 0.0001			0.0001	Pass	
4.4'-DDT	mg/L	< 0.0001			0.0001	Pass	
a-BHC	mg/L	< 0.0001			0.0001	Pass	
Aldrin	mg/L	< 0.0001			0.0001	Pass	
b-BHC	mg/L	< 0.0001			0.0001	Pass	
d-BHC	mg/L	< 0.0001			0.0001	Pass	
Dieldrin	mg/L	< 0.0001			0.0001	Pass	
Endosulfan I	mg/L	< 0.0001			0.0001	Pass	
Endosulfan II	mg/L	< 0.0001			0.0001	Pass	
Endosulfan sulphate	mg/L	< 0.0001			0.0001	Pass	
Endrin	mg/L	< 0.0001			0.0001	Pass	
Endrin aldehyde	mg/L	< 0.0001			0.0001	Pass	
Endrin ketone	mg/L	< 0.0001			0.0001	Pass	
g-BHC (Lindane)	mg/L	< 0.0001			0.0001	Pass	
Heptachlor	mg/L	< 0.0001			0.0001	Pass	
Heptachlor epoxide	mg/L	< 0.0001			0.0001	Pass	
Hexachlorobenzene	mg/L	< 0.0001			0.0001	Pass	
Methoxychlor	mg/L	< 0.0001			0.0001	Pass	
Toxaphene	mg/L	< 0.01			0.01	Pass	
Method Blank							
Organophosphorus Pesticides							
Azinphos-methyl	mg/L	< 0.002			0.002	Pass	
Bolstar	mg/L	< 0.002			0.002	Pass	
Chlorfenvinphos	mg/L	< 0.002			0.002	Pass	
Chlorpyrifos	mg/L	< 0.02			0.02	Pass	
Chlorpyrifos-methyl	mg/L	< 0.002			0.002	Pass	
Coumaphos	mg/L	< 0.02			0.02	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Demeton-S	mg/L	< 0.02			0.02	Pass	
Demeton-O	mg/L	< 0.002			0.002	Pass	
Diazinon	mg/L	< 0.002			0.002	Pass	
Dichlorvos	mg/L	< 0.002			0.002	Pass	
Dimethoate	mg/L	< 0.002			0.002	Pass	
Disulfoton	mg/L	< 0.002			0.002	Pass	
EPN	mg/L	< 0.002			0.002	Pass	
Ethion	mg/L	< 0.002			0.002	Pass	
Ethoprop	mg/L	< 0.002			0.002	Pass	
Ethyl parathion	mg/L	< 0.002			0.002	Pass	
Fenitrothion	mg/L	< 0.002			0.002	Pass	
Fensulfothion	mg/L	< 0.002			0.002	Pass	
Fenthion	mg/L	< 0.002			0.002	Pass	
Malathion	mg/L	< 0.002			0.002	Pass	
Merphos	mg/L	< 0.002			0.002	Pass	
Methyl parathion	mg/L	< 0.002			0.002	Pass	
Mevinphos	mg/L	< 0.002			0.002	Pass	
Monocrotophos	mg/L	< 0.002			0.002	Pass	
Naled	mg/L	< 0.002			0.002	Pass	
Omethoate	mg/L	< 0.002			0.002	Pass	
Phorate	mg/L	< 0.002			0.002	Pass	
Pirimiphos-methyl	mg/L	< 0.02			0.02	Pass	
Pyrazophos	mg/L	< 0.002			0.002	Pass	
Ronnel	mg/L	< 0.002			0.002	Pass	
Terbufos	mg/L	< 0.002			0.002	Pass	
Tetrachlorvinphos	mg/L	< 0.002			0.002	Pass	
Tokuthion	mg/L	< 0.002			0.002	Pass	
Trichloronate	mg/L	< 0.002			0.002	Pass	
Method Blank							
Polychlorinated Biphenyls							
Aroclor-1016	mg/L	< 0.001			0.001	Pass	
Aroclor-1221	mg/L	< 0.001			0.001	Pass	
Aroclor-1232	mg/L	< 0.001			0.001	Pass	
Aroclor-1242	mg/L	< 0.001			0.001	Pass	
Aroclor-1248	mg/L	< 0.001			0.001	Pass	
Aroclor-1254	mg/L	< 0.001			0.001	Pass	
Aroclor-1260	mg/L	< 0.001			0.001	Pass	
Total PCB*	mg/L	< 0.001			0.001	Pass	
Method Blank							
Polycyclic Aromatic Hydrocarbons (Trace level)							
Acenaphthene	mg/L	< 0.00001			0.00001	Pass	
Acenaphthylene	mg/L	< 0.00001			0.00001	Pass	
Anthracene	mg/L	< 0.00001			0.00001	Pass	
Benz(a)anthracene	mg/L	< 0.00001			0.00001	Pass	
Benzo(a)pyrene	mg/L	< 0.00001			0.00001	Pass	
Benzo(b&j)fluoranthene	mg/L	< 0.00001			0.00001	Pass	
Benzo(g.h.i)perylene	mg/L	< 0.00001			0.00001	Pass	
Benzo(k)fluoranthene	mg/L	< 0.00001			0.00001	Pass	
Chrysene	mg/L	< 0.00001			0.00001	Pass	
Dibenz(a.h)anthracene	mg/L	< 0.00001			0.00001	Pass	
Fluoranthene	mg/L	< 0.00001			0.00001	Pass	
Fluorene	mg/L	< 0.00001			0.00001	Pass	
Indeno(1.2.3-cd)pyrene	mg/L	< 0.00001			0.00001	Pass	
Naphthalene	mg/L	< 0.00001			0.00001	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Phenanthrene	mg/L	< 0.00001			0.00001	Pass	
Pyrene	mg/L	< 0.00001			0.00001	Pass	
Total PAH*	mg/L	< 0			0.00001	Pass	
Method Blank							
Phenolics (total)	mg/L	< 0.05			0.05	Pass	
Method Blank							
Heavy Metals							
Arsenic	mg/L	< 0.001			0.001	Pass	
Arsenic (filtered)	mg/L	< 0.001			0.001	Pass	
Cadmium	mg/L	< 0.0002			0.0002	Pass	
Cadmium (filtered)	mg/L	< 0.0002			0.0002	Pass	
Chromium	mg/L	< 0.001			0.001	Pass	
Chromium (filtered)	mg/L	< 0.001			0.001	Pass	
Copper	mg/L	< 0.001			0.001	Pass	
Copper (filtered)	mg/L	< 0.001			0.001	Pass	
Lead	mg/L	< 0.001			0.001	Pass	
Lead (filtered)	mg/L	< 0.001			0.001	Pass	
Mercury	mg/L	< 0.0001			0.0001	Pass	
Mercury (filtered)	mg/L	< 0.0001			0.0001	Pass	
Nickel	mg/L	< 0.001			0.001	Pass	
Nickel (filtered)	mg/L	< 0.001			0.001	Pass	
Zinc	mg/L	< 0.005			0.005	Pass	
Zinc (filtered)	mg/L	< 0.005			0.005	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
Naphthalene	%	85			70-130	Pass	
TRH C6-C10	%	98			70-130	Pass	
TRH >C10-C16	%	76			70-130	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 1999 NEPM Fractions							
TRH C6-C9	%	95			70-130	Pass	
TRH C10-C14	%	79			70-130	Pass	
LCS - % Recovery							
BTEX							
Benzene	%	92			70-130	Pass	
Toluene	%	89			70-130	Pass	
Ethylbenzene	%	82			70-130	Pass	
m&p-Xylenes	%	81			70-130	Pass	
Xylenes - Total	%	82			70-130	Pass	
LCS - % Recovery							
Organochlorine Pesticides							
Chlordanes - Total	%	114			70-130	Pass	
4.4'-DDD	%	104			70-130	Pass	
4.4'-DDE	%	105			70-130	Pass	
4.4'-DDT	%	97			70-130	Pass	
a-BHC	%	113			70-130	Pass	
Aldrin	%	94			70-130	Pass	
b-BHC	%	110			70-130	Pass	
d-BHC	%	112			70-130	Pass	
Dieldrin	%	90			70-130	Pass	
Endosulfan I	%	93			70-130	Pass	
Endosulfan II	%	104			70-130	Pass	
Endosulfan sulphate	%	94			70-130	Pass	
Endrin	%	94			70-130	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Endrin aldehyde	%	126			70-130	Pass	
Endrin ketone	%	104			70-130	Pass	
g-BHC (Lindane)	%	124			70-130	Pass	
Heptachlor	%	95			70-130	Pass	
Heptachlor epoxide	%	97			70-130	Pass	
Hexachlorobenzene	%	114			70-130	Pass	
Methoxychlor	%	86			70-130	Pass	
LCS - % Recovery							
Organophosphorus Pesticides							
Diazinon	%	115			70-130	Pass	
Dimethoate	%	80			70-130	Pass	
Ethion	%	110			70-130	Pass	
Fenitrothion	%	103			70-130	Pass	
Methyl parathion	%	102			70-130	Pass	
Mevinphos	%	98			70-130	Pass	
LCS - % Recovery							
Polychlorinated Biphenyls							
Aroclor-1260	%	120			70-130	Pass	
LCS - % Recovery							
Polycyclic Aromatic Hydrocarbons (Trace level)							
Acenaphthene	%	79			70-130	Pass	
Acenaphthylene	%	77			70-130	Pass	
Anthracene	%	72			70-130	Pass	
Benz(a)anthracene	%	99			70-130	Pass	
Benzo(a)pyrene	%	101			70-130	Pass	
Benzo(b&j)fluoranthene	%	77			70-130	Pass	
Benzo(g.h.i)perylene	%	78			70-130	Pass	
Benzo(k)fluoranthene	%	89			70-130	Pass	
Chrysene	%	82			70-130	Pass	
Dibenz(a.h)anthracene	%	93			70-130	Pass	
Fluoranthene	%	77			70-130	Pass	
Fluorene	%	83			70-130	Pass	
Indeno(1.2.3-cd)pyrene	%	72			70-130	Pass	
Naphthalene	%	86			70-130	Pass	
Phenanthrene	%	83			70-130	Pass	
Pyrene	%	82			70-130	Pass	
LCS - % Recovery							
Phenolics (total)	%	100			70-130	Pass	
LCS - % Recovery							
Heavy Metals							
Arsenic	%	95			80-120	Pass	
Cadmium	%	97			80-120	Pass	
Chromium	%	97			80-120	Pass	
Copper	%	96			80-120	Pass	
Lead	%	95			80-120	Pass	
Mercury	%	95			75-125	Pass	
Nickel	%	95			80-120	Pass	
Zinc	%	97			80-120	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1					
TRH >C10-C16	W19-Oc25712	NCP	%	90			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1					

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
TRH C10-C14	W19-Oc25712	NCP	%	95			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1					
Naphthalene	S19-Oc26969	CP	%	72			70-130	Pass	
TRH C6-C10	S19-Oc26969	CP	%	94			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1					
TRH C6-C9	S19-Oc26969	CP	%	95			70-130	Pass	
Spike - % Recovery									
BTEX				Result 1					
Benzene	S19-Oc26969	CP	%	98			70-130	Pass	
Toluene	S19-Oc26969	CP	%	97			70-130	Pass	
Ethylbenzene	S19-Oc26969	CP	%	94			70-130	Pass	
m&p-Xylenes	S19-Oc26969	CP	%	90			70-130	Pass	
o-Xylene	S19-Oc26969	CP	%	92			70-130	Pass	
Xylenes - Total	S19-Oc26969	CP	%	91			70-130	Pass	
Spike - % Recovery									
Polycyclic Aromatic Hydrocarbons (Trace level)				Result 1					
Acenaphthene	B19-Oc28739	NCP	%	85			70-130	Pass	
Acenaphthylene	B19-Oc28739	NCP	%	91			70-130	Pass	
Anthracene	B19-Oc28739	NCP	%	81			70-130	Pass	
Benz(a)anthracene	B19-Oc28739	NCP	%	77			70-130	Pass	
Benzo(a)pyrene	B19-Oc28739	NCP	%	84			70-130	Pass	
Benzo(b&j)fluoranthene	B19-Oc28739	NCP	%	76			70-130	Pass	
Benzo(g.h.i)perylene	B19-Oc28739	NCP	%	87			70-130	Pass	
Benzo(k)fluoranthene	B19-Oc28739	NCP	%	106			70-130	Pass	
Chrysene	B19-Oc28739	NCP	%	100			70-130	Pass	
Dibenz(a.h)anthracene	B19-Oc28739	NCP	%	73			70-130	Pass	
Fluoranthene	B19-Oc28739	NCP	%	92			70-130	Pass	
Fluorene	B19-Oc28739	NCP	%	98			70-130	Pass	
Indeno(1.2.3-cd)pyrene	B19-Oc28739	NCP	%	121			70-130	Pass	
Naphthalene	B19-Oc28739	NCP	%	73			70-130	Pass	
Phenanthrene	B19-Oc28739	NCP	%	84			70-130	Pass	
Pyrene	B19-Oc28739	NCP	%	87			70-130	Pass	
Spike - % Recovery									
Organochlorine Pesticides				Result 1					
4.4'-DDE	M19-Oc18417	NCP	%	90			70-130	Pass	
a-BHC	M19-Oc18417	NCP	%	111			70-130	Pass	
Aldrin	M19-Oc18417	NCP	%	75			70-130	Pass	
b-BHC	M19-Oc18417	NCP	%	94			70-130	Pass	
d-BHC	M19-Oc18417	NCP	%	99			70-130	Pass	
Dieldrin	M19-Oc18417	NCP	%	85			70-130	Pass	
Endosulfan I	M19-Oc18417	NCP	%	83			70-130	Pass	
Endosulfan II	M19-Oc18417	NCP	%	88			70-130	Pass	
Endrin	M19-Oc18417	NCP	%	87			70-130	Pass	
Endrin aldehyde	M19-Oc18417	NCP	%	82			70-130	Pass	
g-BHC (Lindane)	M19-Oc18417	NCP	%	122			70-130	Pass	
Heptachlor	M19-Oc18417	NCP	%	71			70-130	Pass	
Heptachlor epoxide	M19-Oc18417	NCP	%	74			70-130	Pass	
Hexachlorobenzene	M19-Oc18417	NCP	%	124			70-130	Pass	
Spike - % Recovery									
Organophosphorus Pesticides				Result 1					
Diazinon	B19-Oc28018	NCP	%	99			70-130	Pass	
Dimethoate	B19-Oc28018	NCP	%	75			70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Ethion	B19-Oc28018	NCP	%	90			70-130	Pass	
Fenitrothion	B19-Oc28018	NCP	%	108			70-130	Pass	
Methyl parathion	B19-Oc28018	NCP	%	91			70-130	Pass	
Mevinphos	B19-Oc28018	NCP	%	103			70-130	Pass	
Spike - % Recovery									
				Result 1					
Phenolics (total)	S19-Oc26973	CP	%	106			70-130	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Arsenic (filtered)	S19-Oc26975	CP	%	92			70-130	Pass	
Cadmium (filtered)	S19-Oc26975	CP	%	88			70-130	Pass	
Chromium (filtered)	S19-Oc26975	CP	%	93			70-130	Pass	
Copper (filtered)	S19-Oc26975	CP	%	90			70-130	Pass	
Lead (filtered)	S19-Oc26975	CP	%	88			70-130	Pass	
Mercury (filtered)	S19-Oc26975	CP	%	80			70-130	Pass	
Nickel (filtered)	S19-Oc26975	CP	%	88			70-130	Pass	
Zinc (filtered)	S19-Oc26975	CP	%	90			70-130	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1	Result 2	RPD			
Naphthalene	S19-Oc26968	CP	mg/L	< 0.01	< 0.01	<1	30%	Pass	
TRH C6-C10	S19-Oc26968	CP	mg/L	< 0.02	< 0.02	<1	30%	Pass	
TRH >C10-C16	S19-Oc28806	NCP	mg/L	< 0.05	< 0.05	<1	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1	Result 2	RPD			
TRH C6-C9	S19-Oc26968	CP	mg/L	< 0.02	< 0.02	<1	30%	Pass	
TRH C10-C14	S19-Oc28806	NCP	mg/L	< 0.05	< 0.05	<1	30%	Pass	
TRH C15-C28	S19-Oc28806	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
TRH C29-C36	S19-Oc28806	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
Duplicate									
BTEX				Result 1	Result 2	RPD			
Benzene	S19-Oc26968	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Toluene	S19-Oc26968	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Ethylbenzene	S19-Oc26968	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
m&p-Xylenes	S19-Oc26968	CP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
o-Xylene	S19-Oc26968	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Xylenes - Total	S19-Oc26968	CP	mg/L	< 0.003	< 0.003	<1	30%	Pass	
Duplicate									
Polycyclic Aromatic Hydrocarbons (Trace level)				Result 1	Result 2	RPD			
Acenaphthene	B19-Oc28738	NCP	mg/L	< 0.00001	< 0.00001	<1	30%	Pass	
Acenaphthylene	B19-Oc28738	NCP	mg/L	< 0.00001	< 0.00001	<1	30%	Pass	
Anthracene	B19-Oc28738	NCP	mg/L	< 0.00001	< 0.00001	<1	30%	Pass	
Benz(a)anthracene	B19-Oc28738	NCP	mg/L	< 0.00001	< 0.00001	<1	30%	Pass	
Benzo(a)pyrene	B19-Oc28738	NCP	mg/L	< 0.00001	< 0.00001	<1	30%	Pass	
Benzo(b&j)fluoranthene	B19-Oc28738	NCP	mg/L	< 0.00001	< 0.00001	<1	30%	Pass	
Benzo(g.h.i)perylene	B19-Oc28738	NCP	mg/L	< 0.00001	< 0.00001	<1	30%	Pass	
Benzo(k)fluoranthene	B19-Oc28738	NCP	mg/L	< 0.00001	< 0.00001	<1	30%	Pass	
Chrysene	B19-Oc28738	NCP	mg/L	< 0.00001	< 0.00001	<1	30%	Pass	
Dibenz(a.h)anthracene	B19-Oc28738	NCP	mg/L	< 0.00001	< 0.00001	<1	30%	Pass	
Fluoranthene	B19-Oc28738	NCP	mg/L	< 0.00001	< 0.00001	<1	30%	Pass	
Fluorene	B19-Oc28738	NCP	mg/L	< 0.00001	< 0.00001	<1	30%	Pass	
Indeno(1.2.3-cd)pyrene	B19-Oc28738	NCP	mg/L	< 0.00001	< 0.00001	<1	30%	Pass	
Naphthalene	B19-Oc28738	NCP	mg/L	< 0.00001	< 0.00001	<1	30%	Pass	
Phenanthrene	B19-Oc28738	NCP	mg/L	< 0.00001	< 0.00001	<1	30%	Pass	
Pyrene	B19-Oc28738	NCP	mg/L	< 0.00001	< 0.00001	<1	30%	Pass	

Duplicate									
Organochlorine Pesticides				Result 1	Result 2	RPD			
Chlordanes - Total	M19-Oc24938	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
4.4'-DDD	M19-Oc24938	NCP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	
4.4'-DDE	M19-Oc24938	NCP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	
4.4'-DDT	M19-Oc24938	NCP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	
a-BHC	M19-Oc24938	NCP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	
Aldrin	M19-Oc24938	NCP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	
b-BHC	M19-Oc24938	NCP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	
d-BHC	M19-Oc24938	NCP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	
Dieldrin	M19-Oc24938	NCP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	
Endosulfan I	M19-Oc24938	NCP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	
Endosulfan II	M19-Oc24938	NCP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	
Endosulfan sulphate	M19-Oc24938	NCP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	
Endrin	M19-Oc24938	NCP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	
Endrin aldehyde	M19-Oc24938	NCP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	
Endrin ketone	M19-Oc24938	NCP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	
g-BHC (Lindane)	M19-Oc24938	NCP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	
Heptachlor	M19-Oc24938	NCP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	
Heptachlor epoxide	M19-Oc24938	NCP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	
Hexachlorobenzene	M19-Oc24938	NCP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	
Methoxychlor	M19-Oc24938	NCP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	
Duplicate									
Organophosphorus Pesticides				Result 1	Result 2	RPD			
Azinphos-methyl	M19-Oc24938	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
Bolstar	M19-Oc24938	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
Chlorfenvinphos	M19-Oc24938	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
Chlorpyrifos	M19-Oc24938	NCP	mg/L	< 0.02	< 0.02	<1	30%	Pass	
Chlorpyrifos-methyl	M19-Oc24938	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
Coumaphos	M19-Oc24938	NCP	mg/L	< 0.02	< 0.02	<1	30%	Pass	
Demeton-S	M19-Oc24938	NCP	mg/L	< 0.02	< 0.02	<1	30%	Pass	
Demeton-O	M19-Oc24938	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
Diazinon	M19-Oc24938	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
Dichlorvos	M19-Oc24938	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
Dimethoate	M19-Oc24938	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
Disulfoton	M19-Oc24938	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
EPN	M19-Oc24938	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
Ethion	M19-Oc24938	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
Ethoprop	M19-Oc24938	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
Ethyl parathion	M19-Oc24938	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
Fenitrothion	M19-Oc24938	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
Fensulfothion	M19-Oc24938	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
Fenthion	M19-Oc24938	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
Malathion	M19-Oc24938	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
Merphos	M19-Oc24938	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
Methyl parathion	M19-Oc24938	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
Mevinphos	M19-Oc24938	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
Monocrotophos	M19-Oc24938	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
Naled	M19-Oc24938	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
Omethoate	M19-Oc24938	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
Phorate	M19-Oc24938	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
Pirimiphos-methyl	M19-Oc24938	NCP	mg/L	< 0.02	< 0.02	<1	30%	Pass	
Pyrazophos	M19-Oc24938	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
Ronnel	M19-Oc24938	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
Terbufos	M19-Oc24938	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
Tetrachlorvinphos	M19-Oc24938	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	

Duplicate									
Organophosphorus Pesticides				Result 1	Result 2	RPD			
Tokuthion	M19-Oc24938	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
Trichloronate	M19-Oc24938	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
Duplicate									
Polychlorinated Biphenyls				Result 1	Result 2	RPD			
Aroclor-1016	M19-Oc24938	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Aroclor-1221	M19-Oc24938	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Aroclor-1232	M19-Oc24938	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Aroclor-1242	M19-Oc24938	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Aroclor-1248	M19-Oc24938	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Aroclor-1254	M19-Oc24938	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Aroclor-1260	M19-Oc24938	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Total PCB*	M19-Oc24938	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
Phenolics (total)	S19-Oc26973	CP	mg/L	< 0.05	< 0.05	<1	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Arsenic (filtered)	S19-Oc26975	CP	mg/L	0.002	0.002	1.0	30%	Pass	
Cadmium (filtered)	S19-Oc26975	CP	mg/L	< 0.0002	< 0.0002	<1	30%	Pass	
Chromium (filtered)	S19-Oc26975	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Copper (filtered)	S19-Oc26975	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Lead (filtered)	S19-Oc26975	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Mercury (filtered)	S19-Oc26975	CP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	
Nickel (filtered)	S19-Oc26975	CP	mg/L	0.002	0.002	4.0	30%	Pass	
Zinc (filtered)	S19-Oc26975	CP	mg/L	< 0.005	< 0.005	<1	30%	Pass	

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Qualifier Codes/Comments

Code	Description
N01	F2 is determined by arithmetically subtracting the "naphthalene" value from the ">C10-C16" value. The naphthalene value used in this calculation is obtained from volatiles (Purge & Trap analysis).
N02	Where we have reported both volatile (P&T GCMS) and semivolatile (GCMS) naphthalene data, results may not be identical. Provided correct sample handling protocols have been followed, any observed differences in results are likely to be due to procedural differences within each methodology. Results determined by both techniques have passed all QAQC acceptance criteria, and are entirely technically valid.
N04	F1 is determined by arithmetically subtracting the "Total BTEX" value from the "C6-C10" value. The "Total BTEX" value is obtained by summing the concentrations of BTEX analytes. The "C6-C10" value is obtained by quantitating against a standard of mixed aromatic/aliphatic analytes.
R20	This sample is a Trip Spike and therefore all results are reported as a percentage

Authorised By

Ursula Long	Analytical Services Manager
Emily Rosenberg	Senior Analyst-Metal (VIC)
Harry Bacalis	Senior Analyst-Volatile (VIC)
Joseph Edouard	Senior Analyst-Organic (VIC)
Julie Kay	Senior Analyst-Inorganic (VIC)



Glenn Jackson
General Manager

Final report - this Report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please click here.

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Arcadis Australia
Lvl 16/580 George Street
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NSW 2000

NATA Accredited
Accreditation Number 1261
Site Number 18217

Accredited for compliance with ISO/IEC 17025 – Testing
The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

Attention: **Jack Palma**

Report **684323-W**
Project name MIRVAC - KEMPS CREEK
Project ID 10035157
Received Date Oct 24, 2019

Client Sample ID			**MW03**
Sample Matrix			**Water**
Eurofins Sample No.			**S19-Oc37310**
Date Sampled			**Oct 23, 2019**
Test/Reference	LOR	Unit	
Total Recoverable Hydrocarbons - 1999 NEPM Fractions			
TRH C6-C9	0.02	mg/L	< 0.02
TRH C10-C14	0.05	mg/L	< 0.05
TRH C15-C28	0.1	mg/L	< 0.1
TRH C29-C36	0.1	mg/L	< 0.1
TRH C10-C36 (Total)	0.1	mg/L	< 0.1
BTEX			
Benzene	0.001	mg/L	< 0.001
Toluene	0.001	mg/L	< 0.001
Ethylbenzene	0.001	mg/L	< 0.001
m&p-Xylenes	0.002	mg/L	< 0.002
o-Xylene	0.001	mg/L	< 0.001
Xylenes - Total	0.003	mg/L	< 0.003
4-Bromofluorobenzene (surr.)	1	%	83
Total Recoverable Hydrocarbons - 2013 NEPM Fractions			
Naphthalene[N02]	0.01	mg/L	< 0.01
TRH C6-C10	0.02	mg/L	< 0.02
TRH C6-C10 less BTEX (F1)[N04]	0.02	mg/L	< 0.02
TRH >C10-C16	0.05	mg/L	0.07
TRH >C10-C16 less Naphthalene (F2)[N01]	0.05	mg/L	0.07
TRH >C16-C34	0.1	mg/L	< 0.1
TRH >C34-C40	0.1	mg/L	< 0.1
TRH >C10-C40 (total)*	0.1	mg/L	< 0.1
Organochlorine Pesticides			
Chlordanes - Total	0.001	mg/L	< 0.001
4.4'-DDD	0.0001	mg/L	< 0.0001
4.4'-DDE	0.0001	mg/L	< 0.0001
4.4'-DDT	0.0001	mg/L	< 0.0001
a-BHC	0.0001	mg/L	< 0.0001
Aldrin	0.0001	mg/L	< 0.0001
b-BHC	0.0001	mg/L	< 0.0001
d-BHC	0.0001	mg/L	< 0.0001
Dieldrin	0.0001	mg/L	< 0.0001
Endosulfan I	0.0001	mg/L	< 0.0001
Endosulfan II	0.0001	mg/L	< 0.0001
Endosulfan sulphate	0.0001	mg/L	< 0.0001

Client Sample ID			MW03
Sample Matrix			Water
Eurofins Sample No.			S19-Oc37310
Date Sampled			Oct 23, 2019
Test/Reference	LOR	Unit	
Organochlorine Pesticides			
Endrin	0.0001	mg/L	< 0.0001
Endrin aldehyde	0.0001	mg/L	< 0.0001
Endrin ketone	0.0001	mg/L	< 0.0001
g-BHC (Lindane)	0.0001	mg/L	< 0.0001
Heptachlor	0.0001	mg/L	< 0.0001
Heptachlor epoxide	0.0001	mg/L	< 0.0001
Hexachlorobenzene	0.0001	mg/L	< 0.0001
Methoxychlor	0.0001	mg/L	< 0.0001
Toxaphene	0.01	mg/L	< 0.01
Aldrin and Dieldrin (Total)*	0.0001	mg/L	< 0.0001
DDT + DDE + DDD (Total)*	0.0001	mg/L	< 0.0001
Vic EPA IWRG 621 OCP (Total)*	0.001	mg/L	< 0.001
Vic EPA IWRG 621 Other OCP (Total)*	0.001	mg/L	< 0.001
Dibutylchlorendate (surr.)	1	%	140
Tetrachloro-m-xylene (surr.)	1	%	135
Organophosphorus Pesticides			
Azinphos-methyl	0.002	mg/L	< 0.002
Bolstar	0.002	mg/L	< 0.002
Chlorfenvinphos	0.002	mg/L	< 0.002
Chlorpyrifos	0.02	mg/L	< 0.02
Chlorpyrifos-methyl	0.002	mg/L	< 0.002
Coumaphos	0.02	mg/L	< 0.02
Demeton-S	0.02	mg/L	< 0.02
Demeton-O	0.002	mg/L	< 0.002
Diazinon	0.002	mg/L	< 0.002
Dichlorvos	0.002	mg/L	< 0.002
Dimethoate	0.002	mg/L	< 0.002
Disulfoton	0.002	mg/L	< 0.002
EPN	0.002	mg/L	< 0.002
Ethion	0.002	mg/L	< 0.002
Ethoprop	0.002	mg/L	< 0.002
Ethyl parathion	0.002	mg/L	< 0.002
Fenitrothion	0.002	mg/L	< 0.002
Fensulfothion	0.002	mg/L	< 0.002
Fenthion	0.002	mg/L	< 0.002
Malathion	0.002	mg/L	< 0.002
Merphos	0.002	mg/L	< 0.002
Methyl parathion	0.002	mg/L	< 0.002
Mevinphos	0.002	mg/L	< 0.002
Monocrotophos	0.002	mg/L	< 0.002
Naled	0.002	mg/L	< 0.002
Omethoate	0.002	mg/L	< 0.002
Phorate	0.002	mg/L	< 0.002
Pirimiphos-methyl	0.02	mg/L	< 0.02
Pyrazophos	0.002	mg/L	< 0.002
Ronnel	0.002	mg/L	< 0.002
Terbufos	0.002	mg/L	< 0.002
Tetrachlorvinphos	0.002	mg/L	< 0.002
Tokuthion	0.002	mg/L	< 0.002

Client Sample ID			MW03
Sample Matrix			Water
Eurofins Sample No.			S19-Oc37310
Date Sampled			Oct 23, 2019
Test/Reference	LOR	Unit	
Organophosphorus Pesticides			
Trichloronate	0.002	mg/L	< 0.002
Triphenylphosphate (surr.)	1	%	20
Polychlorinated Biphenyls			
Aroclor-1016	0.005	mg/L	< 0.005
Aroclor-1221	0.001	mg/L	< 0.001
Aroclor-1232	0.005	mg/L	< 0.005
Aroclor-1242	0.005	mg/L	< 0.005
Aroclor-1248	0.005	mg/L	< 0.005
Aroclor-1254	0.005	mg/L	< 0.005
Aroclor-1260	0.005	mg/L	< 0.005
Total PCB*	0.001	mg/L	< 0.001
Dibutylchlorendate (surr.)	1	%	140
Tetrachloro-m-xylene (surr.)	1	%	135
Polycyclic Aromatic Hydrocarbons (Trace level)			
Acenaphthene	0.00001	mg/L	< 0.00001
Acenaphthylene	0.00001	mg/L	< 0.00001
Anthracene	0.00001	mg/L	< 0.00001
Benz(a)anthracene	0.00001	mg/L	< 0.00001
Benzo(a)pyrene	0.00001	mg/L	< 0.00001
Benzo(b&j)fluoranthene	0.00001	mg/L	< 0.00001
Benzo(g.h.i)perylene	0.00001	mg/L	< 0.00001
Benzo(k)fluoranthene	0.00001	mg/L	< 0.00001
Chrysene	0.00001	mg/L	< 0.00001
Dibenz(a.h)anthracene	0.00001	mg/L	< 0.00001
Fluoranthene	0.00001	mg/L	< 0.00001
Fluorene	0.00001	mg/L	< 0.00001
Indeno(1.2.3-cd)pyrene	0.00001	mg/L	< 0.00001
Naphthalene	0.00001	mg/L	< 0.00001
Phenanthrene	0.00001	mg/L	< 0.00001
Pyrene	0.00001	mg/L	< 0.00001
Total PAH*	0.00001	mg/L	< 0.00001
2-Fluorobiphenyl (surr.)	1	%	71
p-Terphenyl-d14 (surr.)	1	%	66
Heavy Metals			
Arsenic (filtered)	0.001	mg/L	< 0.001
Cadmium (filtered)	0.0002	mg/L	0.0003
Chromium (filtered)	0.001	mg/L	< 0.001
Copper (filtered)	0.001	mg/L	0.002
Lead (filtered)	0.001	mg/L	< 0.001
Mercury (filtered)	0.0001	mg/L	< 0.0001
Nickel (filtered)	0.001	mg/L	0.004
Zinc (filtered)	0.005	mg/L	0.012

Sample History

Where samples are submitted/analysed over several days, the last date of extraction and analysis is reported.
A recent review of our LIMS has resulted in the correction or clarification of some method identifications. Due to this, some of the method reference information on reports has changed. However, no substantive change has been made to our laboratory methods, and as such there is no change in the validity of current or previous results.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Total Recoverable Hydrocarbons - 1999 NEPM Fractions	Sydney	Oct 24, 2019	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
BTEX	Sydney	Oct 24, 2019	14 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Sydney	Oct 24, 2019	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Sydney	Oct 24, 2019	
- Method: LTM-ORG-2010 TRH C6-C40			
Polycyclic Aromatic Hydrocarbons (Trace level)	Melbourne	Oct 25, 2019	7 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water (trace)			
Metals M8 filtered	Sydney	Oct 24, 2019	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Organochlorine Pesticides	Sydney	Oct 24, 2019	7 Days
- Method: LTM-ORG-2220 OCP & PCB in Soil and Water			
Organophosphorus Pesticides	Sydney	Oct 24, 2019	7 Days
- Method: LTM-ORG-2200 Organophosphorus Pesticides by GC-MS			
Polychlorinated Biphenyls	Sydney	Oct 24, 2019	7 Days
- Method: LTM-ORG-2220 OCP & PCB in Soil and Water			

eurofins | Environment Testing

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Site # 23736

Company Name:	Arcadis Australia	**Order No.:**		**Received:**	Oct 24, 2019 9:26 AM
Address:	Lvl 16/580 George Street Sydney NSW 2000	**Report #:**	684323	**Due:**	Oct 25, 2019
		Phone:	02 8907 9000	**Priority:**	1 Day
		Fax:		**Contact Name:**	Jack Palma
Project Name:	MIRVAC - KEMPS CREEK				
Project ID:	10035157				

Eurofins Analytical Services Manager : Ursula Long

Sample Detail						Eurofins | mgt Suite B15	Eurofins | mgt Suite B7 (filtered metals/PAH trace level)
Melbourne Laboratory - NATA Site # 1254 & 14271							X
Sydney Laboratory - NATA Site # 18217						X	X
Brisbane Laboratory - NATA Site # 20794							
Perth Laboratory - NATA Site # 23736							
External Laboratory							
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**		
1	MW03	Oct 23, 2019		Water	S19-Oc37310	X	X
Test Counts						1	1

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
3. All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. Information identified on this report with blue colour, indicates data provided by customer, that may have an impact on the results.
9. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether the holding time is 7 days however for all other VOCs such as BTEX or C6-10 TRH then the holding time is 14 days.

****NOTE:** pH duplicates are reported as a range NOT as RPD

Units

mg/kg: milligrams per kilogram

mg/L: milligrams per litre

ug/L: micrograms per litre

ppm: Parts per million

ppb: Parts per billion

%: Percentage

org/100mL: Organisms per 100 millilitres

NTU: Nephelometric Turbidity Units

MPN/100mL: Most Probable Number of organisms per 100 millilitres

Terms

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
LCS	Laboratory Control Sample - reported as percent recovery.
CRM	Certified Reference Material - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
USEPA	United States Environmental Protection Agency
APHA	American Public Health Association
TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
QSM	US Department of Defense Quality Systems Manual Version 5.3
CP	Client Parent - QC was performed on samples pertaining to this report
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
TEQ	Toxic Equivalency Quotient

QC - Acceptance Criteria

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR : No Limit

Results between 10-20 times the LOR : RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

Surrogate Recoveries: Recoveries must lie between 20-130% Phenols & 50-150% PFASs

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.3 where no positive PFAS results have been reported have been reviewed and no data was affected.

WA DWER (n=10): PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. Organochlorine Pesticide analysis - where reporting LCS data, Toxaphene & Chlordane are not added to the LCS.
4. Organochlorine Pesticide analysis - where reporting Spike data, Toxaphene is not added to the Spike.
5. Total Recoverable Hydrocarbons - where reporting Spike & LCS data, a single spike of commercial Hydrocarbon products in the range of C12-C30 is added and it's Total Recovery is reported in the C10-C14 cell of the Report.
6. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling.Therefore laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
7. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of Recovery the term "INT" appears against that analyte.
8. Polychlorinated Biphenyls are spiked only using Aroclor 1260 in Matrix Spikes and LCS.
9. For Matrix Spikes and LCS results a dash " -" in the report means that the specific analyte was not added to the QC sample.
10. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Total Recoverable Hydrocarbons - 1999 NEPM Fractions							
TRH C6-C9	mg/L	< 0.02			0.02	Pass	
TRH C10-C14	mg/L	< 0.05			0.05	Pass	
TRH C15-C28	mg/L	< 0.1			0.1	Pass	
TRH C29-C36	mg/L	< 0.1			0.1	Pass	
Method Blank							
BTEX							
Benzene	mg/L	< 0.001			0.001	Pass	
Toluene	mg/L	< 0.001			0.001	Pass	
Ethylbenzene	mg/L	< 0.001			0.001	Pass	
m&p-Xylenes	mg/L	< 0.002			0.002	Pass	
o-Xylene	mg/L	< 0.001			0.001	Pass	
Xylenes - Total	mg/L	< 0.003			0.003	Pass	
Method Blank							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
Naphthalene	mg/L	< 0.01			0.01	Pass	
TRH C6-C10	mg/L	< 0.02			0.02	Pass	
TRH >C10-C16	mg/L	< 0.05			0.05	Pass	
TRH >C16-C34	mg/L	< 0.1			0.1	Pass	
TRH >C34-C40	mg/L	< 0.1			0.1	Pass	
Method Blank							
Organochlorine Pesticides							
Chlordanes - Total	mg/L	< 0.001			0.001	Pass	
4.4'-DDD	mg/L	< 0.0001			0.0001	Pass	
4.4'-DDE	mg/L	< 0.0001			0.0001	Pass	
4.4'-DDT	mg/L	< 0.0001			0.0001	Pass	
a-BHC	mg/L	< 0.0001			0.0001	Pass	
Aldrin	mg/L	< 0.0001			0.0001	Pass	
b-BHC	mg/L	< 0.0001			0.0001	Pass	
d-BHC	mg/L	< 0.0001			0.0001	Pass	
Dieldrin	mg/L	< 0.0001			0.0001	Pass	
Endosulfan I	mg/L	< 0.0001			0.0001	Pass	
Endosulfan II	mg/L	< 0.0001			0.0001	Pass	
Endosulfan sulphate	mg/L	< 0.0001			0.0001	Pass	
Endrin	mg/L	< 0.0001			0.0001	Pass	
Endrin aldehyde	mg/L	< 0.0001			0.0001	Pass	
Endrin ketone	mg/L	< 0.0001			0.0001	Pass	
g-BHC (Lindane)	mg/L	< 0.0001			0.0001	Pass	
Heptachlor	mg/L	< 0.0001			0.0001	Pass	
Heptachlor epoxide	mg/L	< 0.0001			0.0001	Pass	
Hexachlorobenzene	mg/L	< 0.0001			0.0001	Pass	
Methoxychlor	mg/L	< 0.0001			0.0001	Pass	
Toxaphene	mg/L	< 0.01			0.01	Pass	
Method Blank							
Organophosphorus Pesticides							
Azinphos-methyl	mg/L	< 0.002			0.002	Pass	
Bolstar	mg/L	< 0.002			0.002	Pass	
Chlorfenvinphos	mg/L	< 0.002			0.002	Pass	
Chlorpyrifos	mg/L	< 0.02			0.02	Pass	
Chlorpyrifos-methyl	mg/L	< 0.002			0.002	Pass	
Coumaphos	mg/L	< 0.02			0.02	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Demeton-S	mg/L	< 0.02			0.02	Pass	
Demeton-O	mg/L	< 0.002			0.002	Pass	
Diazinon	mg/L	< 0.002			0.002	Pass	
Dichlorvos	mg/L	< 0.002			0.002	Pass	
Dimethoate	mg/L	< 0.002			0.002	Pass	
Disulfoton	mg/L	< 0.002			0.002	Pass	
EPN	mg/L	< 0.002			0.002	Pass	
Ethion	mg/L	< 0.002			0.002	Pass	
Ethoprop	mg/L	< 0.002			0.002	Pass	
Ethyl parathion	mg/L	< 0.002			0.002	Pass	
Fenitrothion	mg/L	< 0.002			0.002	Pass	
Fensulfothion	mg/L	< 0.002			0.002	Pass	
Fenthion	mg/L	< 0.002			0.002	Pass	
Malathion	mg/L	< 0.002			0.002	Pass	
Merphos	mg/L	< 0.002			0.002	Pass	
Methyl parathion	mg/L	< 0.002			0.002	Pass	
Mevinphos	mg/L	< 0.002			0.002	Pass	
Monocrotophos	mg/L	< 0.002			0.002	Pass	
Naled	mg/L	< 0.002			0.002	Pass	
Omethoate	mg/L	< 0.002			0.002	Pass	
Phorate	mg/L	< 0.002			0.002	Pass	
Pirimiphos-methyl	mg/L	< 0.02			0.02	Pass	
Pyrazophos	mg/L	< 0.002			0.002	Pass	
Ronnel	mg/L	< 0.002			0.002	Pass	
Terbufos	mg/L	< 0.002			0.002	Pass	
Tetrachlorvinphos	mg/L	< 0.002			0.002	Pass	
Tokuthion	mg/L	< 0.002			0.002	Pass	
Trichloronate	mg/L	< 0.002			0.002	Pass	
Method Blank							
Polychlorinated Biphenyls							
Aroclor-1016	mg/L	< 0.005			0.005	Pass	
Aroclor-1221	mg/L	< 0.001			0.001	Pass	
Aroclor-1232	mg/L	< 0.005			0.005	Pass	
Aroclor-1242	mg/L	< 0.005			0.005	Pass	
Aroclor-1248	mg/L	< 0.005			0.005	Pass	
Aroclor-1254	mg/L	< 0.005			0.005	Pass	
Aroclor-1260	mg/L	< 0.005			0.005	Pass	
Total PCB*	mg/L	< 0.001			0.001	Pass	
Method Blank							
Polycyclic Aromatic Hydrocarbons (Trace level)							
Total PAH*	mg/L	< 0			0.00001	Pass	
Method Blank							
Heavy Metals							
Arsenic (filtered)	mg/L	< 0.001			0.001	Pass	
Cadmium (filtered)	mg/L	< 0.0002			0.0002	Pass	
Chromium (filtered)	mg/L	< 0.001			0.001	Pass	
Copper (filtered)	mg/L	< 0.001			0.001	Pass	
Lead (filtered)	mg/L	< 0.001			0.001	Pass	
Mercury (filtered)	mg/L	< 0.0001			0.0001	Pass	
Nickel (filtered)	mg/L	< 0.001			0.001	Pass	
Zinc (filtered)	mg/L	< 0.005			0.005	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 1999 NEPM Fractions							
TRH C6-C9	%	100			70-130	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
TRH C10-C14	%	78			70-130	Pass	
LCS - % Recovery							
BTEX							
Benzene	%	95			70-130	Pass	
Toluene	%	92			70-130	Pass	
Ethylbenzene	%	90			70-130	Pass	
m&p-Xylenes	%	89			70-130	Pass	
o-Xylene	%	93			70-130	Pass	
Xylenes - Total	%	90			70-130	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
Naphthalene	%	86			70-130	Pass	
TRH C6-C10	%	102			70-130	Pass	
TRH >C10-C16	%	84			70-130	Pass	
LCS - % Recovery							
Organochlorine Pesticides							
Chlordanes - Total	%	99			70-130	Pass	
4.4'-DDD	%	103			70-130	Pass	
4.4'-DDE	%	104			70-130	Pass	
4.4'-DDT	%	92			70-130	Pass	
a-BHC	%	88			70-130	Pass	
Aldrin	%	97			70-130	Pass	
b-BHC	%	101			70-130	Pass	
d-BHC	%	93			70-130	Pass	
Dieldrin	%	103			70-130	Pass	
Endosulfan I	%	105			70-130	Pass	
Endosulfan II	%	102			70-130	Pass	
Endosulfan sulphate	%	95			70-130	Pass	
Endrin	%	106			70-130	Pass	
Endrin aldehyde	%	91			70-130	Pass	
Endrin ketone	%	101			70-130	Pass	
g-BHC (Lindane)	%	94			70-130	Pass	
Heptachlor	%	91			70-130	Pass	
Heptachlor epoxide	%	104			70-130	Pass	
Hexachlorobenzene	%	83			70-130	Pass	
Methoxychlor	%	95			70-130	Pass	
Toxaphene	%	101			70-130	Pass	
LCS - % Recovery							
Organophosphorus Pesticides							
Diazinon	%	90			70-130	Pass	
Dimethoate	%	87			70-130	Pass	
Ethion	%	115			70-130	Pass	
Fenitrothion	%	90			70-130	Pass	
Methyl parathion	%	90			70-130	Pass	
Mevinphos	%	116			70-130	Pass	
LCS - % Recovery							
Polychlorinated Biphenyls							
Aroclor-1260	%	86			70-130	Pass	
LCS - % Recovery							
Heavy Metals							
Arsenic (filtered)	%	100			70-130	Pass	
Cadmium (filtered)	%	100			70-130	Pass	
Chromium (filtered)	%	101			70-130	Pass	
Copper (filtered)	%	100			70-130	Pass	

Test			Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Lead (filtered)			%	100			70-130	Pass	
Mercury (filtered)			%	93			70-130	Pass	
Nickel (filtered)			%	100			70-130	Pass	
Zinc (filtered)			%	97			70-130	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Spike - % Recovery									
Heavy Metals				Result 1					
Arsenic (filtered)	S19-Oc38762	NCP	%	116			70-130	Pass	
Cadmium (filtered)	S19-Oc38762	NCP	%	97			70-130	Pass	
Chromium (filtered)	S19-Oc38762	NCP	%	95			70-130	Pass	
Copper (filtered)	S19-Oc38762	NCP	%	86			70-130	Pass	
Lead (filtered)	S19-Oc38762	NCP	%	92			70-130	Pass	
Mercury (filtered)	S19-Oc38762	NCP	%	100			70-130	Pass	
Nickel (filtered)	S19-Oc38762	NCP	%	83			70-130	Pass	
Zinc (filtered)	S19-Oc38762	NCP	%	84			70-130	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Arsenic (filtered)	S19-Oc37310	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Cadmium (filtered)	S19-Oc37310	CP	mg/L	0.0003	0.0003	13	30%	Pass	
Chromium (filtered)	S19-Oc37310	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Copper (filtered)	S19-Oc37310	CP	mg/L	0.002	0.002	11	30%	Pass	
Lead (filtered)	S19-Oc37310	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Mercury (filtered)	S19-Oc37310	CP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	
Nickel (filtered)	S19-Oc37310	CP	mg/L	0.004	0.004	3.0	30%	Pass	
Zinc (filtered)	S19-Oc37310	CP	mg/L	0.012	0.011	13	30%	Pass	

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Qualifier Codes/Comments

Code	Description
N01	F2 is determined by arithmetically subtracting the "naphthalene" value from the ">C10-C16" value. The naphthalene value used in this calculation is obtained from volatiles (Purge & Trap analysis).
N02	Where we have reported both volatile (P&T GCMS) and semivolatile (GCMS) naphthalene data, results may not be identical. Provided correct sample handling protocols have been followed, any observed differences in results are likely to be due to procedural differences within each methodology. Results determined by both techniques have passed all QAQC acceptance criteria, and are entirely technically valid.
N04	F1 is determined by arithmetically subtracting the "Total BTEX" value from the "C6-C10" value. The "Total BTEX" value is obtained by summing the concentrations of BTEX analytes. The "C6-C10" value is obtained by quantitating against a standard of mixed aromatic/aliphatic analytes.

Authorised By

Ursula Long	Analytical Services Manager
Andrew Sullivan	Senior Analyst-Organic (NSW)
Gabriele Cordero	Senior Analyst-Metal (NSW)
Joseph Edouard	Senior Analyst-Organic (VIC)



Glenn Jackson

General Manager

Final report - this Report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please click here.

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ARCADIS Design & Consultancy for natural and built assets

Attachment B

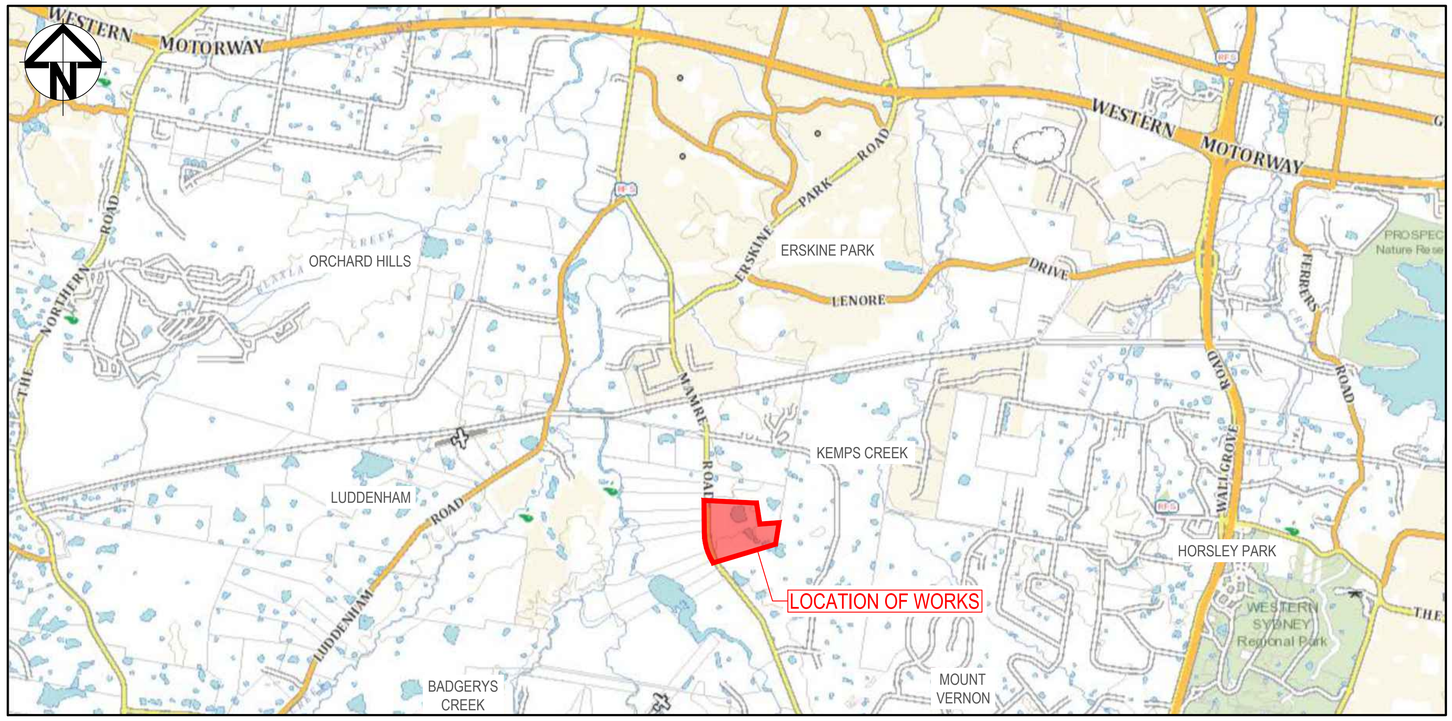
Aspect Industrial Estate Stage 1 Civil Works Package (Mod 3) Application

ASPECT INDUSTRIAL ESTATE

STAGE 1 CIVIL WORKS PACKAGE

STATE SIGNIFICANT DEVELOPMENT

MOD 3 APPLICATION



LOCALITY PLAN

NOT TO SCALE

Issue	Description	Date
J	ISSUED FOR DEVELOPMENT APPLICATION	14-04-22
H	ISSUED FOR DEVELOPMENT APPLICATION	18-03-22
G	ISSUED FOR DEVELOPMENT APPLICATION	04-03-22
F	ISSUED FOR DEVELOPMENT APPLICATION	24-02-22
E	ISSUED FOR DEVELOPMENT APPLICATION	03-02-22
D	ISSUED FOR DEVELOPMENT APPLICATION	08-10-21
C	ISSUED FOR DEVELOPMENT APPLICATION	15-10-20
B	ISSUED FOR DEVELOPMENT APPLICATION	12-10-20
A	ISSUED FOR DEVELOPMENT APPLICATION	15-05-20

100mm on Original

Bar Scales

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Client

mirvac

Scales

Grid MGA

Height Datum AHD

GDA2020

Drawn	KR
Designed	KR
Checked	AT
Approved	AM

Project

ASPECT INDUSTIAL ESTATE
MAMRE ROAD,
KEMPS CREEK
STAGE 1

Title

COVER SHEET AND
LOCALITY PLAN

Civil Engineers and Project Managers

at&l

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Status

FOR APPROVAL
NOT TO BE USED FOR CONSTRUCTION

A1

Project - Drawing No.

18-596-C1000

Issue

J

F:\18-596 Mamre Road\6.0 Drgs\Civil\Final\SSD\1000_STAGE 1 SSD_MOD 2\18-596-C1000.dwg

DRAWING LIST

DRAWING No.	DRAWING TITLE
18-596-C1000	COVER SHEET AND LOCALITY PLAN
18-596-C1001	DRAWING LIST
18-596-C1002	NOTES AND LEGENDS SHEET
18-596-C1003	GENERAL ARRANGEMENT PLAN
18-596-C1005	TYPICAL ROAD SECTIONS SHEET 1
18-596-C1006	TYPICAL ROAD SECTIONS SHEET 2
18-596-C1007	TYPICAL ROAD SECTIONS SHEET 3
18-596-C1010	TYPICAL SECTIONS SHEET 1
18-596-C1011	TYPICAL SECTIONS SHEET 2
18-596-C1012	TYPICAL SECTIONS SHEET 3
18-596-C1013	TYPICAL SECTIONS SHEET 4
18-596-C1020	BULK EARTHWORKS CONTOUR PLAN
18-596-C1021	BULK EARTHWORKS SECTIONS SHEET 1
18-596-C1022	BULK EARTHWORKS SECTIONS SHEET 2
18-596-C1025	BULK EARTHWORKS CUT/FILL PLAN
18-596-C1030	BULK EARTHWORKS PLAN SHEET 1
18-596-C1031	BULK EARTHWORKS PLAN SHEET 2
18-596-C1032	BULK EARTHWORKS PLAN SHEET 3
18-596-C1033	BULK EARTHWORKS PLAN SHEET 4
18-596-C1034	BULK EARTHWORKS PLAN SHEET 5
18-596-C1035	BULK EARTHWORKS PLAN SHEET 6
18-596-C1036	BULK EARTHWORKS PLAN SHEET 7
18-596-C1037	BULK EARTHWORKS PLAN SHEET 8
18-596-C1038	BULK EARTHWORKS PLAN SHEET 9
18-596-C1039	BULK EARTHWORKS PLAN SHEET 10
18-596-C1040	STORMWATER DRAINAGE OVERALL PLAN
18-596-C1045	STORMWATER DRAINAGE CATCHMENT PLAN (PRE-DEVELOPED)
18-596-C1046	STORMWATER DRAINAGE CATCHMENT PLAN (POST-DEVELOPED)
18-596-C1050	ROADWORKS AND STORMWATER DRAINAGE SHEET 1
18-596-C1051	ROADWORKS AND STORMWATER DRAINAGE SHEET 2
18-596-C1052	ROADWORKS AND STORMWATER DRAINAGE SHEET 3
18-596-C1053	ROADWORKS AND STORMWATER DRAINAGE SHEET 4
18-596-C1054	ROADWORKS AND STORMWATER DRAINAGE SHEET 5
18-596-C1055	ROADWORKS AND STORMWATER DRAINAGE SHEET 6
18-596-C1056	ROADWORKS AND STORMWATER DRAINAGE SHEET 7
18-596-C1057	ROADWORKS AND STORMWATER DRAINAGE SHEET 8
18-596-C1058	ROADWORKS AND STORMWATER DRAINAGE SHEET 9
18-596-C1059	ROADWORKS AND STORMWATER DRAINAGE SHEET 10
18-596-C1060	ROADWORKS AND STORMWATER DRAINAGE SHEET 11
18-596-C1061	ROADWORKS AND STORMWATER DRAINAGE SHEET 12
18-596-C1070	ROAD 01 LONGITUDINAL SECTION SHEET 1
18-596-C1071	ROAD 02 LONGITUDINAL SECTION SHEET 1
18-596-C1072	ROAD 03 LONGITUDINAL SECTION SHEET 1
18-596-C1073	ROAD 04 LONGITUDINAL SECTION SHEET 1
18-596-C1080	RETAINING WALL GENERAL ARRANGEMENT PLAN
18-596-C1081	RETAINING WALL PROFILES SHEET 1
18-596-C1082	RETAINING WALL PROFILES SHEET 2
18-596-C1090	SERVICES AND UTILITIES COORDINATION OVERALL PLAN
18-596-C1091	SERVICES AND UTILITIES COORDINATION PLAN SHEET 1
18-596-C1092	SERVICES AND UTILITIES COORDINATION PLAN SHEET 2
18-596-C1093	SERVICES AND UTILITIES COORDINATION PLAN SHEET 3
18-596-C1094	SERVICES AND UTILITIES COORDINATION PLAN SHEET 4
18-596-C1110	EROSION AND SEDIMENT CONTROL PLAN SHEET 1
18-596-C1111	EROSION AND SEDIMENT CONTROL PLAN SHEET 2
18-596-C1112	EROSION AND SEDIMENT CONTROL PLAN SHEET 3
18-596-C1113	EROSION AND SEDIMENT CONTROL PLAN SHEET 4
18-596-C1114	EROSION AND SEDIMENT CONTROL PLAN SHEET 5
18-596-C1115	EROSION AND SEDIMENT CONTROL PLAN SHEET 6
18-596-C1116	EROSION AND SEDIMENT CONTROL PLAN SHEET 7
18-596-C1117	EROSION AND SEDIMENT CONTROL PLAN SHEET 8
18-596-C1118	EROSION AND SEDIMENT CONTROL PLAN SHEET 9
18-596-C1119	EROSION AND SEDIMENT CONTROL PLAN SHEET 10
18-596-C1120	EROSION AND SEDIMENT CONTROL DETAILS
18-596-C1150	VEHICLE TURN PATHS PLAN SHEET 1
18-596-C1151	VEHICLE TURN PATHS PLAN SHEET 2
18-596-C1152	VEHICLE TURN PATHS PLAN SHEET 3
18-596-C1153	VEHICLE TURN PATHS PLAN SHEET 4
18-596-C1154	VEHICLE TURN PATHS PLAN SHEET 5
18-596-C1155	VEHICLE TURN PATHS PLAN SHEET 6
18-596-C1203	TEMPORARY WORKS GENERAL ARRANGEMENT PLAN
18-596-C1210	TEMPORARY WORKS TYPICAL SECTIONS SHEET 1
18-596-C1220	TEMPORARY WORKS BULK EARTHWORKS CONTOUR PLAN
18-596-C1221	TEMPORARY WORKS BULK EARTHWORKS SECTIONS SHEET 1
18-596-C1230	TEMPORARY WORKS BULK EARTHWORKS PLAN SHEET 1
18-596-C1231	TEMPORARY WORKS BULK EARTHWORKS PLAN SHEET 2
18-596-C1250	TEMPORARY WORKS ROADWORKS AND STORMWATER DRAINAGE SHEET 1
18-596-C1310	TEMPORARY WORKS EROSION AND SEDIMENT CONTROL PLAN SHEET 1
18-596-C1311	TEMPORARY WORKS EROSION AND SEDIMENT CONTROL PLAN SHEET 2

Issue	Description	Date
J	ISSUED FOR DEVELOPMENT APPLICATION	14-04-22
H	ISSUED FOR DEVELOPMENT APPLICATION	18-03-22
G	ISSUED FOR DEVELOPMENT APPLICATION	04-03-22
F	ISSUED FOR DEVELOPMENT APPLICATION	24-02-22
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B	ISSUED FOR DEVELOPMENT APPLICATION	12-10-20
A	ISSUED FOR DEVELOPMENT APPLICATION	15-05-20

Bar Scales

100mm on Original

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Client: mirvac

Scales

		Drawn	KR
		Designed	KR
Grid	MGA	Checked	AT
Height Datum	AHD	Approved	AM

GDA2020

Project: ASPECT INDUSTIAL ESTATE
MAMRE ROAD,
KEMPS CREEK
STAGE 1

Title: DRAWING LIST

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Status: FOR APPROVAL
NOT TO BE USED FOR CONSTRUCTION

A1

Project - Drawing No.: 18-596-C1001

Issue: J

F:\18-596 Mamre Road\6.0 Drgs\Civil\Final\SSD\1000_STAGE 1 SSD_MOD 2\18-596-C1001.dwg

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 COMAPACTED 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 (UNBOUND). R.M.S FORM 3052 (BOUND) 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^3 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.
13. ALL WORKS CARRIED OUT ADJACENT TO AND WITHIN TRANSGRID'S EASEMENT TO COMPLY WITH TRANSGRID'S GUIDELINES AND REQUIREMENTS.
14. ALL WORKS TO BE CONSTRUCTED IN ACCORDANCE WITH PENRITH CITY COUNCIL'S ENGINEERING CONSTRUCTION SPECIFICATION FOR CIVIL WORKS

SURVEY NOTES

THE EXISTING SITE CONDITIONS SHOWN ON THE FOLLOWING DRAWINGS HAVE BEEN INVESTIGATED BY CARDNO HARD & FORESTER PTY LTD and LAND PARTNERS PTY LTD, 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.
PRIOR TO THE COMMENCEMENT OF THE WORKS, THE CONTRACTOR SHALL UNDERTAKE A DETAILED BOUNDARY SURVEY AND COMPARE AGAINST THE DESIGN FOR DISCREPANCIES.
SHOULD DISCREPANCIES BE ENCOUNTERED DURING CONSTRUCTION BETWEEN THE SURVEY DATA, DESIGN DATA AND ACTUAL FIELD DATA, CONTACT AT & L IMMEDIATELY.

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

THE TITLE BOUNDARIES SHOWN HEREON WERE NOT MARKED AT THE TIME OF SURVEY AND HAVE BEEN DETERMINED BY PLAN DIMENSIONS ONLY AND NOT BY FIELD SURVEY.

SERVICES SHOWN HEREON HAVE BEEN LOCATED WHERE POSSIBLE BY FIELD SURVEY. IF NOT ABLE TO BE SO LOCATED, SERVICES HAVE BEEN PLOTTED FROM THE RECORDS OF RELEVANT AUTHORITIES WHERE AVAILABLE AND HAVE BEEN NOTED ACCORDINGLY ON THE PLAN. WHERE SUCH RECORDS DO NOT EXIST OR ARE INADEQUATE A NOTATION HAS BEEN MADE HEREON.

PRIOR TO ANY DEMOLITION, EXCAVATION OR CONSTRUCTION ON THE SITE, THE RELEVANT AUTHORITY SHOULD BE CONTACTED FOR POSSIBLE LOCATION OF FURTHER UNDERGROUND SERVICES AND DETAILED LOCATIONS OF ALL SERVICES.

DEWATERING

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

EXISTING UNDERGROUND SERVICES

1. 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.
2. 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.
3. CONTRACTORS SHALL TAKE DUE CARE WHEN EXCAVATING ONSITE INCLUDING HAND EXCAVATION WHERE NECESSARY.
4. CONTRACTORS ARE TO CONTACT THE RELEVANT SERVICE AUTHORITY PRIOR TO COMMENCEMENT OF EXCAVATION WORKS.
5. 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.
6. PRIOR TO COMMENCEMENT OF WORKS, THE CONTRACTOR IS TO CONFIRM THE ALIGNMENT AND LEVELS OF ALL EXISTING SERVICES AT ALL LOCATIONS WHERE THE PROPOSED SERVICES ARE TO CROSS, CONNECT TO, OR ARE LOCATED IN CLOSE PROXIMITY TO THE EXISTING SERVICES.

CONCRETE NOTES

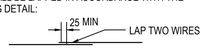
1. ALL WORKMANSHIP AND MATERIALS SHALL BE IN ACCORDANCE WITH AS 3600 CURRENT EDITION WITH AMENDMENTS, EXCEPT WHERE VARIED BY THE CONTRACT DOCUMENTS.
2. CONCRETE QUALITY
   ALL REQUIREMENTS OF THE CURRENT ACSE CONCRETE SPECIFICATION DOCUMENT 1 SHALL APPLY TO THE FORMWORK, REINFORCEMENT AND CONCRETE UNLESS 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 REFERANCE NUMBER FOR FABRIC TO AS 1304.
8. FABRIC SHALL BE LAPPED IN ACCORDANCE WITH THE FOLLOWING DETAIL:



DECOMMISSIONING / DEMOLITION

1. 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.
2. EXISTING INTERNALS FENCING, CATTLE YARDS, UTILITIES AND OTHER REDUNDANT STRUCTURES TO BE DEMOLISHED AND REMOVED TO AN APPROVED WASTE MANAGEMENT FACILITY.
3. DAM DECOMMISSIONING TO BE COMPLETED AS PER THE DAM DECOMMISSIONING PROCEDURE AS CONTAINED WITHIN THE CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN (CEMP).
4. ALL EXISTING SERVICES (INCLUDING SEPTIC TANKS) SHALL BE REMOVED FROM SITE.
5. ALL UNDERGROUND CABLES AND PIPES SHALL BE GRUBBED OUT AND CAPPED AT THE BOUNDARY OF THE SITE.

CONTINUED ABOVE

DECOMMISSIONING / DEMOLITION

CONTINUED FROM BELOW

6. ALL OVERHEAD SERVICES SHALL BE REMOVED FROM WITHIN THE SITE BOUNDARY AND MADE SAFE AT THE TERMINATION LOCATION. ANY POLES SHALL BE REMOVED FROM THE SITE.
7. ALL EXISTING SERVICES TO BE CONSIDERED AS LIVE UNTIL THE CONTRACTOR HAS TESTED AND CONFIRMED TO THE SUPERINTENDENT THAT THE SERVICES ARE DEAD / REDUNDANT.

KERBING NOTES

1. ALL CONCRETE TO HAVE A MINIMUM COMPRESSIVE STRENGTH OF 25 MPa 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 10mm 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. BROOM 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 :-
   IF REQUIRED 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.

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. ALL ROAD CROSSINGS TO BE CLASS '4' 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 HS2 SUPPORT IN ACCORDANCE WITH AS 3725 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. ENLARGERS, CONNECTIONS AND JUNCTIONS TO BE PREFABRICATED FITTINGS WHERE PIPES ARE LESS THAN 300 DIA.
9. WHERE SUBSOIL DRAINS PASS UNDER FLOOR SLABS AND VEHICULAR PAVEMENTS, UNSLOTTED uPVC SEWER GRADE PIPE IS TO BE USED.
10. CARE IS TO BE TAKEN WITH LEVELS OF STORMWATER LINES. GRADES SHOWN ARE NOT TO BE REDUCED WITHOUT APPROVAL.
11. GRATES AND COVERS SHALL CONFORM TO AS 3996 AND PENRITH CITY COUNCIL CONSTRUCTION SPECIFICATIONS.
12. AT ALL TIMES DURING CONSTRUCTION OF STORMWATER PITS, ADEQUATE SAFETY PROCEDURES SHALL BE TAKEN TO ENSURE AGAINST THE POSSIBILITY OF PERSONNEL FALLING DOWN PITS.
13. 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.
14. ALL STORMWATER PITS ARE TO BE CAST IN-SITU IN ACCORDANCE WITH THE STORMWATER DETAILS AND SPECIFICATIONS, UNLESS APPROVED BY THE SUPERINTENDENT / PENRITH CITY COUNCIL. IF APPROVED AND IN ADDITION TO THE SPECIFICATION,

A. ALL PRE-CAST PITS ARE TO BE STRUCTURALLY CERTIFIED TO MEET RELEVANT AUSTRALIAN STANDARDS (AS3600, AS3996).
B. ALL PRECAST PITS TO BE FOUNDED ON CONCRETE BLINDING LAYER WITH A MINIMUM ALLOWABLE BEARING CAPACITY OF 100KPA UP TO 3.0M DEPTH TO INVERT AND 150KPA FROM 3.0M TO 6.0M DEPTH TO INVERT (MINIMUM 100MM THICK 25MPA OR DEEPER TO ENSURE MINIMUM SPECIFIED BEARING CAPACITY IS ACHIEVED).
C. PRE-CAST STORMWATER PITS ARE TO BE CUSTOM MADE WITH OPENINGS WITHIN +50MM OD OF PIPE, HEIGHTS AND PIPE PENETRATIONS DURING MANUFACTURE. ANY ADDITIONAL PENETRATIONS SHALL BE CORE DRILLED.
D. DEMOLITION SAWS ARE NOT TO BE USED IN ANY CIRCUMSTANCES.
E. SINGLE UNITS PREFERRED BUT IF REQUIRED MINIMUM RISER DEPTH 600MM PIT INSTALLATION AND JOINTING PIPES TO PITS SHALL BE UNDERTAKEN IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATIONS.

CONTINUED ABOVE

CONTINUED FROM BELOW

F. ANY DAMAGE TO THE STRUCTURAL INTEGRITY OF THE PRE-CAST PIT WILL BE REPAIRED AND STRUCTURALLY CERTIFIED TO THE SATISFACTION OF THE SUPERINTENDENT / PENRITH CITY COUNCIL.
G. ALL PRE-CAST PIT PENETRATIONS SHALL BE CUT SO THAT IT IS FLUSH WITH THE INTERNAL WALL.
H. PIPE JOINTING/SEALING OF PIPE PENETRATION TO BE WITH A NON-SHRINK MORTAR MIX, E.G. LANKO 702 DURABED OR SIMILAR APPROVED.

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 SHOW ANY FAILURE, THE CONTRACTOR IS TO ENGAGE A QUALIFIED AND EXPERIENCED GEOTECHNICAL ENGINEER TO DETERMINE THE CAUSE AND METHOD OF RECTIFICATION
4. COMPACT CLAY STABILISED 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 STABILISED 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, STABILISE 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 FERTILISE LANDSCAPE AS REQUIRED BY CLIMACTIC CONDITIONS TO ENSURE THE LANDSCAPE IS SUCCESSFUL.
12. AT THE COMPLETION OF WORK WRITTEN CONFIRMATION AND CERTIFICATION IS TO BE PROVIDED FROM A QUALIFIED AND EXPERIENCED GEOTECHNICAL ENGINEER THAT THE EMBANKMENTS HAVE BEEN CONSTRUCTED IN ACCORDANCE WITH THESE DRAWINGS.

EROSION AND SEDIMENT CONTROL NOTES

GENERAL INSTRUCTIONS

1. THE CONTRACTOR IS RESPONSIBLE FOR ENGAGING A SUITABLY QUALIFIED EROSION AND SEDIMENT CONSULTANT FOR THE DURATION OF THE CONTRACT WITH THE EXPERTISE IN DESIGNING AND DOCUMENTING THE CONTROLS TO ALLOW THE INSTALLATION AND MAINTENANCE OF THE EROSION AND SEDIMENT CONTROLS. SUITABLE EROSION AND SEDIMENT CONTROLS SHALL BE PROVIDED AND MAINTAINED BY THE CONTRACTOR REQUIRED TO SUIT THE CONSTRUCTION STAGING
2. ALL WORK SHALL BE GENERALLY CARRIED OUT IN ACCORDANCE WITH
   a. NSW DEPARTMENT OF HOUSING MANUAL "MANAGING URBAN STORMWATER, SOILS AND CONSTRUCTION", 4th EDITION, MARCH 2004.
   b. LOCAL AUTHORITY REQUIREMENTS
   c. EPA REQUIREMENTS
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 / INSTALLED AS DIRECTED BY THE CONTRACTORS EROSION AND SEDIMENT CONTROL CONSULTANT.

EROSION CONTROL

7. DURING WINDY WEATHER, LARGE, UNPROTECTED AREAS WILL BE KEPT MOIST (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.

EROSION AND SEDIMENT CONTROL NOTES

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, WHICH EVER 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.

STAGING

SUITABLE EROSION AND SEDIMENT CONTROLS SHALL BE PROVIDED AND MAINTAINED BY THE CONTRACTOR THROUGHOUT ALL STAGES OF WORKS, THROUGHOUT THE FULL TERM OF THE CONTRACT, WHERE SHOWN ON AT&L DRAWINGS OR WHERE DIRECTED BY THE SUPERINTENDENT OR PENRITH CITY COUNCIL'S ENGINEERS. THE CONTRACTOR IS RESPONSIBLE FOR DESIGNING, DOCUMENTING, INSTALLING AND MAINTAINING THE SEDIMENT AND EROSION CONTROLS REQUIRED TO SUIT THE SELECTED CONSTRUCTION STAGING. THIS IS TO BE DOCUMENTED IN THE FORM OF A SOIL AND WATER MANAGEMENT PLAN TO BE DEVELOPED BY THE CONTRACTOR AND THEIR EROSION ND SEDIMENT CONSULTANT AND PROVIDED BY THE SUPERINTENDENT PRIOR TO CONSTRUCTION COMMENCEMENT.

SUCH CONTROLS SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF THE PROTECTION OF THE ENVIRONMENT OPERATIONS ACT, PENRITH CITY COUNCIL'S SPECIFICATIONS AND THE OFFICE OF ENVIRONMENT AND HERITAGE'S 'MANAGING URBAN STORMWATER: SOILS AND CONSTRUCTION. LANDCOM, (4TH EDITION) MARCH 2004 (REPRINTED 2006) (THE "BLUE BOOK"). VOLUME 1 AND VOLUME 2.

FINISHED SURFACE LEVELS

1. ALL FINISHED SURFACE LEVELS ARE ±1000mm U.N.O.

SITEWORKS LEGEND:

- EXISTING BOUNDARY
- EXISTING ELECTRICITY
- PROPOSED BOUNDARY
- PROPOSED EASEMENT
- PROPOSED RETAINING WALL
- 48.00 PROPOSED MAJOR CONTOUR
- 48.20 PROPOSED MINOR CONTOUR
- PROPOSED BATTER TEMPORARY BATTER 1(V):4(H) PERMANENT BATTER 1(V):5(H) U.N.O
- K&G PROPOSED KERB AND GUTTER
- PROPOSED DRIVEWAY LAYBACK
- PROPOSED KERB RAMP
- LIMIT OF WORKS
- 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 CAPPED STORMWATER PIPE
- PROPOSED STORMWATER LINE

DIAL 1100 BEFORE YOU DIG

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

Issue	Description	Date
J	ISSUED FOR DEVELOPMENT APPLICATION	14-04-22
H	ISSUED FOR DEVELOPMENT APPLICATION	18-03-22
G	ISSUED FOR DEVELOPMENT APPLICATION	04-03-22
F	ISSUED FOR DEVELOPMENT APPLICATION	24-02-22
E	ISSUED FOR DEVELOPMENT APPLICATION	03-02-22
D	ISSUED FOR DEVELOPMENT APPLICATION	08-10-21
C	ISSUED FOR DEVELOPMENT APPLICATION	15-10-20
B	ISSUED FOR DEVELOPMENT APPLICATION	12-10-20
A	ISSUED FOR DEVELOPMENT APPLICATION	15-05-20

Bar Scales

100mm on Original

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Client: mirvac

Scales

		Drawn	KR
		Designed	KR
Grid	MGA	Checked	AT
Height Datum	AHD	Approved	AM

GDA2020

Project
ASPECT INDUSTIAL ESTATE
MAMRE ROAD,
KEMPS CREEK
STAGE 1

Title
NOTES AND LEGENDS SHEET

Civil Engineers and Project Managers
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Level 7, 153 Walker Street
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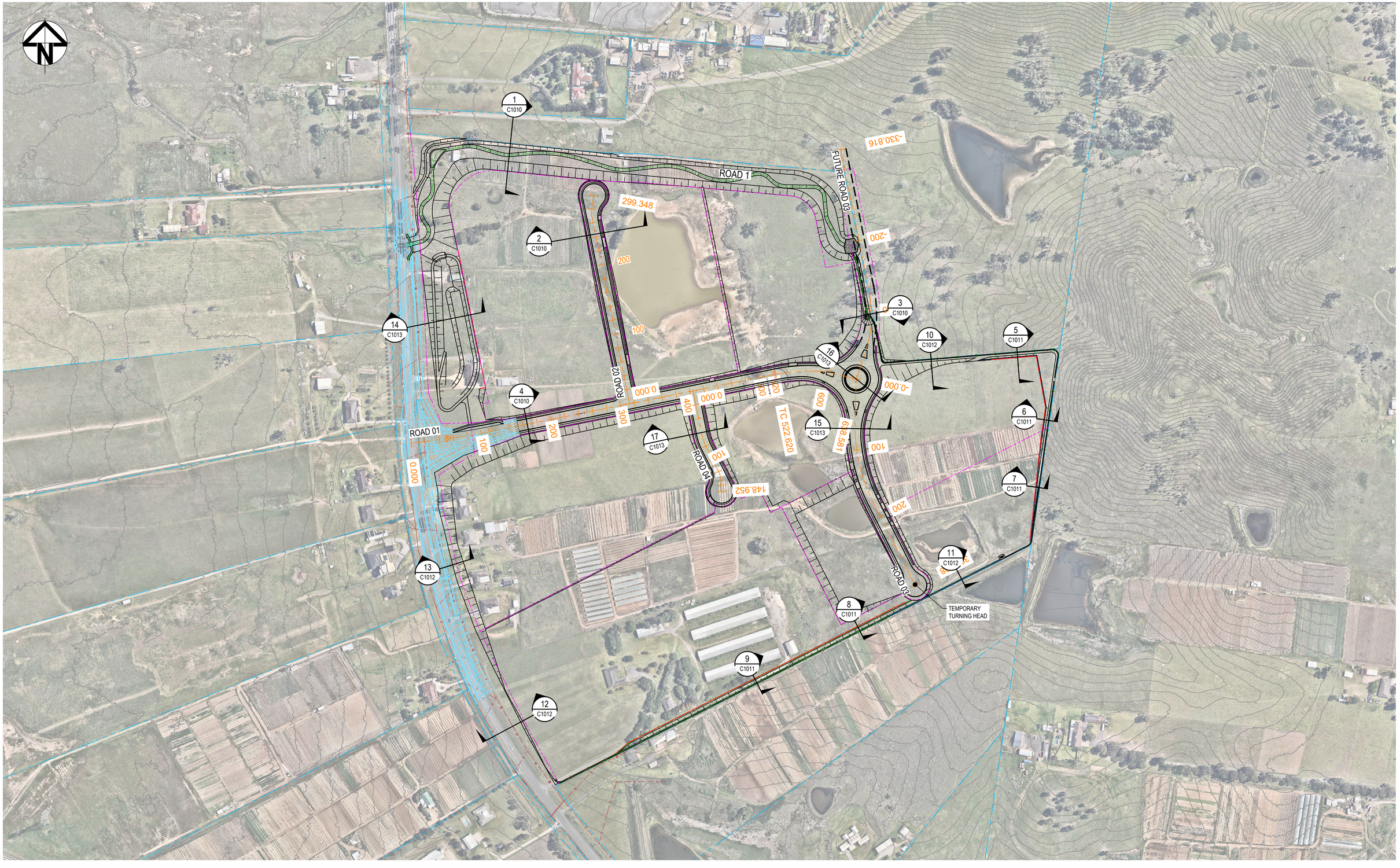
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NOT TO BE USED FOR CONSTRUCTION

A1

Project - Drawing No.: 18-596-C1002

Issue: J

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Issue	Description	Date
N	ISSUED FOR DEVELOPMENT APPLICATION	14-04-22
M	ISSUED FOR DEVELOPMENT APPLICATION	18-03-22
N	ISSUED FOR DEVELOPMENT APPLICATION	04-03-22
M	ISSUED FOR DEVELOPMENT APPLICATION	24-02-23
L	ISSUED FOR DEVELOPMENT APPLICATION	21-02-22
K	ISSUED FOR DEVELOPMENT APPLICATION	10-02-22
J	ISSUED FOR DEVELOPMENT APPLICATION	03-02-22
H	ISSUED FOR DEVELOPMENT APPLICATION	16-12-21
G	ISSUED FOR DEVELOPMENT APPLICATION	08-10-21

Bar Scales

0 50 100 150 200 250m

1 : 2500 @ A1

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Client

mirvac

Scales	1:2500	Drawn	KR
		Designed	KR
Grid	MGA	Checked	AT
Height Datum	AHD	Approved	AM

GDA2020

Project

ASPECT INDUSTIAL ESTATE
MAMRE ROAD,
KEMPS CREEK
STAGE 1

Title

GENERAL ARRANGEMENT PLAN

Civil Engineers and Project Managers

at&l

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Tel: 02 9439 1777
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www.atl.net.au
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Status: FOR APPROVAL
NOT TO BE USED FOR CONSTRUCTION

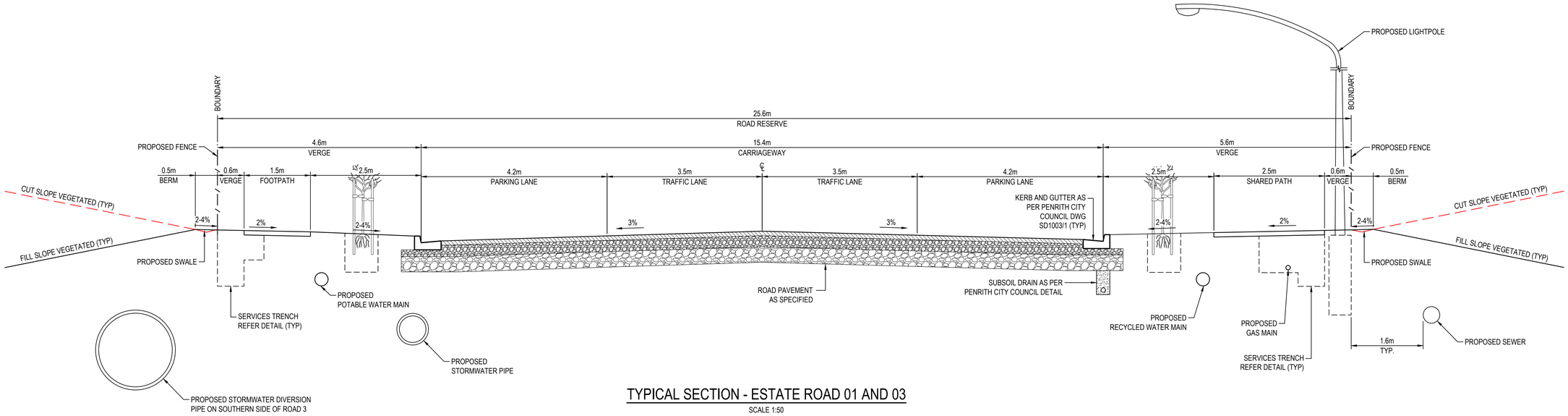
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Project - Drawing No.: 18-596-C1003

Issue: N

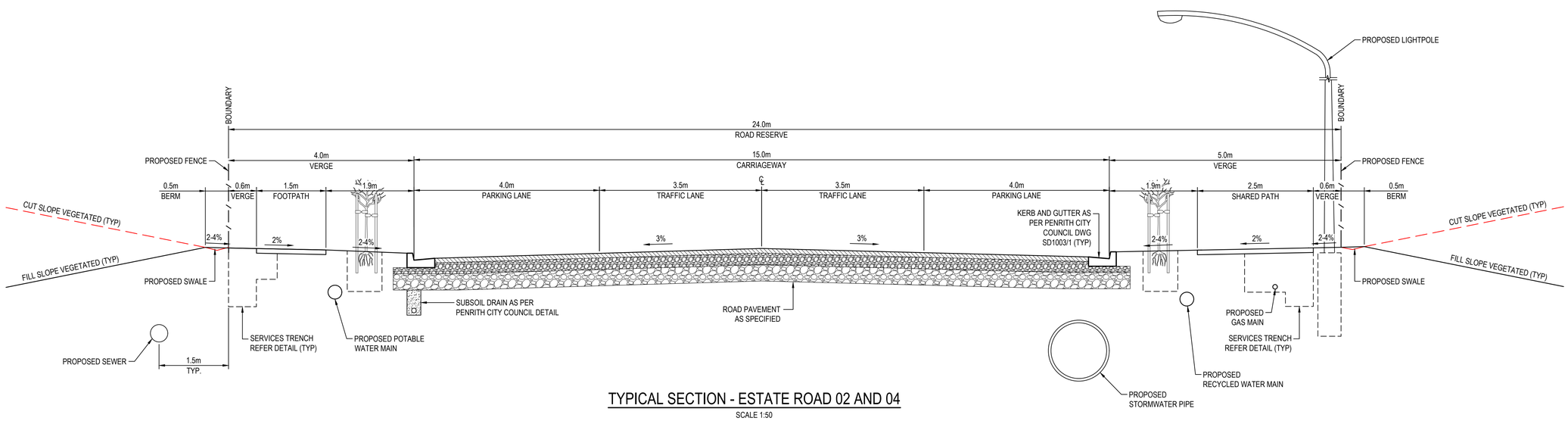
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TYPICAL SECTION - ESTATE ROAD 01 AND 03

SCALE 1:50



TYPICAL SECTION - ESTATE ROAD 02 AND 04

SCALE 1:50

Issue	Description	Date
K	ISSUED FOR DEVELOPMENT APPLICATION	14-04-22
J	ISSUED FOR DEVELOPMENT APPLICATION	18-03-22
H	ISSUED FOR DEVELOPMENT APPLICATION	04-03-22
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E	ISSUED FOR DEVELOPMENT APPLICATION	16-12-21
D	ISSUED FOR DEVELOPMENT APPLICATION	08-10-21
C	ISSUED FOR DEVELOPMENT APPLICATION	15-10-20
B	ISSUED FOR DEVELOPMENT APPLICATION	12-10-20

Bar Scales

0 1 2 3 4 5m

1 : 50 @ A1 1 : 100 @ A3

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Client

mirvac

Scales	1:50	Drawn	KR
		Designed	KR
Grid	MGA	Checked	AT
Height Datum	AHD	Approved	AM

GDA2020

Project

ASPECT INDUSTRIAL ESTATE
MAMRE ROAD,
KEMPS CREEK
STAGE 1

Title

TYPICAL ROAD SECTIONS
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: FOR APPROVAL
NOT TO BE USED FOR CONSTRUCTION

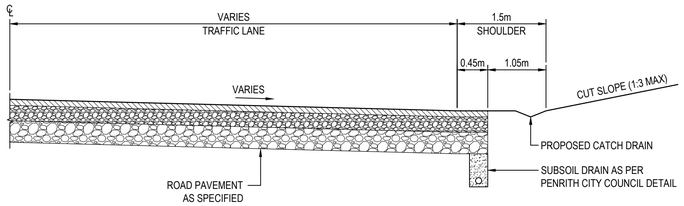
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Project - Drawing No.: 18-596-C1005

Issue: K

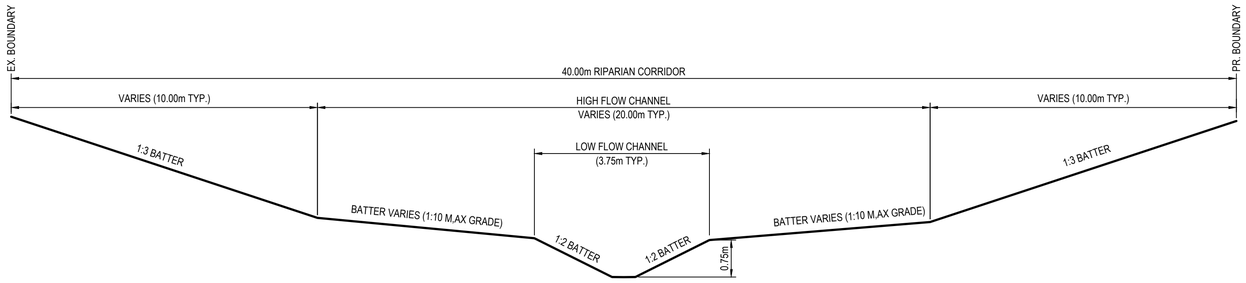
100mm on Original

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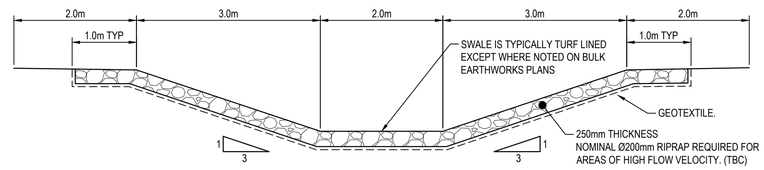


TYPICAL SECTION - TEMPORARY TURNING HEAD

SCALE 1:50

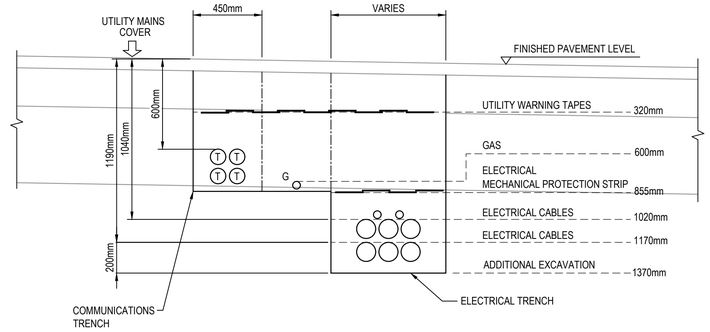


TYPICAL RIPARIAN CORRIDOR SECTION



TYPICAL STORMWATER DIVERSION CATCH DRAIN

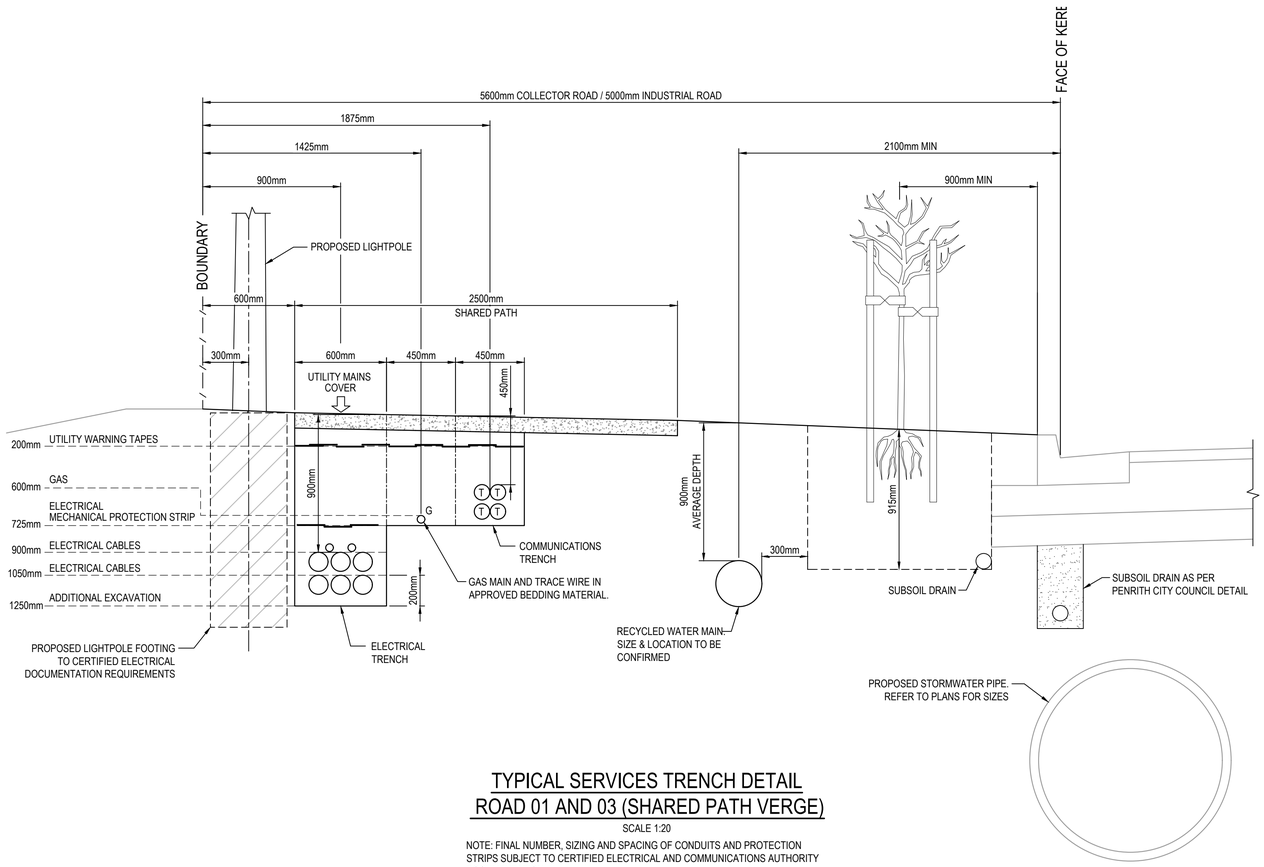
SCALE 1:50



TYPICAL SERVICES TRENCH DETAIL (ROAD CROSSING)

SCALE 1:20

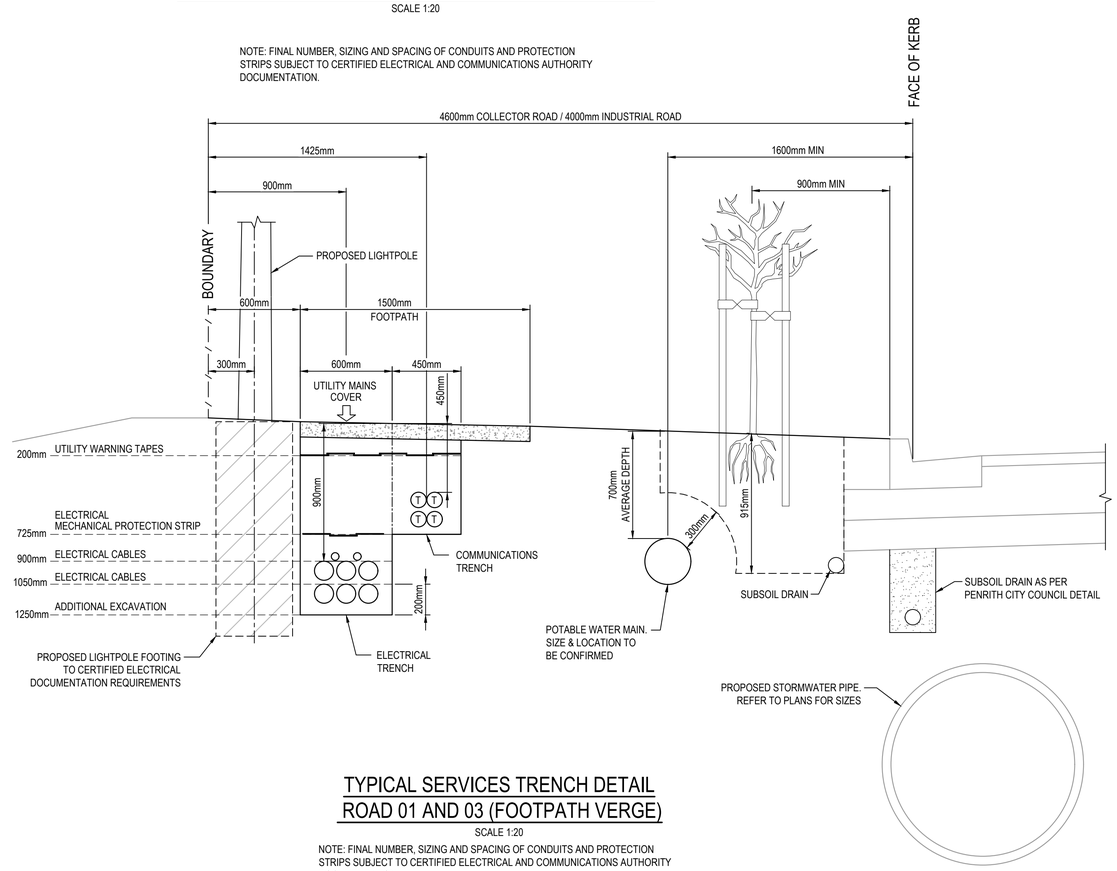
NOTE: FINAL NUMBER, SIZING AND SPACING OF CONDUITS AND PROTECTION STRIPS SUBJECT TO CERTIFIED ELECTRICAL AND COMMUNICATIONS AUTHORITY DOCUMENTATION.



TYPICAL SERVICES TRENCH DETAIL
ROAD 01 AND 03 (SHARED PATH VERGE)

SCALE 1:20

NOTE: FINAL NUMBER, SIZING AND SPACING OF CONDUITS AND PROTECTION STRIPS SUBJECT TO CERTIFIED ELECTRICAL AND COMMUNICATIONS AUTHORITY DOCUMENTATION.



TYPICAL SERVICES TRENCH DETAIL
ROAD 01 AND 03 (FOOTPATH VERGE)

SCALE 1:20

NOTE: FINAL NUMBER, SIZING AND SPACING OF CONDUITS AND PROTECTION STRIPS SUBJECT TO CERTIFIED ELECTRICAL AND COMMUNICATIONS AUTHORITY DOCUMENTATION.

Issue	Description	Date
K	ISSUED FOR DEVELOPMENT APPLICATION	14-04-22
J	ISSUED FOR DEVELOPMENT APPLICATION	18-03-22
H	ISSUED FOR DEVELOPMENT APPLICATION	04-03-22
G	ISSUED FOR DEVELOPMENT APPLICATION	24-02-22
F	ISSUED FOR DEVELOPMENT APPLICATION	03-02-22
E	ISSUED FOR DEVELOPMENT APPLICATION	16-12-21
D	ISSUED FOR DEVELOPMENT APPLICATION	08-10-21
C	ISSUED FOR DEVELOPMENT APPLICATION	15-10-20
B	ISSUED FOR DEVELOPMENT APPLICATION	12-10-20

Bar Scales

0 2 4 6 8 10m
1 : 100 @ A1 1 : 200 @ A3

0 1 2 3 4 5m
1 : 50 @ A1 1 : 100 @ A3

0 500 1000 1500 2000mm
1 : 20 @ A1 1 : 40 @ A3

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Client: mirvac

Scales	1:100 1:50 1:20	Drawn	KR
		Designed	KR
Grid	MGA	Checked	AT
Height Datum	AHD	Approved	AM

GDA2020

Project: ASPECT INDUSTRIAL ESTATE
MAMRE ROAD,
KEMPS CREEK
STAGE 1

Title: TYPICAL ROAD SECTIONS
SHEET 2

Civil Engineers and Project Managers
at&l
Level 7, 153 Walker Street
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ABN 96 130 882 405
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www.atl.net.au
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Status: FOR APPROVAL
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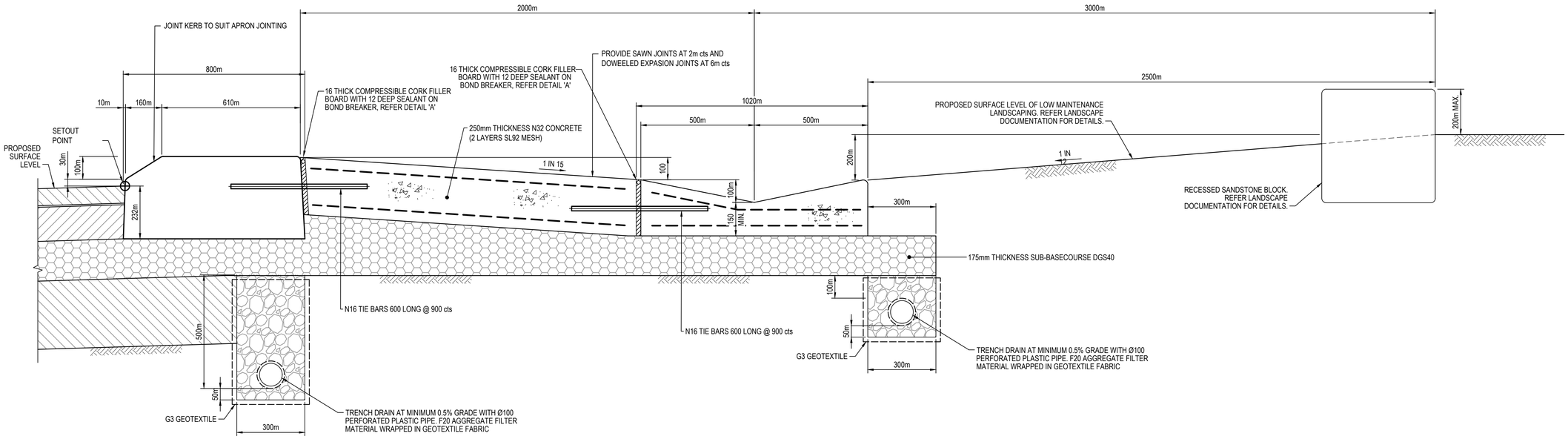
A1

Project - Drawing No.: 18-596-C1006

Issue: K

100mm on Original

F:\18-596 Mamre Road\6.0 Drgs\Civil\Final\SSD\1000_STAGE 1 SSD_MOD 2\18-596-C1006.dwg



SECTION 1 (C1013)
1 : 10

Issue	Description	Date
A	ISSUED FOR DEVELOPMENT APPLICATION	'14-04-22

Bar Scales

0 100 200 400 600 800 1000mm

1 : 10 @ A1 1 : 20 @ A3

100mm on Original

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Client: mirvac

Scales		Drawn	KR
	1:10	Designed	KR
Grid	MGA	Checked	AT
Height Datum	AHD	Approved	AM

GDA2020

Project
ASPECT INDUSTIAL ESTATE
MAMRE ROAD,
KEMPS CREEK
STAGE 1

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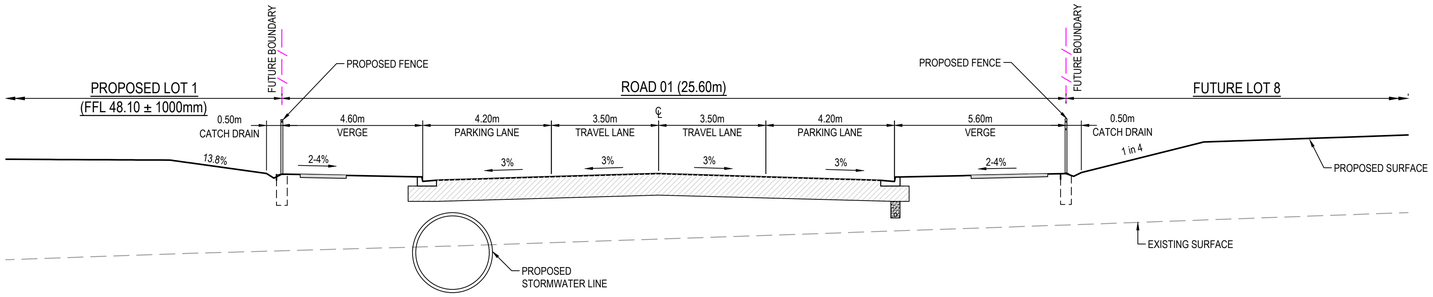
Status: FOR APPROVAL
NOT TO BE USED FOR CONSTRUCTION

A1

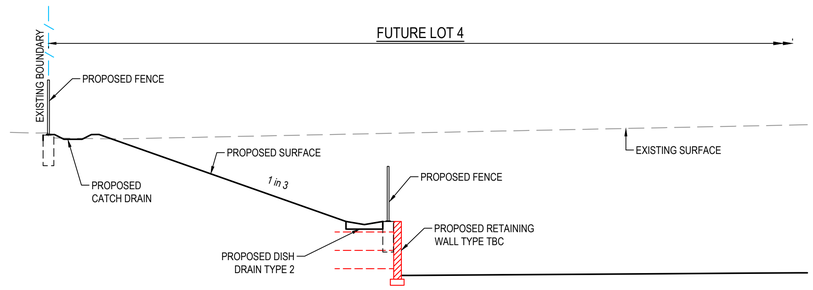
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Issue: A

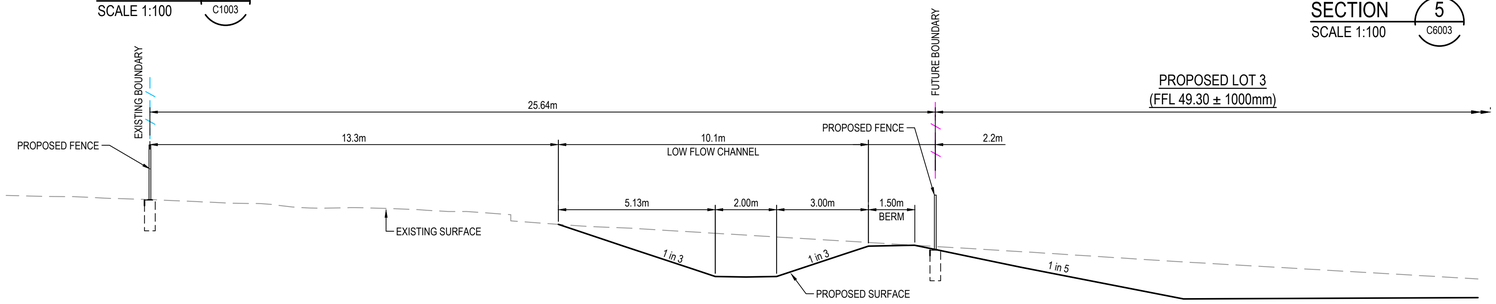
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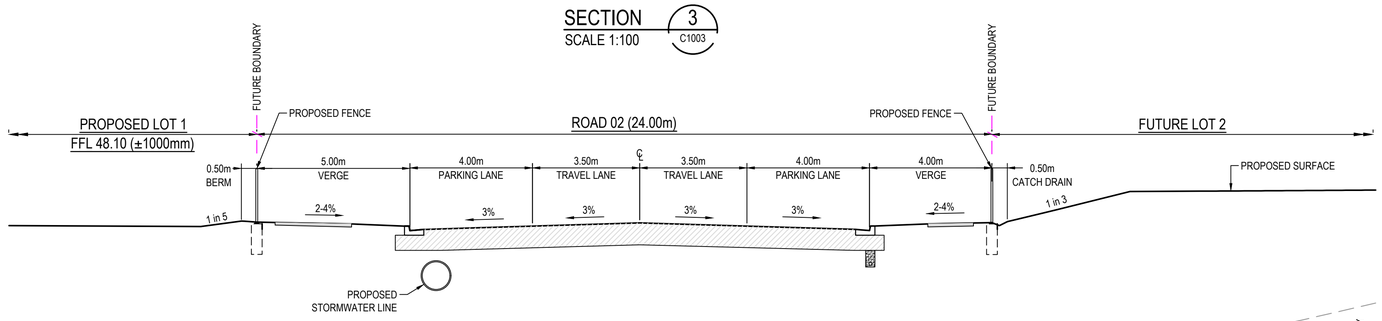
SECTION 4
SCALE 1:100 C1003

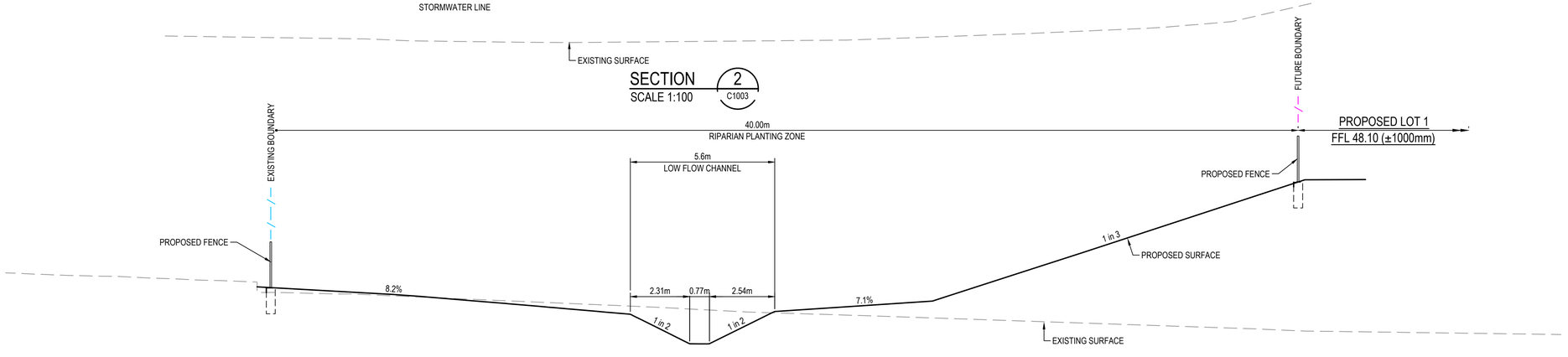


SECTION 5
SCALE 1:100 C6003



SECTION 3
SCALE 1:100 C1003





SECTION 2
SCALE 1:100 C1003

SECTION 1
SCALE 1:100 C1003

Issue	Description	Date
K	ISSUED FOR DEVELOPMENT APPLICATION	14-04-22
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F	ISSUED FOR DEVELOPMENT APPLICATION	03-02-22
E	ISSUED FOR DEVELOPMENT APPLICATION	16-12-21
D	ISSUED FOR DEVELOPMENT APPLICATION	08-10-21
C	ISSUED FOR DEVELOPMENT APPLICATION	15-10-20
B	ISSUED FOR DEVELOPMENT APPLICATION	12-10-20

Bar Scales

0 2 4 6 8 10m

1 : 100 @ A1 1 : 200 @ A3

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Client

mirvac

Scales		Drawn	KR
	1:100	Designed	KR
Grid	MGA	Checked	AT
Height Datum	AHD	Approved	AM

GDA2020

Project

ASPECT INDUSTIAL ESTATE
MAMRE ROAD,
KEMPS CREEK
STAGE 1

Title

TYPICAL SECTIONS
SHEET 1

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info@atl.net.au

Status: FOR APPROVAL
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A1

Project - Drawing No.: 18-596-C1010

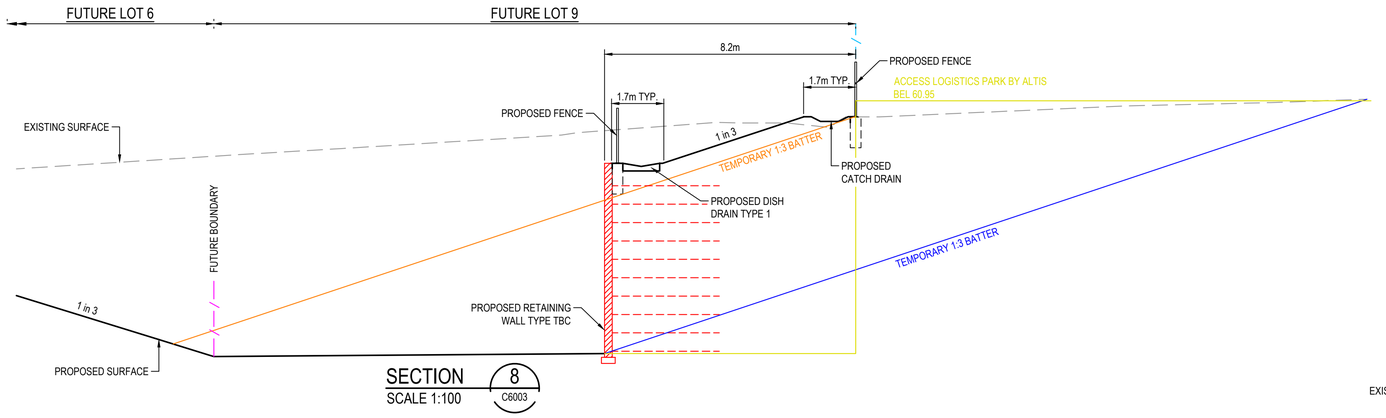
Issue: K

100mm on Original

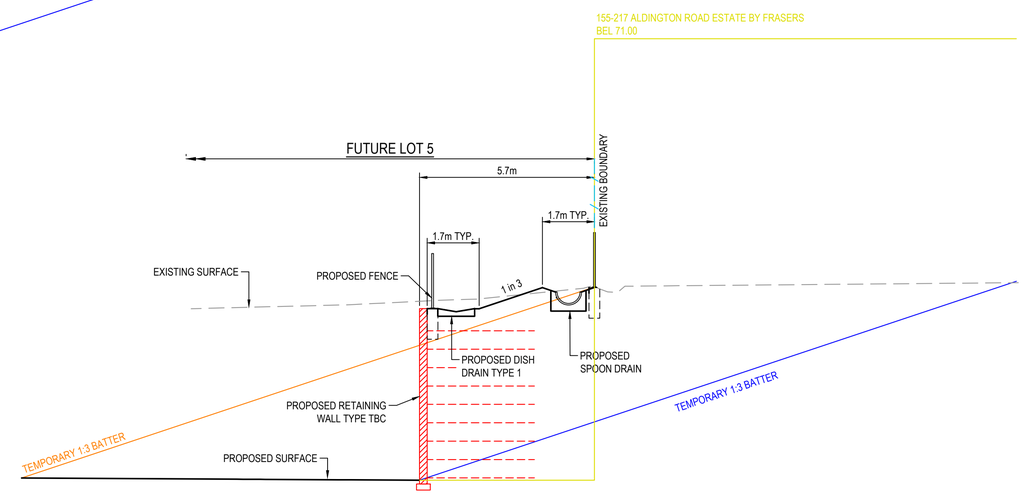
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LEGEND

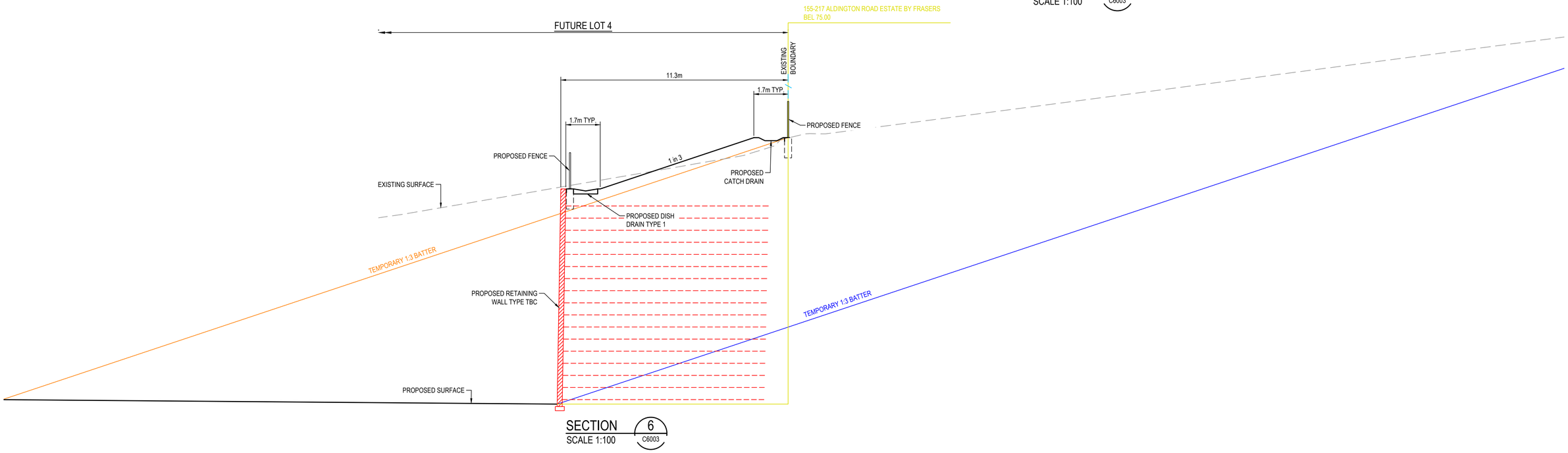
- ALTERNATE TEMPORARY 1:3 BATTER INTO ASPECT SITE
- ALTERNATE TEMPORARY 1:3 BATTER INTO NEIGHBOURING SITE
- NEIGHBOURING SITE BULK EARTHWORKS LEVELS



SECTION 8 C6003
SCALE 1:100



SECTION 7 C6003
SCALE 1:100



SECTION 6 C6003
SCALE 1:100

Issue	Description	Date
K	ISSUED FOR DEVELOPMENT APPLICATION	14-04-22
J	ISSUED FOR DEVELOPMENT APPLICATION	18-03-22
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D	ISSUED FOR DEVELOPMENT APPLICATION	08-10-21
C	ISSUED FOR DEVELOPMENT APPLICATION	15-10-20
B	ISSUED FOR DEVELOPMENT APPLICATION	12-10-20

Bar Scales

0 2 4 6 8 10m

1 : 100 @ A1 1 : 200 @ A3

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Client: mirvac

Scales	1:100	Drawn	KR
		Designed	KR
Grid	MGA	Checked	AT
Height Datum	AHD	Approved	AM

GDA2020

Project
ASPECT INDUSTIAL ESTATE
MAMRE ROAD,
KEMPS CREEK
STAGE 1

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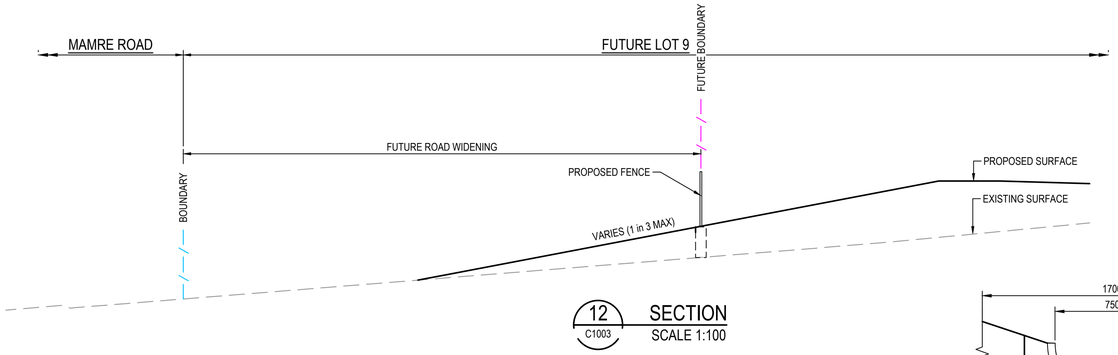
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Project - Drawing No.: 18-596-C1011

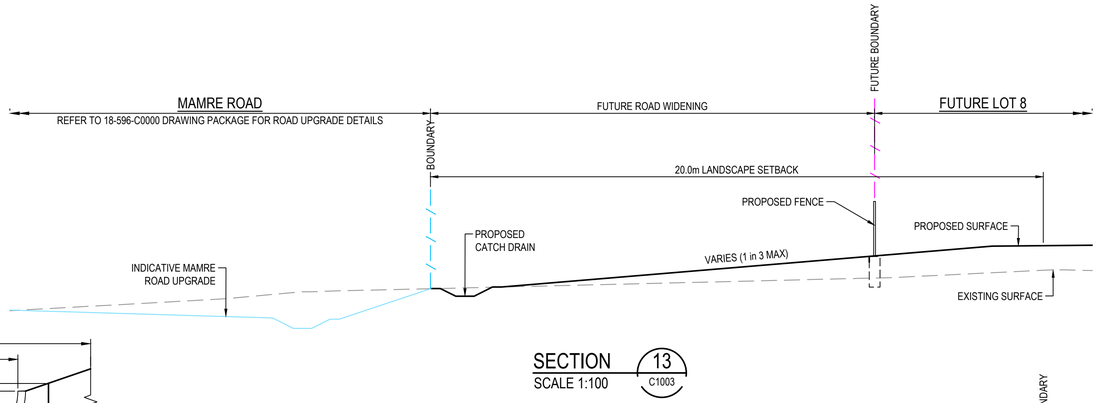
Issue: K

100mm on Original

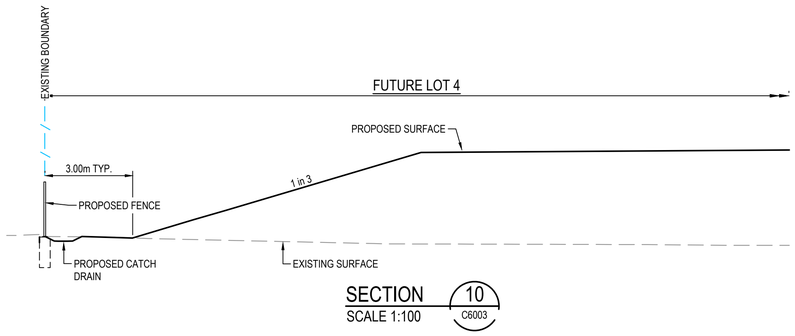
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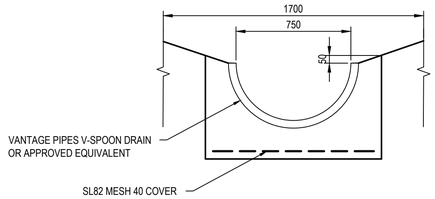
12 C1003 SECTION
SCALE 1:100



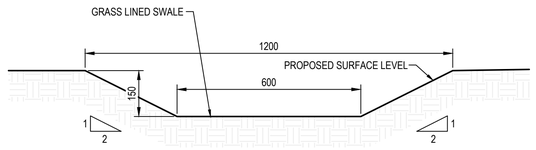
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SCALE 1:100



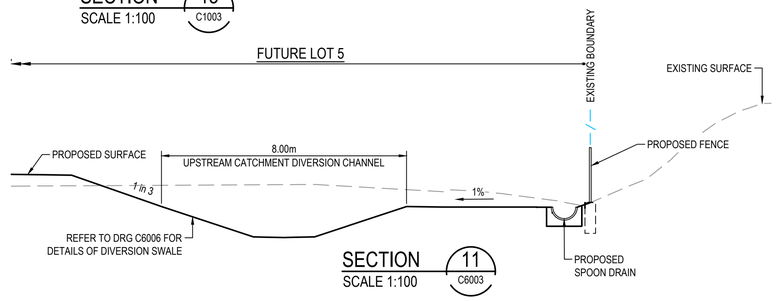
SECTION 10 C6003
SCALE 1:100



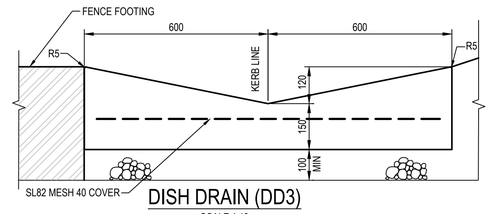
SPOON DRAIN (SD)
SCALE 1:10



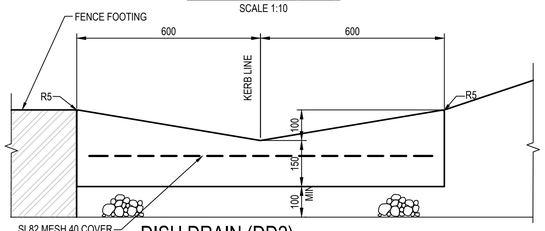
CATCH DRAIN (CD)
SCALE 1:10



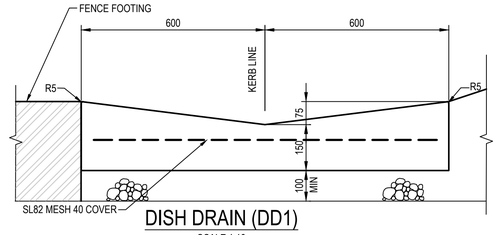
SECTION 11 C6003
SCALE 1:100



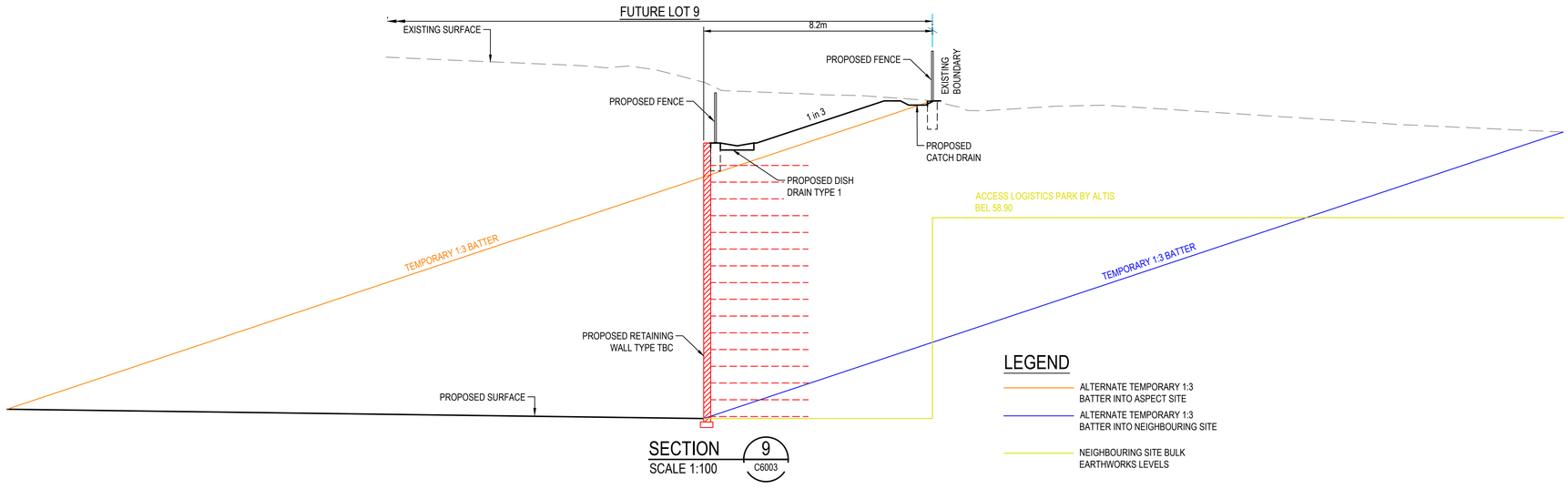
DISH DRAIN (DD3)
SCALE 1:10



DISH DRAIN (DD2)
SCALE 1:10



DISH DRAIN (DD1)
SCALE 1:10



SECTION 9 C6003
SCALE 1:100

Issue	Description	Date
K	ISSUED FOR DEVELOPMENT APPLICATION	14-04-22
J	ISSUED FOR DEVELOPMENT APPLICATION	18-03-22
H	ISSUED FOR DEVELOPMENT APPLICATION	04-03-22
G	ISSUED FOR DEVELOPMENT APPLICATION	24-02-22
F	ISSUED FOR DEVELOPMENT APPLICATION	03-02-22
E	ISSUED FOR DEVELOPMENT APPLICATION	16-12-21
D	ISSUED FOR RESPONSE TO SUBMISSION	17-02-21
C	ISSUED FOR DEVELOPMENT APPLICATION	15-10-20
B	ISSUED FOR DEVELOPMENT APPLICATION	12-10-20

Bar Scales

0 2 4 6 8 10m

1 : 100 @ A1 1 : 200 @ A3

100mm on Original

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Client: mirvac

Scales	1:100	Drawn	KR
		Designed	KR
Grid	MGA	Checked	AT
Height Datum	AHD	Approved	AM

GDA2020

Project
ASPECT INDUSTRIAL ESTATE
MAMRE ROAD,
KEMPS CREEK
STAGE 1

Title
TYPICAL SECTIONS
SHEET 3

Civil Engineers and Project Managers
at&l
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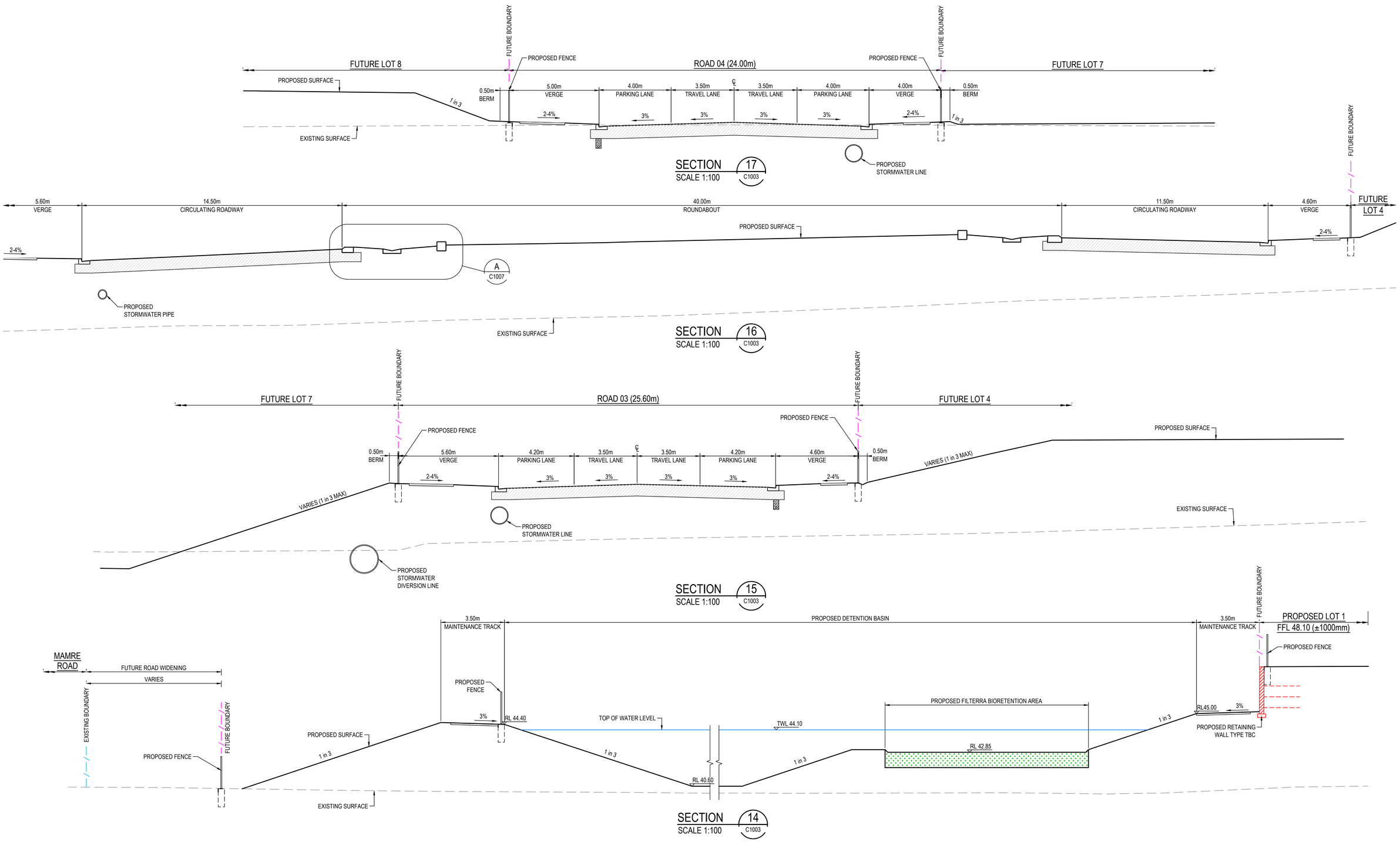
Status
FOR APPROVAL
NOT TO BE USED FOR CONSTRUCTION

A1

Project - Drawing No.
18-596-C1012

Issue
K

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Issue	Description	Date
B	ISSUED FOR DEVELOPMENT APPLICATION	14-04-22
A	ISSUED FOR DEVELOPMENT APPLICATION	18-03-22

100mm on Original

Bar Scales

0 2 4 6 8 10m

1 : 100 @ A1 1 : 200 @ A3

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Client

mirvac

Scales	1:100
Grid	MGA
Height Datum	AHD
Drawn	KR
Designed	KR
Checked	AT
Approved	AM

GDA2020

Project

ASPECT INDUSTRIAL ESTATE
MAMRE ROAD,
KEMPS CREEK
STAGE 1

Title

TYPICAL SECTIONS
SHEET 4

Civil Engineers and Project Managers
at&l
Level 7, 153 Walker Street
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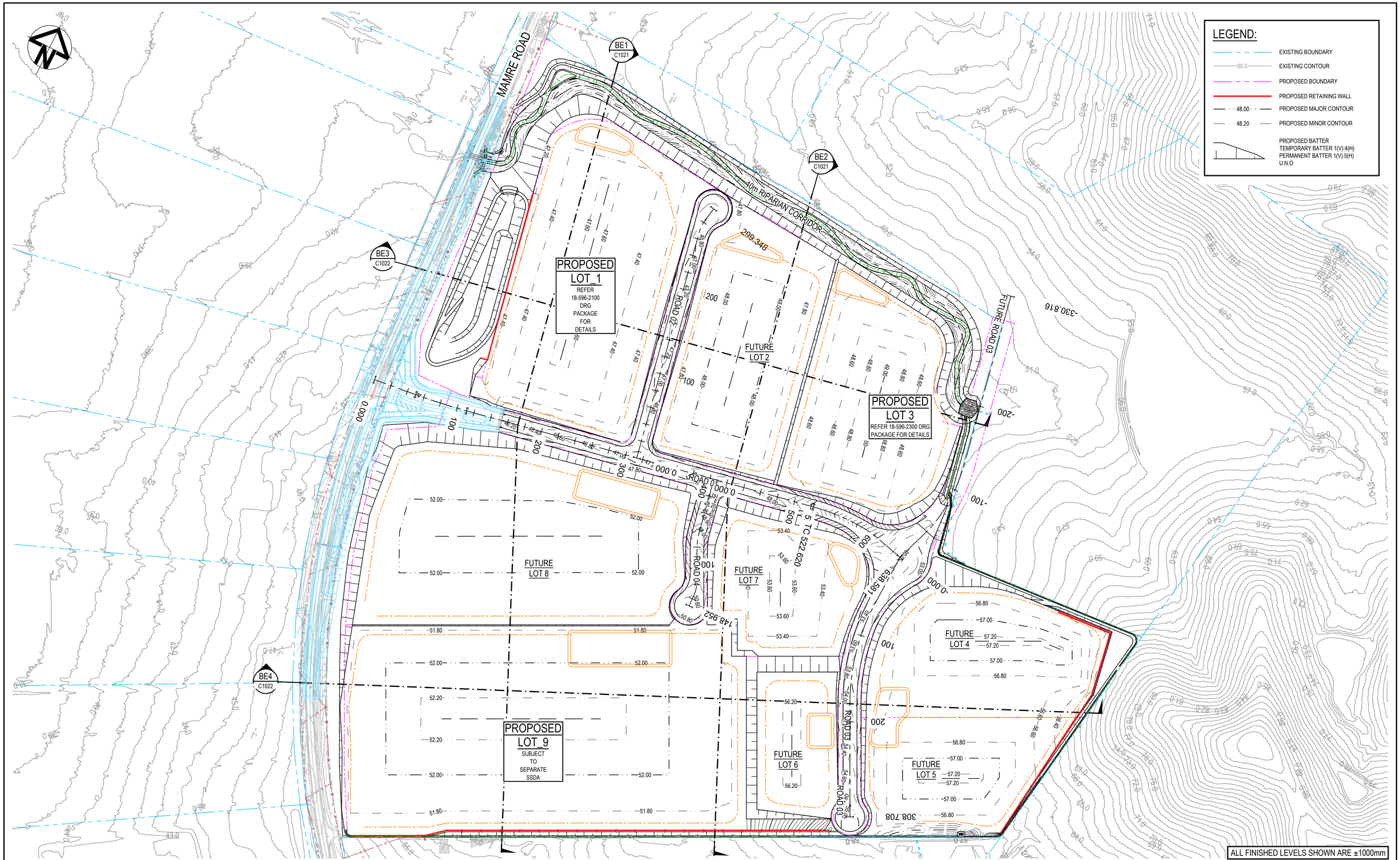
Status: FOR APPROVAL
NOT TO BE USED FOR CONSTRUCTION

A1

Project - Drawing No.: 18-596-C1013

Issue: B

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Issue	Description	Date
K	ISSUED FOR DEVELOPMENT APPLICATION	14-04-22
J	ISSUED FOR DEVELOPMENT APPLICATION	18-03-22
H	ISSUED FOR DEVELOPMENT APPLICATION	04-03-22
G	ISSUED FOR DEVELOPMENT APPLICATION	24-02-22
F	ISSUED FOR DEVELOPMENT APPLICATION	10-02-22
E	ISSUED FOR DEVELOPMENT APPLICATION	03-02-22
D	ISSUED FOR DEVELOPMENT APPLICATION	08-10-21
C	ISSUED FOR DEVELOPMENT APPLICATION	15-10-20
B	ISSUED FOR DEVELOPMENT APPLICATION	12-10-20

Bar Scales

0 50 100 150 200m

1 : 2000 @ A1

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Client

mirvac

Scales	1:2000	Drawn	KR
		Designed	KR
Grid	MGA	Checked	AT
Height Datum	AHD	Approved	AM

GDA2020

Project

ASPECT INDUSTIAL ESTATE
MAMRE ROAD,
KEMPS CREEK
STAGE 1

Title

BULK EARTHWORKS
CONTOUR PLAN

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: FOR APPROVAL
NOT TO BE USED FOR CONSTRUCTION

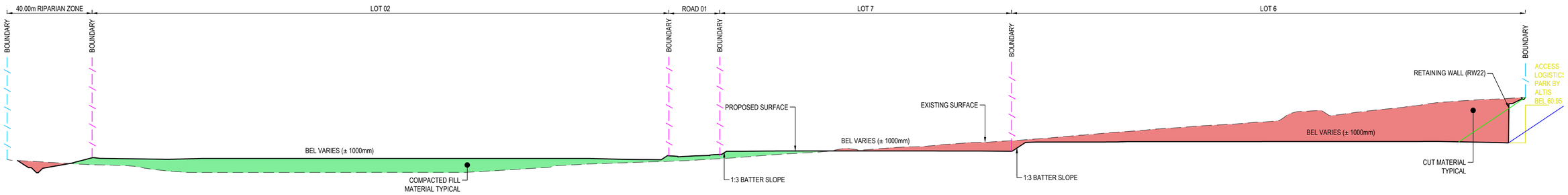
A1

Project - Drawing No.: 18-596-C1020

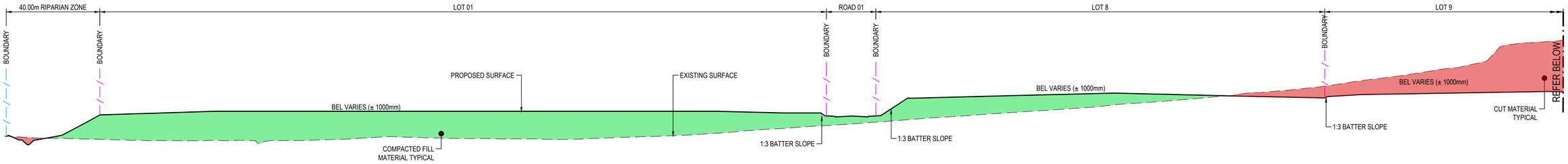
Issue: K

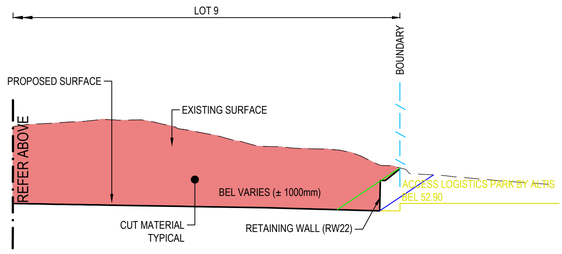
100mm on Original

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SECTION BE2 (C1020)
SCALE 1:1000(H) 1:500(V)





SECTION BE1 (C1020)
SCALE 1:1000(H) 1:500(V)

LEGEND

- ALTERNATE TEMPORARY 1:3 BATTER INTO ASPECT SITE
- ALTERNATE TEMPORARY 1:3 BATTER INTO NEIGHBOURING SITE
- NEIGHBOURING SITE BULK EARTHWORKS LEVELS

ALL FINISHED LEVELS SHOWN ARE ±1000mm

Issue	Description	Date
M	ISSUED FOR DEVELOPMENT APPLICATION	14-04-22
L	ISSUED FOR DEVELOPMENT APPLICATION	18-03-22
K	ISSUED FOR DEVELOPMENT APPLICATION	04-03-22
J	ISSUED FOR DEVELOPMENT APPLICATION	24-02-22
H	ISSUED FOR DEVELOPMENT APPLICATION	16-02-22
G	ISSUED FOR DEVELOPMENT APPLICATION	11-02-22
F	ISSUED FOR DEVELOPMENT APPLICATION	10-02-22
E	ISSUED FOR DEVELOPMENT APPLICATION	03-02-22
D	ISSUED FOR DEVELOPMENT APPLICATION	08-10-21

Bar Scales

0 20 40 60 80 100m
1 : 1000 @ A1 1 : 2000 @ A3
0 10 20 30 40 50m
1 : 500 @ A1 1 : 1000 @ A3

100mm on Original

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Client: mirvac

Scales		Drawn	KR
	1:1000(H) 1:500(V)	Designed	KR
Grid	MGA	Checked	AT
Height Datum	AHD	Approved	AM

GDA2020

Project
ASPECT INDUSTIAL ESTATE
MAMRE ROAD,
KEMPS CREEK
STAGE 1

Title
BULK EARTHWORKS
SECTIONS
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

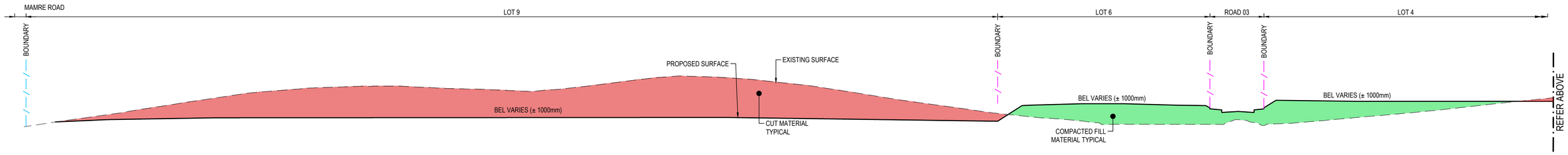
Status: FOR APPROVAL
NOT TO BE USED FOR CONSTRUCTION

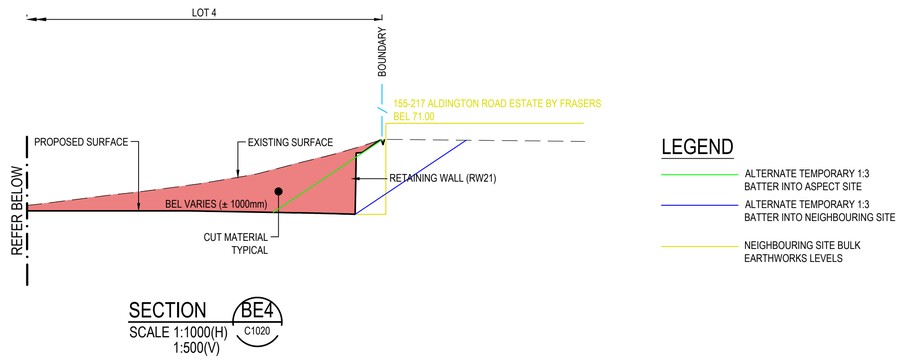
A1

Project - Drawing No.: 18-596-C1021

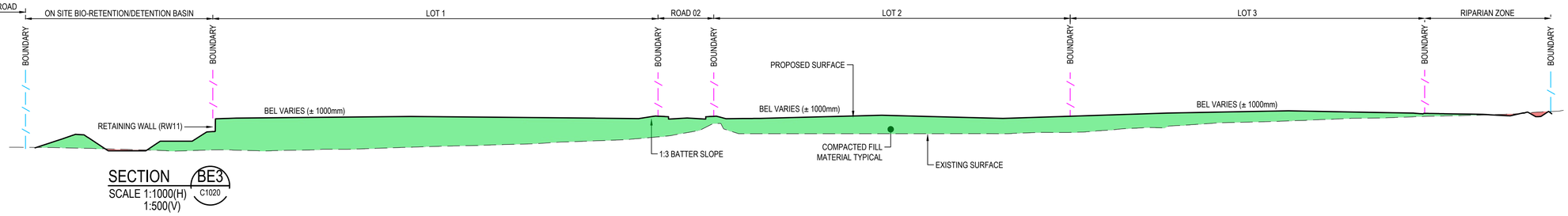
Issue: M

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SECTION BE4 C1020
SCALE 1:1000(H) 1:500(V)



SECTION BE3 C1020
SCALE 1:1000(H) 1:500(V)

ALL FINISHED LEVELS SHOWN ARE ±1000mm

Issue	Description	Date
M	ISSUED FOR DEVELOPMENT APPLICATION	14-04-22
L	ISSUED FOR DEVELOPMENT APPLICATION	18-03-22
K	ISSUED FOR DEVELOPMENT APPLICATION	04-03-22
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H	ISSUED FOR DEVELOPMENT APPLICATION	16-02-22
G	ISSUED FOR DEVELOPMENT APPLICATION	11-02-22
F	ISSUED FOR DEVELOPMENT APPLICATION	10-02-22
E	ISSUED FOR DEVELOPMENT APPLICATION	03-02-22
D	ISSUED FOR DEVELOPMENT APPLICATION	08-10-21

Bar Scales

0 20 40 60 80 100m
1 : 1000 @ A1 1 : 2000 @ A3

0 10 20 30 40 50m
1 : 500 @ A1 1 : 1000 @ A3

100mm on Original

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Client: mirvac

Scales	1:1000(H) 1:500(V)
Grid	MGA
Height Datum	AHD
Drawn	KR
Designed	KR
Checked	AT
Approved	AM

GDA2020

Project
ASPECT INDUSTRIAL ESTATE
MAMRE ROAD,
KEMPS CREEK
STAGE 1

Title
BULK EARTHWORKS
SECTIONS
SHEET 2

Civil Engineers and Project Managers
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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: FOR APPROVAL
NOT TO BE USED FOR CONSTRUCTION

A1

Project - Drawing No.: 18-596-C1022

Issue: M

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EARTHWORKS VOLUMES

A	B	C	D	E	F	G = A+B+C+D+E+F
EXISTING TOPSOIL STRIPPING VOLUME (cu.m) REFER NOTE No.1	EXCAVATION OF EXISTING CREEKS AND DAMS (cu.m) REFER NOTE No.3	INFRAWORKS SERVICES TRENCHING SPOIL	APPROXIMATE VOLUME OF SELECT MATERIAL IMPORT FOR RETAINING WALLS	NET CUT (cu.m)	NET FILL (cu.m)	BALANCE (cu.m)
-25,355	-29,947	-35,000	-34,285	-1,038,896	1,164,503	1020

CUT/FILL DEPTH RANGE LEGEND

Lower_value		Upper_value		Colour
-10.0	to	-8.0	m	
-8.0	to	-7.0	m	
-7.0	to	-6.0	m	
-6.0	to	-5.0	m	
-5.0	to	-4.0	m	
-4.0	to	-3.0	m	
-3.0	to	-2.0	m	
-2.0	to	-1.0	m	
-1.0	to	0.0	m	
0.0	to	1.0	m	
1.0	to	2.0	m	
2.0	to	3.0	m	
3.0	to	4.0	m	
4.0	to	5.0	m	
5.0	to	6.0	m	
6.0	to	7.0	m	
7.0	to	8.0	m	
8.0	to	10.0	m	

EARTHWORKS AREAS

CUT (ha)	17.8
FILL (ha)	38.0
FARM DAMS (ha)	3.0
TOTAL (ha)	58.8

MAMRE ROAD

40m RIPARIAN CORRIDOR

ROAD 01

ROAD 02

ROAD 03

ROAD 04

BEL 47.80 (±1000mm)

PROPOSED LOT_1 REFER 18-596-2100 DRG PACKAGE FOR DETAILS

BEL 48.20 (±1000mm)

FUTURE LOT 2

BEL 49.00 (±1000mm)

PROPOSED LOT 3 REFER 18-596-2300 DRG PACKAGE FOR DETAILS

FUTURE LOT 8 BEL 52.30 (±1000mm)

FUTURE LOT 7 BEL 53.00 (±1000mm)

FUTURE LOT 4 BEL 57.00 (±1000mm)

PROPOSED LOT_9 SUBJECT TO SEPARATE SSDA

BEL 52.30 (±1000mm)

FUTURE LOT 6 BEL 56.00 (±1000mm)

FUTURE LOT 5 BEL 57.00 (±1000mm)

LEGEND:

- EXISTING BOUNDARY
- EXISTING CONTOUR (60.0)
- PROPOSED BOUNDARY
- PROPOSED RETAINING WALL
- PROPOSED BATTER TEMPORARY BATTER 1(V):4(H) PERMANENT BATTER 1(V):5(H) U.N.O
- EXTENT OF EXCAVATION OF EXISTING CREEKS AND DAMS (REFER NOTE No.3)

NOTES

1. EXISTING TOPSOIL STRIPPED 150mm IN AREAS OF LESS THAN 2m OF ENGINEERED FILL TO BE PLACED OVER THE EXISTING SUBGRADE. 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.
2. ALLOWANCE HAS BEEN MADE FOR RETAINING WALL BACKFILL MATERIAL (IMPORT).
3. ADDITIONAL EXCAVATION OF EXISTING CREEKS AND DAMS WITHIN SITE AREA TO A DEPTH 1m BELOW EXISTING INVERT AND WIDTH OF EXISTING CREEK/DAM EXTENT. VOLUMES ARE APPROXIMATE.
   DEPTH OF DAMS HAS BEEN ASSUMED AT 2.5m DEEP. EXCAVATED MATERIAL TO BE FARMED AND USED AS GENERAL FILL WITHIN FILL ZONES 1m BELOW FINAL SURFACE (GEOTECHNICAL ENGINEER TO CONFIRM SUITABILITY OF MATERIAL).
4. POSITIVE BALANCE VOLUMES INDICATE SHORTFALL OF MATERIAL REQUIRED (IMPORT).
5. THE VOLUMES DO NOT TAKE INTO ACCOUNT THE FOLLOWING :-
   - BULKING FACTORS OF REMOVED CUT
   - REMOVAL OF EXISTING BUILDING SLABS AND PAVEMENTS
   - REMOVAL AND\OR REMEDIATION OF ANY EXISTING UNCONTROLLED FILL
   - PROPOSED LANDSCAPING
   - STORMWATER AND UTILITY TRENCHING
   - EROSION AND SEDIMENTATION CONTROL SWALES AND BASINS
6. BUILDING PADS HAVE BEEN GRADED AT MINIMUM 0.5% GRADE
7. PROPOSED PAVEMENT BOX OUT HAS BEEN SHOWN AT 700mm DEPTH. PAVEMENT DEPTH TO CONFIRMED DURING DETAILED DESIGN.

Issue	Description	Date
K	ISSUED FOR DEVELOPMENT APPLICATION	14-04-22
J	ISSUED FOR DEVELOPMENT APPLICATION	18-03-22
H	ISSUED FOR DEVELOPMENT APPLICATION	04-03-22
G	ISSUED FOR DEVELOPMENT APPLICATION	24-02-22
F	ISSUED FOR DEVELOPMENT APPLICATION	10-02-22
E	ISSUED FOR DEVELOPMENT APPLICATION	03-02-22
D	ISSUED FOR DEVELOPMENT APPLICATION	15-10-20
C	ISSUED FOR DEVELOPMENT APPLICATION	12-10-20
B	ISSUED FOR DEVELOPMENT APPLICATION	22-05-20

Bar Scales

0 50 100 150 200m

1 : 2000 @ A1

100mm on Original

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Client: mirvac

Scales	1:2000	Drawn	KR
		Designed	KR
Grid	MGA	Checked	AT
Height Datum	AHD	Approved	AM

GDA2020

Project: ASPECT INDUSTIAL ESTATE MAMRE ROAD, KEMPS CREEK STAGE 1

Title: BULK EARTHWORKS CUT/FILL PLAN

Civil Engineers and Project Managers
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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: FOR APPROVAL
NOT TO BE USED FOR CONSTRUCTION

A1

Project - Drawing No.: 18-596-C1025

Issue: K

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LEGEND

- EXISTING BOUNDARY
- 60.0 EXISTING CONTOUR
- PROPOSED BOUNDARY
- 65.0 PROPOSED CONTOUR
- +BEL75.00 PROPOSED BULK EARTHWORKS LEVEL
- DD 900mm DISH DRAIN. DETAIL ON C1011
- SD 750mm SPOON DRAIN. DETAIL ON C1011
- CD CATCH DRAIN. DETAIL ON C1011
- EROSION AND SEDIMENT CONTROL CATCH DRAIN. DETAIL ON C1120
- PROPOSED RETAINING WALL
- SCOUR PROTECTION D50=600mm THICKNESS 900mm

MAMRE ROAD

PROPOSED POND LOCATION 300m² APPROXIMATE AREA

40m RIPARIAN CORRIDOR

40.0m RIPARIAN CORRIDOR

5.5m (10.0m TYP.)

15.5m (20.0m TYP.)

14.5m (10m TYP.)

24.5m (20.0m TYP.)

1 3 MAX BATTER

BEL 47.40

1194m³

BEL 47.55

LOW FLOW CHANNEL

47.20

0.3% MIN

RETAINING WALL RW11 (LENGTH: 20m MAX, HEIGHT: 2.5m)

BEL 48.65

0.5% MIN

47.60

47.40

PROPOSED LOT 1

REFER 18-596-2000 DRG PACKAGE FOR DETAILS

BEL 48.65

47.40

47.80

47.60

47.40

47.20

46.80

ROAD 02

46.80

R57

L13.879

10°45'48"

L16.868

280

260

240

220

FUTURE LOT 2

1 3 MAX BATTER

INLET AND OUTLET SCOUR PROTECTION AND ENERGY DISSIPATION TO BE CONFIRMED

DETENTION BASIN

BEL44.34

BEL40.52

BEL40.53

BEL44.94

BEL40.66

BEL40.68

BEL40.69

BEL 47.51

ALL FINISHED LEVELS SHOWN ARE ±1000mm

ADJOINS DRG No 18-596-C1031

ADJOINS DRG No 18-596-C1032

Issue	Description	Date
J	ISSUED FOR DEVELOPMENT APPLICATION	14-04-22
H	ISSUED FOR DEVELOPMENT APPLICATION	18-03-22
G	ISSUED FOR DEVELOPMENT APPLICATION	04-03-22
F	ISSUED FOR DEVELOPMENT APPLICATION	24-02-22
E	ISSUED FOR DEVELOPMENT APPLICATION	03-02-22
D	ISSUED FOR DEVELOPMENT APPLICATION	08-10-21
C	ISSUED FOR DEVELOPMENT APPLICATION	15-10-20
B	ISSUED FOR DEVELOPMENT APPLICATION	12-10-20
A	ISSUED FOR DEVELOPMENT APPLICATION	15-05-20

Bar Scales

0 10 20 30 40 50m

1 : 500 @ A1 1 : 1000 @ A3

100mm on Original

Key Plan

SHEET 1 SHEET 2 SHEET 3 SHEET 4 SHEET 5 SHEET 6 SHEET 7 SHEET 8 SHEET 9 SHEET 10

Client

mirvac

Scales 1:500

Grid MGA

Height Datum AHD

Drawn KR

Designed KR

Checked AT

Approved AM

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Project

ASPECT INDUSTIAL ESTATE
MAMRE ROAD,
KEMPS CREEK
STAGE 1

Title

BULK EARTHWORKS PLAN
SHEET 1

Civil Engineers and Project Managers

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North Sydney NSW 2060
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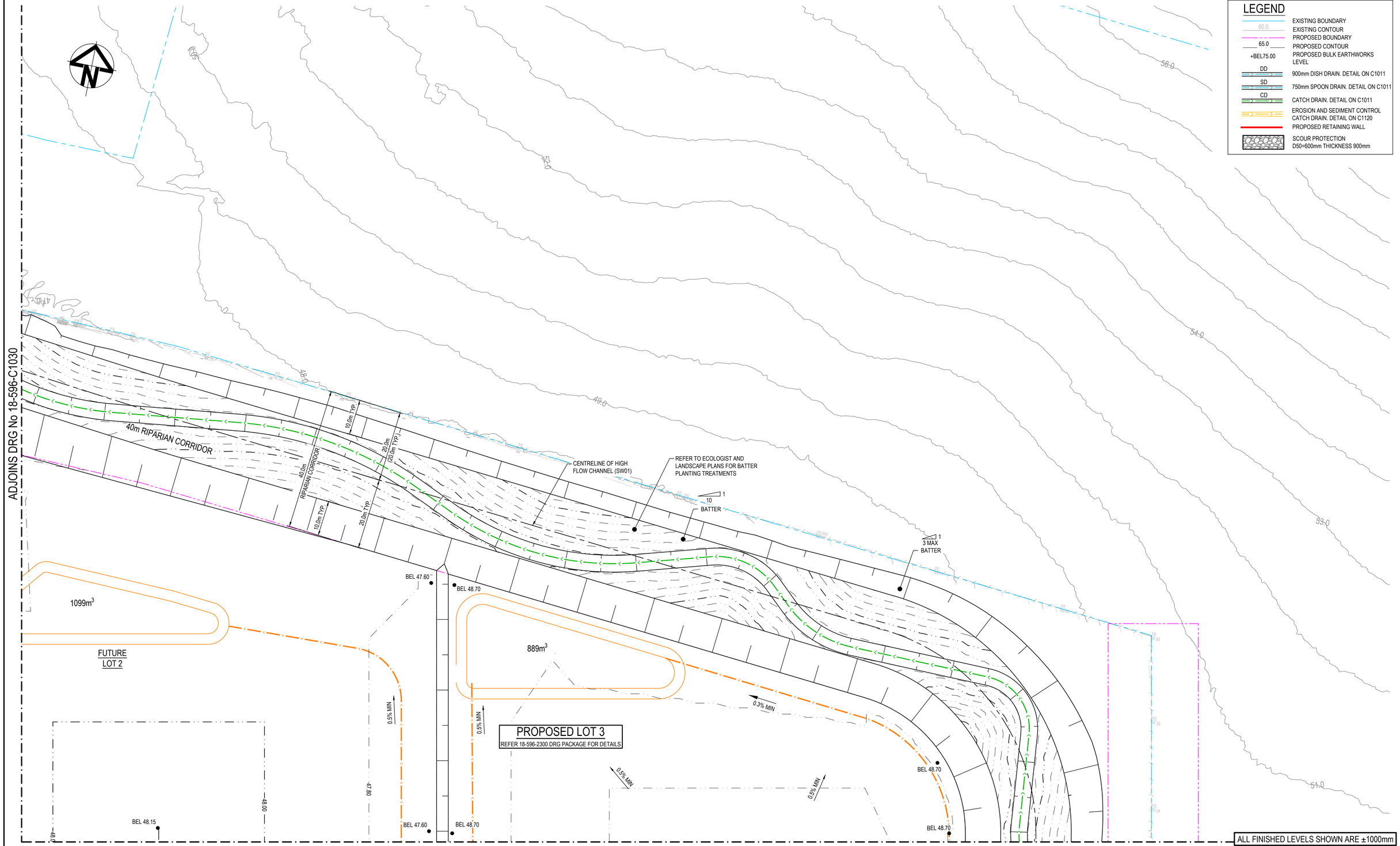
Status FOR APPROVAL
NOT TO BE USED FOR CONSTRUCTION

A1

Project - Drawing No. 18-596-C1030

Issue J

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Issue	Description	Date
J	ISSUED FOR DEVELOPMENT APPLICATION	14-04-22
H	ISSUED FOR DEVELOPMENT APPLICATION	18-03-22
G	ISSUED FOR DEVELOPMENT APPLICATION	04-03-22
F	ISSUED FOR DEVELOPMENT APPLICATION	24-02-22
E	ISSUED FOR DEVELOPMENT APPLICATION	03-02-22
D	ISSUED FOR DEVELOPMENT APPLICATION	08-10-21
C	ISSUED FOR DEVELOPMENT APPLICATION	15-10-20
B	ISSUED FOR DEVELOPMENT APPLICATION	12-10-20
A	ISSUED FOR DEVELOPMENT APPLICATION	15-05-20

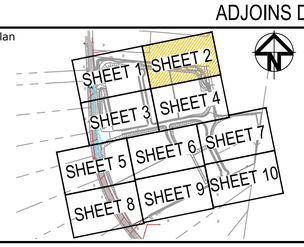
Bar Scales

0 10 20 30 40 50m

1 : 500 @ A1 1 : 1000 @ A3

100mm on Original

Key Plan



Client

mirvac

Scales	1:500	Drawn	KR
		Designed	KR
Grid	MGA	Checked	AT
Height Datum	AHD	Approved	AM

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Project

ASPECT INDUSTIAL ESTATE
MAMRE ROAD,
KEMPS CREEK
STAGE 1

Title

BULK EARTHWORKS
PLAN
SHEET 2

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: FOR APPROVAL
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A1

Project - Drawing No.: 18-596-C1031

Issue: J

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ADJOINS DRG No 18-596-C1030

LEGEND

- EXISTING BOUNDARY
- 60.0 EXISTING CONTOUR
- PROPOSED BOUNDARY
- 65.0 PROPOSED CONTOUR
- +BEL75.00 PROPOSED BULK EARTHWORKS LEVEL
- DD 900mm DISH DRAIN. DETAIL ON C1011
- SD 750mm SPOON DRAIN. DETAIL ON C1011
- CD CATCH DRAIN. DETAIL ON C1011
- EROSION AND SEDIMENT CONTROL CATCH DRAIN. DETAIL ON C1120
- PROPOSED RETAINING WALL
- SCOUR PROTECTION D50=600mm THICKNESS 900mm

MAMRE ROAD

DETENTION BASIN

BIO RETENTION
BEL 42.75

RETAINING WALL RW11 (LENGTH: 209m MAX. HEIGHT: 2.5m)

BEL40.72 BEL40.72 BEL40.88 BEL40.88 BEL44.34 BEL41.09 BEL41.10 BEL41.23 BEL41.25 BEL44.95 BEL44.96 BEL 47.51 BEL44.95

BEL 48.65

PROPOSED LOT 1
REFER 18-596-2100 DRG PACKAGE FOR DETAILS

BEL 48.65

0.5% MIN

47.40 47.60 47.40 47.40

0.5% MIN 0.5% MIN 0.5% MIN

1 3 MAX BATTER

1 3 MAX BATTER

1 3 MAX BATTER

1 3 MAX BATTER

1 3 MAX BATTER

ROAD 01

82°59'25" L50.208 R=800 L61.029

ROAD 02

47.20 47.20 47.00 46.80 47.20 47.80

0.3% MIN

CREST 161.801

FUTURE LOT 2

SAG 28.143

BEL 47.65

BEL 46.70

REFER ORION CONSULTING DRGS FOR INTERSECTION DETAILS

ROAD 01 46.20 46.40 46.60 46.80 ROAD 01

ROAD 02 78°37'10" L411.384 47.20 47.80

FUTURE LOT 8

BEL 51.80

3082m³

FUTURE LOT 8

BEL 51.80

ALL FINISHED LEVELS SHOWN ARE ±1000mm

0.000 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300 320 340

TC 50.20 SAG 53.9 CT 111

0 20 40 60 80 100 120 140 160 180 200

ADJOINS DRG No 18-596-C1034

ADJOINS DRG No 18-596-C1035

ADJOINS DRG No 18-596-C1033

Issue	Description	Date
J	ISSUED FOR DEVELOPMENT APPLICATION	14-04-22
H	ISSUED FOR DEVELOPMENT APPLICATION	18-03-22
G	ISSUED FOR DEVELOPMENT APPLICATION	04-03-22
F	ISSUED FOR DEVELOPMENT APPLICATION	24-02-22
E	ISSUED FOR DEVELOPMENT APPLICATION	03-02-22
D	ISSUED FOR DEVELOPMENT APPLICATION	08-10-21
C	ISSUED FOR DEVELOPMENT APPLICATION	15-10-20
B	ISSUED FOR DEVELOPMENT APPLICATION	12-10-20
A	ISSUED FOR DEVELOPMENT APPLICATION	15-05-20

Bar Scales

0 10 20 30 40 50m

1 : 500 @ A1 1 : 1000 @ A3

100mm on Original

Key Plan

SHEET 1 SHEET 2 SHEET 3 SHEET 4 SHEET 5 SHEET 6 SHEET 7 SHEET 8 SHEET 9 SHEET 10

Client

mirvac

Scales	1:500	Drawn	KR
		Designed	KR
Grid	MGA	Checked	AT
Height Datum	AHD	Approved	AM

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Project
ASPECT INDUSTIAL ESTATE
MAMRE ROAD,
KEMPS CREEK
STAGE 1

Title
BULK EARTHWORKS
PLAN
SHEET 3

Civil Engineers and Project Managers
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Level 7, 153 Walker Street
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www.atl.net.au
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Status
FOR APPROVAL
NOT TO BE USED FOR CONSTRUCTION

A1

Project - Drawing No.
18-596-C1032

Issue
J

F:\18-596 Mamre Road\6.0 Drgs\Civil\Final\SSD\1000_STAGE 1 SSD_MOD 2\18-596-C1032.dwg

ADJOINS DRG No 18-596-C1031

ADJOINS DRG No 18-596-C1032

ADJOINS DRG No 18-596-C1035

ADJOINS DRG No 18-596-C1036

LEGEND

- EXISTING BOUNDARY
- 60.0 EXISTING CONTOUR
- PROPOSED BOUNDARY
- 65.0 PROPOSED CONTOUR
- +BEL75.00 PROPOSED BULK EARTHWORKS LEVEL
- DD 900mm DISH DRAIN. DETAIL ON C1011
- SD 750mm SPOON DRAIN. DETAIL ON C1011
- CD CATCH DRAIN. DETAIL ON C1011
- EROSION AND SEDIMENT CONTROL CATCH DRAIN. DETAIL ON C1120
- PROPOSED RETAINING WALL
- SCOUR PROTECTION D50=600mm THICKNESS 900mm

FUTURE LOT 2

FUTURE LOT 7

PROPOSED LOT 3
REFER 18-596-2300 DRG PACKAGE FOR DETAILS

40m RIPARIAN CORRIDOR

ROAD 01

ROAD 03

ROAD 04

UPSTREAM CATCHMENT DIVERSION CHANNEL. REFER TO TO DRG 18-596-C1006 FOR DETAIL

ALL FINISHED LEVELS SHOWN ARE ±1000mm

Issue	Description	Date
J	ISSUED FOR DEVELOPMENT APPLICATION	14-04-22
H	ISSUED FOR DEVELOPMENT APPLICATION	18-03-22
G	ISSUED FOR DEVELOPMENT APPLICATION	04-03-22
F	ISSUED FOR DEVELOPMENT APPLICATION	24-02-22
E	ISSUED FOR DEVELOPMENT APPLICATION	03-02-22
D	ISSUED FOR DEVELOPMENT APPLICATION	08-10-21
C	ISSUED FOR DEVELOPMENT APPLICATION	15-10-20
B	ISSUED FOR DEVELOPMENT APPLICATION	12-10-20
A	ISSUED FOR DEVELOPMENT APPLICATION	15-05-20

100mm on Original

Bar Scales

0 10 20 30 40 50m

1 : 500 @ A1 1 : 1000 @ A3

Key Plan

SHEET 1 SHEET 2 SHEET 3 SHEET 4 SHEET 5 SHEET 6 SHEET 7 SHEET 8 SHEET 9 SHEET 10

Client

mirvac

Scales	1:500	Drawn	KR
		Designed	KR
Grid	MGA	Checked	AT
Height Datum	AHD	Approved	AM

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GDA2020

Project

ASPECT INDUSTIAL ESTATE
MAMRE ROAD,
KEMPS CREEK
STAGE 1

Title

BULK EARTHWORKS PLAN
SHEET 4

Civil Engineers and Project Managers

at&l

Level 7, 153 Walker Street
North Sydney NSW 2060
ABN 96 130 882 405
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www.atl.net.au
info@atl.net.au

Status: FOR APPROVAL
NOT TO BE USED FOR CONSTRUCTION

A1

Project - Drawing No. 18-596-C1033

Issue J

F:\18-596 Mamre Road\6.0 Drgs\Civil\Final\SSD\1000_STAGE 1 SSD_MOD 2\18-596-C1033.dwg

LEGEND

- EXISTING BOUNDARY
- 60.0 EXISTING CONTOUR
- PROPOSED BOUNDARY
- 65.0 PROPOSED CONTOUR
- +BEL75.00 PROPOSED BULK EARTHWORKS LEVEL
- DD 900mm DISH DRAIN. DETAIL ON C1011
- SD 750mm SPOON DRAIN. DETAIL ON C1011
- CD CATCH DRAIN. DETAIL ON C1011
- EROSION AND SEDIMENT CONTROL CATCH DRAIN. DETAIL ON C1120
- PROPOSED RETAINING WALL
- SCOUR PROTECTION D50=600mm THICKNESS 900mm

ADJOINS DRG No 18-596-C1032

MAMRE ROAD

1 3 MAX BATTER

BEL 51.80

FUTURE LOT 8

52.00

BEL 52.20

0.5% MIN

PROPOSED LOT_9 SUBJECT TO SEPARATE SSDA

BEL 51.70

BEL 54.10

ALL FINISHED LEVELS SHOWN ARE ±1000mm

ADJOINS DRG No 18-596-C1035

ADJOINS DRG No 18-596-C1037

Issue	Description	Date
J	ISSUED FOR DEVELOPMENT APPLICATION	14-04-22
H	ISSUED FOR DEVELOPMENT APPLICATION	18-03-22
G	ISSUED FOR DEVELOPMENT APPLICATION	04-03-22
F	ISSUED FOR DEVELOPMENT APPLICATION	24-02-22
E	ISSUED FOR DEVELOPMENT APPLICATION	03-02-22
D	ISSUED FOR DEVELOPMENT APPLICATION	08-10-21
C	ISSUED FOR DEVELOPMENT APPLICATION	15-10-20
B	ISSUED FOR DEVELOPMENT APPLICATION	12-10-20
A	ISSUED FOR DEVELOPMENT APPLICATION	15-05-20

Bar Scales

0 10 20 30 40 50m

1 : 500 @ A1 1 : 1000 @ A3

100mm on Original

Key Plan

SHEET 1 SHEET 2 SHEET 3 SHEET 4 SHEET 5 SHEET 6 SHEET 7 SHEET 8 SHEET 9 SHEET 10

Client

mirvac

Scales 1:500

Grid MGA

Height Datum AHD

Drawn KR

Designed KR

Checked AT

Approved AM

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GDA2020

Project

ASPECT INDUSTRIAL ESTATE
MAMRE ROAD,
KEMPS CREEK
STAGE 1

Title

BULK EARTHWORKS PLAN SHEET 5

Civil Engineers and Project Managers

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info@atl.net.au

Status FOR APPROVAL
NOT TO BE USED FOR CONSTRUCTION

A1

Project - Drawing No. 18-596-C1034

Issue J

F:\18-596 Mamre Road\6.0 Drgs\Civil\Final\SSD\1000_STAGE 1 SSD_MOD 2\18-596-C1034.dwg

LEGEND

- EXISTING BOUNDARY
- 60.0 — EXISTING CONTOUR
- PROPOSED BOUNDARY
- 65.0 — PROPOSED CONTOUR
- +BEL75.00 — PROPOSED BULK EARTHWORKS LEVEL
- DD — 900mm DISH DRAIN. DETAIL ON C1011
- SD — 750mm SPOON DRAIN. DETAIL ON C1011
- CD — CATCH DRAIN. DETAIL ON C1011
- EROSION AND SEDIMENT CONTROL CATCH DRAIN. DETAIL ON C1120
- PROPOSED RETAINING WALL
- SCOUR PROTECTION D50=600mm THICKNESS 900mm

ADJOINS DRG No 18-596-C1032

ADJOINS DRG No 18-596-C1033

ADJOINS DRG No 18-596-C1034

ADJOINS DRG No 18-596-C1036

ADJOINS DRG No 18-596-C1038

3082m³

4447m³

PROPOSED LOT_9 SUBJECT TO SEPARATE SSDA

FUTURE LOT 8

FUTURE LOT 7

ROAD 04

TC 61.26 60

CT 82.887 80

100

TC 119.00 120

CT 134.291 140

148.952

BEL 51.80 · BEL 52.20 · BEL 54.10 · BEL 51.70 · BEL 53.25 · BEL 53.70 · BEL 56.00

52.00 · 51.80 · 53.40 · 53.60 · 56.20

0.5% MIN

1 3 MAX BATTER

Issue	Description	Date
J	ISSUED FOR DEVELOPMENT APPLICATION	14-04-22
H	ISSUED FOR DEVELOPMENT APPLICATION	18-03-22
G	ISSUED FOR DEVELOPMENT APPLICATION	04-03-22
F	ISSUED FOR DEVELOPMENT APPLICATION	24-02-22
E	ISSUED FOR DEVELOPMENT APPLICATION	03-02-22
D	ISSUED FOR DEVELOPMENT APPLICATION	08-10-21
C	ISSUED FOR DEVELOPMENT APPLICATION	15-10-20
B	ISSUED FOR DEVELOPMENT APPLICATION	12-10-20
A	ISSUED FOR DEVELOPMENT APPLICATION	15-05-20

Bar Scales

0 10 20 30 40 50m

1 : 500 @ A1 1 : 1000 @ A3

100mm on Original

Key Plan

SHEET 1 SHEET 2 SHEET 3 SHEET 4 SHEET 5 SHEET 6 SHEET 7 SHEET 8 SHEET 9 SHEET 10

Client: mirvac

Scales		Drawn	KR
	1:500	Designed	KR
Grid	MGA	Checked	AT
Height Datum	AHD	Approved	AM

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GDA2020

Project: ASPECT INDUSTRIAL ESTATE MAMRE ROAD, KEMPS CREEK STAGE 1

Title: BULK EARTHWORKS PLAN SHEET 6

Civil Engineers and Project Managers

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info@atl.net.au

Status: FOR APPROVAL
NOT TO BE USED FOR CONSTRUCTION

A1

Project - Drawing No.: 18-596-C1035

Issue: J

F:\18-596 Mamre Road\6.0 Drgs\Civil\Final\SSD\1000_STAGE 1 SSD_MOD 2\18-596-C1035.dwg

ADJOINS DRG No 18-596-C1033

ADJOINS DRG No 18-596-C1035

ADJOINS DRG No 18-596-C1039

RETAINING WALL RW21 (LENGTH: 307m, MAX. HEIGHT: 10.9m)

DISH DRAIN TO CONNECT INTO SEDIMENT AND EROSION CONTROL CATCH DRAIN

DISH DRAIN TYPE 2 BEHIND RETAINING WALL. REFER TO DRG C1012 FOR DETAIL.

CATCH DRAIN. REFER TO DRG C1012 FOR DETAIL.

DISH DRAIN TYPE 1 BEHIND RETAINING WALL. REFER TO DRG C1012 FOR DETAIL.

SMOOTHLY TRANSITION CATCH DRAIN INTO SPOON DRAIN. CONTRACTOR TO ENSURE NO PONDING TO OCCUR.

SPOON DRAIN. REFER TO DRG C1012 FOR DETAIL.

FUTURE LOT 7

FUTURE LOT 4

FUTURE LOT 6

FUTURE LOT 5

697m³

889m³

ROAD 01

ROAD 03

3 MAX BATTER

3 TYP. BATTER

0.3% MIN

0.5% MIN

ALL FINISHED LEVELS SHOWN ARE ±1000mm

LEGEND

- EXISTING BOUNDARY
- 60.0 EXISTING CONTOUR
- PROPOSED BOUNDARY
- 65.0 PROPOSED CONTOUR
- +BEL75.00 PROPOSED BULK EARTHWORKS LEVEL
- DD 900mm DISH DRAIN. DETAIL ON C1011
- SD 750mm SPOON DRAIN. DETAIL ON C1011
- CD CATCH DRAIN. DETAIL ON C1011
- EROSION AND SEDIMENT CONTROL CATCH DRAIN. DETAIL ON C1120
- PROPOSED RETAINING WALL
- SCOUR PROTECTION D50=600mm THICKNESS 900mm

Issue	Description	Date
J	ISSUED FOR DEVELOPMENT APPLICATION	14-04-22
H	ISSUED FOR DEVELOPMENT APPLICATION	18-03-22
G	ISSUED FOR DEVELOPMENT APPLICATION	04-03-22
F	ISSUED FOR DEVELOPMENT APPLICATION	24-02-22
E	ISSUED FOR DEVELOPMENT APPLICATION	03-02-22
D	ISSUED FOR DEVELOPMENT APPLICATION	08-10-21
C	ISSUED FOR DEVELOPMENT APPLICATION	15-10-20
B	ISSUED FOR DEVELOPMENT APPLICATION	12-10-20
A	ISSUED FOR DEVELOPMENT APPLICATION	15-05-20

Bar Scales

0 10 20 30 40 50m

1 : 500 @ A1 1 : 1000 @ A3

100mm on Original

Key Plan

SHEET 1 SHEET 2 SHEET 3 SHEET 4 SHEET 5 SHEET 6 SHEET 7 SHEET 8 SHEET 9 SHEET 10

Client: mirvac

Scales: 1:500

Grid: MGA

Height Datum: AHD

Drawn: KR

Designed: KR

Checked: AT

Approved: AM

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GDA2020

Project: ASPECT INDUSTIAL ESTATE
MAMRE ROAD,
KEMPS CREEK
STAGE 1

Title: BULK EARTHWORKS PLAN SHEET 7

Civil Engineers and Project Managers
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info@atl.net.au

Status: FOR APPROVAL
NOT TO BE USED FOR CONSTRUCTION

A1

Project - Drawing No. 18-596-C1036

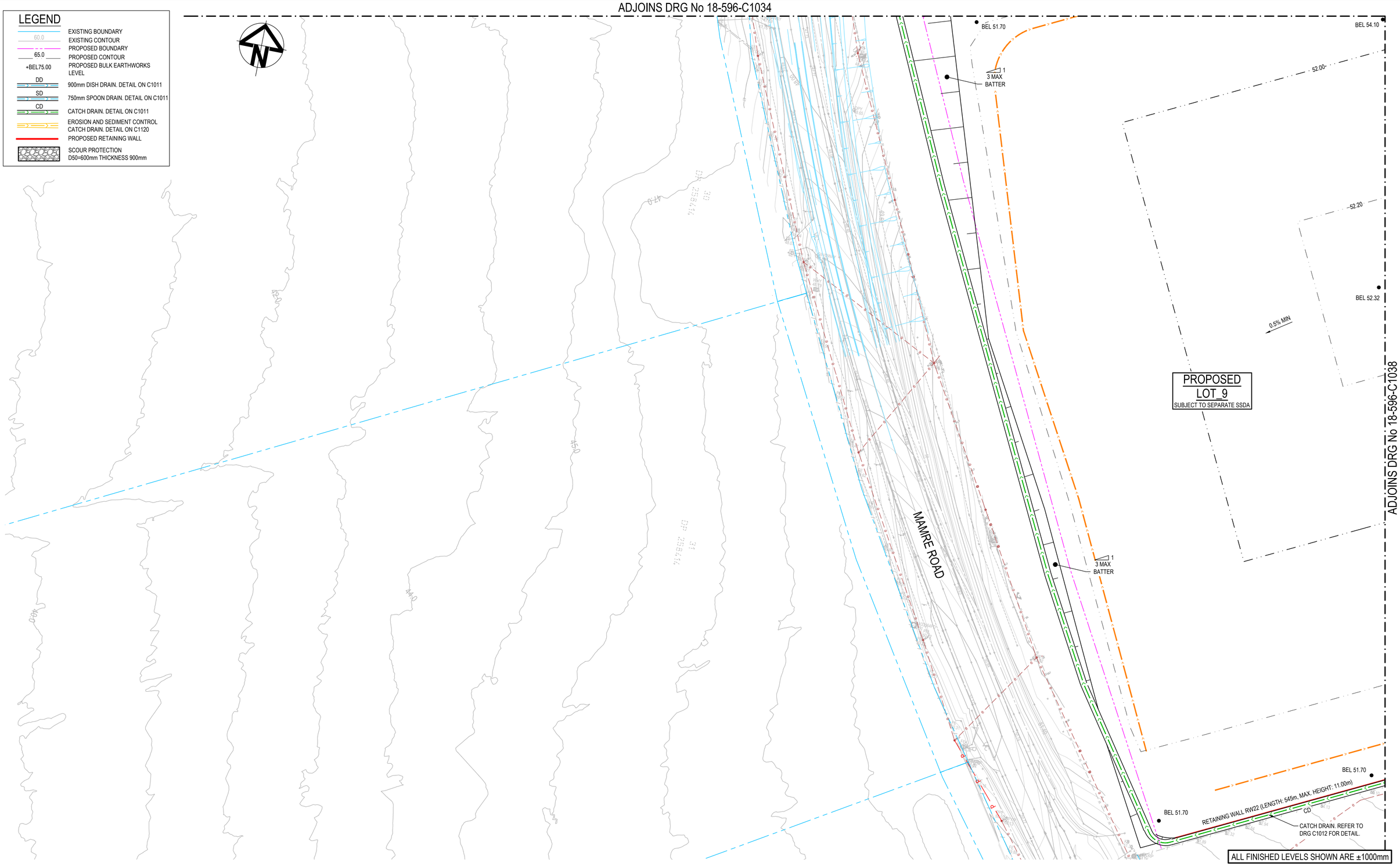
Issue J

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ADJOINS DRG No 18-596-C1034

LEGEND

- EXISTING BOUNDARY
- 60.0 EXISTING CONTOUR
- PROPOSED BOUNDARY
- 65.0 PROPOSED CONTOUR
- +BEL75.00 PROPOSED BULK EARTHWORKS LEVEL
- DD 900mm DISH DRAIN. DETAIL ON C1011
- SD 750mm SPOON DRAIN. DETAIL ON C1011
- CD CATCH DRAIN. DETAIL ON C1011
- EROSION AND SEDIMENT CONTROL CATCH DRAIN. DETAIL ON C1120
- PROPOSED RETAINING WALL
- SCOUR PROTECTION D50=600mm THICKNESS 900mm



ADJOINS DRG No 18-596-C1038

Issue	Description	Date
J	ISSUED FOR DEVELOPMENT APPLICATION	14-04-22
H	ISSUED FOR DEVELOPMENT APPLICATION	18-03-22
G	ISSUED FOR DEVELOPMENT APPLICATION	04-03-22
F	ISSUED FOR DEVELOPMENT APPLICATION	24-02-22
E	ISSUED FOR DEVELOPMENT APPLICATION	03-02-22
D	ISSUED FOR DEVELOPMENT APPLICATION	08-10-21
C	ISSUED FOR DEVELOPMENT APPLICATION	15-10-20
B	ISSUED FOR DEVELOPMENT APPLICATION	12-10-20
A	ISSUED FOR DEVELOPMENT APPLICATION	15-05-20

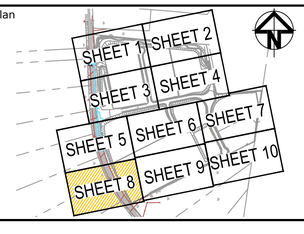
Bar Scales

0 10 20 30 40 50m

1 : 500 @ A1 1 : 1000 @ A3

100mm on Original

Key Plan



Client: mirvac

Scales		Drawn	KR
	1:500	Designed	KR
Grid	MGA	Checked	AT
Height Datum	AHD	Approved	AM

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Project
ASPECT INDUSTIAL ESTATE
MAMRE ROAD,
KEMPS CREEK
STAGE 1

Title
BULK EARTHWORKS
PLAN
SHEET 8

Civil Engineers and Project Managers
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info@atl.net.au

Status: FOR APPROVAL
NOT TO BE USED FOR CONSTRUCTION

A1

Project - Drawing No.: 18-596-C1037

Issue: J

F:\18-596 Mamre Road\6.0 Drgs\Civil\Final\SSD\1000_STAGE 1 SSD_MOD 2\18-596-C1037.dwg

ADJOINS DRG No 18-596-C1035

ADJOINS DRG No 18-596-C1037

ADJOINS DRG No 18-596-C1039

BEL 54.10

BEL 54.10

BEL 52.32

BEL 52.32

0.5% MIN

0.5% MIN

0.5% MIN

52.20

52.00

PROPOSED
LOT 9
SUBJECT TO SEPARATE SSDA

BEL 51.70

BEL 51.70

BEL 56.00

BEL 56.00

FUTURE
LOT 6

0.5% MIN

BEL 56.00

1
3 MAX
BATTER

BEL 56.00

BEL 51.70

51.80

52.00

0.3% MIN

1
3 TYP.
BATTER

DD1

CD

DISH DRAIN TYPE 1 BEHIND RETAINING WALL. REFER TO DRG C1012 FOR DETAIL.

CATCH DRAIN. REFER TO DRG C1012 FOR DETAIL.

BEL 51.70

1
3 TYP.
BATTER

DD3

DD1

CD

DISH DRAIN TYPE 1 BEHIND RETAINING WALL. REFER TO DRG C1012 FOR DETAIL.

DISH DRAIN TYPE 3 BEHIND RETAINING WALL. REFER TO DRG C1012 FOR DETAIL.

51.80

RETAINING WALL RW22 (LENGTH: 545m, MAX. HEIGHT: 11.00m)

DD3

CATCH DRAIN. REFER TO DRG C1012 FOR DETAIL.

BUILDING

BUILDING

BEL 51.70

CD

LEGEND

- EXISTING BOUNDARY
- 60.0 EXISTING CONTOUR
- PROPOSED BOUNDARY
- 65.0 PROPOSED CONTOUR
- +BEL75.00 PROPOSED BULK EARTHWORKS LEVEL
- DD 900mm DISH DRAIN. DETAIL ON C1011
- SD 750mm SPOON DRAIN. DETAIL ON C1011
- CD CATCH DRAIN. DETAIL ON C1011
- EROSION AND SEDIMENT CONTROL CATCH DRAIN. DETAIL ON C1120
- PROPOSED RETAINING WALL
- SCOUR PROTECTION D50=600mm THICKNESS 900mm

ALL FINISHED LEVELS SHOWN ARE ±1000mm

Issue	Description	Date
J	ISSUED FOR DEVELOPMENT APPLICATION	14-04-22
H	ISSUED FOR DEVELOPMENT APPLICATION	18-03-22
G	ISSUED FOR DEVELOPMENT APPLICATION	04-03-22
F	ISSUED FOR DEVELOPMENT APPLICATION	24-02-22
E	ISSUED FOR DEVELOPMENT APPLICATION	03-02-22
D	ISSUED FOR DEVELOPMENT APPLICATION	08-10-21
C	ISSUED FOR DEVELOPMENT APPLICATION	15-10-20
B	ISSUED FOR DEVELOPMENT APPLICATION	12-10-20
A	ISSUED FOR DEVELOPMENT APPLICATION	15-05-20

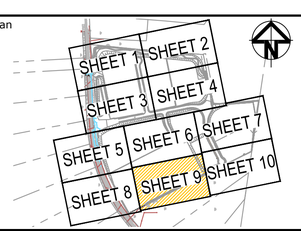
Bar Scales

0 10 20 30 40 50m

1 : 500 @ A1 1 : 1000 @ A3

100mm on Original

Key Plan



Client

mirvac

Scales 1:500

Grid MGA

Height Datum AHD

Drawn KR

Designed KR

Checked AT

Approved AM

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GDA2020

Project
ASPECT INDUSTIAL ESTATE
MAMRE ROAD,
KEMPS CREEK
STAGE 1

Title
BULK EARTHWORKS
PLAN
SHEET 9

Civil Engineers and Project Managers

at&l

Level 7, 153 Walker Street
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Tel: 02 9439 1777
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Status
FOR APPROVAL
NOT TO BE USED FOR CONSTRUCTION

A1

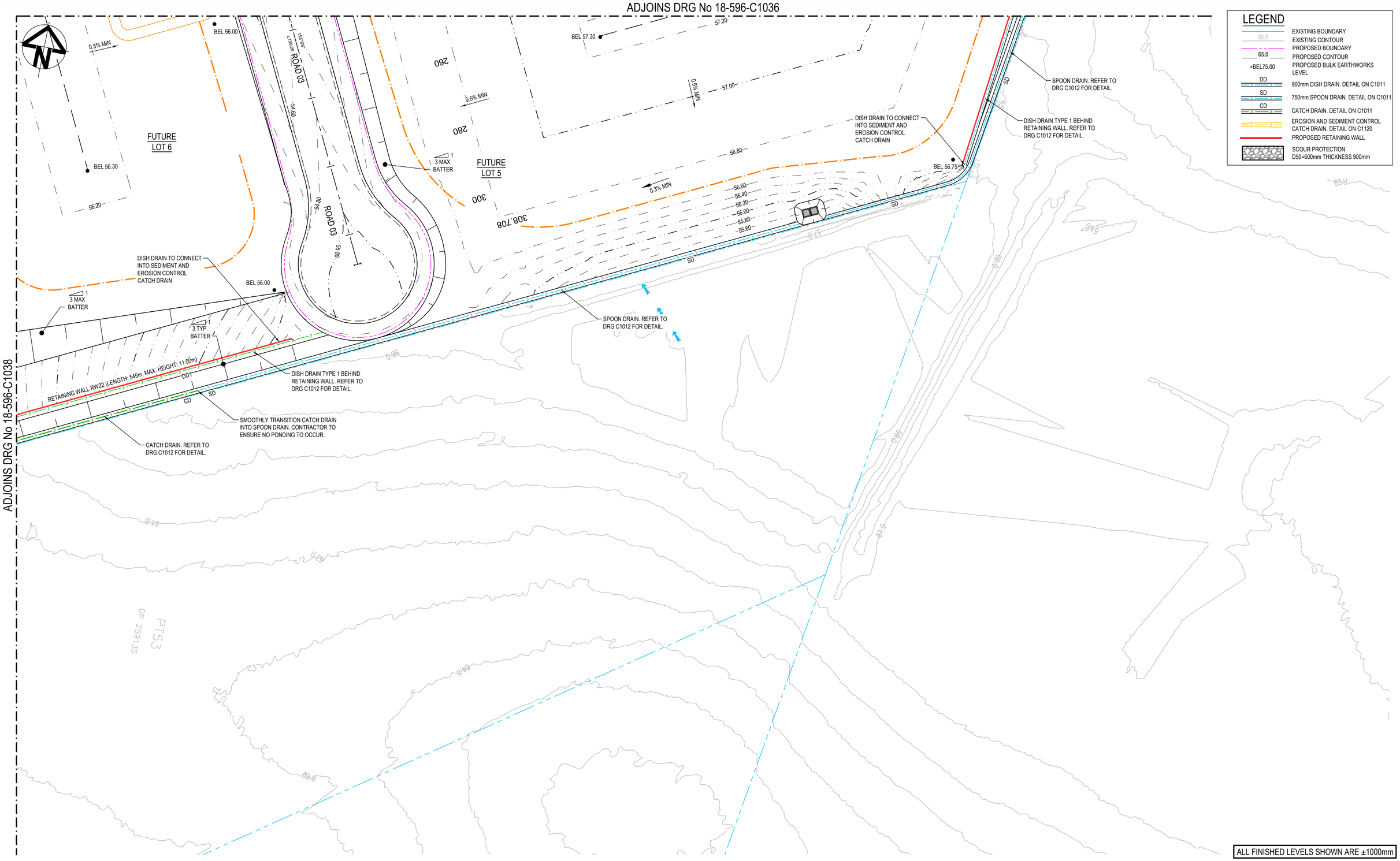
Project - Drawing No.
18-596-C1038

Issue
J

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ADJOINS DRG No 18-596-C1036

ADJOINS DRG No 18-596-C1038



LEGEND

- EXISTING BOUNDARY
- 60.0 EXISTING CONTOUR
- PROPOSED BOUNDARY
- 65.0 PROPOSED CONTOUR
- +BEL75.00 PROPOSED BULK EARTHWORKS LEVEL
- DD 900mm DISH DRAIN. DETAIL ON C1011
- SD 750mm SPOON DRAIN. DETAIL ON C1011
- CD CATCH DRAIN. DETAIL ON C1011
- EROSION AND SEDIMENT CONTROL CATCH DRAIN. DETAIL ON C1120
- PROPOSED RETAINING WALL
- SCOUR PROTECTION D50=600mm THICKNESS 900mm

ALL FINISHED LEVELS SHOWN ARE ±1000mm

Issue	Description	Date
J	ISSUED FOR DEVELOPMENT APPLICATION	14-04-22
H	ISSUED FOR DEVELOPMENT APPLICATION	18-03-22
G	ISSUED FOR DEVELOPMENT APPLICATION	04-03-22
F	ISSUED FOR DEVELOPMENT APPLICATION	24-02-22
E	ISSUED FOR DEVELOPMENT APPLICATION	03-02-22
D	ISSUED FOR DEVELOPMENT APPLICATION	08-10-21
C	ISSUED FOR DEVELOPMENT APPLICATION	15-10-20
B	ISSUED FOR DEVELOPMENT APPLICATION	12-10-20
A	ISSUED FOR DEVELOPMENT APPLICATION	15-05-20

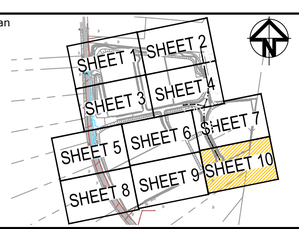
100mm on Original

Bar Scales

0 10 20 30 40 50m

1 : 500 @ A1 1 : 1000 @ A3

Key Plan



Client: mirvac

Scales: 1:500

Grid: MGA

Height Datum: AHD

Drawn: KR

Designed: KR

Checked: AT

Approved: AM

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Project: ASPECT INDUSTIAL ESTATE
MAMRE ROAD,
KEMPS CREEK
STAGE 1

Title: BULK EARTHWORKS PLAN SHEET 10

Civil Engineers and Project Managers
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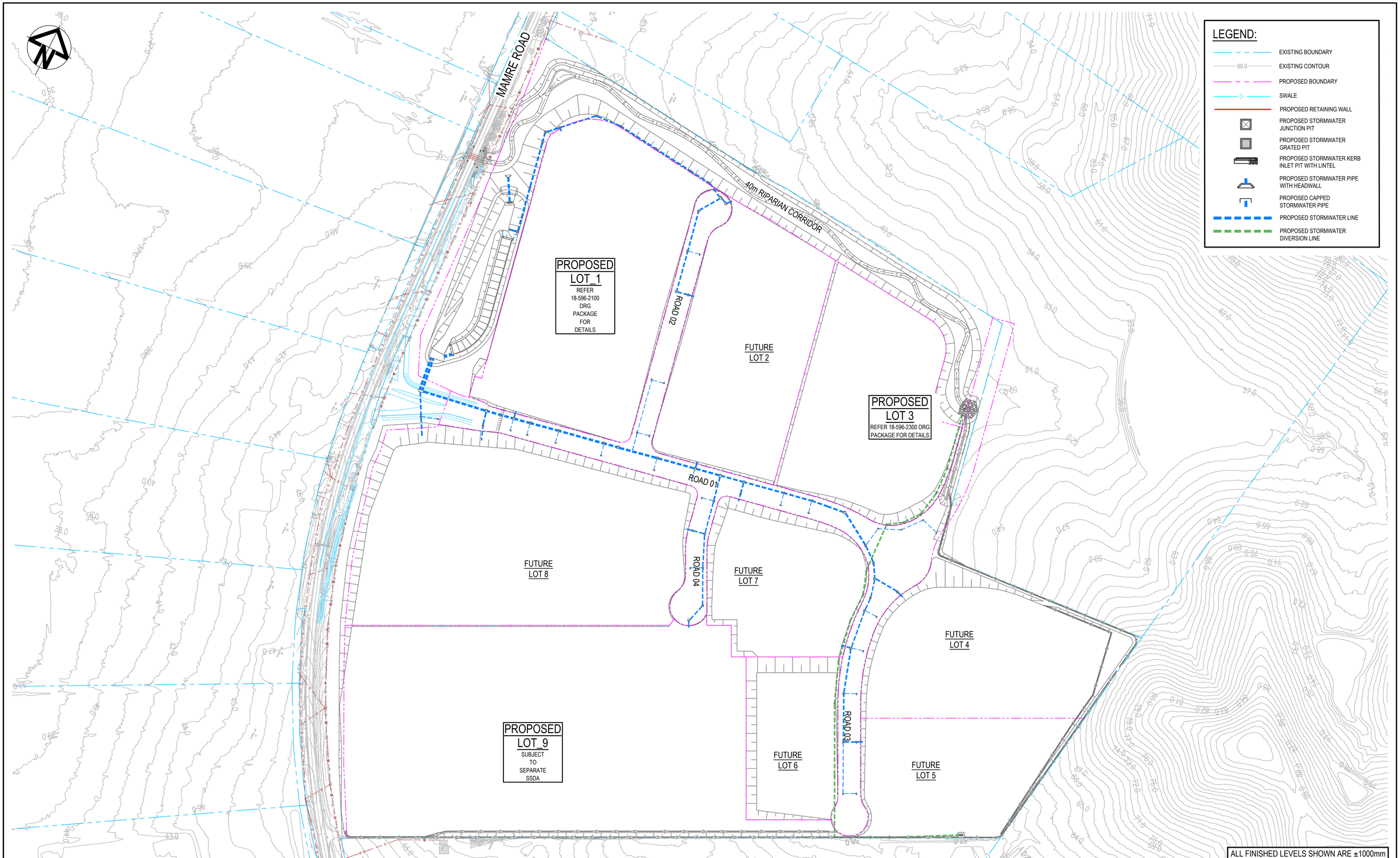
Status: FOR APPROVAL
NOT TO BE USED FOR CONSTRUCTION

A1

Project - Drawing No.: 18-596-C1039

Issue: J

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Issue	Description	Date
J	ISSUED FOR DEVELOPMENT APPLICATION	14-04-22
H	ISSUED FOR DEVELOPMENT APPLICATION	18-03-22
G	ISSUED FOR DEVELOPMENT APPLICATION	04-03-22
F	ISSUED FOR DEVELOPMENT APPLICATION	24-02-22
E	ISSUED FOR DEVELOPMENT APPLICATION	03-02-22
D	ISSUED FOR DEVELOPMENT APPLICATION	08-10-21
C	ISSUED FOR DEVELOPMENT APPLICATION	15-10-20
B	ISSUED FOR DEVELOPMENT APPLICATION	12-10-20
A	ISSUED FOR DEVELOPMENT APPLICATION	15-05-20

Bar Scales

0 50 100 150 200m

1 : 2000 @ A1

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Client

mirvac

Scales	1:2000	Drawn	KR
		Designed	KR
Grid	MGA	Checked	AT
Height Datum	AHD	Approved	AM

GDA2020

Project

ASPECT INDUSTIAL ESTATE
MAMRE ROAD,
KEMPS CREEK
STAGE 1

Title

STORMWATER DRAINAGE
OVERALL PLAN

Civil Engineers and Project Managers

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Tel: 02 9439 1777
Fax: 02 9923 1055
www.atl.net.au
info@atl.net.au

Status: FOR APPROVAL
NOT TO BE USED FOR CONSTRUCTION

A1

Project - Drawing No.: 18-596-C1040

Issue: J

100mm on Original

F:\18-596 Mamre Road\6.0 Drgs\Civil\Final\SSD\1000_STAGE 1 SSD_MOD 2\18-596-C1040.dwg

EXIST-1
3.303 ha

EXIST-2A
4.848ha

EXIST-2B
28.266ha

EXIST-2C
30.385 ha

EXIST-2D
18.890ha

EXIST-2E
17.792 ha

EXIST-2F
1.841 ha

EXIST-3
16.463ha

EXT-4
3.507ha

EXT-7
3.981ha

LEGEND:

- EXISTING BOUNDARY
- SITE EXTENT
- EXISTING CATCHMENT
- CATCHMENT DISCHARGE POINT

Issue	Description	Date
J	ISSUED FOR DEVELOPMENT APPLICATION	14-04-22
H	ISSUED FOR DEVELOPMENT APPLICATION	18-03-22
G	ISSUED FOR DEVELOPMENT APPLICATION	04-03-22
F	ISSUED FOR DEVELOPMENT APPLICATION	24-02-22
E	ISSUED FOR DEVELOPMENT APPLICATION	03-02-22
D	ISSUED FOR DEVELOPMENT APPLICATION	08-10-21
C	ISSUED FOR DEVELOPMENT APPLICATION	15-10-20
B	ISSUED FOR DEVELOPMENT APPLICATION	12-10-20
A	ISSUED FOR DEVELOPMENT APPLICATION	15-05-20

100mm on Original

Bar Scales

0 50 100 150 200 250m

1 : 2500 @ A1

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Client

mirvac

Scales	1:2500
Grid	MGA
Height Datum	AHD
Drawn	KR
Designed	KR
Checked	AT
Approved	AM

GDA2020

Project
ASPECT INDUSTIAL ESTATE
MAMRE ROAD,
KEMPS CREEK
STAGE 1

Title
STORMWATER DRAINAGE CATCHMENT PLAN (PRE-DEVELOPED)

Civil Engineers and Project Managers
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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

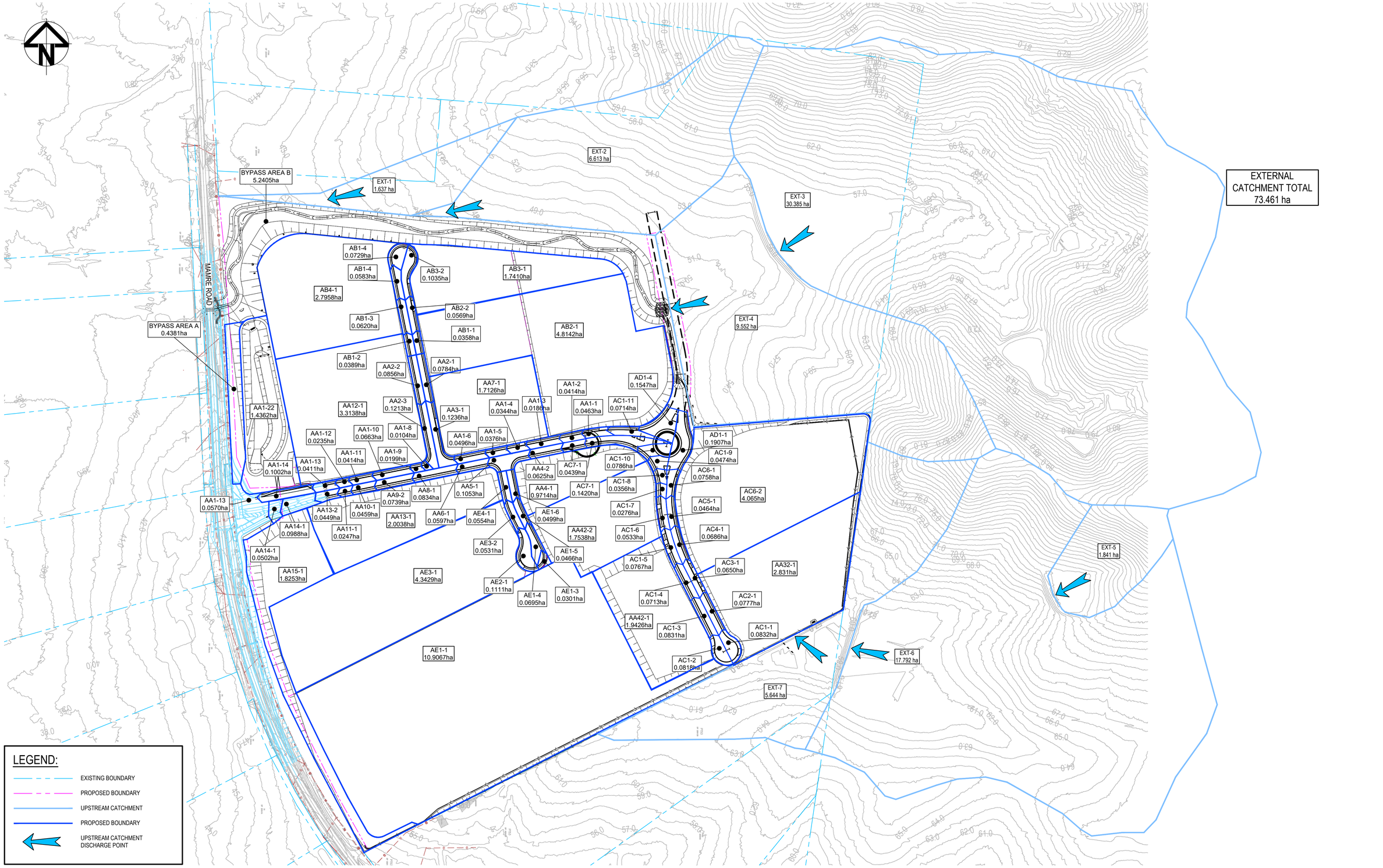
Status
FOR APPROVAL
NOT TO BE USED FOR CONSTRUCTION

A1

Project - Drawing No.
18-596-C1045

Issue
J

F:\18-596 Mamre Road\6.0 Drgs\Civil\Final\SSD\1000_STAGE 1 SSD_MOD 2\18-596-C1045.dwg



Issue	Description	Date
J	ISSUED FOR DEVELOPMENT APPLICATION	14-04-22
H	ISSUED FOR DEVELOPMENT APPLICATION	18-03-22
G	ISSUED FOR DEVELOPMENT APPLICATION	04-03-22
F	ISSUED FOR DEVELOPMENT APPLICATION	24-02-22
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D	ISSUED FOR DEVELOPMENT APPLICATION	08-10-21
C	ISSUED FOR DEVELOPMENT APPLICATION	15-10-20
B	ISSUED FOR DEVELOPMENT APPLICATION	12-10-20
A	ISSUED FOR DEVELOPMENT APPLICATION	15-05-20

100mm on Original

Bar Scales

0 50 100 150 200 250m

1 : 2500 @ A1

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Client

mirvac

Scales	1:2500	Drawn	KR
		Designed	KR
Grid	MGA	Checked	AT
Height Datum	AHD	Approved	AM

GDA2020

Project

ASPECT INDUSTRIAL ESTATE
MAMRE ROAD,
KEMPS CREEK
STAGE 1

Title

STORMWATER DRAINAGE CATCHMENT PLAN (POST-DEVELOPED)

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: FOR APPROVAL
NOT TO BE USED FOR CONSTRUCTION

A1

Project - Drawing No.: 18-596-C1046

Issue: J

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ADJOINS DRG 18-596-C1060

LEGEND:

- EXISTING BOUNDARY
- EXISTING ELECTRICITY
- PROPOSED BOUNDARY
- PROPOSED EASEMENT
- PROPOSED RETAINING WALL
- 48.00 PROPOSED MAJOR CONTOUR
- 48.20 PROPOSED MINOR CONTOUR
- PROPOSED BATTER STAGE 1A WORKS TEMPORARY BATTER 1(V):4(H) PERMANENT BATTER 1(V):5(H) U.N.O
- MK PROPOSED MOUNTABLE KERB TO PCC SPECIFICATION
- K&G PROPOSED KERB AND GUTTER TO PCC SPECIFICATION
- PROPOSED DRIVEWAY LAYBACK
- PROPOSED KERB RAMP
- LIMIT OF WORKS
- PROPOSED CATCH DRAIN
- PROPOSED STORMWATER JUNCTION PIT
- PROPOSED STORMWATER JUNCTION PIT
- PROPOSED STORMWATER KERB INLET PIT WITH LINTEL
- PROPOSED STORMWATER PIPE WITH HEADWALL
- PROPOSED CAPPED STORMWATER PIPE
- PROPOSED STORMWATER LINE
- PROPOSED INDUSTRIAL ROAD PAVEMENT TO PCC SPECIFICATION
- PROPOSED FOOTPATH PAVEMENT TO PCC SPECIFICATION
- PROPOSED INDUSTRIAL DRIVEWAY PAVEMENT TO PCC SPECIFICATION
- CUL-DE-SEC ROUNDABOUT PAVEMENT
- MAINTENANCE ACCESS TRACK
- BASIN MAINTENANCE DRIVEWAY
- REINFORCED CONCRETE WIER
- LANDSCAPED MEDIAN
- CONCRETE MEDIAN

PROPOSED DIVERSION CHAMBER

AA1-15

F44.40

F41.00

F45.00

4 x Ø600 FRC

USIL 41.44
DSIL 41.31

PROPOSED LOW FLOW PIPE TO DRAIN TREATABLE FLOW TO FILTERRA BIO-RETENTION SYSTEM. REFER TO DRG 18-596-C1059 FOR DETAILS

PROPOSED STORMWATER DETENTION BASIN.

GRADE LANDSCAPE TO DRAIN 100 YEAR ARI STORMWATER OVERLAND FLOW TO BASIN

OVERLAND FLOW PATH TYP.

BOX CULVERT 2 x 2.4W x 2.4H

PROPOSED STORMWATER SPLITTER PIT WITH LOW AND HIGH FLOW WEIR. LOW FLOW IS TO BE DIRECTED INTO BIO BASN AND HIGH FLOW IS TO BE DIRECTED INTO OSD BASIN

1 VARIES (3 MAX) BATTER

PROPOSED BASIN MAINTENANCE ACCESS TRACK

1 VARIES (3 MAX) BATTER

PROPOSED LOT 1
REFER 18-596-2100 DRG PACKAGE FOR DETAILS

CAP PROPOSED STORMWATER PIP FOR FUTURE CONNECTION

AA12-1

BOX CULVERT 1.5W x 0.9H

AA1-14

AA1-13

BOX CULVERT 2.4W x 2.4H

AA1-12

1.50m
4.60m

ROAD 01

82°59'25"
L50.208
R-800
L61.029

BOX CULVERT 1.5W x 0.9H

ROAD 01

BOX CULVERT 1.5W x 0.9H

REFER ORION CONSULTING DRGS FOR INTERSECTION DETAILS

7.70m
25.60m ROAD RESERVE
7.70m

FRC Ø375

AA11-1

5.60m
2.50m

INTERSECTION GEOMETRY (INCLUSIVE OF BOUNDARY) BASED ON INDICATIVE TfNSW CONCEPT PLAN. TBC WITH TfNSW AT DETAILED DESIGN

AA13-2

FRC 2 x Ø525

AA13-1

FRC Ø525

AA14-1

AA14-2

BOX CULVERT 1.5W x 0.9H

BOX CULVERT 1.5W x 0.9H

AA15-2

TC 50.208

SAG 53.933

20

40

60

80

100

120

140

160

1 VARIES (3 MAX) BATTER

CT 111.237

CAP PROPOSED STORMWATER PIPE FOR FUTURE CONNECTION

AA15-1

CAP PROPOSED STORMWATER PIPE FOR FUTURE CONNECTION

FUTURE LOT 8

ALL FINISHED LEVELS SHOWN ARE ±1000mm

ADJOINS DRG 18-596-C1051

Issue	Description	Date
J	ISSUED FOR DEVELOPMENT APPLICATION	14-04-22
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A	ISSUED FOR DEVELOPMENT APPLICATION	15-05-20

100mm on Original

Bar Scales

0 5 10 15 20 25m

1 : 250 @ A1 1 : 500 @ A3

Key Plan

Client

mirvac

Scales	1:250	Drawn	KR
		Designed	KR
Grid	MGA	Checked	AT
Height Datum	AHD	Approved	AM

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Project
ASPECT INDUSTIAL ESTATE
MAMRE ROAD,
KEMPS CREEK
STAGE 1

Title
ROADWORKS
AND STORMWATER DRAINAGE
SHEET 1

Civil Engineers and Project Managers
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Status
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A1

Project - Drawing No.
18-596-C1050

Issue
J

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ADJOINS DRG 18-596-C1057

ADJOINS DRG 18-596-C1050

ADJOINS DRG 18-596-C1052

PROPOSED LOT 1
REFER 18-596-2100 DRG PACKAGE FOR DETAILS

FUTURE LOT 2

FUTURE LOT 8

24.00m ROAD RESERVE
5.00m | 7.50m | 7.50m | 4.00m
2.50m | 1.50m

ROAD 01
ROAD 02

AA1-11 | AA1-10 | AA1-9 | AA1-8 | AA1-7 | AA1-6
AA2-3 | AA3-1
AA10-1 | AA9-1 | AA8-1 | AA6-1

BOX CULVERT 2.4W x 2.4H
BOX CULVERT 2.1W x 2.4H

FRC Ø375
FRC Ø600

1 VARIES (3 MAX) BATTER

47.00 | 47.20 | 47.40 | 47.60 | 47.80 | 48.00 | 47.40

78°37'10"
L411.384

SAG 28.143

1.50m | 4.60m | 7.70m | 25.60m ROAD RESERVE | 7.70m | 2.50m | 5.60m

40 | 20 | 000'0

180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360

ALL FINISHED LEVELS SHOWN ARE ±1000mm

Issue	Description	Date
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A	ISSUED FOR DEVELOPMENT APPLICATION	15-05-20

Bar Scales

0 5 10 15 20 25m

1 : 250 @ A1 1 : 500 @ A3

100mm on Original

Key Plan

Client

mirvac

Scales	1:250	Drawn	KR
		Designed	KR
Grid	MGA	Checked	AT
Height Datum	AHD	Approved	AM

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GDA2020

Project
ASPECT INDUSTIAL ESTATE
MAMRE ROAD,
KEMPS CREEK
STAGE 1

Title
ROADWORKS
AND STORMWATER DRAINAGE
SHEET 2

Civil Engineers and Project Managers
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A1

Project - Drawing No.
18-596-C1051

Issue
J

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FUTURE
LOT 2

PROPOSED LOT 3
REFER 18-596-2300 DRG PACKAGE FOR DETAILS

1 VARIES (3 MAX) BATTER

CAP PROPOSED STORMWATER PIPE FOR FUTURE CONNECTION

AA7-1

BOX CULVERT 1.5W x 0.9H

AA1-5

BOX CULVERT 2.1W x 2.4H

AA1-4

BOX CULVERT 1.8W x 1.8H

AA1-3

1.50m
4.60m

BOX CULVERT 1.8W x 1.5H

AA1-2

BOX CULVERT 1.8W x 1.5H

AA1-1

BOX CULVERT 1.8W x 1.5H

ADJOINS DRG 18-596-C1051

ADJOINS DRG 18-596-C1053

FRC Ø375

ROAD 01

48.20

48.40

ROAD 04

BOX CULVERT 1.5W x 1.2H

48.60

000.0

2 x FRC Ø600

7.70m
25.60m
ROAD RESERVE
7.70m

48.80

49.00

49.20

49.40

FRC Ø375

ROAD 01

49.60

49.80

50.00

50.20

50.40

50.60

AA5-1

AA4-2

AA4-1

AC10-1

AC7-1

2 x FRC Ø600

2.50m
5.60m

CAP PROPOSED STORMWATER PIPE FOR FUTURE CONNECTION

1 VARIES (3 MAX) BATTER

540

FRC Ø450

AE4-1

AE1-6

380

400

420

440

460

480

500

520

TC 522.620

TC 522.621

FUTURE
LOT 7

40

L61.268

189°37'0"

49.00

49.20

49.40

49.60

BOX CULVERT 1.2W x 1.2H

ROAD 04

1 VARIES (3 MAX) BATTER

TEMPORARY STAGE 1A TURNING HEAD.
REFER TO DRG C1250 FOR DETAILS.
TO BE REMOVED IN STAGE 1B.

ALL FINISHED LEVELS SHOWN ARE ±1000mm

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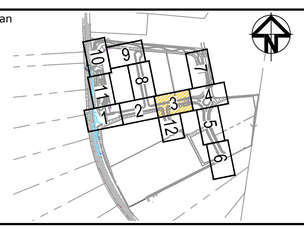
Bar Scales

0 5 10 15 20 25m

1 : 250 @ A1 1 : 500 @ A3

100mm on Original

Key Plan



Client

mirvac

Scales 1:250

Drawn KR

Designed KR

Checked AT

Approved AM

Grid MGA

Height Datum AHD

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Project
ASPECT INDUSTRIAL ESTATE
MAMRE ROAD,
KEMPS CREEK
STAGE 1

Title
ROADWORKS
AND STORMWATER DRAINAGE
SHEET 3

Civil Engineers and Project Managers
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Status
FOR APPROVAL
NOT TO BE USED FOR CONSTRUCTION

A1

Project - Drawing No.
18-596-C1052

Issue
J

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ADJOINS DRG 18-596-C1056

ADJOINS DRG 18-596-C1052

ADJOINS DRG 18-596-C1054

PROPOSED LOT 3
REFER 18-596-2300 DRG PACKAGE FOR DETAILS

CONNECT TO EXISTING STORMWATER

1 VARIES (3 MAX) BATTER

BOX CULVERT 1.8W x 1.5H

AA1-2

AA1-1

AC1-11

AC10-1

AC7-1

AC1-10

AC1-9

AC1-8

AC6-2

AC6-1

ROAD 01

ROAD RESERVE 25.60m

1.50m

4.60m

7.70m

2.50m

5.60m

FRC Ø375

DV1-13

DV1-12

DV1-11

DV1-10

DV1-9

AD1-1

AD1-2

AD1-3

GRASS LINED SWALE

105I.Ø

150I.Ø

FRC Ø450

BOX CULVERT 1.5W x 1.5H

BOX CULVERT 1.5W x 1.2H

BOX CULVERT 1.5W x 0.9H

BOX CULVERT 1.2W x 1.2H

R240

L63.336

R100.031

L17.216

TC 522.620

TC 522.621

CTP 595.956

603.172

636.581

TEMPORARY STAGE 1A TURNING HEAD.
REFER TO DRG C1250 FOR DETAILS.
TO BE REMOVED IN STAGE 1B

FUTURE LOT 7

FUTURE LOT 4

CAP PROPOSED STORMWATER PIPE FOR FUTURE CONNECTION

Issue	Description	Date
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B	ISSUED FOR DEVELOPMENT APPLICATION	12-10-20
A	ISSUED FOR DEVELOPMENT APPLICATION	15-05-20

100mm on Original

Bar Scales

0 5 10 15 20 25m

1 : 250 @ A1 1 : 500 @ A3

Key Plan

Client

mirvac

Scales	1:250	Drawn	KR
		Designed	KR
Grid	MGA	Checked	AT
Height Datum	AHD	Approved	AM

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Project
ASPECT INDUSTIAL ESTATE
MAMRE ROAD,
KEMPS CREEK
STAGE 1

Title
ROADWORKS
AND STORMWATER DRAINAGE
SHEET 4

Civil Engineers and Project Managers
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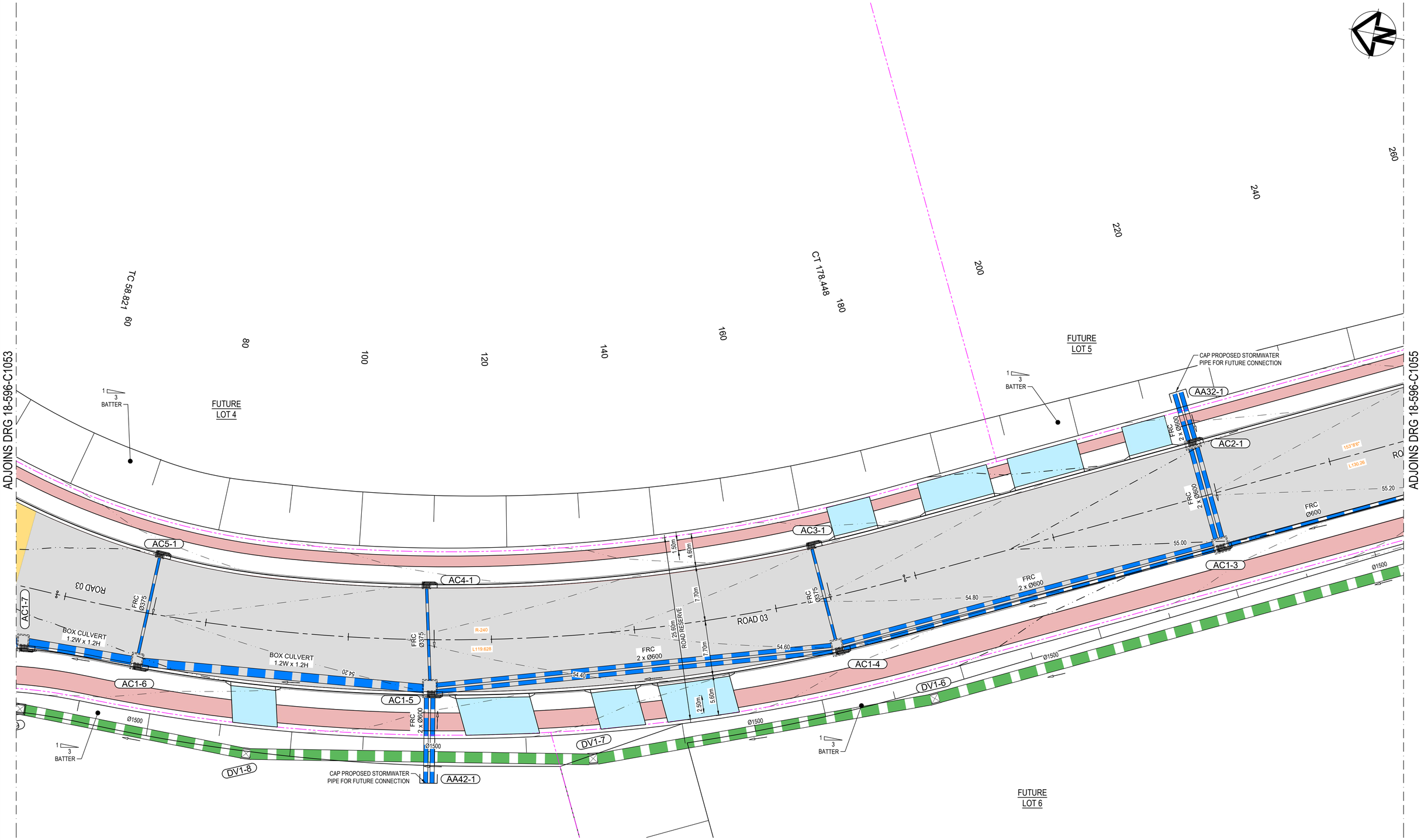
Status
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A1

Project - Drawing No.
18-596-C1053

Issue
J

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Issue	Description	Date
J	ISSUED FOR DEVELOPMENT APPLICATION	14-04-22
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A	ISSUED FOR DEVELOPMENT APPLICATION	15-05-20

Bar Scales

0 5 10 15 20 25m

1 : 250 @ A1 1 : 500 @ A3

100mm on Original

Key Plan



Client

mirvac

Scales		Drawn	KR
	1:250	Designed	KR
Grid	MGA	Checked	AT
Height Datum	AHD	Approved	AM

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Project

ASPECT INDUSTRIAL ESTATE
MAMRE ROAD,
KEMPS CREEK
STAGE 1

Title

ROADWORKS
AND STORMWATER DRAINAGE
SHEET 5

Civil Engineers and Project Managers

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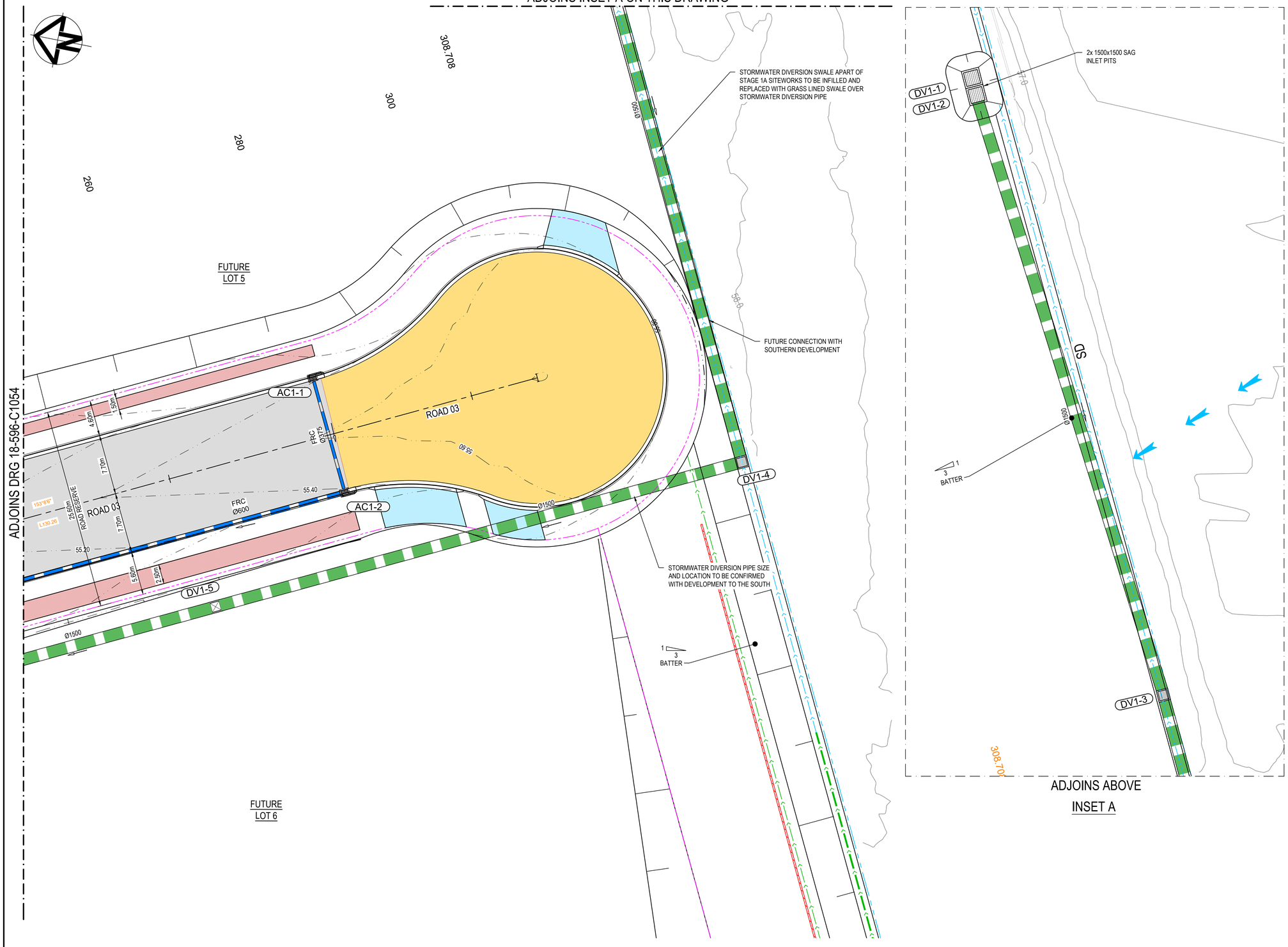
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Project - Drawing No.: 18-596-C1054

Issue: J

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ADJOINS INSET A ON THIS DRAWING



ALL FINISHED LEVELS SHOWN ARE ±1000mm

Issue	Description	Date
J	ISSUED FOR DEVELOPMENT APPLICATION	14-04-22
H	ISSUED FOR DEVELOPMENT APPLICATION	18-03-22
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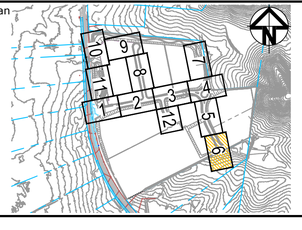
100mm on Original

Bar Scales

0 5 10 15 20 25m

1 : 250 @ A1 1 : 500 @ A3

Key Plan



Client

mirvac

Scales	1:250	Drawn	KR
		Designed	KR
Grid	MGA	Checked	AT
Height Datum	AHD	Approved	AM

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Project

ASPECT INDUSTIAL ESTATE
MAMRE ROAD,
KEMPS CREEK
STAGE 1

Title

ROADWORKS
AND STORMWATER DRAINAGE
SHEET 6

Civil Engineers and Project Managers

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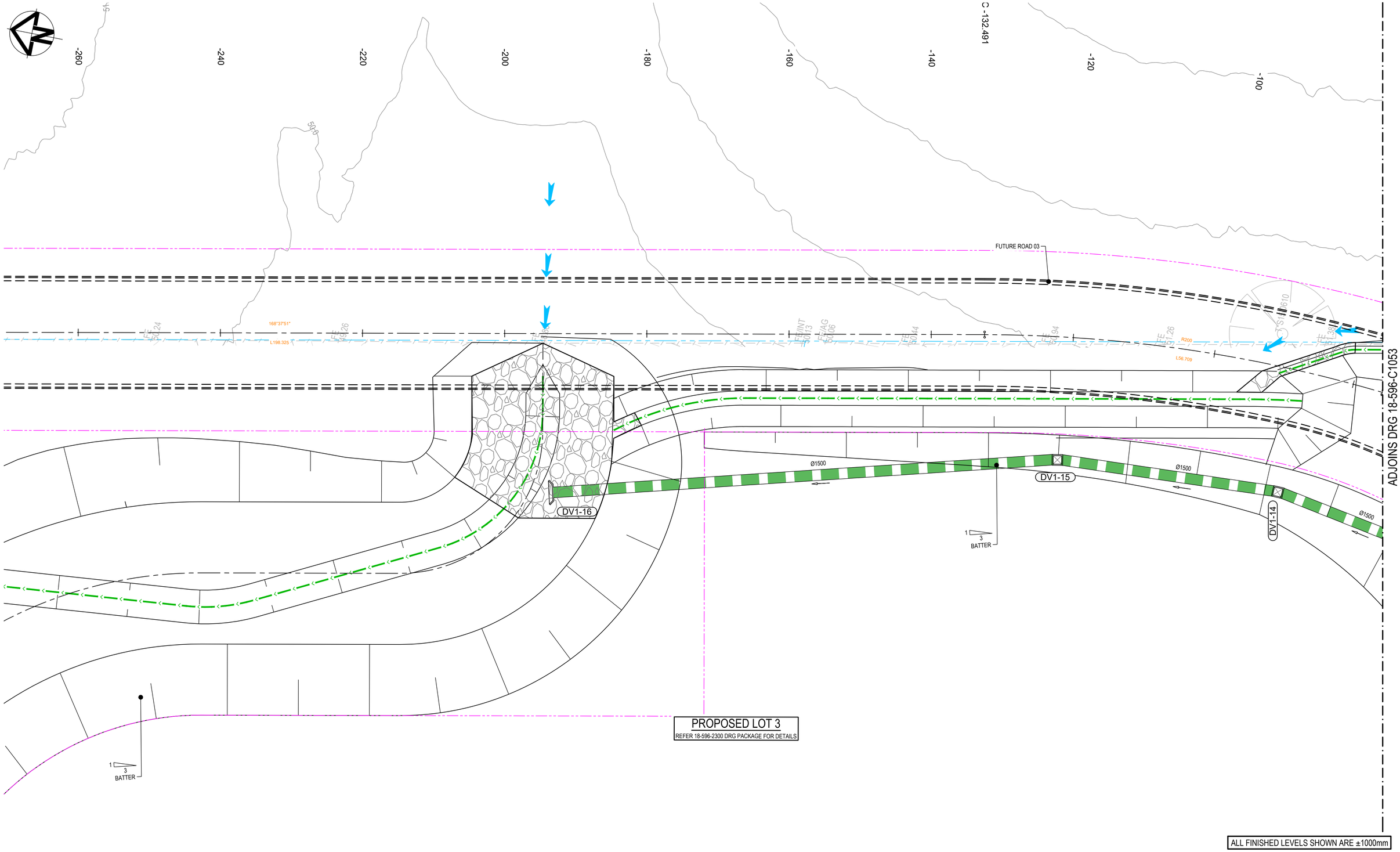
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A1

Project - Drawing No.: 18-596-C1055

Issue: J

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Issue	Description	Date
J	ISSUED FOR DEVELOPMENT APPLICATION	14-04-22
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B	ISSUED FOR DEVELOPMENT APPLICATION	12-10-20
A	ISSUED FOR DEVELOPMENT APPLICATION	15-05-20

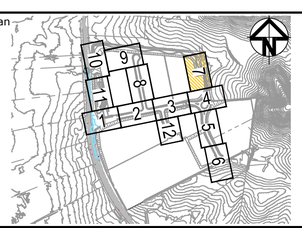
100mm on Original

Bar Scales

0 5 10 15 20 25m

1 : 250 @ A1 1 : 500 @ A3

Key Plan



Client

mirvac

Scales 1:250

Drawn KR

Designed KR

Checked AT

Approved AM

Grid MGA

Height Datum AHD

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GDA2020

Project

ASPECT INDUSTIAL ESTATE
MAMRE ROAD,
KEMPS CREEK
STAGE 1

Title

ROADWORKS
AND STORMWATER DRAINAGE
SHEET 7

Civil Engineers and Project Managers

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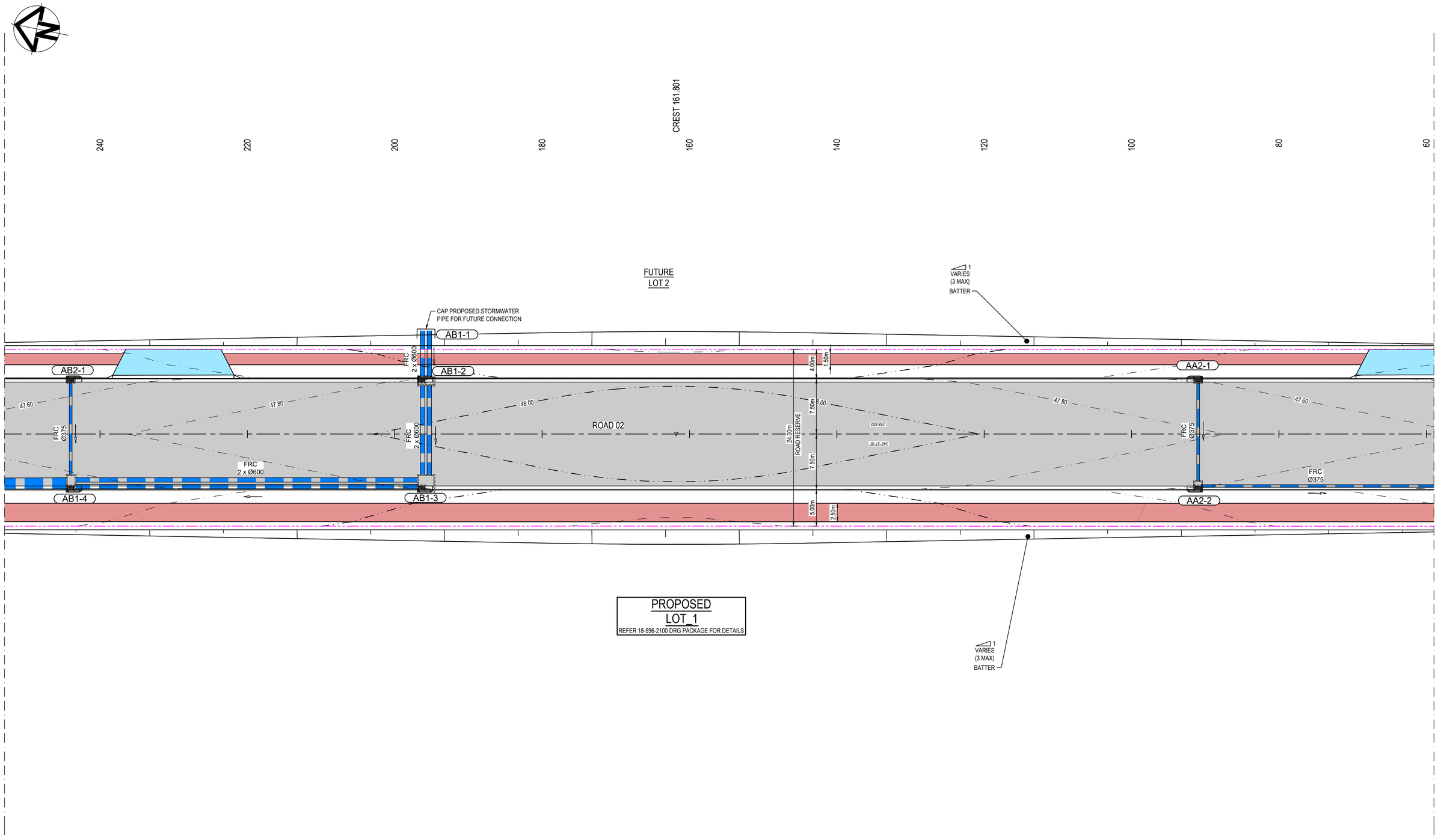
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A1

Project - Drawing No. 18-596-C1056

Issue J

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ALL FINISHED LEVELS SHOWN ARE ±1000mm

Issue	Description	Date
J	ISSUED FOR DEVELOPMENT APPLICATION	14-04-22
H	ISSUED FOR DEVELOPMENT APPLICATION	18-03-22
G	ISSUED FOR DEVELOPMENT APPLICATION	04-03-22
F	ISSUED FOR DEVELOPMENT APPLICATION	24-02-22
E	ISSUED FOR DEVELOPMENT APPLICATION	03-02-22
D	ISSUED FOR DEVELOPMENT APPLICATION	08-10-21
C	ISSUED FOR DEVELOPMENT APPLICATION	15-10-20
B	ISSUED FOR DEVELOPMENT APPLICATION	12-10-20
A	ISSUED FOR DEVELOPMENT APPLICATION	15-05-20

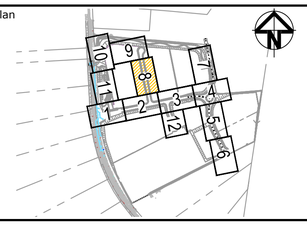
Bar Scales

0 5 10 15 20 25m

1 : 250 @ A1 1 : 500 @ A3

100mm on Original

Key Plan



Client

mirvac

Scales 1:250

Drawn KR

Designed KR

Grid MGA

Checked AT

Height Datum AHD

Approved AM

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GDA2020

Project

ASPECT INDUSTIAL ESTATE
MAMRE ROAD,
KEMPS CREEK
STAGE 1

Title

ROADWORKS
AND STORMWATER DRAINAGE
SHEET 8

Civil Engineers and Project Managers

at&l

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Status

FOR APPROVAL
NOT TO BE USED FOR CONSTRUCTION

A1

Project - Drawing No.

18-596-C1057

Issue

J

F:\18-596 Mamre Road\6.0 Drgs\Civil\Final\SSD\1000_STAGE 1 SSD_MOD 2\18-596-C1057.dwg

ADJOINS DRG 18-596-C1059

AB1-11

BOX CULVERT 1.5W x 1.2H

AB1-10

40m RIPARIAN CORRIDOR

BOX CULVERT 1.5W x 1.2H

AB1-9

BOX CULVERT 1.5W x 1.2H

AB1-8

BOX CULVERT 1.5W x 1.2H

AB1-7

BOX CULVERT 1.5W x 1.2H

CAP PROPOSED STORMWATER PIPE FOR FUTURE CONNECTION

AB1-6

AB3-1

FRC 2 x Ø600

FRC 2 x Ø600

AB3-2

BOX CULVERT 1.5W x 0.9H

AB1-5

1 VARIES (3 MAX) BATTER

PROPOSED LOT 1

REFER 18-596-2100 DRG PACKAGE FOR DETAILS

FUTURE LOT 2

ROAD 02

BOX CULVERT 1.5W x 0.9H

280

260

ALL FINISHED LEVELS SHOWN ARE ±1000mm

ADJOINS DRG 18-596-C1057

Issue	Description	Date
J	ISSUED FOR DEVELOPMENT APPLICATION	14-04-22
H	ISSUED FOR DEVELOPMENT APPLICATION	18-03-22
G	ISSUED FOR DEVELOPMENT APPLICATION	04-03-22
F	ISSUED FOR DEVELOPMENT APPLICATION	24-02-22
E	ISSUED FOR DEVELOPMENT APPLICATION	03-02-22
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C	ISSUED FOR DEVELOPMENT APPLICATION	15-10-20
B	ISSUED FOR DEVELOPMENT APPLICATION	12-10-20
A	ISSUED FOR DEVELOPMENT APPLICATION	15-05-20

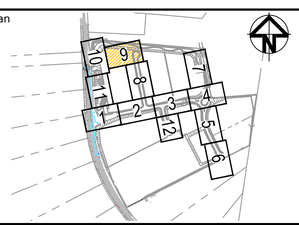
100mm on Original

Bar Scales

0 5 10 15 20 25m

1 : 250 @ A1 1 : 500 @ A3

Key Plan



Client

mirvac

Scales	1:250	Drawn	KR
		Designed	KR
Grid	MGA	Checked	AT
Height Datum	AHD	Approved	AM

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GDA2020

Project

ASPECT INDUSTRIAL ESTATE
MAMRE ROAD,
KEMPS CREEK
STAGE 1

Title

ROADWORKS
AND STORMWATER DRAINAGE
SHEET 9

Civil Engineers and Project Managers

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Status: FOR APPROVAL
NOT TO BE USED FOR CONSTRUCTION

A1

Project - Drawing No.: 18-596-C1058

Issue: J

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ADJOINS DRG 18-596-C1058

ADJOINS DRG 18-596-C1060

PROPOSED LOT 1
REFER 18-596-2100 DRG PACKAGE FOR DETAILS

BOX CULVERT 1.8W x 1.2H

BOX CULVERT 1.8W x 0.9H

AB4-1

CAP PROPOSED STORMWATER PIPE FOR FUTURE CONNECTION

AB1-12

AB1-13

AB1-14

AB1-15

1 in 3 BATTER

RETAINING WALL RW11 (LENGTH: 211m, MAX. HEIGHT: 2.5m)

PROPOSED STORMWATER HIGH FLOW DISCHARGE PIT. REFER TO DRG C1019 FOR DETAILS.

PROPOSED BASIN OVERFLOW MINIMUM WIDTH 15m AT RL44.10m

PROVIDE ROCK SCOUR PROTECTION

F44.40

F44.10

F40.62

AO1-1

AO1-2

BOX CULVERT 2.1W X 1.8H

STORMWATER BASIN DISCHARGE LINE

STORMWATER BASIN TO DISCHARGE TO PROPOSED SWALE

LOW FLOW CHANNEL

PROPOSED POND LOCATION. 300m² APPROXIMATE AREA

1 in 4 BATTER

1 in 10 BATTER

EXISTING POWER POLES TO REMAIN

SWALE IL39.26 AT 0.5% GRADE

INLET AND OUTLET SCOUR PROTECTION AND ENERGY DISSIPATION TO BE CONFIRMED

MAKE SMOOTH CONNECTION WITH EXISTING CHANNEL

REFER TO ECOLOGIST AND LANDSCAPE PLANS FOR BATTER PLANTING TREATMENTS

1 in VARIES (3 MAX) BATTER

EXISTING 3No. 900 HIGH x 1800 WIDE ROAD CULVERT CROSSING. UPSTREAM INVERT LEVEL IL38.97

EXISTING CULVERT WING WALLS TO BE RETAINED.

MAMRE ROAD

ALL FINISHED LEVELS SHOWN ARE ±1000mm

Issue	Description	Date
E	ISSUED FOR DEVELOPMENT APPLICATION	'14-04-22
D	ISSUED FOR DEVELOPMENT APPLICATION	18-03-22
C	ISSUED FOR DEVELOPMENT APPLICATION	04-03-22
B	ISSUED FOR DEVELOPMENT APPLICATION	24-02-22
A	ISSUED FOR DEVELOPMENT APPLICATION	03-02-22

100mm on Original

Bar Scales

0 5 10 15 20 25m

1 : 250 @ A1 1 : 500 @ A3

Key Plan

Client

mirvac

Scales 1:250

Grid MGA

Height Datum AHD

Drawn KR

Designed KR

Checked DS

Approved AM

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GDA2020

Project
ASPECT INDUSTRIAL ESTATE
MAMRE ROAD,
KEMPS CREEK
STAGE 1

Title
ROADWORKS
AND STORMWATER DRAINAGE
SHEET 10

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Status
FOR APPROVAL
NOT TO BE USED FOR CONSTRUCTION

A1

Project - Drawing No.
18-596-C1059

Issue
E

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PROPOSED LOT 1
REFER 18-596-2100 DRG PACKAGE FOR DETAILS

PROPOSED FILTERRA BIORETENTION.
BY OCEAN PROTECT. TO BE INSTALLED TO MANUFACTURER'S SPECIFICATION. REFER TO OCEAN PROTECT FOR COSTING.

1 in 3 BATTER

PROPOSED STORMWATER SPLITTER PIT

BOX CULVERT 1.8W x 1.2H

AB1-16

USIL 41.93
DSIL 41.86

FRC Ø600

AB1B-1

FULL HEIGHT SEPARATION WALL BETWEEN FILTERRA SECTIONS

F45.00

POSED LOW FLOW PIPE DRAIN TO FILTERRA BIO RETENTION AREA

AB1-17

BOX CULVERT 1.8W x 1.2H

PROPOSED BIO-RETENTION INLET STRUCTURE TO MANUFACTURER'S SPECIFICATION

BIO RETENTION
BEL 42.75

PROPOSED FILTERRA BIO-RETENTION SYSTEM
MINIMUM SURFACE AREA: 1,600m²
TOP OF FILTER MEDIA LEVEL: RL42.85mAHD
TOP OF EXTENDED DETENTION: RL43.00mAHD

STORMFILTER BAY
3x690mm PSORB CARTRIDGES

FRC Ø375

F43.00

F45.00

DETENTION BASIN

0.5% MIN

PROVIDE ROCK SCOUR PROTECTION

PROPOSED BIORETENTION UNDERDRAIN COLLECTION LINES

F40.80

PROPOSED BIO-RETENTION COLLECTION LINE TO OUTLET INTO OSD BASIN

WEEP HOLES AT BASE OF WEIR INTO SF CHAMBER TO ALLOW FOR CHANNEL TO EMPTY AT THE END OF THE STORM

WEIR TO OVERFLOW INTO STORMFILTER CHAMBER WHEN FILTERRA SYSTEM IS FULL
SMALL HOLES IN THE BASE OF WEIR TO ALLOW FOR CHANNEL TO EMPTY AT THE END OF THE STORM
WEIR LEVEL WITH EXTERNAL OVERFLOW WEIR

1 in 3 BATTER

DETENTION BASIN

PROPOSED STORMWATER DETENTION BASIN
VOLUME: 14,900m³
MAXIMUM DEPTH: 3.5m

F44.40

PROPOSED BIO-RETENTION COLLECTION LINE TO OUTLET INTO OSD BASIN

USIL 41.44
DSIL 41.31

FRC 4 x Ø600

F40.91

FRC Ø315

AA1B-1

F41.00

STORMFILTER
FILTER NUMBERS TBC
5x690mm PSORB CARTRIDGES

HIGH FLOW DIVERSION WEIR
RL 43.00

ADJOINS DRG 18-596-C1059

ADJOINS DRG 18-596-C1050

ALL FINISHED LEVELS SHOWN ARE ±1000mm

Issue	Description	Date
E	ISSUED FOR DEVELOPMENT APPLICATION	'14-04-22
D	ISSUED FOR DEVELOPMENT APPLICATION	18-03-22
C	ISSUED FOR DEVELOPMENT APPLICATION	04-03-22
B	ISSUED FOR DEVELOPMENT APPLICATION	24-02-22
A	ISSUED FOR DEVELOPMENT APPLICATION	03-02-22

100mm on Original

Bar Scales

0 5 10 15 20 25m

1 : 250 @ A1 1 : 500 @ A3

Key Plan



Client

mirvac

Scales		Drawn	KR
	1:250	Designed	KR
Grid	MGA	Checked	DS
Height Datum	AHD	Approved	AM

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Project
ASPECT INDUSTIAL ESTATE
MAMRE ROAD,
KEMPS CREEK
STAGE 1

Title
ROADWORKS
AND STORMWATER DRAINAGE
SHEET 11

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Status
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NOT TO BE USED FOR CONSTRUCTION

A1

Project - Drawing No.
18-596-C1060

Issue
E

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ADJOINS DRG 18-596-C1051

ADJOINS DRG 18-596-C1053

PROPOSED
LOT_9
SUBJECT TO SEPARATE SSDA

FUTURE
LOT 7

FUTURE
LOT 8

AE1-1
AE1-2
AE1-3
AE1-4
AE1-5
AE1-6
AE2-1
AE3-1
AE3-2
AE4-1
AA4-1
AA4-2
AA5-1

ROAD 01
ROAD 04
ROAD RESERVE

BOX CULVERT 1.2W x 1.2H
BOX CULVERT 1.5W x 1.2H
BOX CULVERT 1.2W x 0.9H

FRC 2 x Ø600
FRC Ø450

CAP PROPOSED STORMWATER PIPE FOR FUTURE CONNECTION

1 VARIES (3 MAX) BATTER

TC 61.268
TC 119.004
CT 82.887
CT 134.291
148.952

ALL FINISHED LEVELS SHOWN ARE ±1000mm

Issue	Description	Date
E	ISSUED FOR DEVELOPMENT APPLICATION	'14-04-22
D	ISSUED FOR DEVELOPMENT APPLICATION	18-03-22
C	ISSUED FOR DEVELOPMENT APPLICATION	04-03-22
B	ISSUED FOR DEVELOPMENT APPLICATION	24-02-22
A	ISSUED FOR DEVELOPMENT APPLICATION	03-02-22

100mm on Original

Bar Scales

0 5 10 15 20 25m

1 : 250 @ A1 1 : 500 @ A3

Key Plan

Client

mirvac

Scales 1:250

Drawn KR

Designed KR

Grid MGA

Checked DS

Height Datum AHD

Approved AM

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Project
ASPECT INDUSTRIAL ESTATE
MAMRE ROAD,
KEMPS CREEK
STAGE 1

Title
ROADWORKS
AND STORMWATER DRAINAGE
SHEET 12

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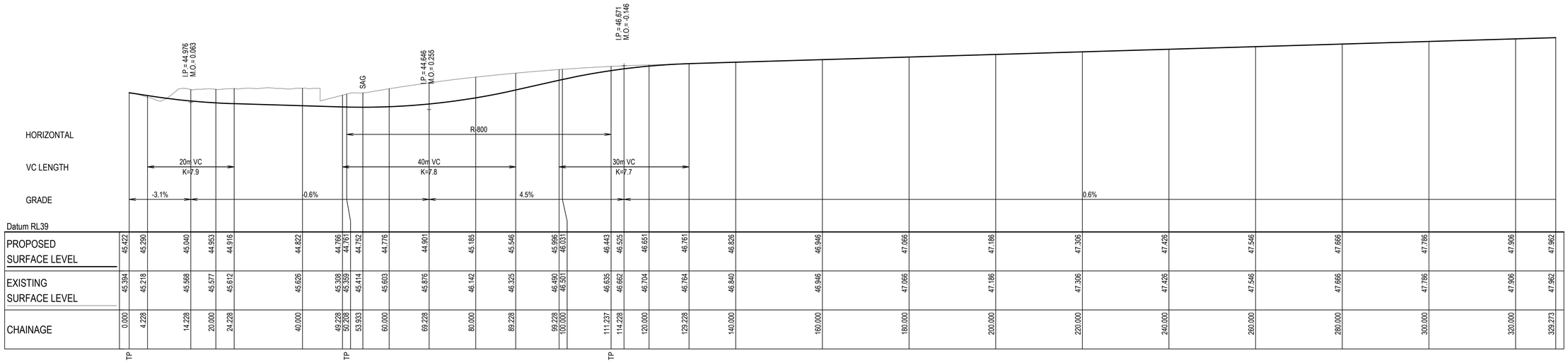
Status
FOR APPROVAL
NOT TO BE USED FOR CONSTRUCTION

A1

Project - Drawing No.
18-596-C1061

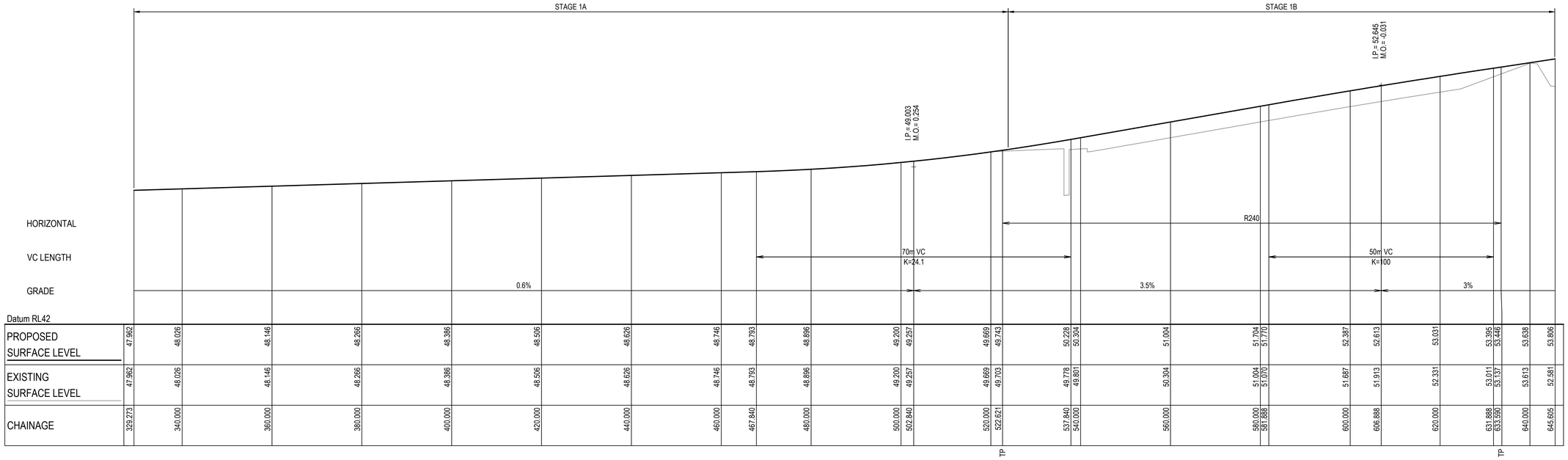
Issue
E

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ROAD 01 LONGITUDINAL SECTION

SCALE 1:500 HORI.
1:100 VERT.



ROAD 01 LONGITUDINAL SECTION

SCALE 1:500 HORI.
1:100 VERT.

Issue	Description	Date
J	ISSUED FOR DEVELOPMENT APPLICATION	14-04-22
H	ISSUED FOR DEVELOPMENT APPLICATION	18-03-22
G	ISSUED FOR DEVELOPMENT APPLICATION	04-03-22
F	ISSUED FOR DEVELOPMENT APPLICATION	24-02-22
E	ISSUED FOR DEVELOPMENT APPLICATION	03-02-22
D	ISSUED FOR DEVELOPMENT APPLICATION	08-10-21
C	ISSUED FOR DEVELOPMENT APPLICATION	15-10-20
B	ISSUED FOR DEVELOPMENT APPLICATION	12-10-20
A	ISSUED FOR DEVELOPMENT APPLICATION	15-05-20

100mm on Original

Bar Scales

0 2 4 6 8 10m
1 : 100 @ A1 1 : 200 @ A3

0 10 20 30 40 50m
1 : 500 @ A1 1 : 1000 @ A3

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Client: mirvac

Scales: 1:500 (H) 1:100 (V)
Grid: MGA
Height Datum: AHD
GDA2020

Drawn	KR
Designed	KR
Checked	AT
Approved	AM

Project
ASPECT INDUSTIAL ESTATE
MAMRE ROAD,
KEMPS CREEK
STAGE 1

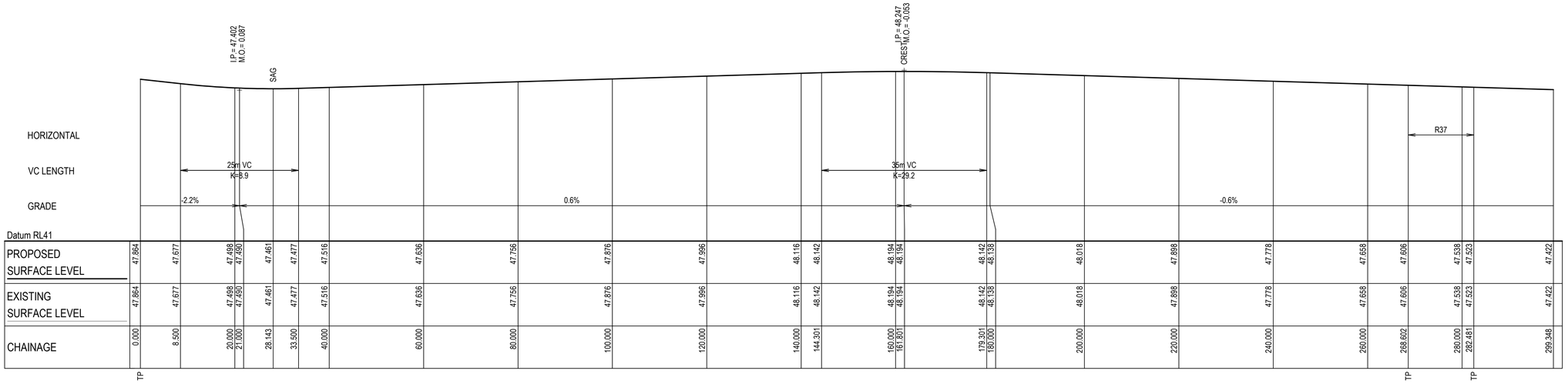
Title
ROAD 01
LONGITUDINAL SECTION
SHEET 1

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Status: FOR APPROVAL
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A1

Project - Drawing No.: 18-596-C1070
Issue: J

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ROAD 02 LONGITUDINAL SECTION

SCALE 1:500 HORI.
1:100 VERT.

Issue	Description	Date
J	ISSUED FOR DEVELOPMENT APPLICATION	14-04-22
H	ISSUED FOR DEVELOPMENT APPLICATION	18-03-22
G	ISSUED FOR DEVELOPMENT APPLICATION	04-03-22
F	ISSUED FOR DEVELOPMENT APPLICATION	24-02-22
E	ISSUED FOR DEVELOPMENT APPLICATION	03-02-22
D	ISSUED FOR DEVELOPMENT APPLICATION	08-10-21
C	ISSUED FOR DEVELOPMENT APPLICATION	15-10-20
B	ISSUED FOR DEVELOPMENT APPLICATION	12-10-20
A	ISSUED FOR DEVELOPMENT APPLICATION	15-05-20

Bar Scales

0 2 4 6 8 10m
1 : 100 @ A1 1 : 200 @ A3

0 10 20 30 40 50m
1 : 500 @ A1 1 : 1000 @ A3

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Client: mirvac

Scales: 1:500 (H) 1:100(V)
Grid: MGA
Height Datum: AHD
GDA2020

Drawn: KR
Designed: KR
Checked: AT
Approved: AM

Project: ASPECT INDUSTIAL ESTATE
MAMRE ROAD,
KEMPS CREEK
STAGE 1

Title: ROAD 02
LONGITUDINAL SECTION
SHEET 1

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Status: FOR APPROVAL
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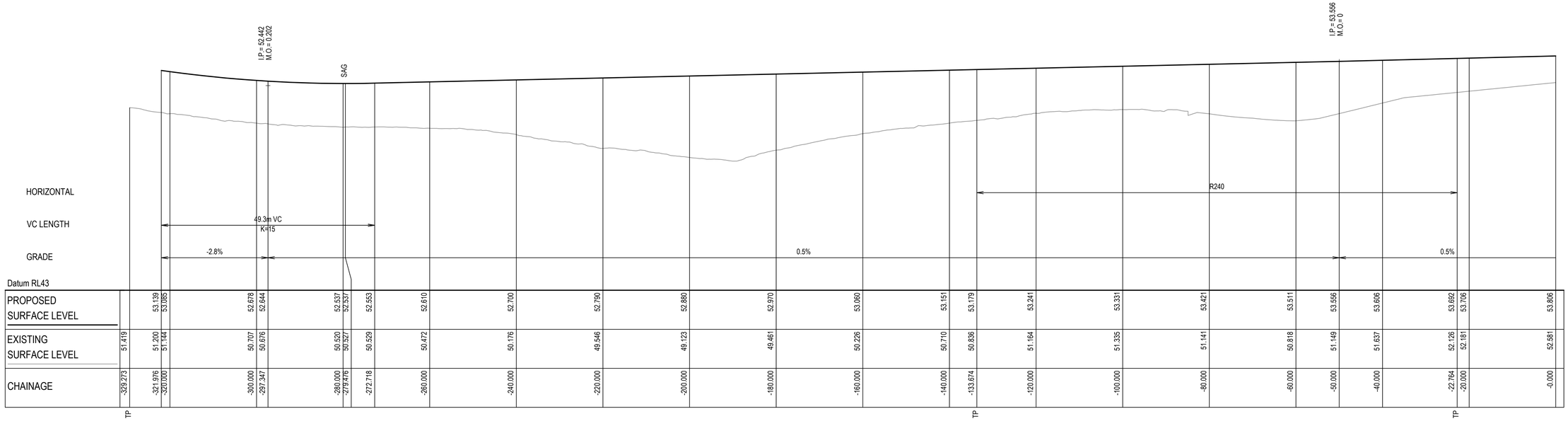
A1

Project - Drawing No.: 18-596-C1071

Issue: J

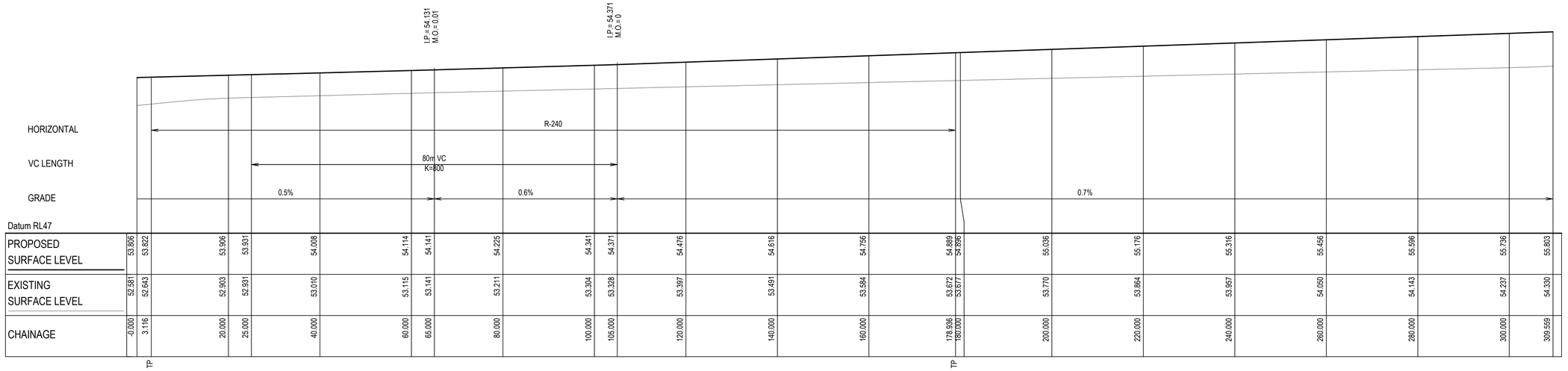
100mm on Original

F:\18-596 Mamre Road\6.0 Drgs\Civil\Final\SSD\1000_STAGE 1 SSD_MOD 2\18-596-C1071.dwg



ROAD 03 LONGITUDINAL SECTION

SCALE 1:500 HORI.
1:100 VERT.



ROAD 03 LONGITUDINAL SECTION

SCALE 1:500 HORI.
1:100 VERT.

Issue	Description	Date
J	ISSUED FOR DEVELOPMENT APPLICATION	14-04-22
H	ISSUED FOR DEVELOPMENT APPLICATION	18-03-22
G	ISSUED FOR DEVELOPMENT APPLICATION	04-03-22
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C	ISSUED FOR DEVELOPMENT APPLICATION	15-10-20
B	ISSUED FOR DEVELOPMENT APPLICATION	12-10-20
A	ISSUED FOR DEVELOPMENT APPLICATION	15-05-20

100mm on Original

Bar Scales

0 2 4 6 8 10m
1 : 100 @ A1 1 : 200 @ A3

0 10 20 30 40 50m
1 : 500 @ A1 1 : 1000 @ A3

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Client: mirvac

Scales	1:500 (H) 1:100(V)	Drawn	KR
		Designed	KR
Grid	MGA	Checked	AT
Height Datum	AHD	Approved	AM

GDA2020

Project
ASPECT INDUSTIAL ESTATE
MAMRE ROAD,
KEMPS CREEK
STAGE 1

Title
ROAD 03
LONGITUDINAL SECTION
SHEET 1

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info@atl.net.au

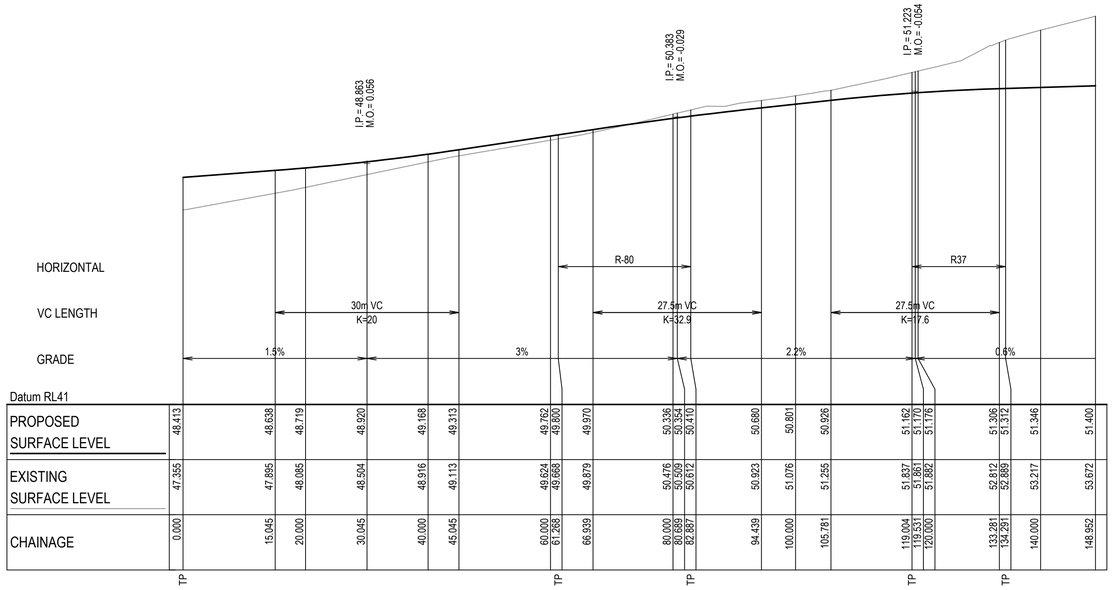
Status: FOR APPROVAL
NOT TO BE USED FOR CONSTRUCTION

A1

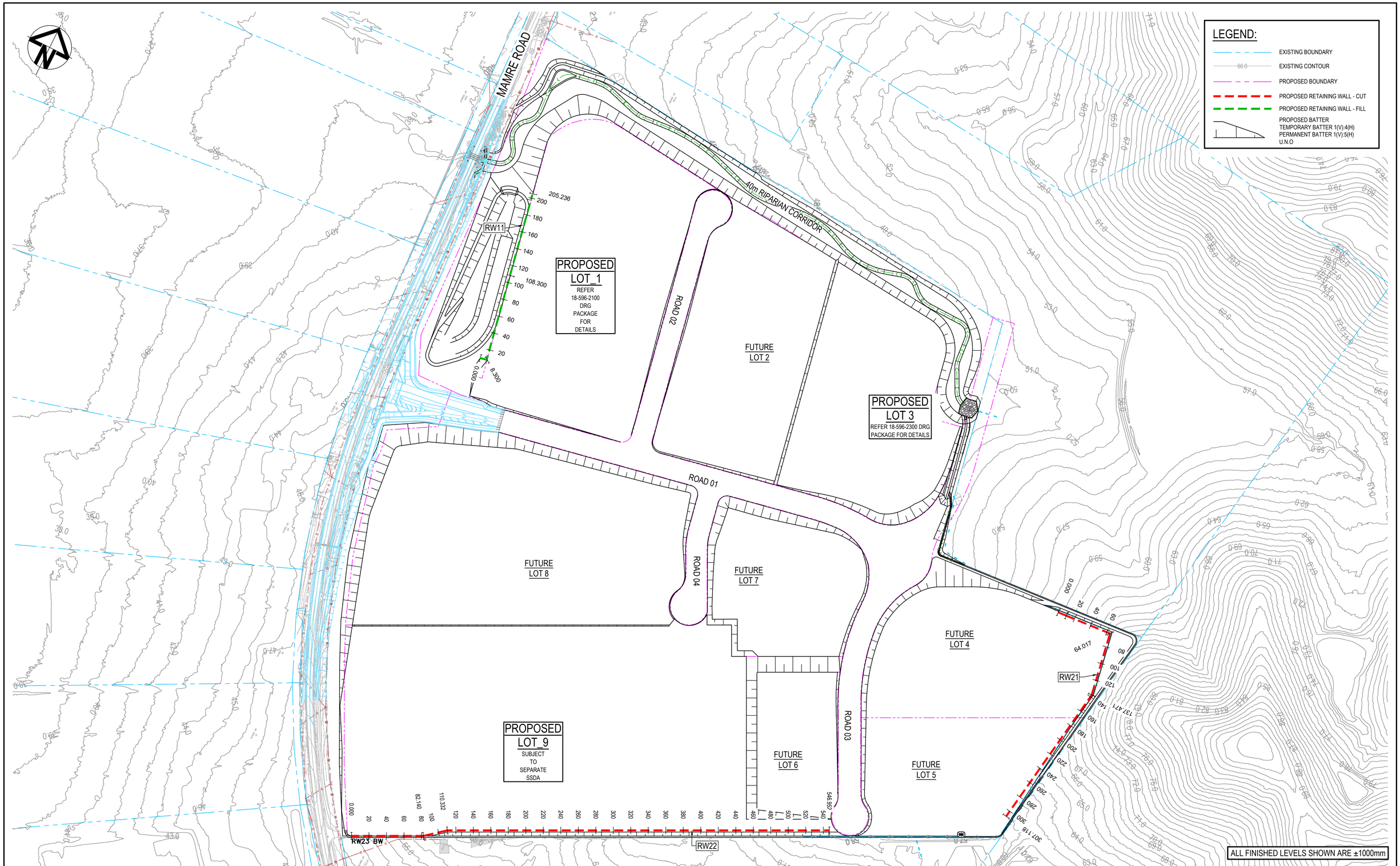
Project - Drawing No.: 18-596-C1072

Issue: J

F:\18-596 Mamre Road\6.0 Drgs\Civil\Final\SSD\1000_STAGE 1 SSD_MOD 2\18-596-C1072.dwg


I.P.= 48.863
M.O.= 0.056
I.P.= 50.383
M.O.= 0.029
I.P.= 51.223
M.O.= 0.054
HORIZONTAL
R-80
R37
VC LENGTH
30m VC
K=20
27.5m VC
K=32.9
27.5m VC
K=17.6
GRADE
1.5%
3%
2.2%
0.6%
Datum RL41

| | | |



Issue	Description	Date
J	ISSUED FOR DEVELOPMENT APPLICATION	14-04-22
H	ISSUED FOR DEVELOPMENT APPLICATION	18-03-22
G	ISSUED FOR DEVELOPMENT APPLICATION	04-03-22
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D	ISSUED FOR DEVELOPMENT APPLICATION	08-10-21
C	ISSUED FOR DEVELOPMENT APPLICATION	15-10-20
B	ISSUED FOR DEVELOPMENT APPLICATION	12-10-20
A	ISSUED FOR DEVELOPMENT APPLICATION	15-05-20

100mm on Original

Bar Scales

0 50 100 150 200m

1 : 2000 @ A1

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Client

mirvac

Scales	1:2000	Drawn	KR
		Designed	KR
Grid	MGA	Checked	AT
Height Datum	AHD	Approved	AM

GDA2020

Project

ASPECT INDUSTIAL ESTATE
MAMRE ROAD,
KEMPS CREEK
STAGE 1

Title

RETAINING WALL
GENERAL ARRANGEMENT
PLAN

Civil Engineers and Project Managers

at&l

Level 7, 153 Walker Street
North Sydney NSW 2060
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www.atl.net.au
info@atl.net.au

Status: FOR APPROVAL
NOT TO BE USED FOR CONSTRUCTION

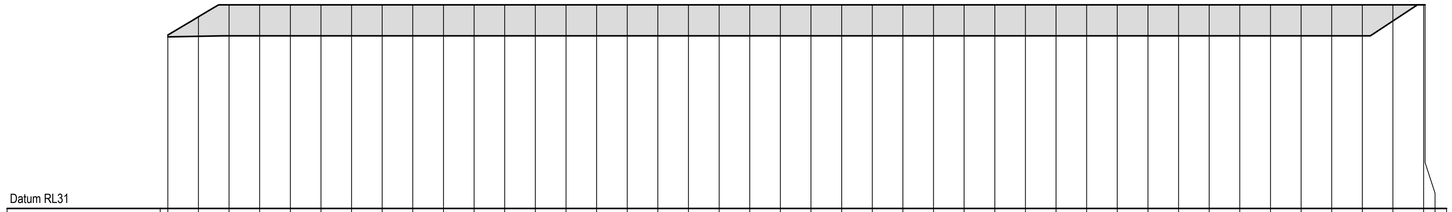
A1

Project - Drawing No.: 18-596-C1080

Issue: J

F:\18-596 Mamre Road\6.0 Drgs\Civil\Final\SSD\1000_STAGE 1 SSD_MOD 2\18-596-C1080.dwg

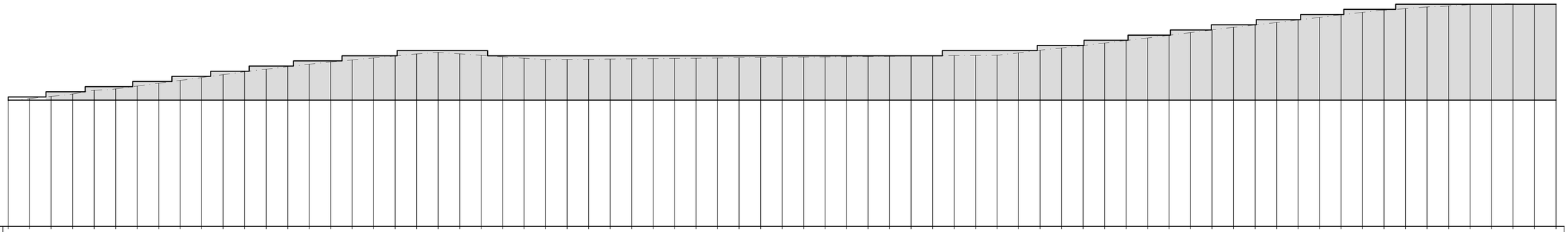
NOTE:
RETAINING WALL DESIGN AND DETAIL TO BE CONFIRMED AT DETAILED DESIGN STAGES.



Datum RL31

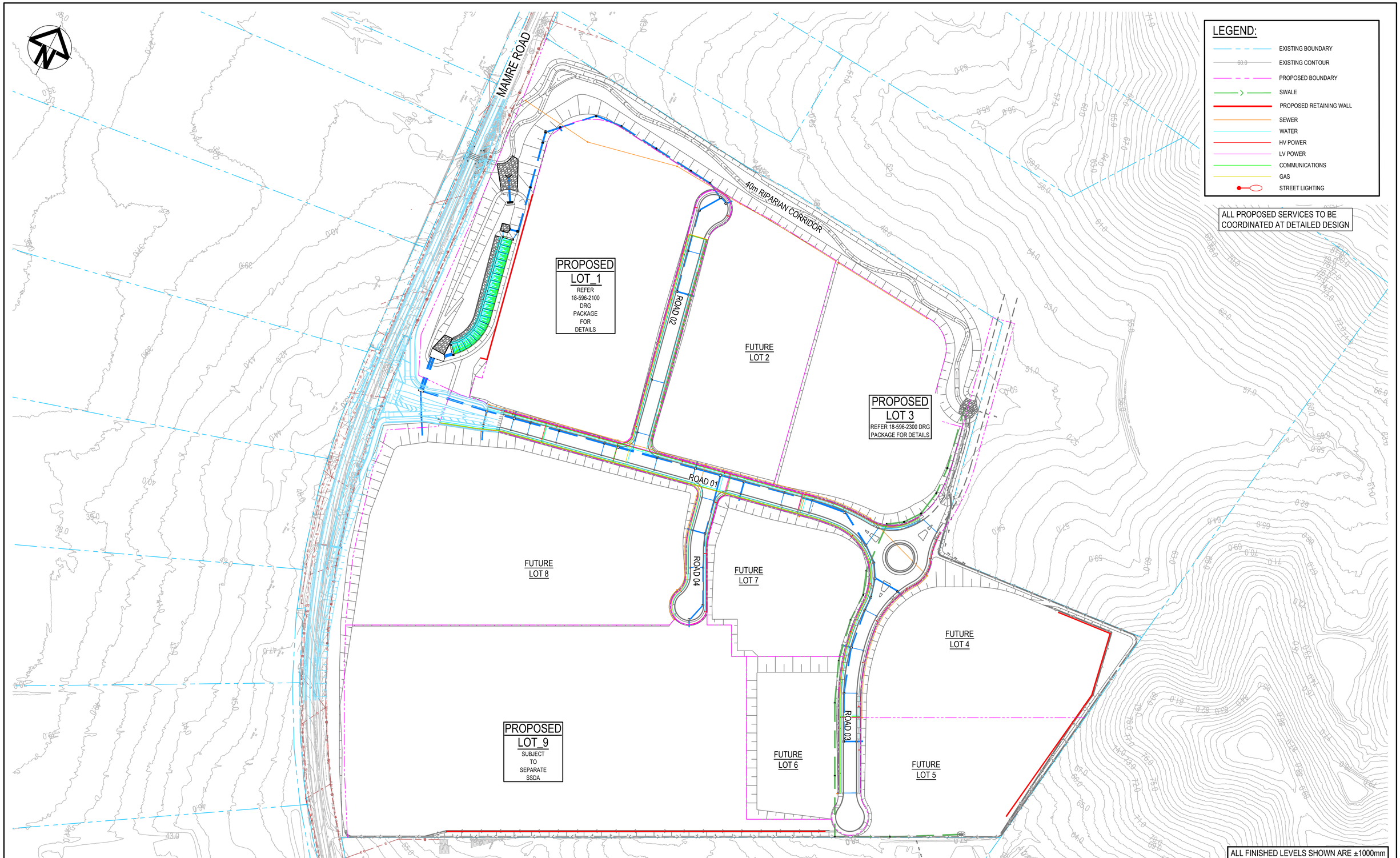
| | | |

NOTE:
RETAINING WALL DESIGN AND DETAIL TO BE CONFIRMED AT DETAILED DESIGN STAGES.



Datum RL37

| | | |



Issue	Description	Date
J	ISSUED FOR DEVELOPMENT APPLICATION	14-04-22
H	ISSUED FOR DEVELOPMENT APPLICATION	18-03-22
G	ISSUED FOR DEVELOPMENT APPLICATION	04-03-22
F	ISSUED FOR DEVELOPMENT APPLICATION	24-02-22
E	ISSUED FOR DEVELOPMENT APPLICATION	03-02-22
D	ISSUED FOR DEVELOPMENT APPLICATION	08-10-21
C	ISSUED FOR DEVELOPMENT APPLICATION	15-10-20
B	ISSUED FOR DEVELOPMENT APPLICATION	12-10-20
A	ISSUED FOR DEVELOPMENT APPLICATION	15-05-20

Bar Scales

0 50 100 150 200m

1 : 2000 @ A1

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Client

mirvac

Scales	1:2000	Drawn	KR
		Designed	KR
Grid	MGA	Checked	AT
Height Datum	AHD	Approved	AM

GDA2020

Project

ASPECT INDUSTIAL ESTATE
MAMRE ROAD,
KEMPS CREEK
STAGE 1

Title

SERVICES AND UTILITIES COORDINATION OVERALL PLAN

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: FOR APPROVAL
NOT TO BE USED FOR CONSTRUCTION

A1

Project - Drawing No.: 18-596-C1090

Issue: J

100mm on Original

F:\18-596 Mamre Road\6.0 Drgs\Civil\Final\SSD\1000_STAGE 1 SSD_MOD 2\18-596-C1090.dwg

ADJOINS DRG No 18-596-C1093

LEGEND

GENERAL

- EXISTING BOUNDARY
- 50 EXISTING CONTOURS
- 65.0 PROPOSED CONTOURS
- FUTURE MAMRE ROAD WIDENING
- PROPOSED BOUNDARY

UTILITIES - PROPOSED

- STORMWATER PIPE WITH SIZE
- KERB INLET PIT
- KERB INLET SAG PIT
- GROSS POLLUTANT TRAP
- JUNCTION PIT
- GRATED INLET PIT
- HEADWALL
- S SEWER
- W WATER
- HV HV POWER
- LV LV POWER
- T COMMUNICATIONS
- G GAS
- STREET LIGHTING

UTILITIES - EXISTING

- e ELECTRICITY LINE
- w WATER

NOTE

REFER TO TYPICAL ROAD SECTIONS ON DRG C1005 & 1006 FOR DIMENSIONS OF SERVICE ALLOCATIONS

ALL PROPOSED SERVICES TO BE COORDINATED AT DETAILED DESIGN

PROPOSED LOT_1
REFER 18-596-2100 DRG PACKAGE FOR DETAILS

ROAD 01

ROAD 02

FUTURE LOT 2

FUTURE LOT 8

SAG 28.143

SAG 53.933

TC 50.208

CT 111.237

REFER ORION CONSULTING DRGS FOR INTERSECTION DETAILS

ADJOINS DRG No 18-596-C1092

ALL FINISHED LEVELS SHOWN ARE ±1000mm

Issue	Description	Date
J	ISSUED FOR DEVELOPMENT APPLICATION	14-04-22
H	ISSUED FOR DEVELOPMENT APPLICATION	18-03-22
G	ISSUED FOR DEVELOPMENT APPLICATION	04-03-22
F	ISSUED FOR DEVELOPMENT APPLICATION	24-02-22
E	ISSUED FOR DEVELOPMENT APPLICATION	03-02-22
D	ISSUED FOR DEVELOPMENT APPLICATION	08-10-21
C	ISSUED FOR DEVELOPMENT APPLICATION	15-10-20
B	ISSUED FOR DEVELOPMENT APPLICATION	12-10-20
A	ISSUED FOR DEVELOPMENT APPLICATION	15-05-20

Bar Scales

0 10 20 30 40 50m

1 : 500 @ A1 1 : 1000 @ A3

Key Plan

SHEET 1 SHEET 2 SHEET 3 SHEET 4

Client

mirvac

Scales	1:500	Drawn	KR
		Designed	KR
Grid	MGA	Checked	AT
Height Datum	AHD	Approved	AM

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Project
ASPECT INDUSTIAL ESTATE
MAMRE ROAD,
KEMPS CREEK
STAGE 1

Title
SERVICES AND UTILITIES COORDINATION PLAN
SHEET 1

Civil Engineers and Project Managers
at&l
Level 7, 153 Walker Street
North Sydney NSW 2060
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Tel: 02 9439 1777
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www.atl.net.au
info@atl.net.au

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A1

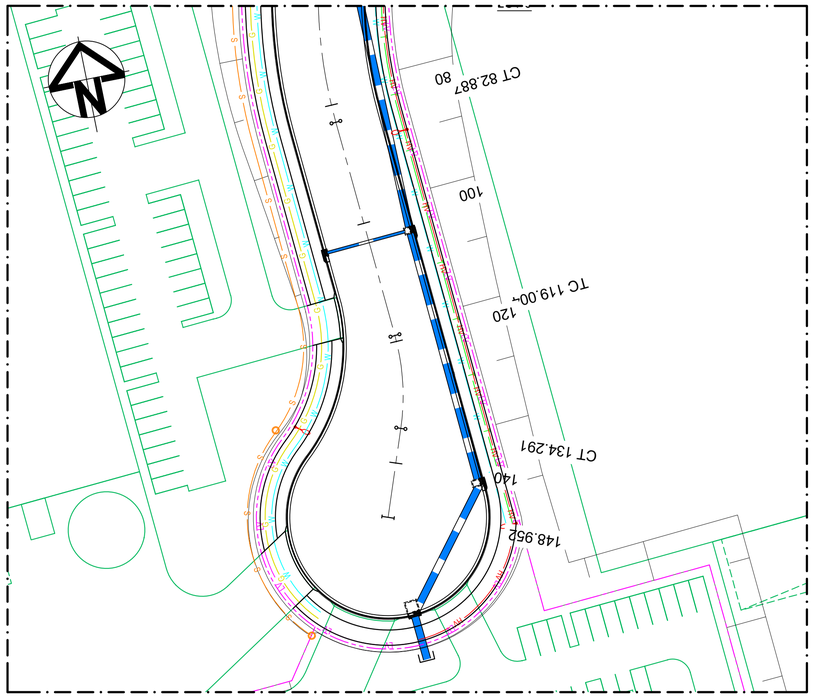
Project - Drawing No. 18-596-C1091

Issue J

100mm on Original

F:\18-596 Mamre Road\6.0 Drgs\Civil\Final\SSD\1000_STAGE 1 SSD_MOD 2\18-596-C1091.dwg

ADJOINS DRG No 18-596-C1093



INSET A

PROPOSED
LOT 3
REFER 18-596-2300 DRG PACKAGE FOR DETAILS

SERVICES BUILT DURING STAGE 1A ARE TO BE CAPPED AT THE TURNING HEAD FOR FUTURE EXTENSION DURING STAGE 1B

ROAD 04

R240
L63.336

R100.031
T7.436

R240
L36.769

R14.975
L37.358

FUTURE
LOT 4

FUTURE
LOT 5

FUTURE
LOT 8

TC 522.621

CTP 585.956

638.581

ADJOINS DRG No 18-596-C1091

ADJOINS INSET A ON THIS DRG

ADJOINS DRG No 18-596-C1094

LEGEND

GENERAL

- EXISTING BOUNDARY
- EXISTING CONTOURS
- PROPOSED CONTOURS
- FUTURE MAMRE ROAD WIDENING
- PROPOSED BOUNDARY

UTILITIES - PROPOSED

- STORMWATER PIPE WITH SIZE
- KERB INLET PIT
- KERB INLET SAG PIT
- GROSS POLLUTANT TRAP
- JUNCTION PIT
- GRATED INLET PIT
- HEADWALL
- S SEWER
- W WATER
- HV HV POWER
- LV LV POWER
- T COMMUNICATIONS
- G GAS
- STREET LIGHTING

UTILITIES - EXISTING

- e ELECTRICITY LINE
- w WATER

NOTE
REFER TO TYPICAL ROAD SECTIONS ON DRG C1005 & 1006 FOR DIMENSIONS OF SERVICE ALLOCATIONS

ALL PROPOSED SERVICES TO BE COORDINATED AT DETAILED DESIGN

ALL FINISHED LEVELS SHOWN ARE ±1000mm

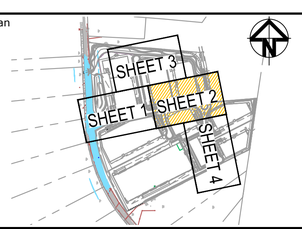
Issue	Description	Date
J	ISSUED FOR DEVELOPMENT APPLICATION	14-04-22
H	ISSUED FOR DEVELOPMENT APPLICATION	18-03-22
G	ISSUED FOR DEVELOPMENT APPLICATION	04-03-22
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D	ISSUED FOR DEVELOPMENT APPLICATION	08-10-21
C	ISSUED FOR DEVELOPMENT APPLICATION	15-10-20
B	ISSUED FOR DEVELOPMENT APPLICATION	12-10-20
A	ISSUED FOR DEVELOPMENT APPLICATION	15-05-20

Bar Scales

0 10 20 30 40 50m

1 : 500 @ A1 1 : 1000 @ A3

Key Plan



Client

mirvac

Scales		Drawn	KR
1:500		Designed	KR
Grid	MGA	Checked	AT
Height Datum	AHD	Approved	AM

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Project
ASPECT INDUSTIAL ESTATE
MAMRE ROAD,
KEMPS CREEK
STAGE 1

Title
SERVICES AND
UTILITIES COORDINATION
PLAN
SHEET 2

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
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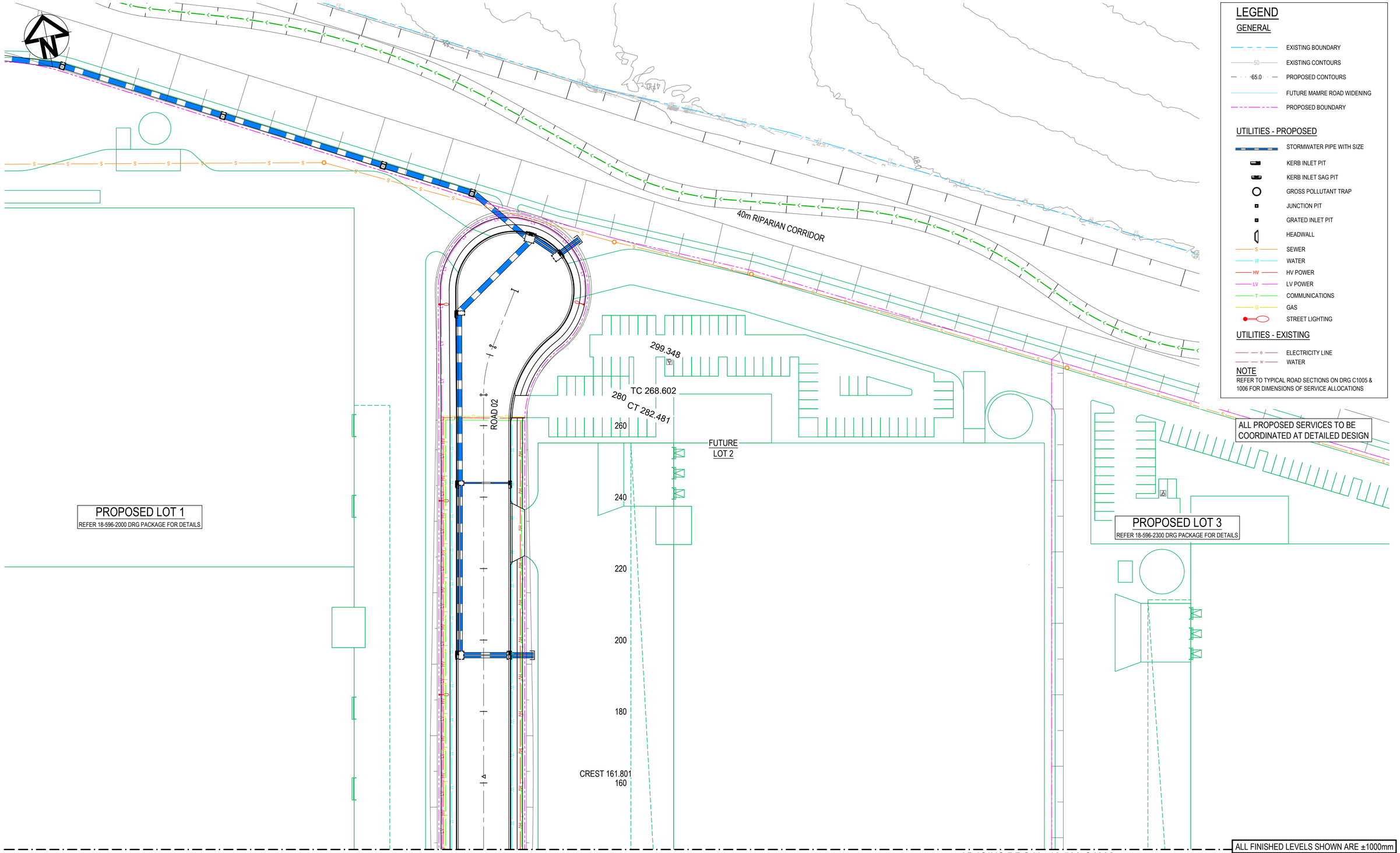
A1

Project - Drawing No.
18-596-C1092

Issue
J

100mm on Original

F:\18-596 Mamre Road\6.0 Drgs\Civil\Final\SSD\1000_STAGE 1 SSD_MOD 2\18-596-C1092.dwg



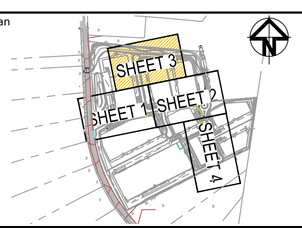
Issue	Description	Date
J	ISSUED FOR DEVELOPMENT APPLICATION	14-04-22
H	ISSUED FOR DEVELOPMENT APPLICATION	18-03-22
G	ISSUED FOR DEVELOPMENT APPLICATION	04-03-22
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D	ISSUED FOR DEVELOPMENT APPLICATION	08-10-21
C	ISSUED FOR DEVELOPMENT APPLICATION	15-10-20
B	ISSUED FOR DEVELOPMENT APPLICATION	12-10-20
A	ISSUED FOR DEVELOPMENT APPLICATION	15-05-20

Bar Scales

0 10 20 30 40 50m

1 : 500 @ A1 1 : 1000 @ A3

Key Plan



Client

mirvac

Scales	1:500	Drawn	KR
		Designed	KR
Grid	MGA	Checked	AT
Height Datum	AHD	Approved	AM

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Project

ASPECT INDUSTIAL ESTATE
MAMRE ROAD,
KEMPS CREEK
STAGE 1

Title

SERVICES AND UTILITIES COORDINATION PLAN SHEET 3

Civil Engineers and Project Managers

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www.atl.net.au
info@atl.net.au

Status: FOR APPROVAL
NOT TO BE USED FOR CONSTRUCTION

A1

Project - Drawing No.: 18-596-C1093

Issue: J

100mm on Original

F:\18-596 Mamre Road\6.0 Drgs\Civil\Final\SSD\1000_STAGE 1 SSD_MOD 2\18-596-C1093.dwg

FUTURE LOT 4

FUTURE LOT 5

FUTURE LOT 6

FUTURE LOT 8

ROAD 01

ROAD 03

TC 58.821

CT 178.448

CTP 585.956

TC 522.621

R-240 L-119.628

R-48.975 L37.358

R-109.693 L63.336

161°41'38" L58.821

153°8'6" L130.26

638.581

603.172

SERVICES BUILT DURING STAGE 1A ARE TO BE CAPPED AT THE TURNING HEAD FOR FUTURE EXTENSION DURING STAGE 1B

ADJOINS DRG No 18-596-C1092

ALL PROPOSED SERVICES TO BE COORDINATED AT DETAILED DESIGN

ALL FINISHED LEVELS SHOWN ARE ±1000mm

LEGEND

GENERAL

- EXISTING BOUNDARY
- EXISTING CONTOURS
- PROPOSED CONTOURS
- FUTURE MAMRE ROAD WIDENING
- PROPOSED BOUNDARY

UTILITIES - PROPOSED

- STORMWATER PIPE WITH SIZE
- KERB INLET PIT
- KERB INLET SAG PIT
- GROSS POLLUTANT TRAP
- JUNCTION PIT
- GRATED INLET PIT
- HEADWALL
- SEWER
- WATER
- HV POWER
- LV POWER
- COMMUNICATIONS
- GAS
- STREET LIGHTING

UTILITIES - EXISTING

- ELECTRICITY LINE
- WATER

NOTE

REFER TO TYPICAL ROAD SECTIONS ON DRG C1005 & 1006 FOR DIMENSIONS OF SERVICE ALLOCATIONS

Issue	Description	Date
E	ISSUED FOR DEVELOPMENT APPLICATION	'14-04-22
D	ISSUED FOR DEVELOPMENT APPLICATION	18-03-22
C	ISSUED FOR DEVELOPMENT APPLICATION	04-03-22
B	ISSUED FOR DEVELOPMENT APPLICATION	24-02-22
A	ISSUED FOR DEVELOPMENT APPLICATION	03-02-22

Bar Scales

0 10 20 30 40 50m

1 : 500 @ A1 1 : 1000 @ A3

Key Plan

SHEET 1, SHEET 2, SHEET 3, SHEET 4

Client

mirvac

Scales		Drawn	KR
1:500		Designed	KR
Grid	MGA	Checked	DS
Height Datum	AHD	Approved	AM

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Project

ASPECT INDUSTRIAL ESTATE
MAMRE ROAD,
KEMPS CREEK
STAGE 1

Title

SERVICES AND UTILITIES COORDINATION PLAN SHEET 4

Civil Engineers and Project Managers

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Level 7, 153 Walker Street
North Sydney NSW 2060
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info@atl.net.au

Status: FOR APPROVAL
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A1

Project - Drawing No.: 18-596-C1094

Issue: E

100mm on Original

F:\18-596 Mamre Road\6.0 Drgs\Civil\Final\SSD\1000_STAGE 1 SSD_MOD 2\18-596-C1094.dwg

LEGEND

- SEDIMENT FENCE (SD 6-8)
- CATCH DRAIN
- BARRIER FENCE
- STRAW BALE FILTER (SD 6-7)
- MESH AND GRAVEL INLET FILTER (SD 6-11)
- ROCK RIFFLE CHECK DAM (SD 5-4)
- GEOTEXTILE INLET (SD 6-12)
- STABILISED SITE ACCESS AND TRUCK WASH DOWN AREA (SD 6-14)
- PROPOSED SITE ACCESS GATE

MAMRE ROAD

PROVIDE SEDIMENT FENCE (TYP.)

STRAWBALE AND GEOTEXTILE SEDIMENT FILTER AT 30m SPACING (TYP.)

STRAWBALE AND GEOTEXTILE SEDIMENT FILTER AT 30m SPACING (TYP.)

EMERGENCY BASIN OVERFLOW

BEL 47.40

1194m³

BEL 47.55

PROPOSED SEDIMENT BASIN A

CATCHMENT AREA = 5.81Ha
DEPTH OF SETTLING ZONE = 600mm
SURFACE AREA = 1,327m²
SETTLING ZONE VOLUME = 796m³
SEDIMENT STORAGE VOLUME = 398m³
TOTAL BASIN VOLUME = 1194m³

ROCK RIFFLE CHECK DAM AT 30m SPACING (TYP.)

PROVIDE CATCH DRAIN (TYP.)

47.20

47.40

47.60

47.80

ROCK RIFFLE CHECK DAM AT 30m SPACING (TYP.)

PROVIDE CATCH DRAIN (TYP.)

PROVIDE GEOTEXTILE INLET FILTER (TYP.)

BEL44.34

BEL40.52

BEL40.53

BEL44.94

DETENTION BASIN

BEL40.66

BEL40.68

BEL40.69

BEL 47.51

BEL 48.40

0.5% MIN

47.60

47.40

BEL 48.40

0.5% MIN

0.3% MIN

47.40

47.00

46.80

EMERGENCY BASIN OVERFLOW

PROPOSED SEDIMENT BASIN B

REFER TO DRG 18-596-C1111 FOR DIMENSIONS

PROVIDE CATCH DRAIN (TYP.)

ALL FINISHED LEVELS SHOWN ARE ±1000mm

ADJOINS DRG No 18-596-C1111

ADJOINS DRG No 18-596-C1112

Issue	Description	Date
J	ISSUED FOR DEVELOPMENT APPLICATION	14-04-22
H	ISSUED FOR DEVELOPMENT APPLICATION	18-03-22
G	ISSUED FOR DEVELOPMENT APPLICATION	04-03-22
F	ISSUED FOR DEVELOPMENT APPLICATION	24-02-22
E	ISSUED FOR DEVELOPMENT APPLICATION	03-02-22
D	ISSUED FOR DEVELOPMENT APPLICATION	08-10-21
C	ISSUED FOR DEVELOPMENT APPLICATION	15-10-20
B	ISSUED FOR DEVELOPMENT APPLICATION	12-10-20
A	ISSUED FOR DEVELOPMENT APPLICATION	15-05-20

Bar Scales

0 10 20 30 40 50m

1 : 500 @ A1 1 : 1000 @ A3

100mm on Original

Key Plan

SHEET 1 SHEET 2
SHEET 3 SHEET 4
SHEET 5 SHEET 6 SHEET 7
SHEET 8 SHEET 9 SHEET 10

Client

mirvac

Scales 1:500

Grid MGA

Height Datum AHD

Drawn KR

Designed KR

Checked AT

Approved AM

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Project

ASPECT INDUSTIAL ESTATE
MAMRE ROAD,
KEMPS CREEK
STAGE 1

Title

EROSION AND SEDIMENT CONTROL PLAN
SHEET 1

Civil Engineers and Project Managers

at&l

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info@atl.net.au

Status FOR APPROVAL
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A1

Project - Drawing No. 18-596-C1110

Issue J

F:\18-596 Mamre Road\6.0 Drgs\Civil\Final\SSD\1000_STAGE 1 SSD_MOD 2\18-596-C1110.dwg

ADJOINS DRG No 18-596-C1110

LEGEND

- SEDIMENT FENCE (SD 6-8)
- CATCH DRAIN
- BARRIER FENCE
- STRAW BALE FILTER (SD 6-7)
- MESH AND GRAVEL INLET FILTER (SD 6-11)
- ROCK RIFFLE CHECK DAM (SD 5-4)
- GEOTEXTILE INLET (SD 6-12)
- STABILISED SITE ACCESS AND TRUCK WASH DOWN AREA (SD 6-14)
- PROPOSED SITE ACCESS GATE

STRAWBALE AND GEOTEXTILE SEDIMENT FILTER AT 30m SPACING (TYP.)

REFER TO ECOLOGIST AND LANDSCAPE PLANS FOR BATTER PLANTING TREATMENTS

1 in 10 BATTER

1 in 3 MAX BATTER

1099m³

PROPOSED SEDIMENT BASIN B
CATCHMENT AREA = 4.185 Ha
DEPTH OF SETTLING ZONE = 600mm
SURFACE AREA = 1,222m²
SETTLING ZONE VOLUME = 733m³
SEDIMENT STORAGE VOLUME = 366m³
TOTAL BASIN VOLUME = 1099m³

889m³

PROPOSED SEDIMENT BASIN C
CATCHMENT AREA = 4.326 Ha
DEPTH OF SETTLING ZONE = 600mm
SURFACE AREA = 993m²
SETTLING ZONE VOLUME = 593m³
SEDIMENT STORAGE VOLUME = 296m³
TOTAL BASIN VOLUME = 889m³

ROCK RIFFLE CHECK DAM AT 30m SPACING (TYP.)

PROVIDE CATCH DRAIN (TYP.)

ROCK RIFFLE CHECK DAM AT 30m SPACING (TYP.)

0.5% MIN

0.3% MIN

STRAWBALE AND GEOTEXTILE SEDIMENT FILTER AT 30m SPACING (TYP.)

ALL FINISHED LEVELS SHOWN ARE ±100mm

ADJOINS DRG No 18-596-C1113

Issue	Description	Date
J	ISSUED FOR DEVELOPMENT APPLICATION	14-04-22
H	ISSUED FOR DEVELOPMENT APPLICATION	18-03-22
G	ISSUED FOR DEVELOPMENT APPLICATION	04-03-22
F	ISSUED FOR DEVELOPMENT APPLICATION	24-02-22
E	ISSUED FOR DEVELOPMENT APPLICATION	03-02-22
D	ISSUED FOR DEVELOPMENT APPLICATION	08-10-21
C	ISSUED FOR DEVELOPMENT APPLICATION	15-10-20
B	ISSUED FOR DEVELOPMENT APPLICATION	12-10-20
A	ISSUED FOR DEVELOPMENT APPLICATION	15-05-20

Bar Scales

0 10 20 30 40 50m

1 : 500 @ A1 1 : 1000 @ A3

Key Plan

SHEET 1 SHEET 2 SHEET 3 SHEET 4 SHEET 5 SHEET 6 SHEET 7 SHEET 8 SHEET 9 SHEET 10

Client

mirvac

Scales		Drawn	KR
1:500		Designed	KR
Grid	MGA	Checked	AT
Height Datum	AHD	Approved	AM

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Project
ASPECT INDUSTRIAL ESTATE
MAMRE ROAD,
KEMPS CREEK
STAGE 1

Title
EROSION AND SEDIMENT CONTROL PLAN
SHEET 2

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
FOR APPROVAL
NOT TO BE USED FOR CONSTRUCTION

A1

Project - Drawing No.
18-596-C1111

Issue
J

100mm on Original

F:\18-596 Mamre Road\6.0 Drgs\Civil\Final\SSD\1000_STAGE 1 SSD_MOD 2\18-596-C1111.dwg

ADJOINS DRG No 18-596-C1110

LEGEND

- SEDIMENT FENCE (SD 6-8)
- CATCH DRAIN
- BARRIER FENCE
- STRAW BALE FILTER (SD 6-7)
- MESH AND GRAVEL INLET FILTER (SD 6-11)
- ROCK RIFFLE CHECK DAM (SD 5-4)
- GEOTEXTILE INLET (SD 6-12)
- STABILISED SITE ACCESS AND TRUCK WASH DOWN AREA (SD 6-14)
- PROPOSED SITE ACCESS GATE

MAMRE ROAD

DETENTION BASIN

BIO RETENTION
BEL 42.75

BEL40.72 BEL40.72 BEL40.88 BEL40.88 BEL44.34 BEL41.09 BEL41.10 BEL41.23 BEL41.25 BEL44.96 BEL44.95 BEL44.95

PROVIDE SEDIMENT FENCE (TYP.)

PROVIDE CATCH DRAIN (TYP.)

ROCK RIFFLE CHECK DAM AT 30m SPACING (TYP.)

BEL 47.51

47.40

0.3% MIN

0.5% MIN

47.60

BEL 48.40 BEL 48.40

47.40

ROCK RIFFLE CHECK DAM AT 30m SPACING (TYP.)

PROVIDE CATCH DRAIN (TYP.)

PROVIDE CATCH DRAIN (TYP.)

47.20

47.40

47.80

47.00

46.80

STABILISED SITE ACCESS AND TRUCK WASH DOWN AREA

STABILISED SITE ACCESS AND TRUCK WASH DOWN AREA

PROVIDE SEDIMENT FENCE (TYP.)

BEL 46.70

BEL 47.65

46.20 46.40 46.60 46.80

PROPOSED SEDIMENT BASIN J
REFER TO DRG 18-596-C1114 FOR DIMENSIONS

PROVIDE SEDIMENT FENCE (TYP.)

BEL 51.80

EMERGENCY BASIN OVERFLOW

PROPOSED SEDIMENT BASIN F2
REFER TO DRG 18-596-C1115 FOR DIMENSIONS

47.20

47.80

BEL 51.80

3082m³

ALL FINISHED LEVELS SHOWN ARE ±100mm

ADJOINS DRG No 18-596-C1114

ADJOINS DRG No 18-596-C1115

ADJOINS DRG No 18-596-C1113

Issue	Description	Date
J	ISSUED FOR DEVELOPMENT APPLICATION	14-04-22
H	ISSUED FOR DEVELOPMENT APPLICATION	18-03-22
G	ISSUED FOR DEVELOPMENT APPLICATION	04-03-22
F	ISSUED FOR DEVELOPMENT APPLICATION	24-02-22
E	ISSUED FOR DEVELOPMENT APPLICATION	03-02-22
D	ISSUED FOR DEVELOPMENT APPLICATION	08-10-21
C	ISSUED FOR DEVELOPMENT APPLICATION	15-10-20
B	ISSUED FOR DEVELOPMENT APPLICATION	12-10-20
A	ISSUED FOR DEVELOPMENT APPLICATION	15-05-20

Bar Scales

0 10 20 30 40 50m

1 : 500 @ A1 1 : 1000 @ A3

100mm on Original

Key Plan

SHEET 1 SHEET 2 SHEET 3 SHEET 4 SHEET 5 SHEET 6 SHEET 7 SHEET 8 SHEET 9 SHEET 10

Client

mirvac

Scales	1:500
Grid	MGA
Height Datum	AHD
Drawn	KR
Designed	KR
Checked	AT
Approved	AM

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GDA2020

Project
ASPECT INDUSTRIAL ESTATE
MAMRE ROAD,
KEMPS CREEK
STAGE 1

Title
EROSION AND SEDIMENT CONTROL PLAN
SHEET 3

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
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www.atl.net.au
info@atl.net.au

Status
FOR APPROVAL
NOT TO BE USED FOR CONSTRUCTION

A1

Project - Drawing No.
18-596-C1112

Issue
J

F:\18-596 Mamre Road\6.0 Drgs\Civil\Final\SSD\1000_STAGE 1 SSD_MOD 2\18-596-C1112.dwg

ADJOINS DRG No 18-596-C1111

ADJOINS DRG No 18-596-C1112

ADJOINS DRG No 18-596-C1115

ADJOINS DRG No 18-596-C1116

LEGEND

- SEDIMENT FENCE (SD 6-8)
- CATCH DRAIN
- BARRIER FENCE
- STRAW BALE FILTER (SD 6-7)
- MESH AND GRAVEL INLET FILTER (SD 6-11)
- ROCK RIFFLE CHECK DAM (SD 5-4)
- GEOTEXTILE INLET (SD 6-12)
- STABILISED SITE ACCESS AND TRUCK WASH DOWN AREA (SD 6-14)
- PROPOSED SITE ACCESS GATE

ROCK RIFFLE CHECK DAM AT 30m SPACING (TYP.)

PROVIDE CATCH DRAIN (TYP.)

STRAWBALE AND GEOTEXTILE SEDIMENT FILTER AT 30m SPACING (TYP.)

STABILISED SITE ACCESS AND TRUCK WASH DOWN AREA

EMERGENCY BASIN OVERFLOW

PROVIDE SEDIMENT FENCE (TYP.)

ALL FINISHED LEVELS SHOWN ARE ±1000mm

Issue	Description	Date
J	ISSUED FOR DEVELOPMENT APPLICATION	14-04-22
H	ISSUED FOR DEVELOPMENT APPLICATION	18-03-22
G	ISSUED FOR DEVELOPMENT APPLICATION	04-03-22
F	ISSUED FOR DEVELOPMENT APPLICATION	24-02-22
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D	ISSUED FOR DEVELOPMENT APPLICATION	08-10-21
C	ISSUED FOR DEVELOPMENT APPLICATION	15-10-20
B	ISSUED FOR DEVELOPMENT APPLICATION	12-10-20
A	ISSUED FOR DEVELOPMENT APPLICATION	15-05-20

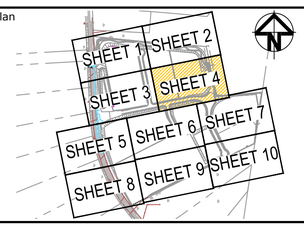
100mm on Original

Bar Scales

0 10 20 30 40 50m

1 : 500 @ A1 1 : 1000 @ A3

Key Plan



Client

mirvac

Scales		Drawn	KR
	1:500	Designed	KR
Grid	MGA	Checked	AT
Height Datum	AHD	Approved	AM

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Project

ASPECT INDUSTRIAL ESTATE
MAMRE ROAD,
KEMPS CREEK
STAGE 1

Title

EROSION AND SEDIMENT CONTROL PLAN
SHEET 4

Civil Engineers and Project Managers

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info@atl.net.au

Status: FOR APPROVAL
NOT TO BE USED FOR CONSTRUCTION

A1

Project - Drawing No.: 18-596-C1113

Issue: J

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ADJOINS DRG No 18-596-C1112

ADJOINS DRG No 18-596-C1115

ADJOINS DRG No 18-596-C117

MAMRE ROAD

ROCK RIFFLE CHECK DAM AT 30m SPACING (TYP.)

PROVIDE CATCH DRAIN (TYP.)

PROVIDE SEDIMENT FENCE (TYP.)

52.00

0.5% MIN

52.00

PROVIDE CATCH DRAIN (TYP.)

51.80

ROCK RIFFLE CHECK DAM AT 30m SPACING (TYP.)

ALL FINISHED LEVELS SHOWN ARE ±1000mm

LEGEND

- SEDIMENT FENCE (SD 6-8)
- CATCH DRAIN
- BARRIER FENCE
- STRAW BALE FILTER (SD 6-7)
- MESH AND GRAVEL INLET FILTER (SD 6-11)
- ROCK RIFFLE CHECK DAM (SD 5-4)
- GEOTEXTILE INLET (SD 6-12)
- STABILISED SITE ACCESS AND TRUCK WASH DOWN AREA (SD 6-14)
- PROPOSED SITE ACCESS GATE

Issue	Description	Date
J	ISSUED FOR DEVELOPMENT APPLICATION	14-04-22
H	ISSUED FOR DEVELOPMENT APPLICATION	18-03-22
G	ISSUED FOR DEVELOPMENT APPLICATION	04-03-22
F	ISSUED FOR DEVELOPMENT APPLICATION	24-02-22
E	ISSUED FOR DEVELOPMENT APPLICATION	03-02-22
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C	ISSUED FOR DEVELOPMENT APPLICATION	15-10-20
B	ISSUED FOR DEVELOPMENT APPLICATION	12-10-20
A	ISSUED FOR DEVELOPMENT APPLICATION	15-05-20

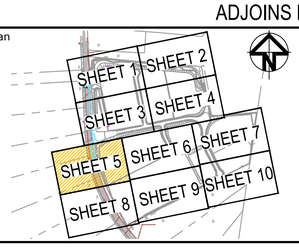
100mm on Original

Bar Scales

0 10 20 30 40 50m

1 : 500 @ A1 1 : 1000 @ A3

Key Plan



Client

mirvac

Scales		Drawn	KR
1:500		Designed	KR
Grid	MGA	Checked	AT
Height Datum	AHD	Approved	AM

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Project

ASPECT INDUSTRIAL ESTATE
MAMRE ROAD,
KEMPS CREEK
STAGE 1

Title

EROSION AND SEDIMENT CONTROL PLAN
SHEET 5

Civil Engineers and Project Managers

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info@atl.net.au

Status: FOR APPROVAL
NOT TO BE USED FOR CONSTRUCTION

A1

Project - Drawing No.: 18-596-C1114

Issue: J

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ADJOINS DRG No 18-596-C1112

ADJOINS DRG No 18-596-C1113

ADJOINS DRG No 18-596-C1114

ADJOINS DRG No 18-596-C1116

ADJOINS DRG No 18-596-C1118

PROVIDE CATCH DRAIN (TYP.)

ROCK RIFFLE CHECK DAM AT 30m SPACING (TYP.)

3082m³

PROPOSED SEDIMENT BASIN G
CATCHMENT AREA = 6.45 Ha
DEPTH OF SETTLING ZONE = 600mm
SURFACE AREA = 3425m²
SETTLING ZONE VOLUME = 2055m³
SEDIMENT STORAGE VOLUME = 1027m³
TOTAL BASIN VOLUME = 3082m³

4447m³

PROPOSED SEDIMENT BASIN H
CATCHMENT AREA = 10.60 Ha
DEPTH OF SETTLING ZONE = 600mm
SURFACE AREA = 4943m²
SETTLING ZONE VOLUME = 2965m³
SEDIMENT STORAGE VOLUME = 1482m³
TOTAL BASIN VOLUME = 4447m³

EMERGENCY BASIN OVERFLOW

0.5% MIN

52.00

48.40 48.60 48.80 49.00 49.20 49.40 49.60 49.80 50.00 50.20 50.40 50.60 50.80

53.60 53.40

LEGEND

- SEDIMENT FENCE (SD 6-8)
- CATCH DRAIN
- BARRIER FENCE
- STRAW BALE FILTER (SD 6-7)
- MESH AND GRAVEL INLET FILTER (SD 6-11)
- ROCK RIFFLE CHECK DAM (SD 5-4)
- GEOTEXTILE INLET (SD 6-12)
- STABILISED SITE ACCESS AND TRUCK WASH DOWN AREA (SD 6-14)
- PROPOSED SITE ACCESS GATE

ALL FINISHED LEVELS SHOWN ARE ±1000mm

Issue	Description	Date
J	ISSUED FOR DEVELOPMENT APPLICATION	14-04-22
H	ISSUED FOR DEVELOPMENT APPLICATION	18-03-22
G	ISSUED FOR DEVELOPMENT APPLICATION	04-03-22
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D	ISSUED FOR DEVELOPMENT APPLICATION	08-10-21
C	ISSUED FOR DEVELOPMENT APPLICATION	15-10-20
B	ISSUED FOR DEVELOPMENT APPLICATION	12-10-20
A	ISSUED FOR DEVELOPMENT APPLICATION	15-05-20

Bar Scales

0 10 20 30 40 50m

1 : 500 @ A1 1 : 1000 @ A3

Key Plan

SHEET 1 SHEET 2 SHEET 3 SHEET 4 SHEET 5 SHEET 6 SHEET 7 SHEET 8 SHEET 9 SHEET 10

Client: mirvac

Scales	1:500	Drawn	KR
		Designed	KR
Grid	MGA	Checked	AT
Height Datum	AHD	Approved	AM

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GDA2020

Project: ASPECT INDUSTRIAL ESTATE
MAMRE ROAD,
KEMPS CREEK
STAGE 1

Title: EROSION AND SEDIMENT CONTROL PLAN SHEET 6

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info@atl.net.au

Status: FOR APPROVAL
NOT TO BE USED FOR CONSTRUCTION

A1

Project - Drawing No.: 18-596-C1115

Issue: J

100mm on Original

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ADJOINS DRG No 18-596-C1113

ADJOINS DRG No 18-596-C1115

ADJOINS DRG No 18-596-C1119

PROPOSED SEDIMENT BASIN F
CATCHMENT AREA = 2.65 Ha
DEPTH OF SETTLING ZONE = 600mm
SURFACE AREA = 775m²
SETTLING ZONE VOLUME = 465m³
SEDIMENT STORAGE VOLUME = 232m³
TOTAL BASIN VOLUME = 697m³

697m³

PROPOSED SEDIMENT BASIN D
CATCHMENT AREA = 5.991 Ha
DEPTH OF SETTLING ZONE = 600mm
SURFACE AREA = 1749m²
SETTLING ZONE VOLUME = 1049m³
SEDIMENT STORAGE VOLUME = 524m³
TOTAL BASIN VOLUME = 1573m³

1573m³

PROPOSED SEDIMENT BASIN E
CATCHMENT AREA = 3.385 Ha
DEPTH OF SETTLING ZONE = 600mm
SURFACE AREA = 989m²
SETTLING ZONE VOLUME = 593m³
SEDIMENT STORAGE VOLUME = 296m³
TOTAL BASIN VOLUME = 889m³

889m³

PROVIDE SEDIMENT FENCE (TYP.)
ROCK RIFFLE CHECK DAM AT 30m SPACING (TYP.)
PROVIDE CATCH DRAIN (TYP.)
STABILISED SITE ACCESS AND TRUCK WASH DOWN AREA
EMERGENCY BASIN OVERFLOW
0.5% MIN
0.3% MIN

LEGEND

- SEDIMENT FENCE (SD 6-8)
- CATCH DRAIN
- BARRIER FENCE
- STRAW BALE FILTER (SD 6-7)
- MESH AND GRAVEL INLET FILTER (SD 6-11)
- ROCK RIFFLE CHECK DAM (SD 5-4)
- GEOTEXTILE INLET (SD 6-12)
- STABILISED SITE ACCESS AND TRUCK WASH DOWN AREA (SD 6-14)
- PROPOSED SITE ACCESS GATE

Issue	Description	Date
J	ISSUED FOR DEVELOPMENT APPLICATION	14-04-22
H	ISSUED FOR DEVELOPMENT APPLICATION	18-03-22
G	ISSUED FOR DEVELOPMENT APPLICATION	04-03-22
F	ISSUED FOR DEVELOPMENT APPLICATION	24-02-22
E	ISSUED FOR DEVELOPMENT APPLICATION	03-02-22
D	ISSUED FOR DEVELOPMENT APPLICATION	08-10-21
C	ISSUED FOR DEVELOPMENT APPLICATION	15-10-20
B	ISSUED FOR DEVELOPMENT APPLICATION	12-10-20
A	ISSUED FOR DEVELOPMENT APPLICATION	15-05-20

Bar Scales

0 10 20 30 40 50m

1 : 500 @ A1 1 : 1000 @ A3

100mm on Original

Key Plan

SHEET 1 SHEET 2 SHEET 3 SHEET 4 SHEET 5 SHEET 6 SHEET 7 SHEET 8 SHEET 9 SHEET 10

Client

mirvac

Scales	1:500	Drawn	KR
		Designed	KR
Grid	MGA	Checked	AT
Height Datum	AHD	Approved	AM

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Project
ASPECT INDUSTIAL ESTATE
MAMRE ROAD,
KEMPS CREEK
STAGE 1

Title
EROSION AND SEDIMENT CONTROL PLAN
SHEET 7

Civil Engineers and Project Managers
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Tel: 02 9439 1777
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www.atl.net.au
info@atl.net.au

Status
FOR APPROVAL
NOT TO BE USED FOR CONSTRUCTION

A1

Project - Drawing No.
18-596-C1116

Issue
J

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ADJOINS DRG No 18-596-C1114

PROVIDE SEDIMENT FENCE (TYP.)

PROVIDE CATCH DRAIN (TYP.)

52.00

52.20

0.5% MIN

MAMRE ROAD

ROCK RIFFLE CHECK DAM AT 30m SPACING (TYP.)

RETAINING WALL RW22 (LENGTH: 545m, MAX. HEIGHT: 11.00m)

PROVIDE SEDIMENT FENCE (TYP.)

ALL FINISHED LEVELS SHOWN ARE ±1000mm

ADJOINS DRG No 18-596-C1118

LEGEND

- SEDIMENT FENCE (SD 6-8)
- CATCH DRAIN
- BARRIER FENCE
- STRAW BALE FILTER (SD 6-7)
- MESH AND GRAVEL INLET FILTER (SD 6-11)
- ROCK RIFFLE CHECK DAM (SD 5-4)
- GEOTEXTILE INLET (SD 6-12)
- STABILISED SITE ACCESS AND TRUCK WASH DOWN AREA (SD 6-14)
- PROPOSED SITE ACCESS GATE

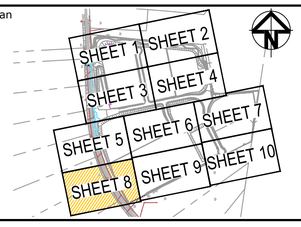
Issue	Description	Date
J	ISSUED FOR DEVELOPMENT APPLICATION	14-04-22
H	ISSUED FOR DEVELOPMENT APPLICATION	18-03-22
G	ISSUED FOR DEVELOPMENT APPLICATION	04-03-22
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B	ISSUED FOR DEVELOPMENT APPLICATION	12-10-20
A	ISSUED FOR DEVELOPMENT APPLICATION	15-05-20

Bar Scales

0 10 20 30 40 50m

1 : 500 @ A1 1 : 1000 @ A3

Key Plan



Client

mirvac

Scales	1:500	Drawn	KR
		Designed	KR
Grid	MGA	Checked	AT
Height Datum	AHD	Approved	AM

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Project

ASPECT INDUSTRIAL ESTATE
MAMRE ROAD,
KEMPS CREEK
STAGE 1

Title

EROSION AND SEDIMENT CONTROL PLAN
SHEET 8

Civil Engineers and Project Managers

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info@atl.net.au

Status: FOR APPROVAL
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A1

Project - Drawing No.: 18-596-C1117

Issue: J

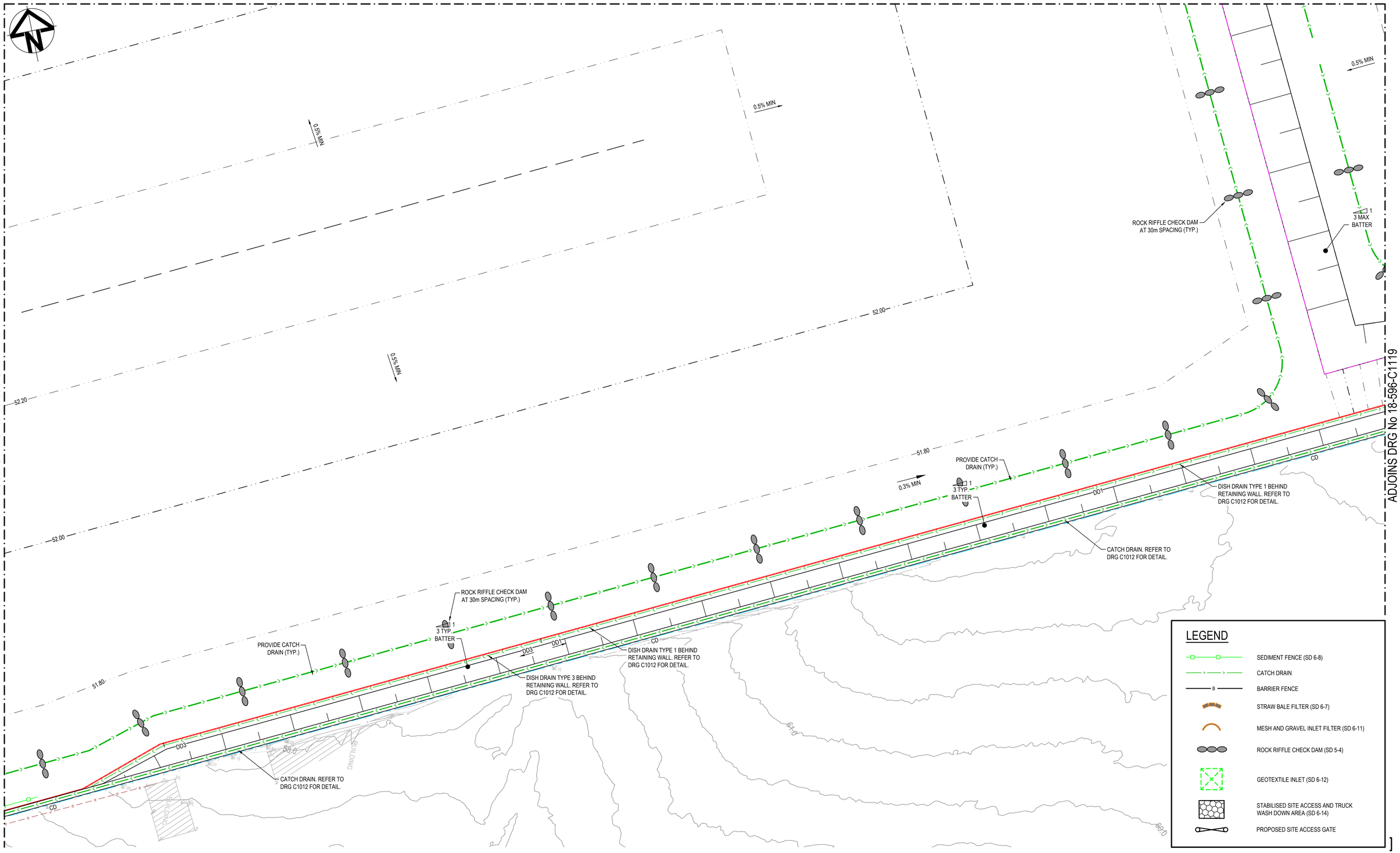
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ADJOINS DRG No 18-596-C1115

ADJOINS DRG No 18-596-C1117

ADJOINS DRG No 18-596-C1119



Issue	Description	Date
J	ISSUED FOR DEVELOPMENT APPLICATION	14-04-22
H	ISSUED FOR DEVELOPMENT APPLICATION	18-03-22
G	ISSUED FOR DEVELOPMENT APPLICATION	04-03-22
F	ISSUED FOR DEVELOPMENT APPLICATION	24-02-22
E	ISSUED FOR DEVELOPMENT APPLICATION	03-02-22
D	ISSUED FOR DEVELOPMENT APPLICATION	08-10-21
C	ISSUED FOR DEVELOPMENT APPLICATION	15-10-20
B	ISSUED FOR DEVELOPMENT APPLICATION	12-10-20
A	ISSUED FOR DEVELOPMENT APPLICATION	15-05-20

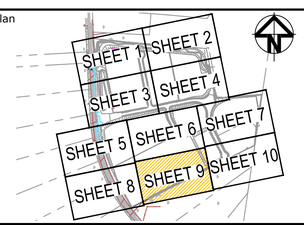
100mm on Original

Bar Scales

0 10 20 30 40 50m

1 : 500 @ A1 1 : 1000 @ A3

Key Plan



Client

mirvac

Scales		Drawn	KR
1:500		Designed	KR
Grid	MGA	Checked	AT
Height Datum	AHD	Approved	AM

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GDA2020

Project

ASPECT INDUSTRIAL ESTATE
MAMRE ROAD,
KEMPS CREEK
STAGE 1

Title

EROSION AND SEDIMENT CONTROL PLAN
SHEET 9

Civil Engineers and Project Managers

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Status

FOR APPROVAL
NOT TO BE USED FOR CONSTRUCTION

A1

Project - Drawing No.

18-596-C1118

Issue

J

F:\18-596 Mamre Road\6.0 Drgs\Civil\Final\SSD\1000_STAGE 1 SSD_MOD 2\18-596-C1118.dwg

ADJOINS DRG No 18-596-C1116

ADJOINS DRG No 18-596-C1118

PROVIDE SEDIMENT FENCE (TYP.)

PROVIDE CATCH DRAIN (TYP.)

0.5% MIN

STABILISED SITE ACCESS AND TRUCK WASH DOWN AREA

ROCK RIFFLE CHECK DAM AT 30m SPACING (TYP.)

PT53 DP 259135

LEGEND

- SEDIMENT FENCE (SD 6-8)
- CATCH DRAIN
- BARRIER FENCE
- STRAW BALE FILTER (SD 6-7)
- MESH AND GRAVEL INLET FILTER (SD 6-11)
- ROCK RIFFLE CHECK DAM (SD 5-4)
- GEOTEXTILE INLET (SD 6-12)
- STABILISED SITE ACCESS AND TRUCK WASH DOWN AREA (SD 6-14)
- PROPOSED SITE ACCESS GATE

Issue	Description	Date
J	ISSUED FOR DEVELOPMENT APPLICATION	14-04-22
H	ISSUED FOR DEVELOPMENT APPLICATION	18-03-22
G	ISSUED FOR DEVELOPMENT APPLICATION	04-03-22
F	ISSUED FOR DEVELOPMENT APPLICATION	24-02-22
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B	ISSUED FOR DEVELOPMENT APPLICATION	12-10-20
A	ISSUED FOR DEVELOPMENT APPLICATION	15-05-20

100mm on Original

Bar Scales

0 10 20 30 40 50m

1 : 500 @ A1 1 : 1000 @ A3

Key Plan

SHEET 1 SHEET 2 SHEET 3 SHEET 4 SHEET 5 SHEET 6 SHEET 7 SHEET 8 SHEET 9 SHEET 10

Client: mirvac

Scales: 1:500

Grid: MGA

Height Datum: AHD

Drawn: KR

Designed: KR

Checked: AT

Approved: AM

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GDA2020

Project: ASPECT INDUSTRIAL ESTATE
MAMRE ROAD,
KEMPS CREEK
STAGE 1

Title: EROSION AND SEDIMENT CONTROL PLAN SHEET 10

Civil Engineers and Project Managers
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ABN 96 130 882 405
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info@atl.net.au

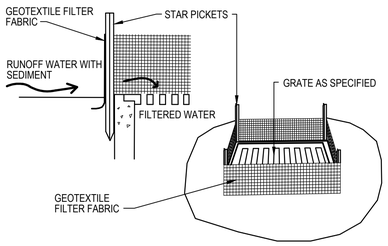
Status: FOR APPROVAL
NOT TO BE USED FOR CONSTRUCTION

A1

Project - Drawing No.: 18-596-C1119

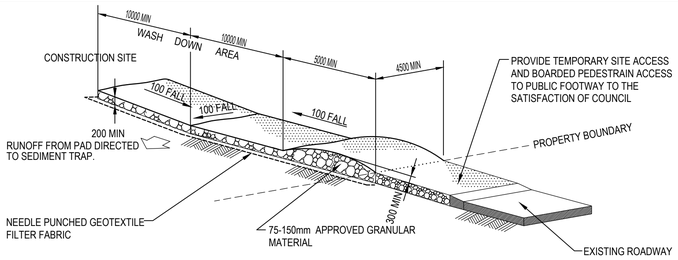
Issue: J

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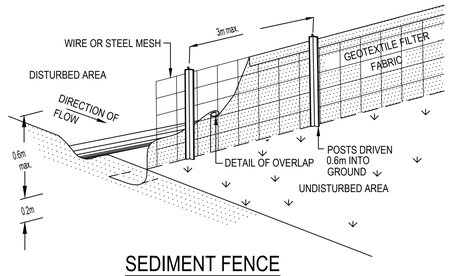
GEOTEXTILE FILTER PIT SURROUND

NTS



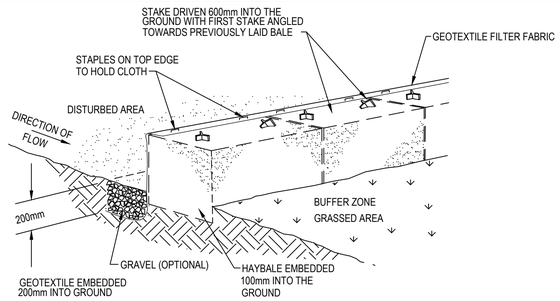
STABILISED SITE ACCESS AND TRUCK WASH DOWN AREA

NTS



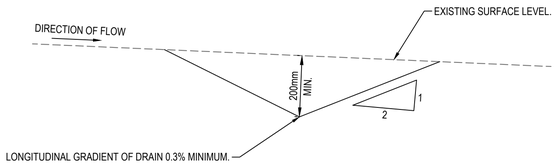
SEDIMENT FENCE

NTS



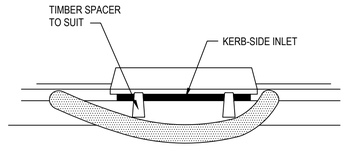
HAYBALE AND GEOTEXTILE SEDIMENT FILTER

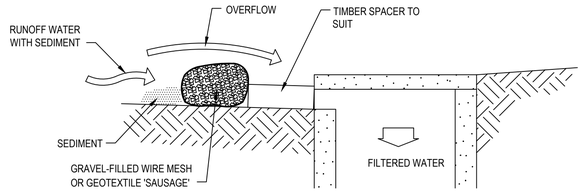
NTS



CATCH DRAIN DETAIL

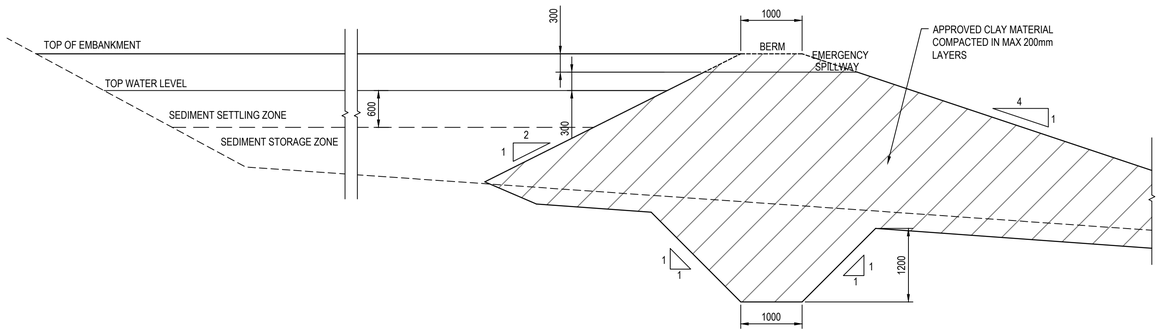
SCALE 1:10





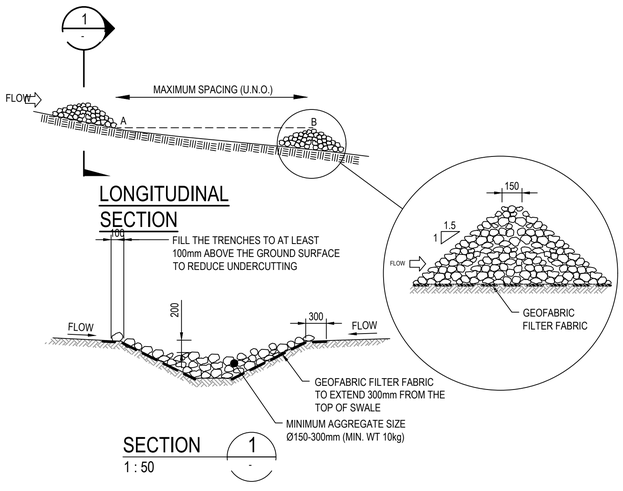
MESH AND GRAVEL INLET FILTER

NTS



SEDIMENT BASIN TYPICAL CROSS SECTION

1 : 50



ROCK RIFFLE CHECK DAM (SD 5-4)

1 : 50

Issue	Description	Date
J	ISSUED FOR DEVELOPMENT APPLICATION	14-04-22
H	ISSUED FOR DEVELOPMENT APPLICATION	18-03-22
G	ISSUED FOR DEVELOPMENT APPLICATION	04-03-22
F	ISSUED FOR DEVELOPMENT APPLICATION	24-02-22
E	ISSUED FOR DEVELOPMENT APPLICATION	03-02-22
D	ISSUED FOR DEVELOPMENT APPLICATION	08-10-21
C	ISSUED FOR DEVELOPMENT APPLICATION	15-10-20
B	ISSUED FOR DEVELOPMENT APPLICATION	12-10-20
A	ISSUED FOR DEVELOPMENT APPLICATION	15-05-20

Bar Scales

0 100 200 400 600 800 1000mm

1 : 10 @ A1 1 : 20 @ A3

0 1 2 3 4 5m

1 : 50 @ A1 1 : 100 @ A3

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Client: mirvac

Scales: 1:10, 1:50

Grid: MGA

Height Datum: AHD

GDA2020

Drawn: KR

Designed: KR

Checked: AT

Approved: AM

Project: ASPECT INDUSTIAL ESTATE
MAMRE ROAD,
KEMPS CREEK
STAGE 1

Title: EROSION AND SEDIMENT CONTROL DETAILS

Civil Engineers and Project Managers
at&l
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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: FOR APPROVAL
NOT TO BE USED FOR CONSTRUCTION

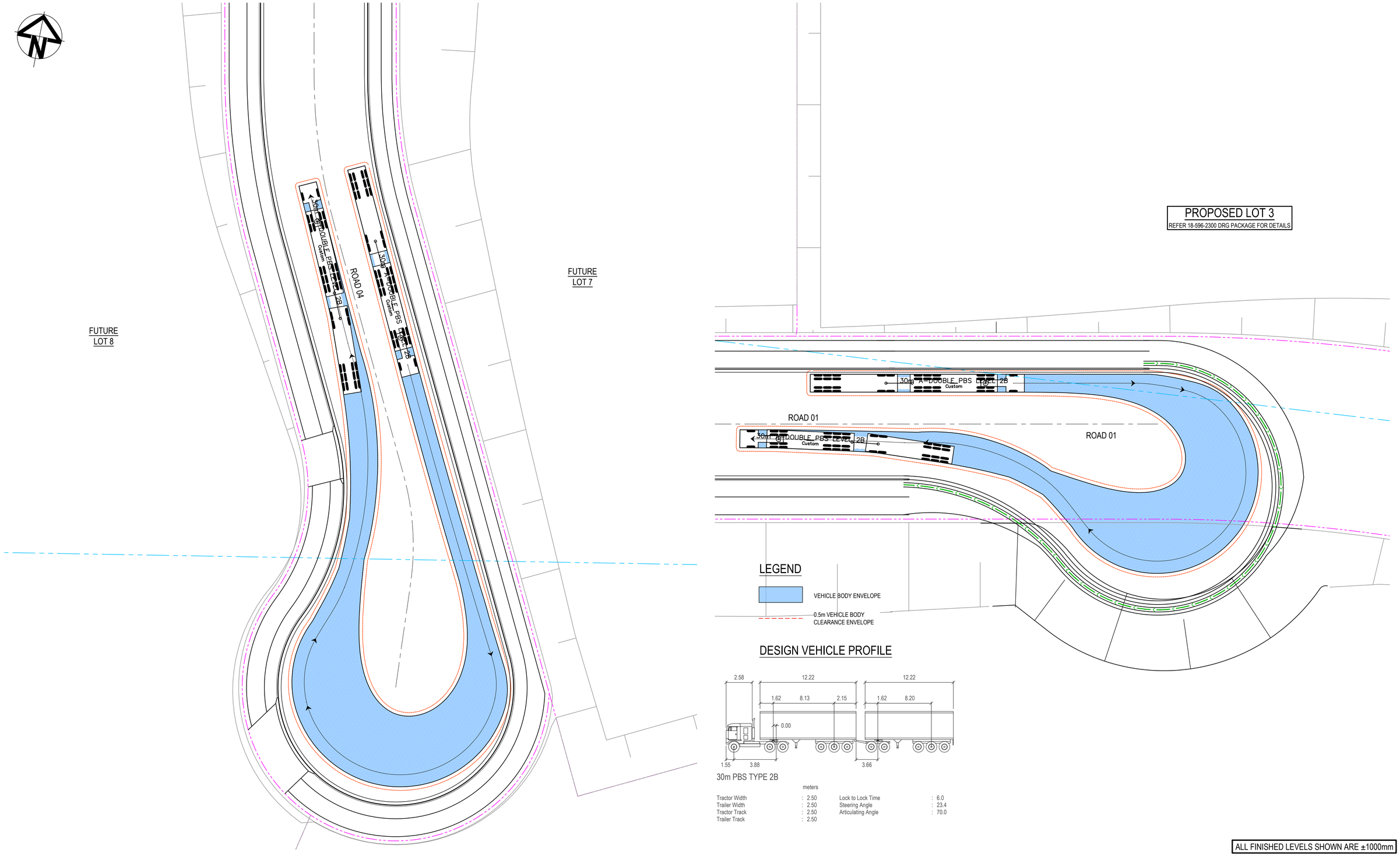
A1

Project - Drawing No.: 18-596-C1120

Issue: J

100mm on Original

F:\18-596 Mamre Road\6.0 Drgs\Civil\Final\SSD\1000_STAGE 1 SSD_MOD 2\18-596-C1120.dwg



DESIGN VEHICLE PROFILE

30m PBS TYPE 2B

meters

Tractor Width	: 2.50	Lock to Lock Time	: 6.0
Trailer Width	: 2.50	Steering Angle	: 23.4
Tractor Track	: 2.50	Articulating Angle	: 70.0
Trailer Track	: 2.50		

ALL FINISHED LEVELS SHOWN ARE ±1000mm

Issue	Description	Date
H	ISSUED FOR DEVELOPMENT APPLICATION	14-04-22
G	ISSUED FOR DEVELOPMENT APPLICATION	18-03-22
F	ISSUED FOR DEVELOPMENT APPLICATION	04-03-22
E	ISSUED FOR DEVELOPMENT APPLICATION	24-02-22
D	ISSUED FOR DEVELOPMENT APPLICATION	03-02-22
C	ISSUED FOR DEVELOPMENT APPLICATION	08-10-21
B	ISSUED FOR DEVELOPMENT APPLICATION	15-10-20
A	ISSUED FOR DEVELOPMENT APPLICATION	12-10-20

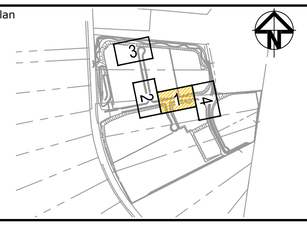
100mm on Original

Bar Scales

0 5 10 15 20 25m

1 : 250 @ A1 1 : 500 @ A3

Key Plan



Client

mirvac

Scales 1:250

Drawn KR

Designed KR

Grid MGA

Checked AT

Height Datum AHD

Approved AM

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Project
ASPECT INDUSTIAL ESTATE
MAMRE ROAD,
KEMPS CREEK
STAGE 1

Title
VEHICLE
TURN PATHS
PLAN
SHEET 1

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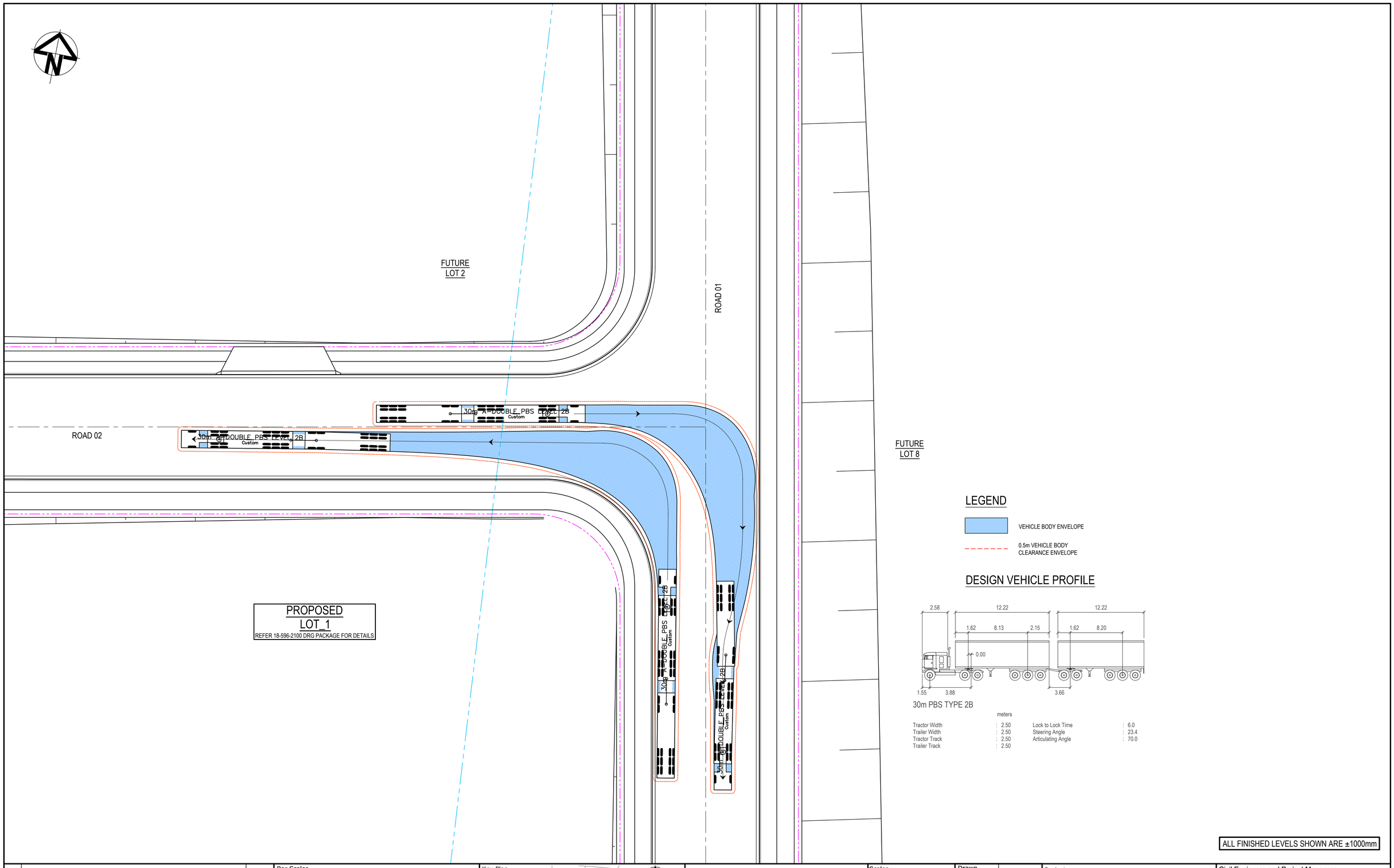
Status
FOR APPROVAL
NOT TO BE USED FOR CONSTRUCTION

A1

Project - Drawing No.
18-596-C1150

Issue
H

F:\18-596 Mamre Road\6.0 Drgs\Civil\Final\SSD\1000_STAGE 1 SSD_MOD 2\18-596-C1150.dwg



ALL FINISHED LEVELS SHOWN ARE ±1000mm

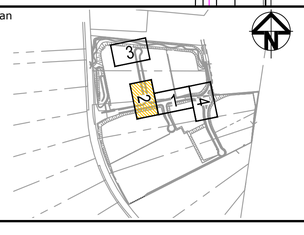
Issue	Description	Date
H	ISSUED FOR DEVELOPMENT APPLICATION	14-04-22
G	ISSUED FOR DEVELOPMENT APPLICATION	18-03-22
F	ISSUED FOR DEVELOPMENT APPLICATION	04-03-22
E	ISSUED FOR DEVELOPMENT APPLICATION	24-02-22
D	ISSUED FOR DEVELOPMENT APPLICATION	03-02-22
C	ISSUED FOR DEVELOPMENT APPLICATION	08-10-21
B	ISSUED FOR DEVELOPMENT APPLICATION	15-10-20
A	ISSUED FOR DEVELOPMENT APPLICATION	12-10-20

Bar Scales

0 5 10 15 20 25m

1 : 250 @ A1 1 : 500 @ A3

Key Plan



Client

mirvac

Scales	1:250
Grid	MGA
Height Datum	AHD
Drawn	KR
Designed	KR
Checked	AT
Approved	AM

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Project
ASPECT INDUSTRIAL ESTATE
MAMRE ROAD,
KEMPS CREEK
STAGE 1

Title
VEHICLE
TURN PATHS
PLAN
SHEET 2

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info@atl.net.au

Status
FOR APPROVAL
NOT TO BE USED FOR CONSTRUCTION

A1

Project - Drawing No.
18-596-C1151

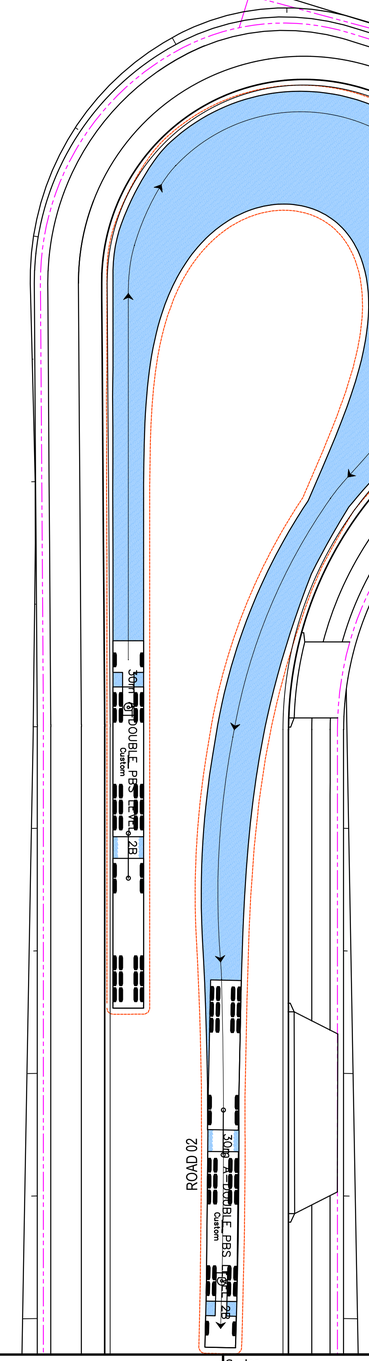
Issue
H

100mm on Original

F:\18-596 Mamre Road\6.0 Drgs\Civil\Final\SSD\1000_STAGE 1 SSD_MOD 2\18-596-C1151.dwg

PROPOSED LOT 1
REFER 18-596-2000 DRG PACKAGE FOR DETAILS

FUTURE
LOT 2

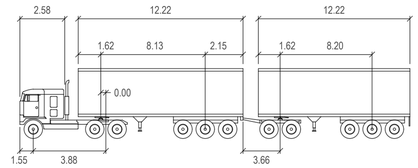


LEGEND

VEHICLE BODY ENVELOPE

0.5m VEHICLE BODY CLEARANCE ENVELOPE

DESIGN VEHICLE PROFILE



30m PBS TYPE 2B

meters

Tractor Width	: 2.50	Lock to Lock Time	: 6.0
Trailer Width	: 2.50	Steering Angle	: 23.4
Tractor Track	: 2.50	Articulating Angle	: 70.0
Trailer Track	: 2.50		

ALL FINISHED LEVELS SHOWN ARE ±1000mm

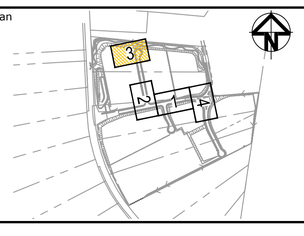
Issue	Description	Date
H	ISSUED FOR DEVELOPMENT APPLICATION	14-04-22
G	ISSUED FOR DEVELOPMENT APPLICATION	18-03-22
F	ISSUED FOR DEVELOPMENT APPLICATION	04-03-22
E	ISSUED FOR DEVELOPMENT APPLICATION	24-02-22
D	ISSUED FOR DEVELOPMENT APPLICATION	03-02-22
C	ISSUED FOR DEVELOPMENT APPLICATION	08-10-21
B	ISSUED FOR DEVELOPMENT APPLICATION	15-10-20
A	ISSUED FOR DEVELOPMENT APPLICATION	12-10-20

Bar Scales

0 5 10 15 20 25m

1 : 250 @ A1 1 : 500 @ A3

Key Plan



Client

mirvac

Scales	1:250
Grid	MGA
Height Datum	AHD
Drawn	KR
Designed	KR
Checked	AT
Approved	AM

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Project
ASPECT INDUSTRIAL ESTATE
MAMRE ROAD,
KEMPS CREEK
STAGE 1

Title
VEHICLE
TURN PATHS
PLAN
SHEET 3

Civil Engineers and Project Managers
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Status
FOR APPROVAL
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A1

Project - Drawing No.
18-596-C1152

Issue
H

100mm on Original

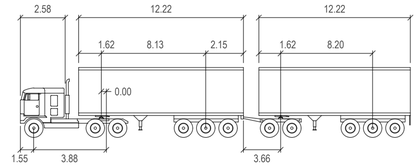
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LEGEND

VEHICLE BODY ENVELOPE

0.5m VEHICLE BODY CLEARANCE ENVELOPE

DESIGN VEHICLE PROFILE



30m PBS TYPE 2B

meters

Tractor Width	: 2.50	Lock to Lock Time	: 6.0
Trailer Width	: 2.50	Steering Angle	: 23.4
Tractor Track	: 2.50	Articulating Angle	: 70.0
Trailer Track	: 2.50		

FUTURE LOT 4

FUTURE LOT 3

FUTURE LOT 7

ROAD 01

ROAD 03

30m B-DOUBLE PBS Custom 2B

30m A-DOUBLE PBS Custom 2B

ALL FINISHED LEVELS SHOWN ARE ±1000mm

Issue	Description	Date
D	ISSUED FOR DEVELOPMENT APPLICATION	14-04-22
C	ISSUED FOR DEVELOPMENT APPLICATION	18-03-22
B	ISSUED FOR DEVELOPMENT APPLICATION	04-03-22
A	ISSUED FOR DEVELOPMENT APPLICATION	24-02-22

100mm on Original

Bar Scales

0 5 10 15 20 25m

1 : 250 @ A1 1 : 500 @ A3

Key Plan

Client

mirvac

Scales		Drawn	KR
	1:250	Designed	KR
Grid	MGA	Checked	AT
Height Datum	AHD	Approved	AM

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Project

ASPECT INDUSTRIAL ESTATE
MAMRE ROAD,
KEMPS CREEK
STAGE 1

Title

VEHICLE
TURN PATHS
PLAN
SHEET 4

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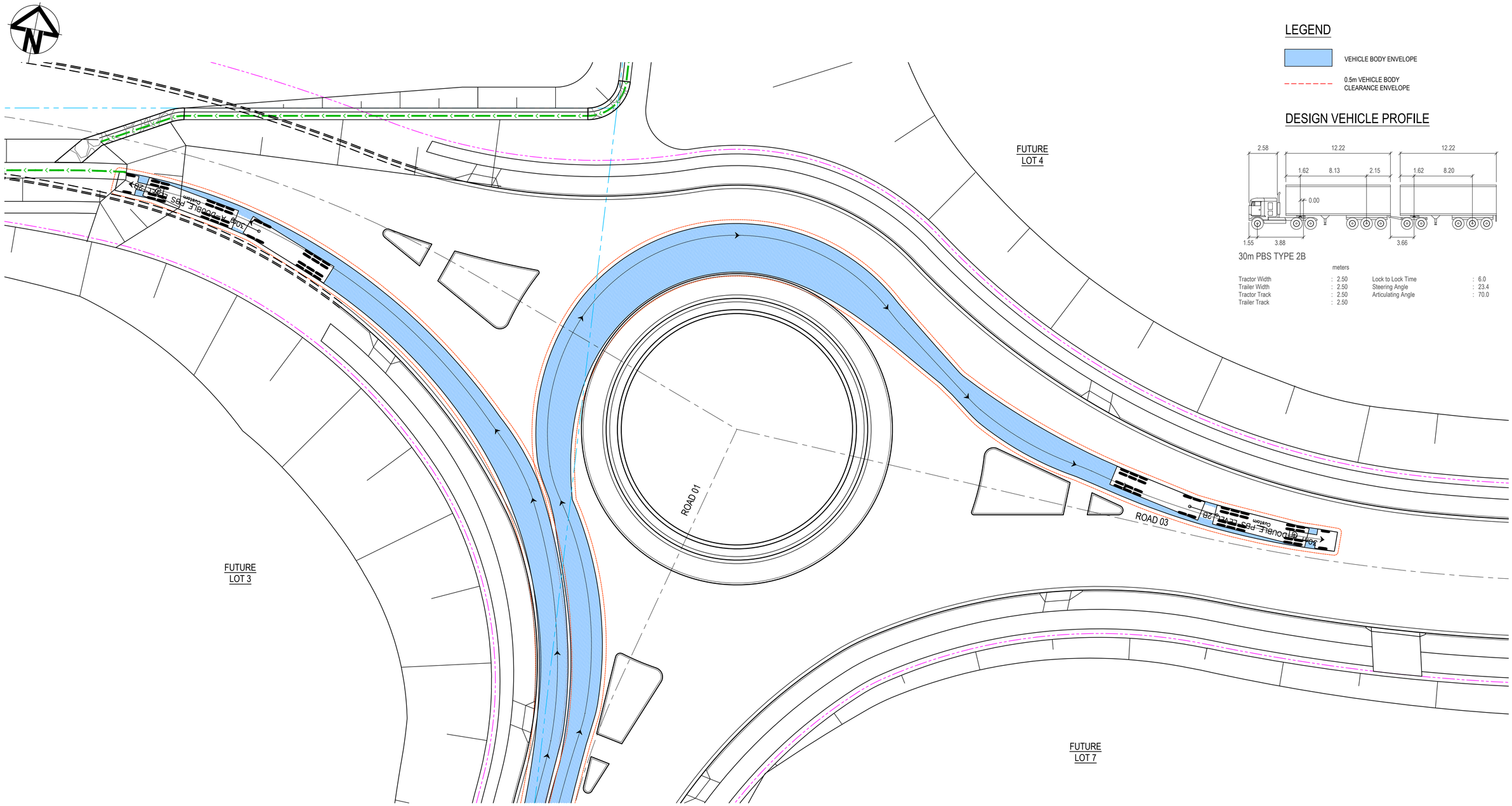
Status: FOR APPROVAL
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A1

Project - Drawing No.: 18-596-C1153

Issue: D

F:\18-596 Mamre Road\6.0 Drgs\Civil\Final\SSD\1000_STAGE 1 SSD_MOD 2\18-596-C1153.dwg



LEGEND

VEHICLE BODY ENVELOPE

0.5m VEHICLE BODY CLEARANCE ENVELOPE

DESIGN VEHICLE PROFILE

30m PBS TYPE 2B

meters

Tractor Width	: 2.50	Lock to Lock Time	: 6.0
Trailer Width	: 2.50	Steering Angle	: 23.4
Tractor Track	: 2.50	Articulating Angle	: 70.0
Trailer Track	: 2.50		

ALL FINISHED LEVELS SHOWN ARE ±1000mm

Issue	Description	Date
D	ISSUED FOR DEVELOPMENT APPLICATION	14-04-22
C	ISSUED FOR DEVELOPMENT APPLICATION	18-03-22
B	ISSUED FOR DEVELOPMENT APPLICATION	04-03-22
A	ISSUED FOR DEVELOPMENT APPLICATION	24-02-22

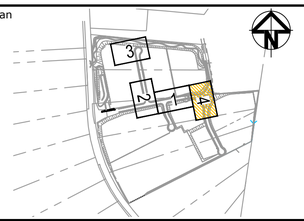
100mm on Original

Bar Scales

0 5 10 15 20 25m

1 : 250 @ A1 1 : 500 @ A3

Key Plan



Client

mirvac

Scales	1:250	Drawn	KR
		Designed	KR
Grid	MGA	Checked	AT
Height Datum	AHD	Approved	AM

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Project

ASPECT INDUSTRIAL ESTATE
MAMRE ROAD,
KEMPS CREEK
STAGE 1

Title

VEHICLE
TURN PATHS
PLAN
SHEET 5

Civil Engineers and Project Managers

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Status

FOR APPROVAL
NOT TO BE USED FOR CONSTRUCTION

A1

Project - Drawing No.

18-596-C1154

Issue

D

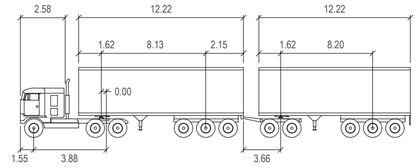
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LEGEND

VEHICLE BODY ENVELOPE

0.5m VEHICLE BODY CLEARANCE ENVELOPE

DESIGN VEHICLE PROFILE



30m PBS TYPE 2B

meters

Tractor Width	: 2.50	Lock to Lock Time	: 6.0
Trailer Width	: 2.50	Steering Angle	: 23.4
Tractor Track	: 2.50	Articulating Angle	: 70.0
Trailer Track	: 2.50		

FUTURE LOT 4

FUTURE LOT 3

FUTURE LOT 7

ROAD 01

ROAD 03

30m DOUBLE PBS 2B Quaism

30m DOUBLE PBS 2B Quaism

ALL FINISHED LEVELS SHOWN ARE ±1000mm

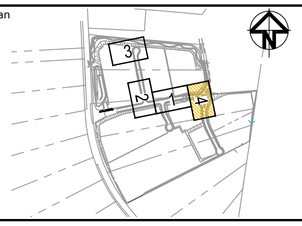
Issue	Description	Date
A	ISSUED FOR DEVELOPMENT APPLICATION	24-02-22

Bar Scales

0 5 10 15 20 25m

1 : 250 @ A1 1 : 500 @ A3

Key Plan



Client

mirvac

Scales		Drawn	KR
	1:250	Designed	KR
Grid	MGA	Checked	AT
Height Datum	AHD	Approved	AM

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Project

ASPECT INDUSTIAL ESTATE
MAMRE ROAD,
KEMPS CREEK
STAGE 1

Title

VEHICLE
TURN PATHS
PLAN
SHEET 7

Civil Engineers and Project Managers

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Status: FOR APPROVAL
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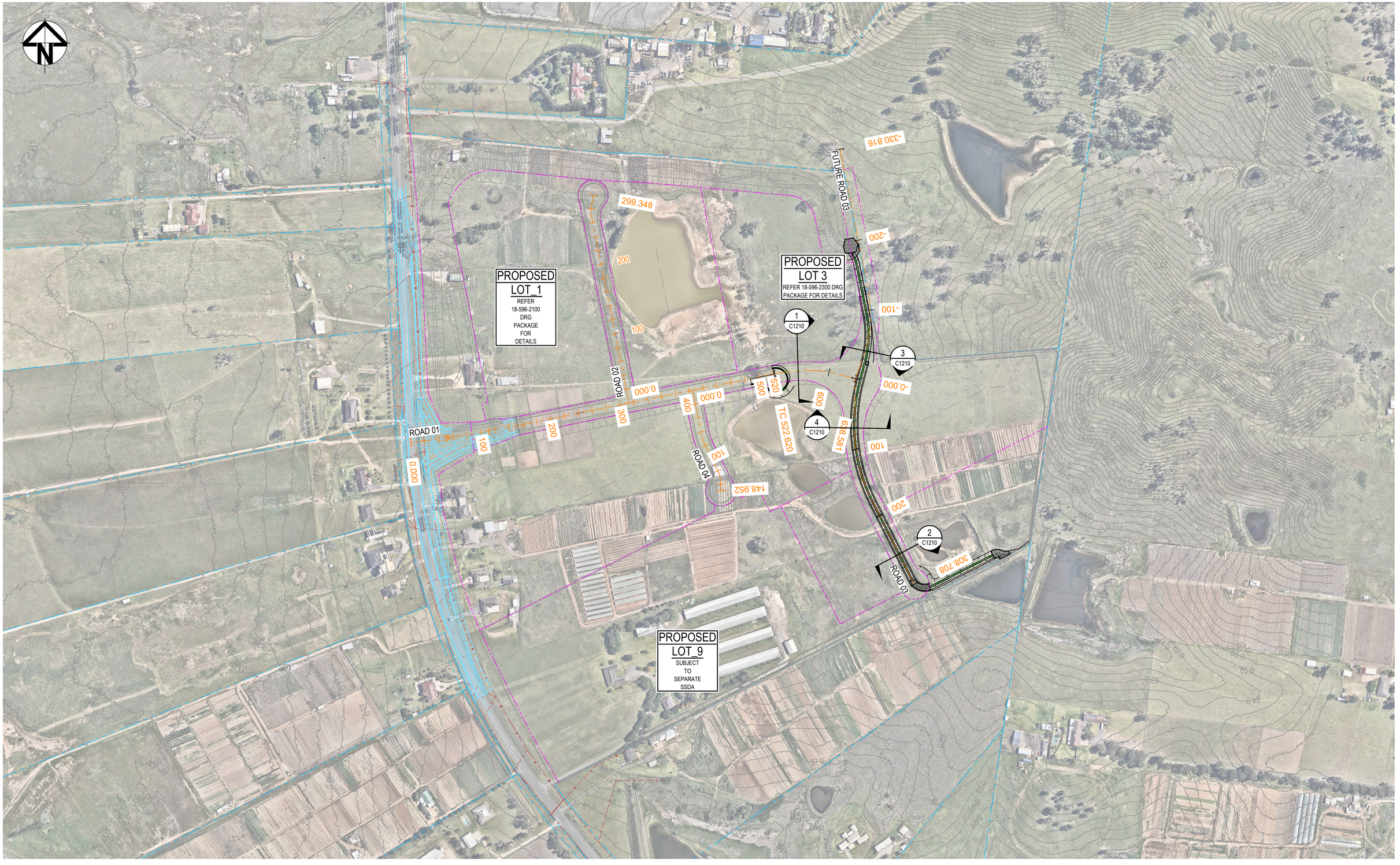
A1

Project - Drawing No.: 18-596-C1156

Issue: A

100mm on Original

F:\18-596 Mamre Road\6.0 Drgs\Civil\Final\SSD\1000_STAGE 1 SSD_MOD 2\18-596-C1156.dwg



Issue	Description	Date
E	ISSUED FOR DEVELOPMENT APPLICATION	14-04-22
D	ISSUED FOR DEVELOPMENT APPLICATION	18-03-22
C	ISSUED FOR DEVELOPMENT APPLICATION	04-03-22
B	ISSUED FOR DEVELOPMENT APPLICATION	24-02-22
A	ISSUED FOR DEVELOPMENT APPLICATION	03-02-22

100mm on Original

Bar Scales

0 50 100 150 200 250m

1 : 2500 @ A1

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Client

mirvac

Scales	1:250
Grid	MGA
Height Datum	AHD
Drawn	KR
Designed	KR
Checked	DS
Approved	AM

GDA2020

Project

ASPECT INDUSTIAL ESTATE
MAMRE ROAD,
KEMPS CREEK
STAGE 1

Title

TEMPORARY WORKS
GENERAL ARRANGEMENT
PLAN

Civil Engineers and Project Managers

at&l

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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

FOR APPROVAL
NOT TO BE USED FOR CONSTRUCTION

A1

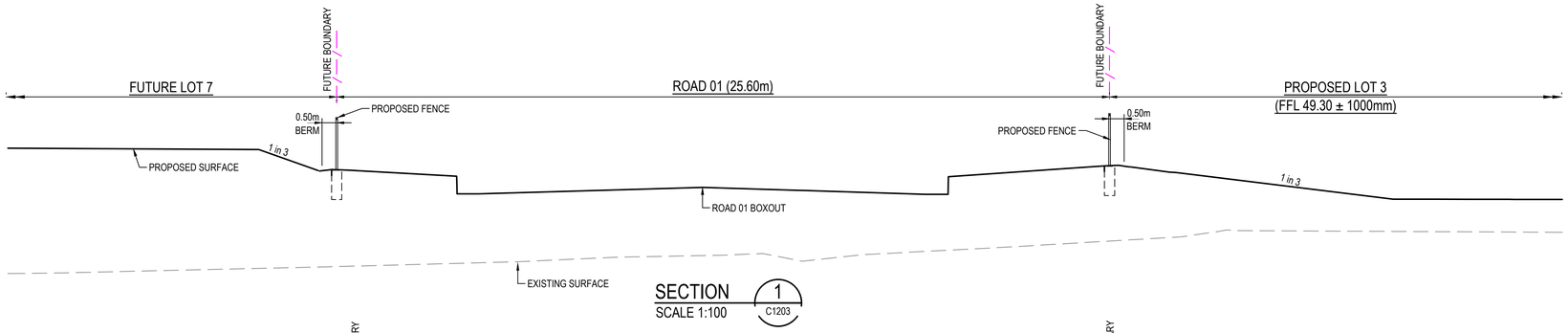
Project - Drawing No.

18-596-C1203

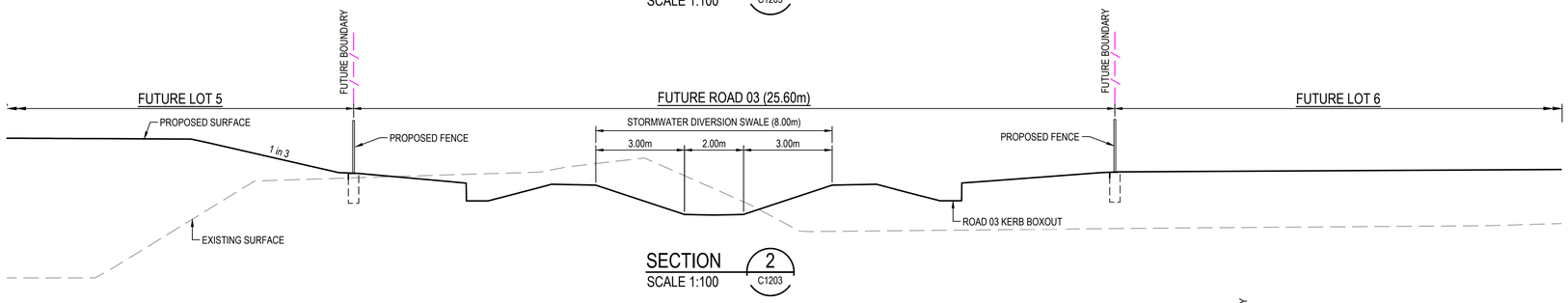
Issue

E

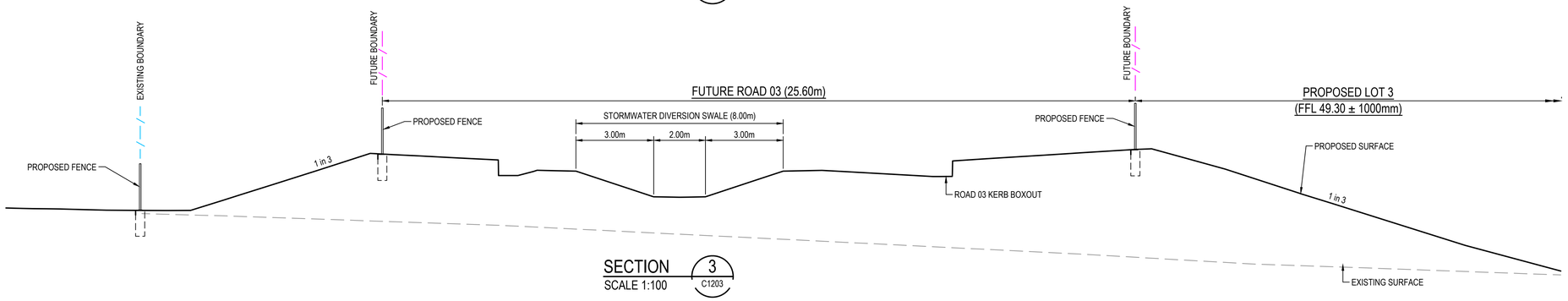
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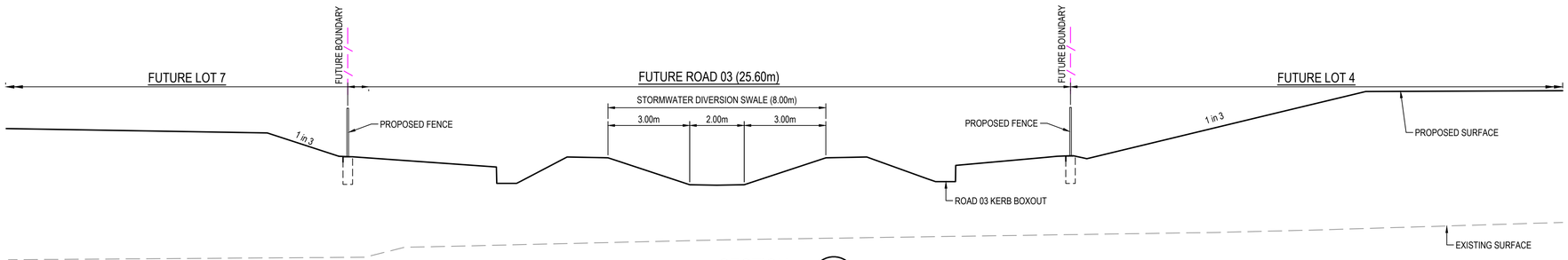
SECTION 1
SCALE 1:100 C1203



SECTION 2
SCALE 1:100 C1203



SECTION 3
SCALE 1:100 C1203



SECTION 4
SCALE 1:100 C1203

Issue	Description	Date
E	ISSUED FOR DEVELOPMENT APPLICATION	14-04-22
D	ISSUED FOR DEVELOPMENT APPLICATION	18-03-22
C	ISSUED FOR DEVELOPMENT APPLICATION	04-03-22
B	ISSUED FOR DEVELOPMENT APPLICATION	24-02-22
A	ISSUED FOR DEVELOPMENT APPLICATION	03-02-22

100mm on Original

Bar Scales

0 2 4 6 8 10m

1 : 100 @ A1 1 : 200 @ A3

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Client: mirvac

Scales: 1:100

Grid: MGA

Height Datum: AHD

GDA2020

Drawn: KR

Designed: KR

Checked: DS

Approved: AM

Project: ASPECT INDUSTRIAL ESTATE
MAMRE ROAD,
KEMPS CREEK
STAGE 1

Title: TEMPORARY WORKS
TYPICAL SECTIONS
SHEET 1

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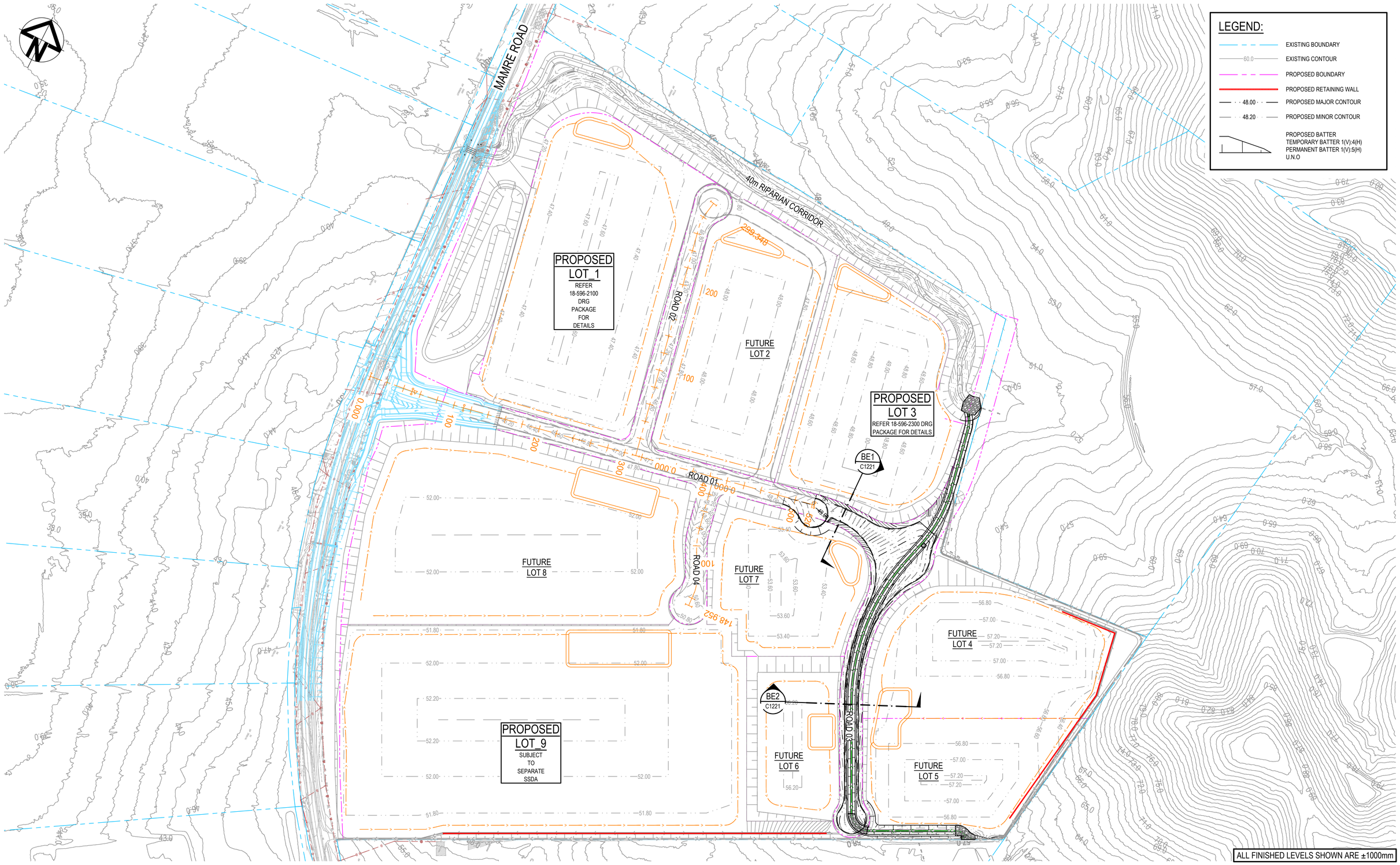
Status: FOR APPROVAL
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A1

Project - Drawing No.: 18-596-C1210

Issue: E

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Issue	Description	Date
E	ISSUED FOR DEVELOPMENT APPLICATION	14-04-22
D	ISSUED FOR DEVELOPMENT APPLICATION	18-03-22
C	ISSUED FOR DEVELOPMENT APPLICATION	04-03-22
B	ISSUED FOR DEVELOPMENT APPLICATION	24-02-22
A	ISSUED FOR DEVELOPMENT APPLICATION	03-02-22

100mm on Original

Bar Scales

0 50 100 150 200m

1 : 2000 @ A1

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Client: mirvac

Scales	1:2000	Drawn	KR
		Designed	KR
Grid	MGA	Checked	DS
Height Datum	AHD	Approved	AM

GDA2020

Project
ASPECT INDUSTIAL ESTATE
MAMRE ROAD,
KEMPS CREEK
STAGE 1

Title
TEMPORARY WORKS
BULK EARTHWORKS
CONTOUR PLAN

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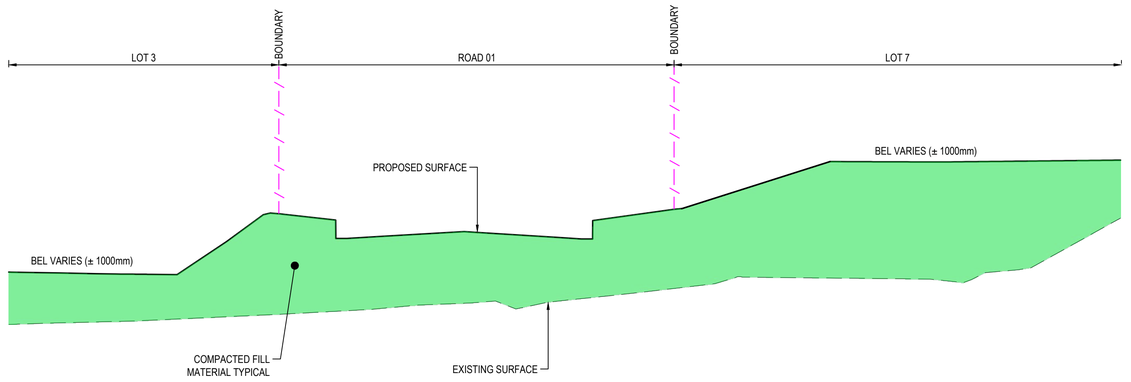
Status: FOR APPROVAL
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A1

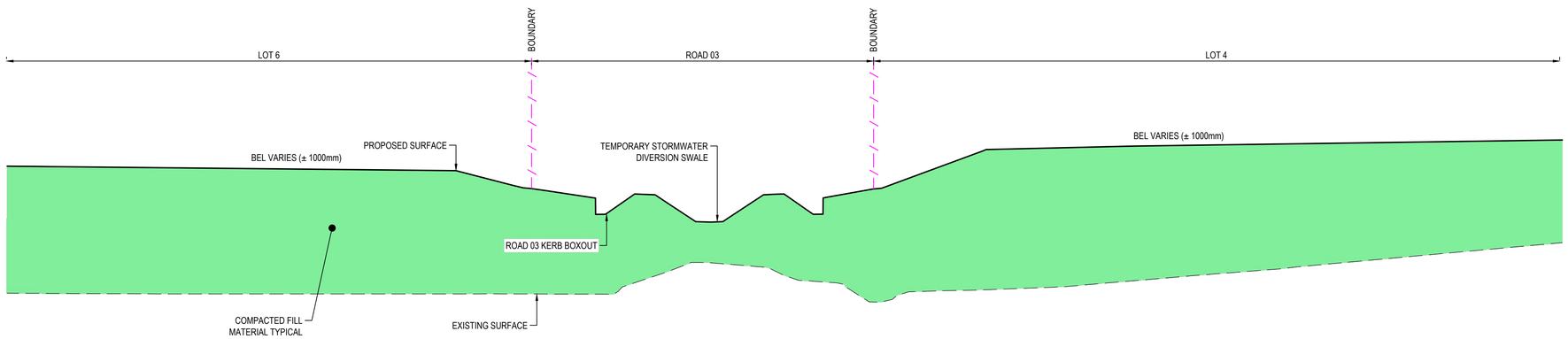
Project - Drawing No.: 18-596-C1220

Issue: E

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SECTION BE1 (C1220)
SCALE 1:200(H)
1:100(V)



SECTION BE2 (C1220)
SCALE 1:200(H)
1:100(V)

ALL FINISHED LEVELS SHOWN ARE ±1000mm

Issue	Description	Date
E	ISSUED FOR DEVELOPMENT APPLICATION	14-04-22
D	ISSUED FOR DEVELOPMENT APPLICATION	18-03-22
C	ISSUED FOR DEVELOPMENT APPLICATION	04-03-22
B	ISSUED FOR DEVELOPMENT APPLICATION	24-02-22
A	ISSUED FOR DEVELOPMENT APPLICATION	03-02-22

Bar Scales

0 5 10 15 20m
1 : 200 @ A1 1 : 400 @ A3

0 2 4 6 8 10m
1 : 100 @ A1 1 : 200 @ A3

100mm on Original

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Client: mirvac

Scales: 1:200(H) 1:100(V)
Grid: MGA
Height Datum: AHD
GDA2020

Drawn: KR
Designed: KR
Checked: DS
Approved: AM

Project: ASPECT INDUSTRIAL ESTATE
MAMRE ROAD,
KEMPS CREEK
STAGE 1

Title: TEMPORARY WORKS
BULK EARTHWORKS
SECTIONS
SHEET 1

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Status: FOR APPROVAL
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A1

Project - Drawing No.: 18-596-C1221

Issue: E

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LEGEND

- EXISTING BOUNDARY
- 60.0 EXISTING CONTOUR
- PROPOSED BOUNDARY
- 65.0 PROPOSED CONTOUR
- +BEL75.00 PROPOSED BULK EARTHWORKS LEVEL
- DD 900mm DISH DRAIN. DETAIL ON C1011
- SD 750mm SPOON DRAIN. DETAIL ON C1011
- CD CATCH DRAIN. DETAIL ON C1011
- EROSION AND SEDIMENT CONTROL CATCH DRAIN. DETAIL ON C1120
- PROPOSED RETAINING WALL
- SCOUR PROTECTION D50=600mm THICKNESS 900mm

PROPOSED LOT 3
REFER 18-596-2300 DRG PACKAGE FOR DETAILS

ROAD 01 | ROAD 03 | FUTURE LOT 8 | FUTURE LOT 4

RETAINING WALL RW21 (LENGTH: 307m, H

ALL FINISHED LEVELS SHOWN ARE ±1000mm

ADJOINS DRG No 18-596-C1230

Issue	Description	Date
E	ISSUED FOR DEVELOPMENT APPLICATION	14-04-22
D	ISSUED FOR DEVELOPMENT APPLICATION	18-03-22
C	ISSUED FOR DEVELOPMENT APPLICATION	04-03-22
B	ISSUED FOR DEVELOPMENT APPLICATION	24-02-22
A	ISSUED FOR DEVELOPMENT APPLICATION	03-02-22

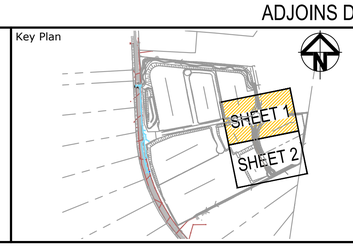
100mm on Original

Bar Scales

0 10 20 30 40 50m

1 : 500 @ A1 1 : 1000 @ A3

Key Plan



Client: mirvac

Scales	1:500
Grid	MGA
Height Datum	AHD
Drawn	KR
Designed	KR
Checked	DS
Approved	AM

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Project: ASPECT INDUSTIAL ESTATE
MAMRE ROAD,
KEMPS CREEK
STAGE 1

Title: TEMPORARY WORKS
BULK EARTHWORKS
PLAN
SHEET 1

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A1

Project - Drawing No.: 18-596-C1230

Issue: E

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ADJOINS DRG No 18-596-C1230

LEGEND

- EXISTING BOUNDARY
- 60.0 EXISTING CONTOUR
- PROPOSED BOUNDARY
- 65.0 PROPOSED CONTOUR
- +BEL75.00 PROPOSED BULK EARTHWORKS LEVEL
- DD 900mm DISH DRAIN. DETAIL ON C1011
- SD 750mm SPOON DRAIN. DETAIL ON C1011
- CD CATCH DRAIN. DETAIL ON C1011
- EROSION AND SEDIMENT CONTROL CATCH DRAIN. DETAIL ON C1120
- PROPOSED RETAINING WALL
- SCOUR PROTECTION D50=600mm THICKNESS 900mm

ROAD 03

ROAD 03

FUTURE LOT 4

FUTURE LOT 5

FUTURE LOT 6

RETAINING WALL RW22 (LENGTH: 545m, MAX. HEIGHT: 11.00m)

ALL FINISHED LEVELS SHOWN ARE ±1000mm

Issue	Description	Date
E	ISSUED FOR DEVELOPMENT APPLICATION	14-04-22
D	ISSUED FOR DEVELOPMENT APPLICATION	18-03-22
C	ISSUED FOR DEVELOPMENT APPLICATION	04-03-22
B	ISSUED FOR DEVELOPMENT APPLICATION	24-02-22
A	ISSUED FOR DEVELOPMENT APPLICATION	03-02-22

Bar Scales

0 10 20 30 40 50m

1 : 500 @ A1 1 : 1000 @ A3

Key Plan

SHEET 1

SHEET 2

Client

mirvac

Scales 1:500

Drawn KR

Designed KR

Checked DS

Approved AM

Grid MGA

Height Datum AHD

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Project

ASPECT INDUSTRIAL ESTATE
MAMRE ROAD,
KEMPS CREEK
STAGE 1

Title

TEMPORARY WORKS
BULK EARTHWORKS
PLAN
SHEET 2

Civil Engineers and Project Managers

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Status FOR APPROVAL
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A1

Project - Drawing No. 18-596-C1231

Issue E

100mm on Original

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LEGEND:

- EXISTING BOUNDARY
- EXISTING ELECTRICITY
- PROPOSED BOUNDARY
- PROPOSED EASEMENT
- PROPOSED RETAINING WALL
- 48.00 PROPOSED MAJOR CONTOUR
- 48.20 PROPOSED MINOR CONTOUR
- PROPOSED BATTER STAGE 1A WORKS TEMPORARY BATTER 1(V):4(H) PERMANENT BATTER 1(V):5(H) U.N.O
- MK PROPOSED MOUNTABLE KERB TO PCC SPECIFICATION
- K&G PROPOSED KERB AND GUTTER TO PCC SPECIFICATION
- PROPOSED DRIVEWAY LAYBACK
- PROPOSED KERB RAMP
- LIMIT OF WORKS
- PROPOSED CATCH DRAIN
- PROPOSED STORMWATER JUNCTION PIT
- PROPOSED STORMWATER JUNCTION PIT
- PROPOSED STORMWATER KERB INLET PIT WITH LINTEL
- PROPOSED STORMWATER PIPE WITH HEADWALL
- PROPOSED CAPPED STORMWATER PIPE
- PROPOSED STORMWATER LINE
- PROPOSED INDUSTRIAL ROAD PAVEMENT TO PCC SPECIFICATION
- PROPOSED FOOTPATH PAVEMENT TO PCC SPECIFICATION
- PROPOSED INDUSTRIAL DRIVEWAY PAVEMENT TO PCC SPECIFICATION
- CUL-DE-SEC ROUNDABOUT PAVEMENT
- MAINTENANCE ACCESS TRACK
- BASIN MAINTENANCE DRIVEWAY
- REINFORCED CONCRETE WIER
- LANDSCAPED MEDIAN
- CONCRETE MEDIAN

PROPOSED LOT 3
REFER 18-596-2300 DRG PACKAGE FOR DETAILS

FUTURE ROAD 01 ALIGNMENT. SEE DRGS C1050-C1061 FOR DETAIL.

AC1-11 Ø1800 Ø1800 AC1-10

Ø375

ROAD 01

CAP PROPOSED STORMWATER PIPE FOR FUTURE CONNECTION

TEMPORARY TURNING HEAD. SEE DETAIL ON DRG C1006.

48.80 49.00 49.20 49.40 49.60 49.80

AC10-1

460 480 500 520

TC 522.621

1 VARIES (3 MAX) BATTER

FUTURE LOT 7

FUTURE LOT 7

ALL FINISHED LEVELS SHOWN ARE ±1000mm

Issue	Description	Date
E	ISSUED FOR DEVELOPMENT APPLICATION	14-04-22
D	ISSUED FOR DEVELOPMENT APPLICATION	18-03-22
C	ISSUED FOR DEVELOPMENT APPLICATION	04-03-22
B	ISSUED FOR DEVELOPMENT APPLICATION	24-02-22
A	ISSUED FOR DEVELOPMENT APPLICATION	03-02-22

Bar Scales

0 5 10 15 20 25m

1 : 250 @ A1 1 : 500 @ A3

Key Plan

Client

mirvac

Scales	1:250
Grid	MGA
Height Datum	AHD
Drawn	KR
Designed	KR
Checked	DS
Approved	AM

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Project
ASPECT INDUSTRIAL ESTATE
MAMRE ROAD,
KEMPS CREEK
STAGE 1

Title
TEMPORARY WORKS
ROADWORKS
AND STORMWATER DRAINAGE
SHEET 1

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Status
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A1

Project - Drawing No.
18-596-C1250

Issue
E

100mm on Original

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LEGEND

- SEDIMENT FENCE (SD 6-8)
- CATCH DRAIN
- BARRIER FENCE
- STRAW BALE FILTER (SD 6-7)
- MESH AND GRAVEL INLET FILTER (SD 6-11)
- ROCK RIFFLE CHECK DAM (SD 5-4)
- GEOTEXTILE INLET (SD 6-12)
- STABILISED SITE ACCESS AND TRUCK WASH DOWN AREA (SD 6-14)
- PROPOSED SITE ACCESS GATE

PROPOSED
LOT 3
REFER 18-596-2300 DRG PACKAGE FOR DETAILS

STRAWBALE AND GEOTEXTILE SEDIMENT FILTER AT 30m SPACING (TYP.)

STABILISED SITE ACCESS AND TRUCK WASH DOWN AREA

ROAD 01

PROVIDE SEDIMENT FENCE (TYP.)

PROPOSED SWALE VEHICLE CROSSING. PROVIDE 2No. Ø1050 RCP WITH HEADWALL INLET/OUTLETS

ROAD 03

PROVIDE SEDIMENT FENCE (TYP.)

PROVIDE SEDIMENT FENCE (TYP.)

FUTURE LOT 8

FUTURE LOT 4

ALL FINISHED LEVELS SHOWN ARE ±1000mm

ADJOINS DRG No 18-596-C1311

Issue	Description	Date
E	ISSUED FOR DEVELOPMENT APPLICATION	14-04-22
D	ISSUED FOR DEVELOPMENT APPLICATION	18-03-22
C	ISSUED FOR DEVELOPMENT APPLICATION	04-03-22
B	ISSUED FOR DEVELOPMENT APPLICATION	24-02-22
A	ISSUED FOR DEVELOPMENT APPLICATION	03-02-22

100mm on Original

Bar Scales

0 10 20 30 40 50m

1 : 500 @ A1 1 : 1000 @ A3

Key Plan

SHEET 1
SHEET 2

Client

mirvac

Scales	1:500
Grid	MGA
Height Datum	AHD
Drawn	KR
Designed	KR
Checked	DS
Approved	AM

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Project
ASPECT INDUSTRIAL ESTATE
MAMRE ROAD,
KEMPS CREEK
STAGE 1

Title
TEMPORARY WORKS
EROSION AND
SEDIMENT CONTROL
PLAN SHEET 1

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A1

Project - Drawing No.
18-596-C1310

Issue
E

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ADJOINS DRG No 18-596-C1310

LEGEND

- SEDIMENT FENCE (SD 6-8)
- CATCH DRAIN
- BARRIER FENCE
- STRAW BALE FILTER (SD 6-7)
- MESH AND GRAVEL INLET FILTER (SD 6-11)
- ROCK RIFFLE CHECK DAM (SD 5-4)
- GEOTEXTILE INLET (SD 6-12)
- STABILISED SITE ACCESS AND TRUCK WASH DOWN AREA (SD 6-14)
- PROPOSED SITE ACCESS GATE

FUTURE LOT 4

FUTURE LOT 5

FUTURE LOT 6

ROAD 03

ROAD 03

STRAWBALE AND GEOTEXTILE SEDIMENT FILTER AT 30m SPACING (TYP.)

PROVIDE SEDIMENT FENCE (TYP.)

PROVIDE SEDIMENT FENCE (TYP.)

STRAWBALE AND GEOTEXTILE SEDIMENT FILTER AT 30m SPACING (TYP.)

ALL FINISHED LEVELS SHOWN ARE ±1000mm

Issue	Description	Date
E	ISSUED FOR DEVELOPMENT APPLICATION	14-04-22
D	ISSUED FOR DEVELOPMENT APPLICATION	18-03-22
C	ISSUED FOR DEVELOPMENT APPLICATION	04-03-22
B	ISSUED FOR DEVELOPMENT APPLICATION	24-02-22
A	ISSUED FOR DEVELOPMENT APPLICATION	03-02-22

100mm on Original

Bar Scales

0 10 20 30 40 50m

1 : 500 @ A1 1 : 1000 @ A3

Key Plan

SHEET 1

SHEET 2

Client

mirvac

Scales	1:500	Drawn	KR
		Designed	KR
Grid	MGA	Checked	DS
Height Datum	AHD	Approved	AM

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Project

ASPECT INDUSTRIAL ESTATE
MAMRE ROAD,
KEMPS CREEK
STAGE 1

Title

TEMPORARY WORKS
EROSION AND
SEDIMENT CONTROL
PLAN SHEET 2

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A1

Project - Drawing No.: 18-596-C1311

Issue: E

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