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CIVIL ENGINEERING REPORT INCORPORATING WATER CYCLE MANAGEMENT STRATEGY

SSD 9522

MAMRE ROAD & SOUTHERN LINK RD. KEMPS CREEK NSW

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1 INTRODUCTION & SCOPE

Costin Roe Consulting Pty Ltd has been commissioned by Frasers Property Australia & Altis Property Partners JV to undertake a *Civil Engineering Report & Water Cycle Management Strategy* (WCMS) to accompany a State Significant Development Application (SSDA) with the NSW Department of Planning, Industry and Environment (DPIE) for the future industrial development of the land. This report presents a civil engineering assessment of a property bounded by WaterNSW Supply Pipes, Lot 23 DP258414, South Creek and Mamre Road, Erskine Park. The development will be referred to The Mamre South Estate (MSE) in this report. The development layout is noted to proponents Masterplan 3.

This report provides an assessment of the civil engineering characteristics of the development site and technical considerations of the following aspects:

- Earthworks & geotechnical considerations;
- Roads and Access;
- Water Cycle Management Strategy (WCMS).

The WCMS comprises several key areas of stormwater and water management which are provided below. These key areas have been established with the aim to reduce impacts from the MSE development on the surrounding environment and neighbouring properties including the adjacent South Creek and South Creek corridor. The water cycle management strategy identifies the management measures required to meet the targets set. The key water cycle management areas assessed in this report are:

- Storm Water Quantity;
- Storm Water Quality;
- Water Supply and Reuse;
- Flooding; and
- Erosion and Sediment Control

This engineering analysis is based on development for industrial warehouse and logistic facilities consistent with industrial estates in the surrounding areas and indicative Masterplan provided by Frasers Property and Altis.

A request for SEAR's has been completed by Willowtree Planning. Reference to **Appendix C** should be made for SSD_9522 SEAR's dated 14 September 2018, and **Section 11** of this report for specific responses to civil engineering and water management related items included in the SEAR's.

This report includes information to address key queries as included a *Request for Additional Information* from the NSW DPE in their letter dated 21 November 2018 and associated *Appendix 1 – Adequacy Review*, and also various consultation during 2019 and first quarter of 2020 which resulted in the final adopted masterplan layout. A detailed response letter (Ref: Co13362.09.ltr, dated 6 December 2018 and subsequent letters throughout first and second quarters of 2020) has been prepared by Costin Roe Consulting in addition to the updated information contained in this report.

2 SITE DESCRIPTION AND PROPOSED DEVELOPMENT

2.1 Site Description

The development is located on a parcel of land on the west of Mamre Road, and to the north and south of Bakers Lane in the suburb of Kemps Creek as shown in **Figure 2.1**.

The land comprises a combined area of approximately 118 Ha with development proposed over approximately 89 Ha of the total land. The current land-use is predominately rural and rural-residential.

The highest elevation on the land is RL 45m AHD at the intersection of Bakers Lane and Mamre Road. The lowest levels range between RL 30m to RL 34.5m along the western boundary of the site adjacent to South Creek in the South Creek Flood plain.

Grades over the land vary from 0.5% to 2.5% with the grades becoming flatter as you move to the west, away from Mamre Road and toward the South Creek floodplain. South Creek is located on the western boundary of the site.

A major WaterNSW Supply Pipeline is located between on northern property boundary of the study area and the Altis First Estate industrial subdivision is located immediately to the north of the Sydney Water pipe.

Figure 2.1 Locality Plan

The site is located within the bounds of Penrith City Council (PCC), therefore the engineering requirements of the PCC *Development Control Plan 2014* require consideration in the design.

2.2 Proposed Development

The proposed development is for an industrial estate, earthworks and infrastructure for future industrial development over an area of approximately 89 Ha. An indicative lot layout is shown in **Figures 2.2.** Infrastructure works will include bulk earthworks, provision of services, road & intersection construction, and stormwater management and has completed in accordance with the Development Masterplan.

The preliminary masterplan layout provided by Frasers Property shows development lots will vary between 1 Ha and 6 Ha in size. Siting of the development lots will be sympathetic to the topography of the land, access and flood planning requirements. The sites adjacent to South Creek will need to allow for the minimum 500mm freeboard to the 1% AEP flood level of South Creek.

Access to all lots would be made via the new Southern Link Road, Bakers Lane and via a new estate access road from Mamre Road. The new access road and associated intersection will be constructed to Penrith City Council requirements and ownership transferred to Penrith City Council.

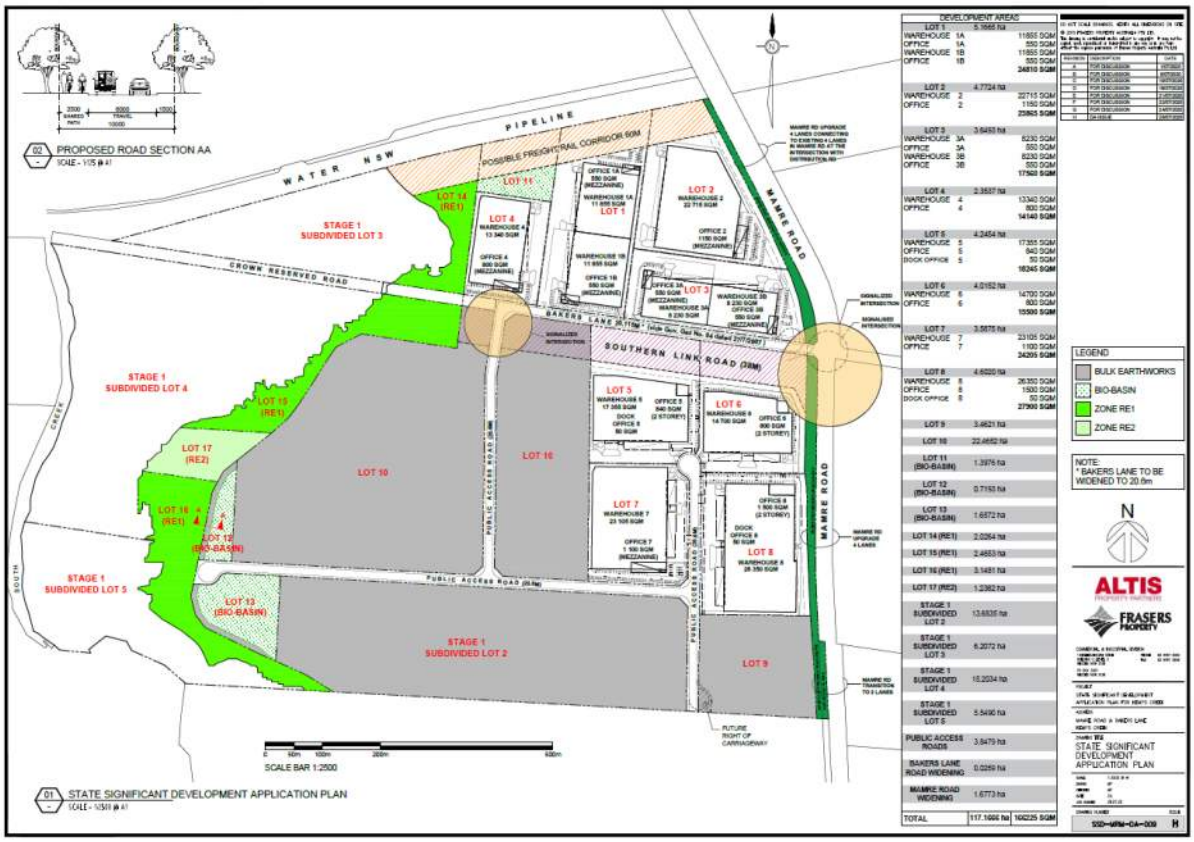

Figure 2.2. Indicative Building Development Masterplan

3 EARTHWORKS & FOUNDATIONS

3.1 Soil Profile and Geotechnical Considerations

A geotechnical report has been provided by Pells Sullivan Meynink dated 9 April 2017.

Based on our knowledge of the area, the site is expected to exhibit characteristics consistent with Bringelly Shale Landscapes.

Geotechnical investigations of surrounding sites reference the Penrith 1:100,000 Geological Series Sheet and the areas to the west of Mamre Road are expected to be underlain by Quaternary fluvial sediments and the eastern half by Bringelly Shale of the Wianamatta Group. Alluvial sediments in and around the South Creek flood plain are described as fine-grained sand, silt and clay. The Bringelly Shale is described as shale, claystone, laminate and lithic sandstone.

Engineering properties of the residual clay soils are that they will be moderately reactive, highly plastic subsoils with poor drainage.

Topsoil depths are expected to average 200mm. Given, however, the long-standing rural use topsoil with depths of 300-400mm in depth can be expected locally. Topsoil will overly natural soils comprising alluvium and/or residual soils. Given the large site area the overall topsoil volume will comprise a significant portion of the overall earthwork's component. Consideration to provide bury pits within undevelopable land.

3.2 Earthworks

Bulk earthworks will be required to facilitate the development of the estate for industrial use. The earthworks will be undertaken to provide large flat building pads, facilitate site access from Mamre Road and proposed estate roads, to drain the site stormwater via gravity, and to keep building levels above the 1% AEP flood level with a minimum freeboard of 0.5m.

High level earthworks and volume estimates have been completed and are shown on drawing **Co13362.00-DA300** of **Appendix A**. The earthworks volume estimates are based on a lot layout with flat building pads. The earthworks analysis has been completed to a level of detail to enable general pad levels to be set and to obtain an order of magnitude cut and fill volume estimate. The primary drivers for the proposed earthworks levels are access and draining the site via gravity. This results in large amounts of fill import being required for the site.

The earthworks volume estimates are as follows:

Topsoil cut	- 175,000 m^3
Cut	- 61, 800 m^3
Fill	+2,076,600 m^3
Detailed Excavation ($1250m^3$/Ha)	- 109,600 m^3
Balance	+1,905,200 m^3 *(import required.)*

The volume estimate is based on a 175,000m^3 topsoil strip (200mm over the site area) to be either removed from the site, blended or placed and used within non-developable vegetation zones. Given the large volume and associated cost this would impose to dispose the topsoil, geotechnical advice is recommended to confirm options for borrow pit arrangement or blending non-organic topsoil component with site won fill material, so disposal of topsoil is not required. Consideration to the short- and long-term performance of the blended fill, including effect on settlement, soil modulus, CBR and bearing capacity should be made in any geotechnical advice. If high-bay or other settlement sensitive uses are proposed on the site, then topsoil blending should not be adopted.

An import of earthworks has been shown in the concept analysis to enable buildings to be sited above the 1% AEP event with 0.5m of freeboard and to enable drainage of sites by gravity. Consideration to bulking of cut materials including rock and clay materials should be allowed for. Bulking of clay would normally be expected to be 4% of the removed volume and rock bulking can be expected in the range of 8-12%.

The site earthworks are to be staged as defined in **Figure 1.3** of this report. Detailed assessment and breakdown of volumes for the development will be provided during construction certificate/detail design phase of the project.

Soil erosion and sediment control measures including sedimentation basins will also be provided for the development – please refer to the Soil and Water Management Plan in **Section 10** of this report. All Soil and Sediment Control measures will be performed in accordance with Penrith City Council requirements and *Landcom Managing Urban Stormwater, Soils and Construction (1998) – The Blue Book.*

Cut earthworks over the site will be minor, and no major changes or impacts to groundwater is expected because of these works.

3.3 Embankment Stability

To assist in maintaining embankment stability, permanent batter slopes will be no steeper than 3 horizontal to 1 vertical while temporary batters will be no steeper than 2 horizontal to 1 vertical. This is in accordance with the recommended maximum batter slopes for residual clays and shale which are present in the area.

Permanent batters will also be adequately vegetated or turfed which will assist in maintaining embankment stability.

Stability of batters and reinstatement of vegetation shall be in accordance with the submitted drawings and the Soil and Water Management Plan in **Section 5**.

3.4 Supervision of Earthworks

All geotechnical testing and inspections performed during the earthwork's operations will be undertaken to Level 1 geotechnical control, in accordance with AS3798-1996.

3.5 Groundwater

The geotechnical investigations undertaken by PSM Geotechnical did not encounter groundwater in any of the test locations. It could be expected that groundwater may be experienced at depth or around the normal dry weather water level of South Creek, and that this level would have some seasonal variation and variation associated with periods of high rainfall. In any event, groundwater if present would be at depth below the proposed filled pad levels and interaction with existing groundwater paths would be negligible.

We confirm that the development does not propose to utilise surface or groundwater water sources. An assessment of the impact on these items is not relevant for the warehouse distribution center construction.

Surface water management, including conveyance of surface runoff, management of water quantity (through on-site detention) and water quantity (through on-site and estate wide management systems using WSUD principles and best practice pollution reduction objectives) has been proposed in the design.

In relation to groundwater affectation, this is expected to be negligible. The geotechnical investigations undertaken by PSM did no encounter groundwater in any of the test locations. Further, the majority of the site and site earthworks involve filling, hence any interaction with existing groundwater or groundwater flow paths would negligible and hence not be impacted.

3.6 Acid Sulphate Soils

An assessment of the potential for acid sulphate soils has been requested as part of the SEAR's requirements.

Reference to the *NSW Land & Water Conservation Acid Sulphate Soils Map 92_Liverpool* shows the subject land clear of any known occurrence of acid sulphate soils.

An environmental assessment has been undertaken by JBS&G for the development – ref 54963/120704 – as included in the EIS. This report includes assessment of acid sulfate soils (refer Section 2.7 of the JBS&G report).

The JBS&G report showed that the risk of acid sulphate soils were low and this site is not subject to any policies relating to acid sulfate soils. As such no specific requirements relating to management of these soils are considered necessary. Refer to the JBS&G report for more detail on this.

3.7 SEPP (WSEA) Clause 33H Earthworks

Consideration to the requirements of SEPP (WSEA) Clause 33H Earthworks has been made in the impact assessment. Review and confirmation specific matters included in Clause 33H(3) has been made for Items (a) through (j) as follows.

a) the likely disruption of, or detrimental effect on, existing drainage patterns and soil stability in the locality,

A detailed flood assessment has been completed in relation to flooding considerations – refer report **Co13362.00-19.rpt** by Costin Roe Consulting.

Refer **Sections 6, 7 & 8** of this report and associated drawings in **Appendix A** which set out stormwater management for the site. The proposed strategy incorporates management of site runoff and upstream drainage paths managing quantity and quality and ensuring acceptable impacts in accordance with various council and NSW government policy.

Consideration to stability of soil has been made during and post construction.

b) the effect of the proposed development on the likely future use or redevelopment of the land,

the proposed development (being industrial warehouse distribution development) is consistent with the land zoning. Future redevelopment of similar industrial developments would be able to be undertaken.

c) the quality of the fill or the soil to be excavated, or both,

Geotechnical and environmental assessments have been undertaken for the site and reviews and discusses suitability for use as engineered fill, foundations and other development requirements. The report shows that with due consideration to the design requirements that development would be able to be made over the development footprint.

d) the effect of the proposed development on the existing and likely amenity of adjoining properties,

Adjoining properties to the north, south and east are noted to comprise land zoned for industrial use, hence similar amenity to these frontages is achieved. The areas to the west of the development is zoned RE1 and RE2 and the masterplan has been agreed with the department to include provision for recreational uses as defined in the urban plan for the precinct.

e) the source of fill material and the destination of excavated material,

There is no excavated material to be removed from the site. Import of fill is required and is expected to be sourced from a variety of locations which will need to be confirmed as part of the Construction Management Plan for the development during Construction Certificate stage of the development.

f) the likelihood of disturbing relics,

A heritage and aboriginal impact study has been undertaken. Refer to separate reports.

g) the proximity to and potential for adverse impacts on a waterway, drinking water catchment or environmentally sensitive area,

A detailed flood assessment has been completed in relation to flooding considerations and confirmation of acceptable impacts – refer report **Co13362.00-19.rpt** by Costin Roe Consulting. Assessments relating to discharge to water has been made in the Ecologist report (refer separate report). Refer Section 6, 7 & 8 of

this report for details of water quantity, water quality and stream erosion index assessments which confirm acceptable impacts relating to stormwater management.

h) appropriate measures proposed to avoid, minimise or mitigate the impacts of the development,

Appropriate measures during and following development have been made in relation to earthworks, erosion and sediment controls and

i) the proximity to and potential for adverse impacts on a heritage item, an archaeological site, or a heritage conservation area,

A heritage and aboriginal impact study has been undertaken. Refer to separate reports.

j) the visual impact of earthworks as viewed from the waterways.

Refer separate visual impact report in relation to visual.

4 ESTATE ROADS & ACCESS

4.1 Introduction

Integration with the broader transport strategy for the area will be required including the proposed Southern Link Road. This includes the provision of signalised intersections with Mamre Road which will be required to be designed and constructed to the requirements of NSW Road and Maritime Services.

The current posted speed limit for Mamre Road is 80kM/hr and Bakers Lane is 60kM/hr. The corresponding design speeds for the two roads are 90kM/hr and 70kM/hr. An existing signalised intersection is present at the intersection of Mamre Road and Bakers Lane.

The proposed road alignments will need to be designed to meet Council requirements. The proposed road layout will incorporate best practice for both horizontal and vertical alignments with empathy to the landform.

4.2 Internal Roads

The estate road will need to be designed and constructed as an industrial road consistent with Penrith City Council *Development Control Plan 2014, Part C10 Transport, Access and Parking*. The road cross section as defined in council DCP is shown in **Table 4.1** and **Figure 4.1**.

Roads 2 and 3 will adopt the Penrith Council DCP arrangement (refer Figure 4.1 and 4.3).

Bakers Lane and Road 1 require a 2.5m shared path to be integrated into the design. During the adjoining First Estate SSD assessment, Penrith Council also requested a 2.5m shared path (4.8m verge) & 1.5m footpath (3.8m verge) to be provided in a larger overall road reserve width of 21.6m. The final agreed arrangement for the First Estate (approved and now constructed), as shown in **Figure 4.2**, included a 2.5m Shared path (4.1m verge) & 1.5m footpath (3.5m verge) whilst maintaining the 20.6m overall width. The agreed arrangement per First Estate is proposed to be adopted for this development.

The arrangement of the roads and intersections should be confirmed by the traffic engineering consultant. We understand that Bakers Lane is proposed for upgrade to run parallel to the Southern Link Road incorporating a transit way and multilane carriageway with separation medians. The typical cross section arrangement completed by Aecom is shown in **Figure 4.3**.

Road Type & Traffic Volume	Parking Lane Provision	Dedicated Travel Lanes	Verge Width (Footpath Pedestrian)	Total Road Reserve	Number of lanes	1.5m Footpath or 2.5m Shared Path
Bakers Lane and north-south link road (Road 1)	6.0m (2 x 3.0m)	7.0m (2 x 3.5m)	3.5m 4.1m	20.6m	2 travel/ 2 parking lane	1.5m 2.5m
PCC DCP 2014 Industrial (Road2 & 3)	6.0m (2 x 3.0m)	7.0m (2 x 3.5m)	3.8m (2x 3.8m)	20.6m	2 travel/ 2 parking lane	1.5m Both sides

Table 4.1. Estate Road Cross Section per PCC DCP2014 and adopted

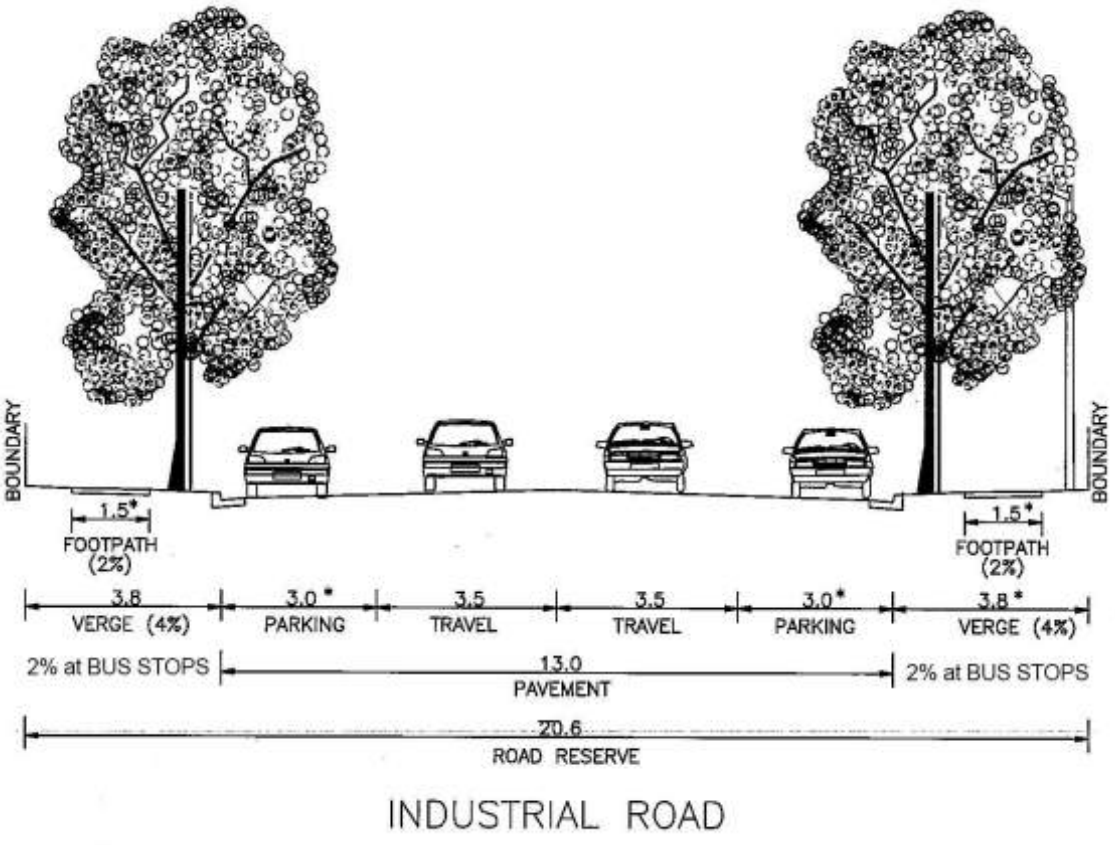

Figure 4.1. DCP Estate Road Cross Section (source: PCC DCP2014 Part C10)

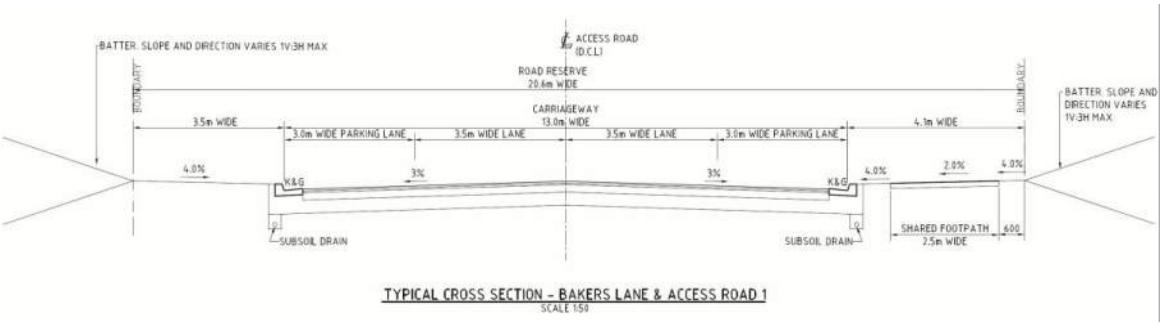

Figure 4.2. Estate Road – Typical Cross Section (Bakers Lane & Road 1)

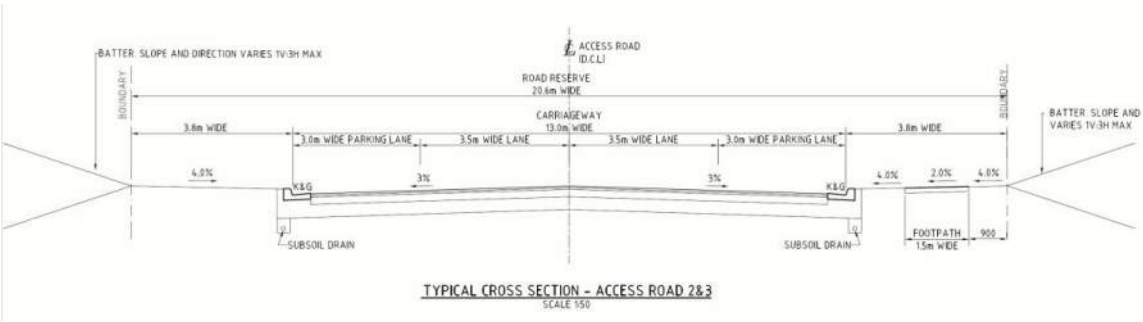

Figure 4.3. Estate Road – Typical Cross Section (Road 2 & 3)

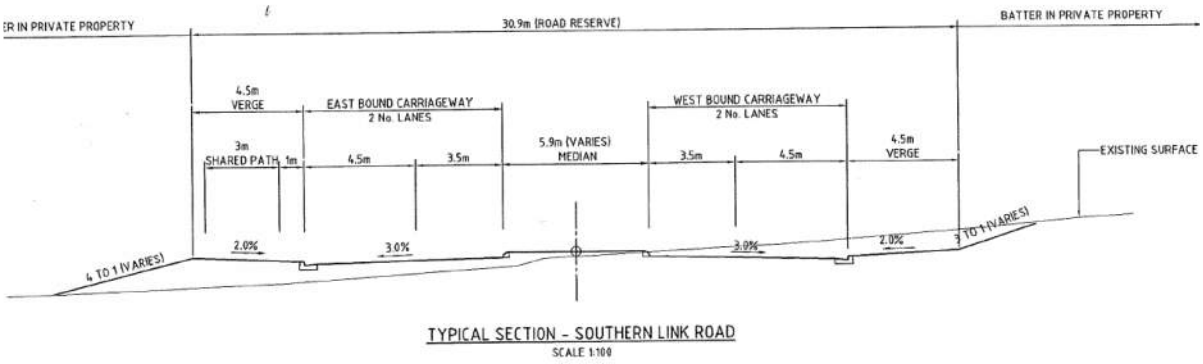

Figure 4.4. Southern Link Road Typical Section (source: Broader Western Sydney Employment Area Southern Link Road Network 60301100-00-FIG-TS-0002)

4.3 General Requirements

All roads will have concrete kerb and gutter and carriageway surface finished with asphaltic concrete as per the requirements of Penrith City Council.

The design for the proposed pavement for internal roads is to be based on *Austroads Pavement Design – A Guide to the Structural Design of Road Pavements.* Council DCP requires the pavement design to be based on a traffic loading of $1x10^7$ ESA. This loading is typical of an industrial road and would meet the needs of the estate.

We recommend that further review of the proposed pavement construction specification and design loading allowance be undertaken for the internal roads when this becomes available.

In accordance with the estate master plan and council requirements, a 1.5m pedestrian path will need to be located on one side of the road cross section with a 2.5m shared path on the other.

4.4 Mamre Road Intersections

Intersections will be required to Mamre Road. The intersections will need to align with Bakers Lane and allow for the future Southern Link Road.

Reference to the Traffic Report by Ason Group provides details on performance of the intersections both pre and post development, and general arrangement for the intersections.

Functional layouts of the intersections based on the general arrangement and Sequences 1A, 1B, 2 and 3, defined in the Traffic Report have been prepared by our office. These sequences are shown below in **Figure 4.4-4.6** and included in **Appendix A**.

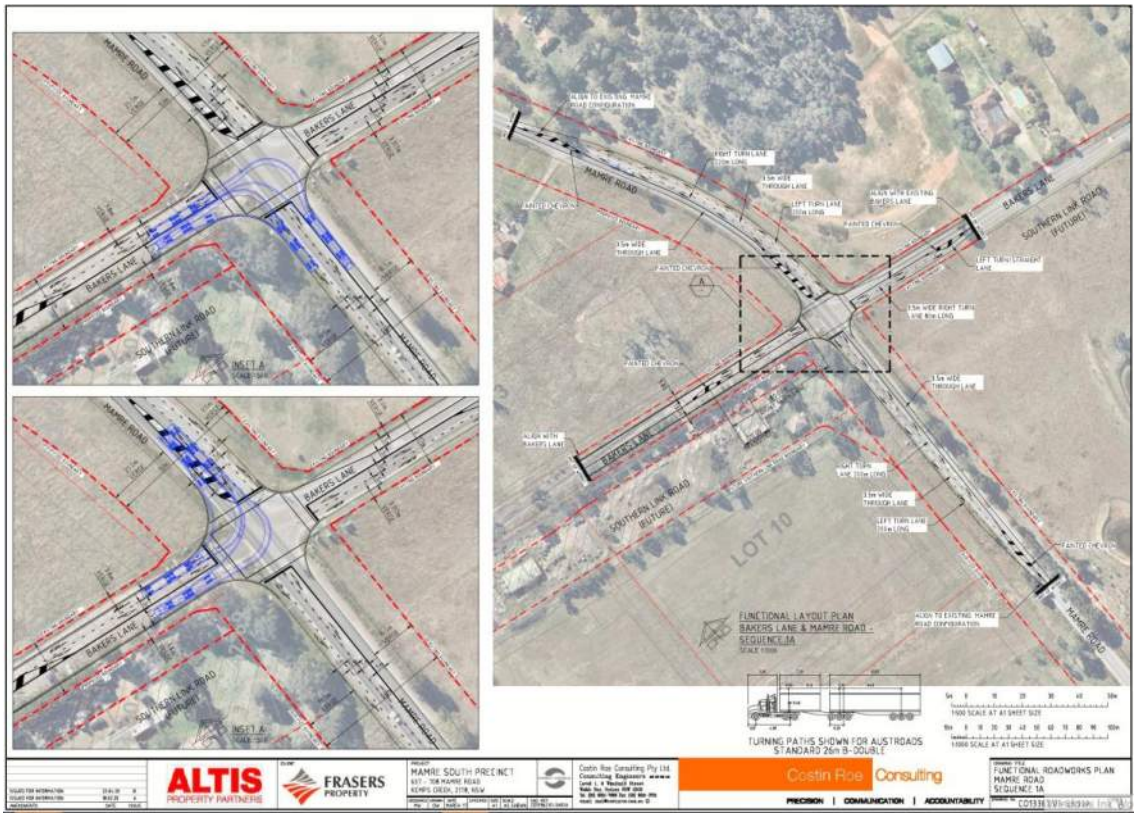

Figure 4.4a. Bakers Lane Intersection (Sequence 1A)

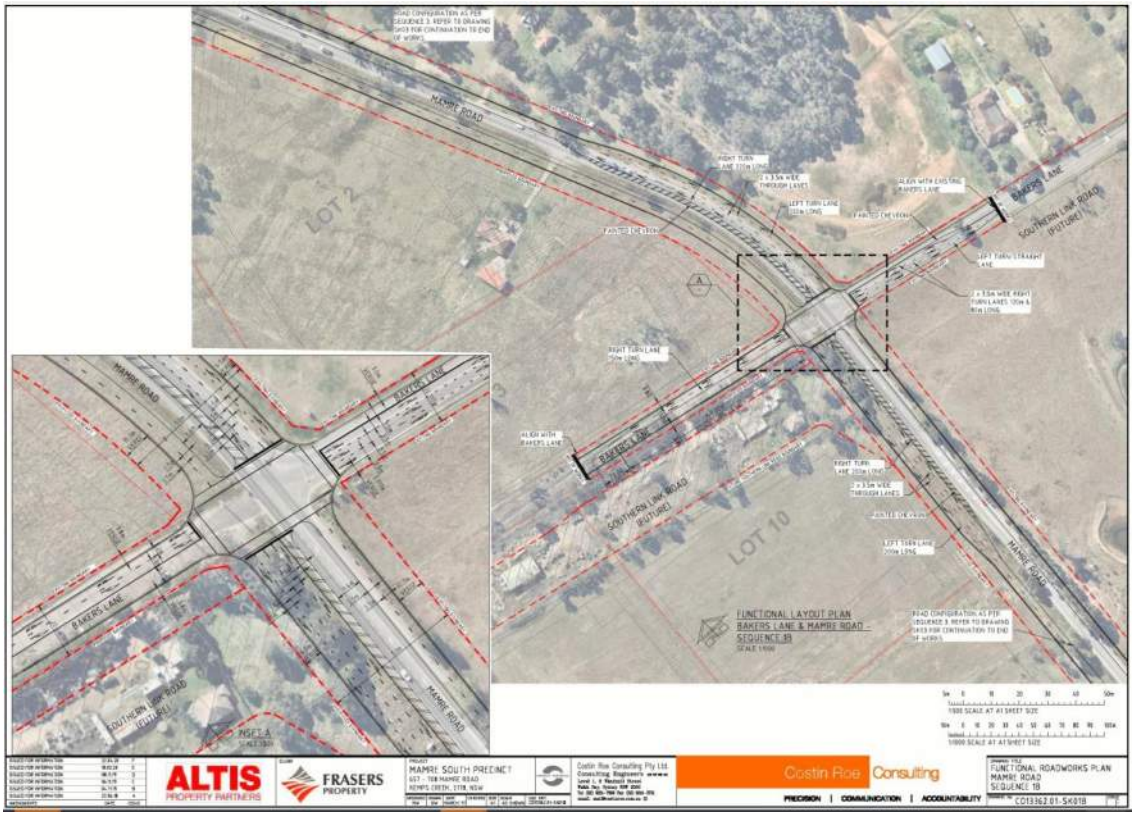

Figure 4.4b. Bakers Lane Intersection (Sequence 1B)

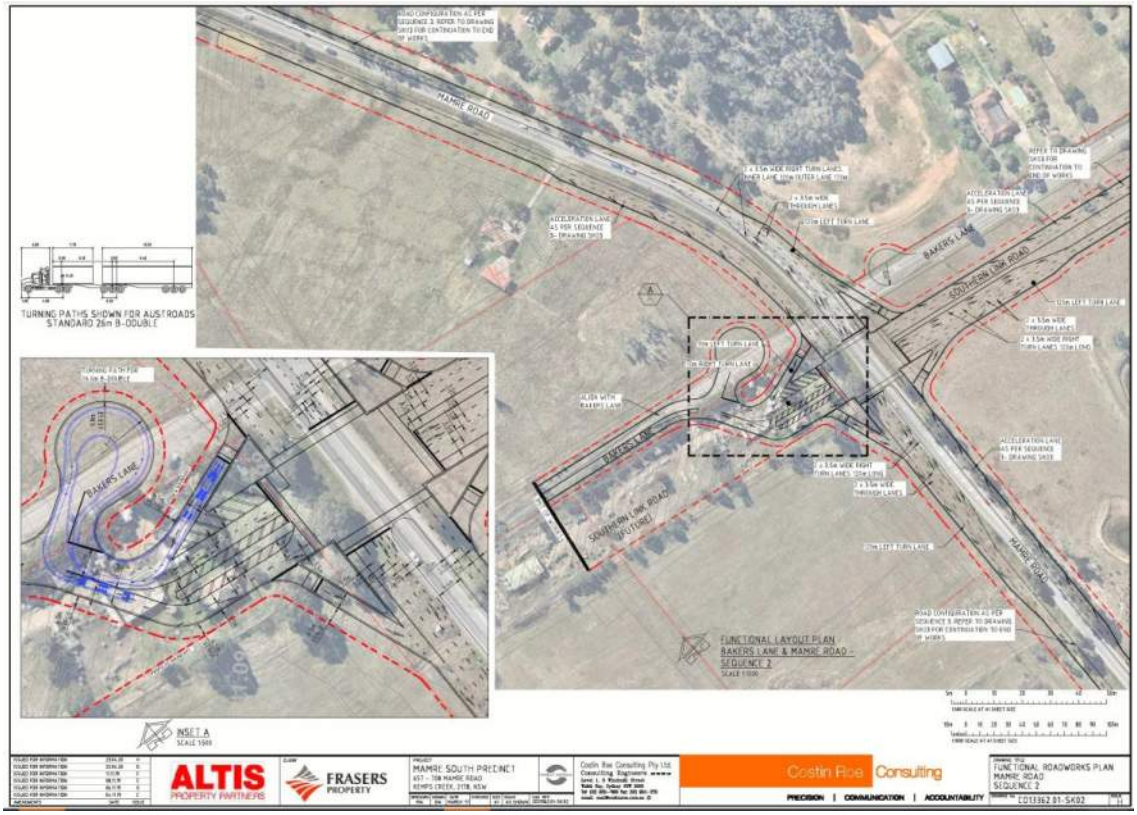

Figure 4.5. Bakers Lane Intersection (Sequence 2 with Southern Link Road East)

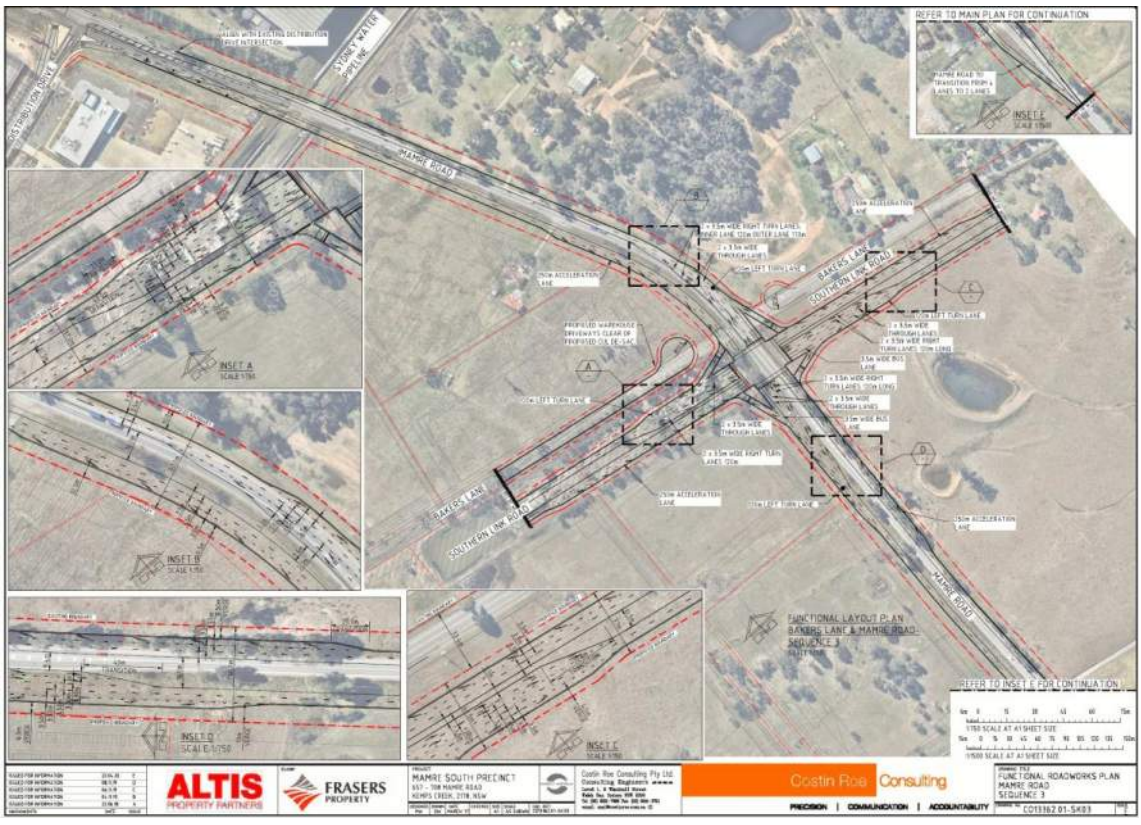

Figure 4.6. Bakers Lane Intersection (Sequence 3 with Southern Link Road West)

4.5 Southern Link Road Alignment

An indicative alignment of the proposed future Southern Link Road (SLR) has been included in the estate masterplan layout. The adopted alignment has been shown generally in accordance with the alignment concepts included in the Mamre Road Upgrade Study document produced for the NSW RMS and SLR concept designs completed by AECOM which have been placed on exhibition on the DPE website. The SLR has been aligned for the Western extension with the Eastern Extension, per Ason Report and the SSDA across the site.

The alignment of this road remains flexible and can be adjusted in future plans should DPIE or TfNSW decide on an alternate alignment. Beyond the first stage buildings there is flexibility to change the alignment, not impacting any built form.

Noting however, that in our opinion, that of the Traffic Engineers (ASON Group) and in the opinion of the proponent, the currently shown alignment is considered to be the most appropriate. The alignment provided within the application co-locates three major infrastructure corridors without major fragmentation of land. There would only be one bridge structure proposed over South Creek, with the alignment proposed. The eastern end of the proposed SLR through the land, aligns with the DPIE AECOM road alignment, currently concept design by TfNSW. We understand that the recent meetings with TfNSW show that the Masterplan arrangement is also their current preferred alignment.

A concept options review has been undertaken to demonstrate potential alternate alignments and South Creek crossing positions (refer drawing **Co13362.01-DA700** and **Figure 4.7**) and the constraints and opportunities noted. This simplified plan shows potential geometry of the SLR, matching 3 key locations being the Mamre Rd intersection, across our site frontage and the Twin creeks estate a barrier to alignment locations.

It is further noted that the application, being on the eastern portion of the site could accommodate a change to the alignment to suit DPIE's alignment once resolved. This could take similar form to one of the three alignments as shown on our drawing **Co13362.00-DA700**.

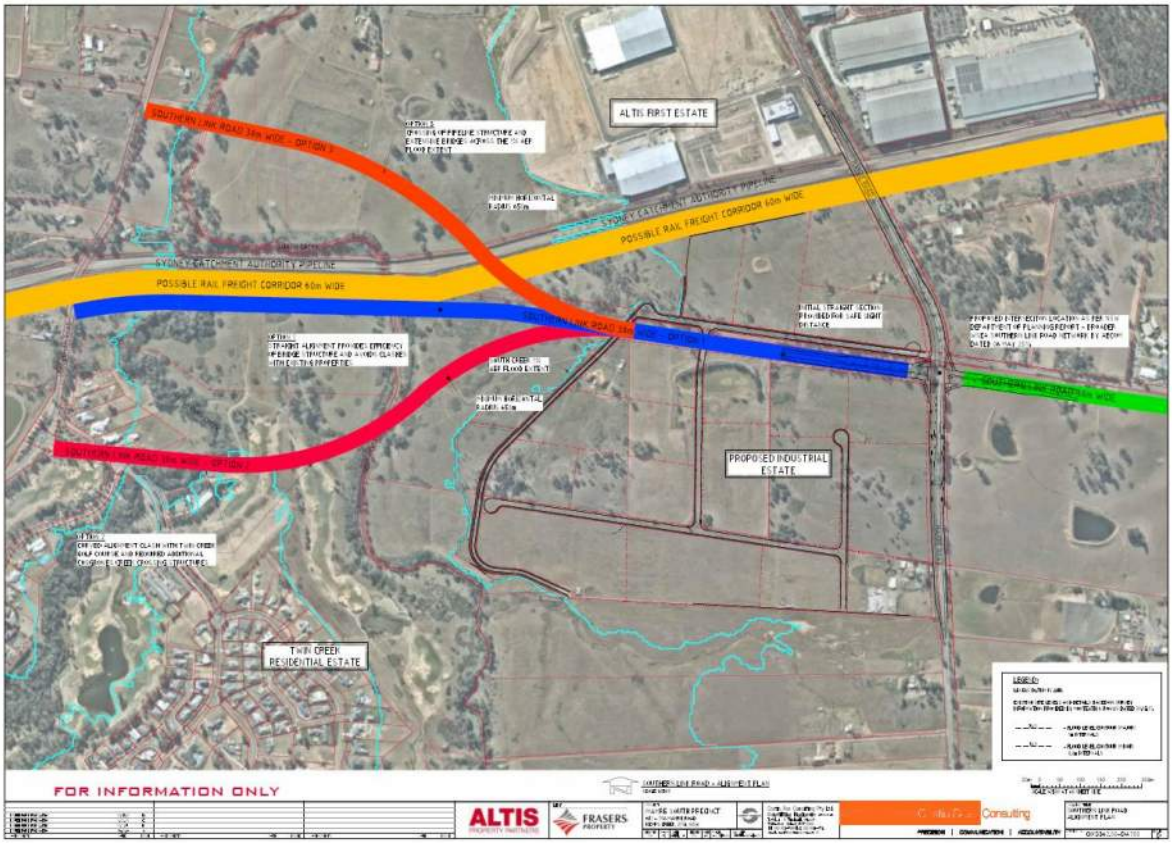

Figure 4.7. SLR Alignment Options Layout

6 WATER CYCLE MANAGEMENT STRATEGY & DRAINAGE METHODOLOGY

6.1 Key Areas and Objectives

Water Cycle Management (WCM) is a holistic approach that addresses competing demands placed on a region's water resources, whilst optimising the social and economic benefits of development in addition to enhancing and protecting the environmental values of receiving waters.

Developing a WCMS at the SSD stage of the land development process provides guidance on urban water management issues to be addressed for the estate and development as a whole. This assists urban rezoning and estate infrastructure planning for the industrial development proposed on the land.

This WCMS has been prepared to inform the DPIE and Penrith Council that the development is able to provide and integrate WCM measures into the stormwater management strategy for estate. It presents guiding principles for WCM across the precinct which includes establishing water management targets and identifying management measures required for future building developments to meet these targets.

Several WCM measures have been included in the WCMS and engineering design, which are set out in this report and the attached drawings. The key WCM elements and targets which have been adopted in the design are included in **Table 6.1** following.

WCM and WSUD measures to meet objectives in **Table 6.1** are consistent with SEPP (WSEA) 2009 Clause 33L, and include consideration to water quality and quantity, natural flow regime, riparian and flooding considerations.

Element	Target	Reference
Water Quantity	Maintaining or improving the volume of stormwater flows to South Creek from this site. "*it will be necessary to demonstrate that there will be no increase in runoff from the site as a result of the development for all storms up to and including the 100-year Average Recurrence Interval (ARI) event for all storm durations*".	DPI Penrith Council - *Stormwater Management Policy, Section 3.3.3*
Water Quality	Load-based pollution reduction targets based on an untreated urbanised catchment: Gross Pollutants 90% Total Suspended Solids 85% Total Phosphorus 60% Total Nitrogen 45% Total Hydrocarbons 90%	Penrith Council DCP Part C3
Flooding	Buildings and road set 500mm above 1% AEP. No affectation to upstream downstream or adjoining properties as a result of development	Penrith Council DCP Part C3. NSW Floodplain Development Manual. Penrith Council DCP Part C3
Water Supply	Reduce Demand on non-potable water uses. Provide minimum 100,000kL rainwater tanks per development or 80% reduction of non-potable uses.	Penrith Council DCP Part C3.
Erosion and Sediment Control	Appropriate erosion and sedimentation control measures must be described in the environmental assessment for all stages of construction to mitigate potential impacts to South Creek.	Landcom Blue Book Penrith City Council DPI
Waterway and Stream Health	Confirmation of pre and post stream forming flows and Stream Erosion Index (SEI) no greater than 3.5.	Growth Centres DCP/ Penrith City Council WSUD Policy 2013

Table 6.1. WCM Targets

A summary of the how each of the WCM objectives will be achieved are described below. Reference to the relevant sections of the report should be made for further and technical details relating to the WCM measures:

- *Stormwater Quantity Management (Refer **Section 7**)*

  The intent of this criterion is to reduce the impact of urban development on existing drainage system by limiting post-development discharge within the receiving waters to the pre-development peak, and to ensure no affectation of upstream, downstream or adjacent properties.

  Attenuation of stormwater runoff from the development is proposed to be managed via one of two estate level basins. The intention is for no water quantity measures to be provided on individual development lots. This will mean that future building developments can be assessed, approved and constructed without the need for site specific detention, based on the provision of the estate level detention basins. There are two proposed basins which are located at the downstream/ western end of the property. The two basins are noted to be proposed clear of the South Creek 1% AEP flood extent.

  Sizing of the detention systems has been completed using DRAINS modelling software in accordance with the Penrith City Council Policy for the 50% AEP to the 1% AEP storm for various durations. The modelling accounts for the drainage system provided for the adjacent sites and conveyance of upstream catchments around the site.

  Refer to **Section 7** of the document for detailed sizing of detention systems.

- *Stormwater Quality Management (Refer **Section 8**)*

  There is a need to target pollutants that are present in stormwater runoff to minimise the adverse impact these pollutants could have on downstream receiving waters.

  The required pollutant reductions are included in **Table 6.1** of this document and MUSIC modelling has been completed to confirm the reduction objectives can be met for the estate.

  A series of Stormwater quality improvement devises (SQID's) have been incorporated in the design of the estate. The proposed management strategy will include the following measures:

  - Primary treatment of the whole of the development catchment (including roads and development sites) will be made via one of two gross pollutant traps (GPT's). GPT's will be located upstream of each of the stormwater management basins.
  - Tertiary treatment of the whole of the development catchment will be made via one of two estate level bio-retention basins. Bio-retention treatment will be provided within the stormwater management basins and are sized to treat the whole of the estate catchment. Refer to drawings **Co13362.00-DA411 & DA418.**
  - Some treatment will also be present by provision of rainwater reuse tanks on development sites through reuse and settlement within the tanks. Allowance for

this treatment is noted to not be included in MUSIC modelling produced for the development.

- Development sites will not require any lot specific treatment systems due to the estate wide management systems proposed.

Reference to **Section 8** of this document should be made for detailed Stormwater Quality modelling and measures.

- *Flood Management (refer **Section 9**)*

  The proposed development considered flooding and large rainfall events, both from the adjacent South Creek, and from site generated runoff and upstream properties.

  Consideration to flood requirements has been made per the outcomes of the Overland Flow Assessment completed by our office as part of the EIS documentation. Refer **Section 9** and separate report **Co13362.00-19.rpt** for details.

  The following measures have been incorporated in the design:

  - All buildings are sited 500mm above the 1% AEP design flood level of South Creek.
  - Built form development is clear of the 1% AEP flood extent;
  - Requirements of Penrith City Council DCP Part C3 have been met regarding works in and around flooding areas;
  - Stormwater detention measures have been included to manage pre and post development runoff as discussed above and in **Section 8**; and
  - Overland flow paths to manage runoff in large storm events have been made including achieving at least 500mm freeboard to building levels from the flow paths.

- *Water Demand Reduction/ Rainwater Reuse*

  Rainwater reuse measures will be provided as part of future building development designs. Rainwater reuse will be required to provide a minimum 100,000 L tank and to reduce demand on non-potable uses by at 80%. The reduction in demand will target non-potable uses such as toilet flushing and irrigation. **Refer Section 8.4**.

- *Waterway Health (Stream Erosion Index (SEI))*

  An SEI assessment for discharge from the development to South Creek has been completed based on industry accepted modelling technique for stream health.

  The SEI focuses on channel form with a critical flow threshold is estimated for the stream whereby excess flow is summed over time to produce a measure of the erosion potential in the stream. Results are compared to a baseline (PCC requires less than 3.5) scenario. In NSW, this metric (based on flow) has generally been called a stream erosion index (SEI) (DEC 2006). Confirmation that an SEI of 1.84 for the development, being below the PCC value of 3.5, has been included in **Section 7.5** of the report.

6.2 SEPP (WSEA) Clause 33L Stormwater

Consideration to the requirements of *SEPP (WSEA) Clause 33L Stormwater, Water Quality and water sensitive design* has been made in the impact assessment. Review and confirmation specific matters included in Clause 33L(2) has been made for Items (a) through (f) as follows.

a) water sensitive design principles are incorporated into the design of the development, and

WSUD elements have been incorporated into the design as set out in Section 6.1 of this report.

b) riparian, stormwater and flooding measures are integrated, and

Riparian, stormwater and flooding measures have been integrated into the design as set out in **Sections 6, 7 & 8** of this report and separate flood report **Co13362.00-19.rpt** by Costin Roe Consulting.

c) the stormwater management system includes all reasonable management actions to avoid adverse impacts on the land to which the development is to be carried out, adjoining properties, riparian land, native bushland, waterways, groundwater dependent ecosystems and groundwater systems, and

The management systems for water quality and quantity provide best practice measures and meet local council policies and the requirements as agreed with council and the DPIE throughout the consultation period. Refer **Section 6.1** for details of proposed management systems.

d) if a potential adverse environmental impact cannot be feasibly avoided, the development minimises and mitigates the adverse impacts of stormwater runoff on adjoining properties, riparian land, native bushland, waterways, groundwater dependent ecosystems and groundwater systems, and

The management systems for water quality and quantity provide best practice measures and meet local council policies and the requirements as agreed with council and the DPIE throughout the consultation period. Refer **Section 6.1** for details of proposed management systems.

e) the development will have an adverse impact on—

a. the water quality or quantity in a waterway, including the water entering the waterway, and

b. the natural flow regime, including groundwater flows to a waterway, and

Management of pre and post development flows to South Creek have incorporated into the proposed management systems, as has confirmation that the stream forming flows (through and SEI assessment) meets and exceeds councils and the DPIE threshold for SEI. Refer **Section 6.1 & 7.5.**

c. the aquatic environment and riparian land (including aquatic and riparian species, communities, populations and habitats), and

Refer ecologist assessment.

d. the stability of the bed, banks and shore of a waterway, and

Management of pre and post development flows to South Creek have incorporated into the proposed management systems, as has confirmation that the stream forming flows (through and SEI assessment) meets and exceeds councils and the DPIE threshold for SEI. Refer **Section 6.1 & 7.5.**

Discharge structures to South Creek are based on NSW Office of Water requirements for waterfront land and include natural energy dissipators and rock apron outlets.

f) the development includes measures to retain, rehabilitate and restore riparian land.

There are no proposed works within riparian land other than the two drainage outlets. Discharge structures to South Creek are based on NSW Office of Water requirements for waterfront land and include natural energy dissipators and rock apron outlets.

6.3 Existing Drainage System & Overland Flows

The site is currently undeveloped rural land with undulating topography which has been described in **Section 1.2**. There is no formal drainage currently on the site however several local depressions and natural gullies are present. There are also several dams which are used for the currently rural farming operations on the land which lie in relation to the natural gullies.

The site is affected by overland flow from minor upstream catchments to the east of the site. A catchment of approximately 30 Ha is conveyed around the site via existing infrastructure in Mamre Road, diverting along the southern boundary of the site to South Creek.

Two smaller catchments are required to be conveyed through the site. Existing 450mm RCP's are located on Mamre Road as shown on drawing **Co13362.00-DA416**. Conveyance of these flows has been included in the estate infrastructure stormwater design. The proposed method of conveyance (i.e. in-ground piped Q20 ARI and overland flow to the Q100 ARI event) of the upstream catchment through the site is shown on drawing **Co13362.00-DA400**. The 1.08m^3/s Q100 flow from the upstream catchment will be designed to bypass all site on-site detention (OSD) measures and water quality treatment systems and be conveyed through the future Southern Link Road corridor. Runoff from a second 450mm RCP (being located in front of Lot 2) will be conveyed in an open swale then as part of inground drainage as shown in drawings **Co13362.00-DA416** and **DA419**. An allowance to convey 1.46m^3/s flow from the 1% AEP runoff.

Management of stormwater over the site has been shown on concept drawings **Co13362.00-DA411 to DA419**.

6.4 Proposed Estate Drainage System

As per general engineering practice and the guidelines of PCC, the proposed stormwater drainage system for the estate development will comprise a minor and major system to safely and efficiently convey collected stormwater run-off from the development to the legal point of discharge.

The minor system is to consist of a piped drainage system which has been designed to accommodate the 1 in 20-year ARI storm event (Q20). This results in the piped system being able to convey all stormwater runoff up to and including the Q20 event. The major system will be designed to cater for storms up to and including the 1 in 100-year ARI storm event (Q100). The major system will employ the use of defined overland flow paths, such as roads and open channels, to safely convey excess run-off from the site.

The design of the stormwater system for this site will be based on relevant national design guidelines, Australian Standard Codes of Practice, the standards of PCC and accepted engineering practice. Runoff from buildings will generally be designed in accordance with AS 3500.3 National Plumbing and Drainage Code Part 3 – Stormwater Drainage. Overall site runoff and stormwater management will generally be designed in accordance with the Institution of Engineers, Australia publication "Australian Rainfall and Runoff" (1988 Edition), Volumes 1 and 2 (AR&R).

Water quality and re-use are to be considered in the design to ensure that any increase in the detrimental effects of pollution are mitigated, PCC Water Quality Objectives are met and that the demand on potable water resources is reduced.

The proposed drainage system will be required to convey the overland flow from upstream catchments east of the property through the site.

The legal point of discharge is a point specified by Council where stormwater from a property can be discharged. The legal point of discharge is usually Council's stormwater infrastructure (where available), the street kerb and channel for smaller developments or downstream receiving waters like an existing stream or gully, lake, pond or waterbody.

Legal discharge for the entire development land is South Creek on the western side of the development site. The design and construction of the proposed outlet structure to South Creek will be assessed in accordance with the NSW Office of Water document *Controlled Activities: Guidelines for Outlet Structures.*

The stormwater outlets to South Creek will need to consist of a reinforced concrete pipe and 'natural' energy dissipater. The outlet is to be aligned with the creek to remove the potential for bank scour and shall include rip rap energy dissipaters constructed in accordance with the Outlet Structures Guidelines as published by the Department of Water & Energy and The Blue Book. This is shown figuratively below in **Figure 6.1** below.

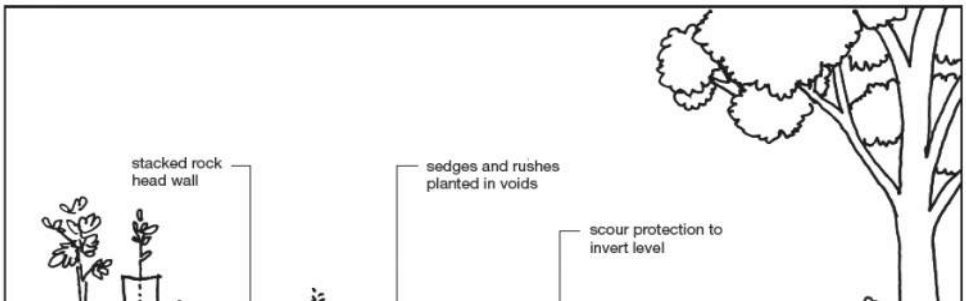

Figure 6.1. Typical Natural Outlet Structure Components

6.5 Climate Change

An assessment has been undertaken for the effect of climate change on the development. The assessment takes into consideration potential effect from increased rainfall intensity and sea level rise.

The effect on development has been assessed for a 10% increase in rainfall intensity. This increase is considered representative of potential climate change impacts for the Western Sydney area (being consistent with projected rainfall increases in accordance with the New South Wales Department of Environment and Climate Change (DECC) 'Floodplain Risk Management Guideline Practical Consideration of Climate Change' (Table 1, October 2007).

This assessment shows that the proposed stormwater drainage system and stormwater management systems (including the proposed detention system) would have sufficient capacity to manage the increased peak flows and water volume with minor increase in hydraulic grade line and peak water level within the basins. We confirm the increase in rainfall intensities will achieve the required minimum 0.5m freeboard to the proposed building pad levels in relation to local overland flow paths in and around the estate as nominated on the design drawings.

In relation to impact on the development from the adjacent South Creek. A conservative estimate of the effect from an increase in rainfall intensity of 10% and a consistent flow rate increase would result in the 1% AEP flows increasing from 1020m^3/s to approximately 1120m^3/s. This increased flow rate would be less than the current 0.5% AEP flow rate of 1180m^3/s hence the increase in flow rate would result in a flood surface which is less than the current 0.5% AEP event. Based on the modelling completed in our Overland Flow Assessment for the 0.5% AEP, the effect from climate change would result in an increase of 0.15m from the current 1% AEP to the reach 1% AEP + 10% flood level. Overall, the flood level differences of the extreme western development sites would be slightly reduced however these sites would still achieve flood freeboards greater than those adopted by many local councils (including Penrith)

and nominated in the NSW Floodplain Manual and still remain at higher level than the PMF. Further noting that the majority of lots in this development will continue to achieve freeboards greater than 0.5m.

The site is situated well upstream from any tidally influenced receiving waters including expected potential sea level rise of 0.3m. We confirm the development will not affect or be affected by potential sea level rise due to the distance from the Hawksbury River and Pacific Ocean, or any tidally influenced water bodies.

An assessment on the stormwater on-site detention basin confirms that the current basin design has sufficient capacity to cater for a rainfall intensity increase of 10% from current rainfall intensities.

6.6 Water & Wastewater Servicing

A detailed *Service Infrastructure Assessment* has been completed by Landpartners Built Environment Consultants in conjunction with Frasers and Altis, and also in consultation with Sydney Water.

The preferred service strategy has been endorsed by Sydney Water in their letter dated 9 January 2020 (refer **Appendix** F). We provide the following summary of the strategy for completeness of the WCM requirements for the site, however reference to the Landpartners report SY073930.000 (included in the EIS) and the Sydney Water endorsement letter (refer **Appendix** F) should be made for detailed information pertaining to water and wastewater servicing.

Water Supply

The following water supply strategy has been endorsed by Sydney Water:

> *A DN200 water main has been confirmed as adequate to service the study site.*
>
> *The preferred water supply option is the extension and amplification of the existing Sydney Water mains from the Erskine Park Elevated WSZ. The preferred extension and amplification require the construction of a DN300 which provides Sydney Water with additional capacity to service other sites in the Cecil Park area while maintaining adequate flow and pressure in the Erskine Park Elevated Reservoir zone.*
>
> *Key assets required:*
>
> - *700m of DN250mm main between James Erskine Drive and Mamre North Development (First Estate)*
> - *Extend a 1.6km DN300mm main lead-in south along Mamre Rd (from the new DN250mm main north of First Estate) to the study site*
> - *New DV on DN300 main*

Refer **Figure 6.2** below for figurative arrangement of the water supply strategy.

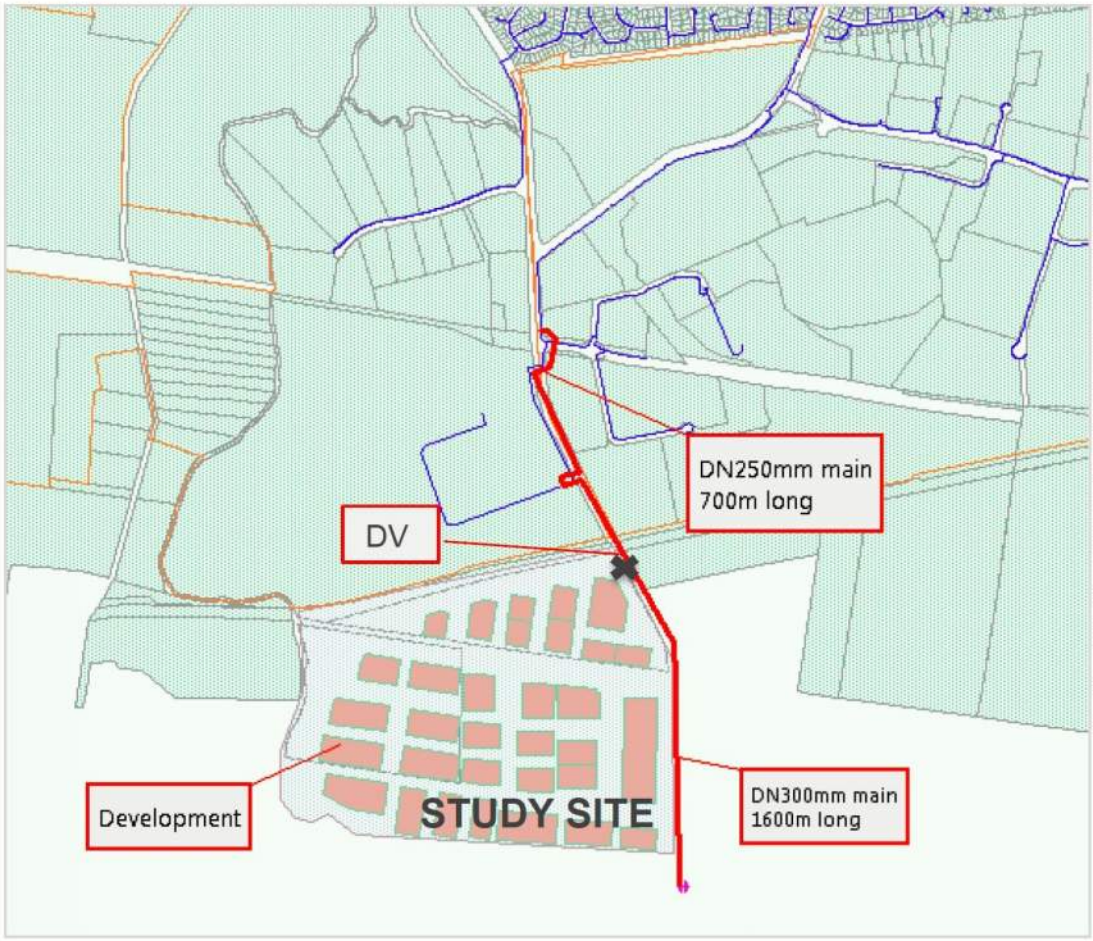

Figure E-1: Preferred Water Option, DN300 extension/Amplification

Figure 6.2. Preferred Water Option

Wastewater

Sydney Water has confirmed endorsement of the two potential interim options (Option A and Option B) for the wastewater strategy. The preferred option will depend on the timing of the development and the provision of Sydney Water's ultimate asset for the Mamre Road south catchment. If the delivery of the ultimate Sydney Water asset is delayed, the Developer could adopt the pressure system to reduce the period of pump out.

Options A and B are summarised as follows:

Option A. Pressure sewer network

The pressure sewer network connects to the existing manhole on James Erskine Drive. A DN140mm pressure main would be required. A barometric loop (approximately 5m) will be required at the connection point.

Key assets required:

- *Provide 2km, DN140mm main along Mamre Road, connect to the manhole on James Erskine Drive*
- *Provide a barometric loop at connection point*

Sydney Water will provide a lead-in to the site. The storage pots at the individual properties will be removed to ensure that minimal pipe depths are maintained and that the final connection to Sydney Water's option is not deep.

Option B. Gravity main and pump out

This option requires the construction of reticulation gravity mains for the study site with a pump out tank at the outlet of the gravity mains.

Key assets required:

- *Provide 4.5km, DN150mm gravity main within study site.*
- *Provide manholes as per WSAA guidelines.*
- *Provide 24-hour storage (75m3) at the pump out location.*

Refer **Figure 6.3** below for figurative arrangement of the two wastewater service strategies.

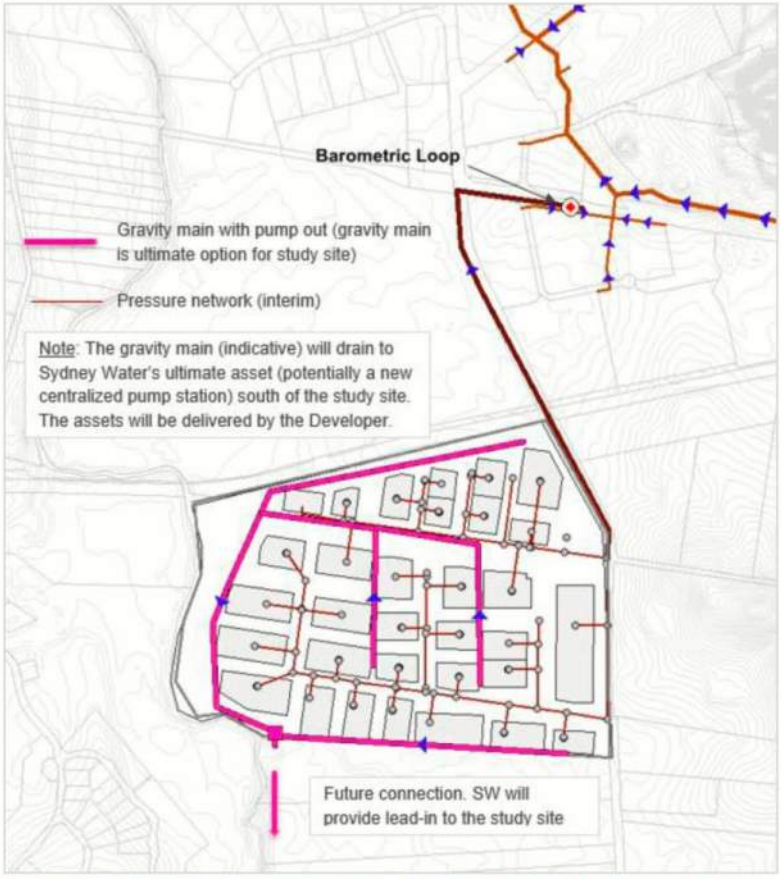

Figure E-2: Preferred Wastewater Options - Gravity/Pump out and Pressure sewer

Figure 6.2. Preferred Wastewater Options

7 WATER QUANTITY MANAGEMENT

7.1 General Design Principles

Penrith City Council adopts the principles of water quantity management, also known as "On-site Detention (OSD)", to ensure the cumulative effect of development does not have a detrimental effect on the existing stormwater infrastructure and watercourses located within their LGA downstream from the site.

Section 3.3.3 of Councils stormwater management policy requires that "*it will be necessary to demonstrate that there will be no increase in runoff from the site as a result of the development for all storms up to and including the 100-year Average Recurrence Interval (ARI) event for all storm durations*".

7.2 Methodology

A hydrological analysis was undertaken to estimate the impact of the development of the site on peak flows at the downstream extent of the site. Modelling of stormwater runoff quantity was considered for the pre-existing case and for the operational phase of the development.

As the site is greater than 5000m^2, the simplified PSD/SSR method contained in *Section 3.3* of the Penrith Council Document *Stormwater Drainage for Building Developments* has not been used in calculating the storage and discharge relationship for the site. Councils preferred modelling software, DRAINs has been used to assess the site detention discharge and storage relationship.

In order to assess the existing and operational phase peak discharges from the development site, a DRAINS hydrological model was used to estimate peak flows from catchments on the site for various storm durations for Q2 year ARI to Q100 year ARI events.

7.3 Proposed Stormwater Quantity Management

Attenuation of stormwater runoff from the whole of the development is proposed to be managed through one of two estate detention basins located at the western extent of the estate.

Individual development lots will not require OSD systems to be provided.

Sizing of the estate basin has been completed using DRAINS modelling software in accordance with the Penrith City Council Policy for the 50% AEP to 1% AEP storms for various durations.

Table 7.1 shows the overall hydrology for the estate, whilst **Tables 7.2 & 7.3** provides details for the pre and post development flows and storage for the two detention systems for the development. The critical storm duration for the 50% AEP to 1% AEP storms is 2 hour and flows and storages are provided for this storm.

AEP	Design Storm (min)	Peak Flow (m^3/s)		
		Undeveloped	**Developed**	
		Site	Site (no atten.)	**Site (+ atten.)**
50%	30	1.89	9.38	**1.84**
	60	2.83	9.88	**2.07**
	120	**3.25**	**9.40**	**2.18**
	180	2.49	7.81	**2.16**
	360	2.99	5.79	**2.22**
5%	30	7.45	16.64	**2.49**
	60	10.02	18.01	**2.87**
	120	**10.07**	**16.76**	**3.04**
	180	8.07	13.99	**3.07**
	360	8.40	10.41	**3.11**
1%	30	11.68	21.64	**2.91**
	60	14.92	22.67	**5.01**
	120	**14.40**	**22.13**	**6.46**
	180	11.57	17.46	**6.21**
	360	10.83	12.77	**6.60**

Table 7.1. Overall Estate Hydrology

AEP	Pre-developed Flow (m^3/s)	Post Developed Flow (m^3/s)				Storage (m^3)	Depth (mm)
		Un-attenuated	Attenuated				
			Low Flow	High Flow	Total		
50%	2.48	7.18	1.68	0	1.68	12906	1130
5%	7.71	12.80	2.35	0	2.35	24773	1920
1%	11.00	16.20	2.60	2.43	5.03	30150	2200

Table 7.2. Detention System Hydraulics – Basin 1

AEP	Pre-developed Flow (m^3/s)	Post Developed Flow (m^3/s)				Storage (m^3)	Depth (mm)
		Un-attenuated	Attenuated				
			Low Flow	High Flow	Total		
50%	0.77	2.22	0.50	0	0.50	3473	1030
5%	2.36	3.96	0.69	0	0.60	6746	1750
1%	3.40	5.03	0.78	0.65	1.43	8465	2110

Table 7.3. Detention System Hydraulics – Basin 2

The modelling has shown that, with the provision of a storage volume of 30150 m^3, within Basin 1, and 8465m^3 in Basin 2, that stormwater flows from the development will be attenuated to pre-development flows.

Detention storage is noted to be fully active. The main detention storage areas are noted to be sited at a level approximately 1m below the bio-retention elements. This will ensure effective discharge of bio-retention filtration, however also assists in ensuring maximum storage capacity can be realised. Further this enables depth of water over the bio-retention elements to be limited.

Based on the design the water level over the basin would be 0.4m for >90% of all runoff events. A maximum depth of 0.9m would be realised for all events up to the 5% AEP (1 in 20 ARI), and maximum depths to 1.2m only realised very infrequently to the 1% AEP event.

The high flows are noted to bypass the bio-retention elements of the basins.

The operation of the bio-retention elements are considered suitable, in accordance with best practice and below normally acceptable maximum ponding depth over bio-retention elements of 1.5m.

7.4 Stream Erosion Index

A Stream Erosion Index (SEI) calculation has been completed for discharge from the site to South Creek. The assessment has been completed in accordance with the methodology set out in Penrith City Council's *WSUD Technical Guidelines* and *Water Sensitive Urban Design (WSUD) Policy* and targets the post development duration of stream forming flows shall be no greater than 3.5 times the pre-development duration of stream forming flows as set in the PCC *WSUD Policy 2013*.

The critical flow threshold is estimated for the stream whereby excess flow is summed over time to produce a measure of the erosion potential in the stream. Results are compared to a baseline (e.g. pre-development in the range of 1-3.5) scenario. In NSW, this metric (based on flow) has generally been called a stream erosion index (SEI) (DEC 2006).

The SEI has been calculated for the development site area of 89 Ha.

The four following steps were used in estimating the SEI:

1. Estimate the critical flow for the receiving waterway above which mobilisation of bed material or shear erosion of bank material commences.
2. Develop and run a calibrated MUSIC model of the area of interest for predevelopment conditions to estimate the mean annual runoff volume above the critical flow.
3. Develop and run a MUSIC model for the post developed scenario to estimate the mean annual runoff volume above the critical flow.
4. Use the outputs from steps 3 and 4 to calculate the SEI for the proposed scenario.

The MUSIC model baseline parameters are included in **Section 8** of the report.

The 50% AEP (2yr ARI) flow for the catchment is 18.993m^3/s. The critical flow for the receiving water for the 50% AEP, being 25% of the 50% AEP, has been estimated at 4.748m^3/s, based on a time of concentration of 18 minutes.

A pre-developed model was set up based on the site being modelled as 100% undeveloped forest. The pre-development runoff volume, above the critical flow, based on the calibrated MUSIC model was calculated at 11.3 ML/yr.

The post-development runoff volume, above the critical flow, based on the post-developed MUSIC model was calculated at 20.8 ML/yr.

The corresponding SEI was calculated at approximately 1.84. This can be seen to be well below the target of 3.5. The requirements of the SEI assessment have been met and acceptable post-development stream health can be expected from this development.

Refer to **Figures 7.1** and **7.2** for MUSIC model configurations relating to the SEI.

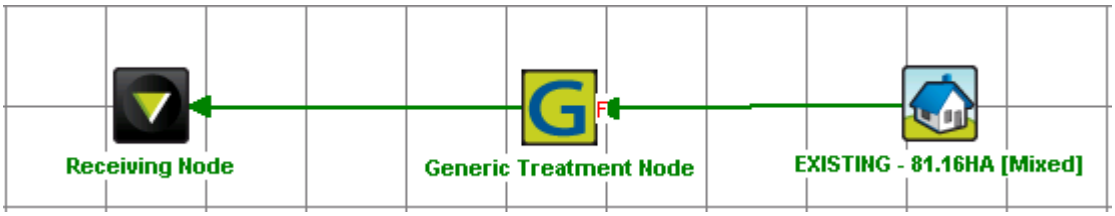

Figure 7.1. Predevelopment SEI Music Model

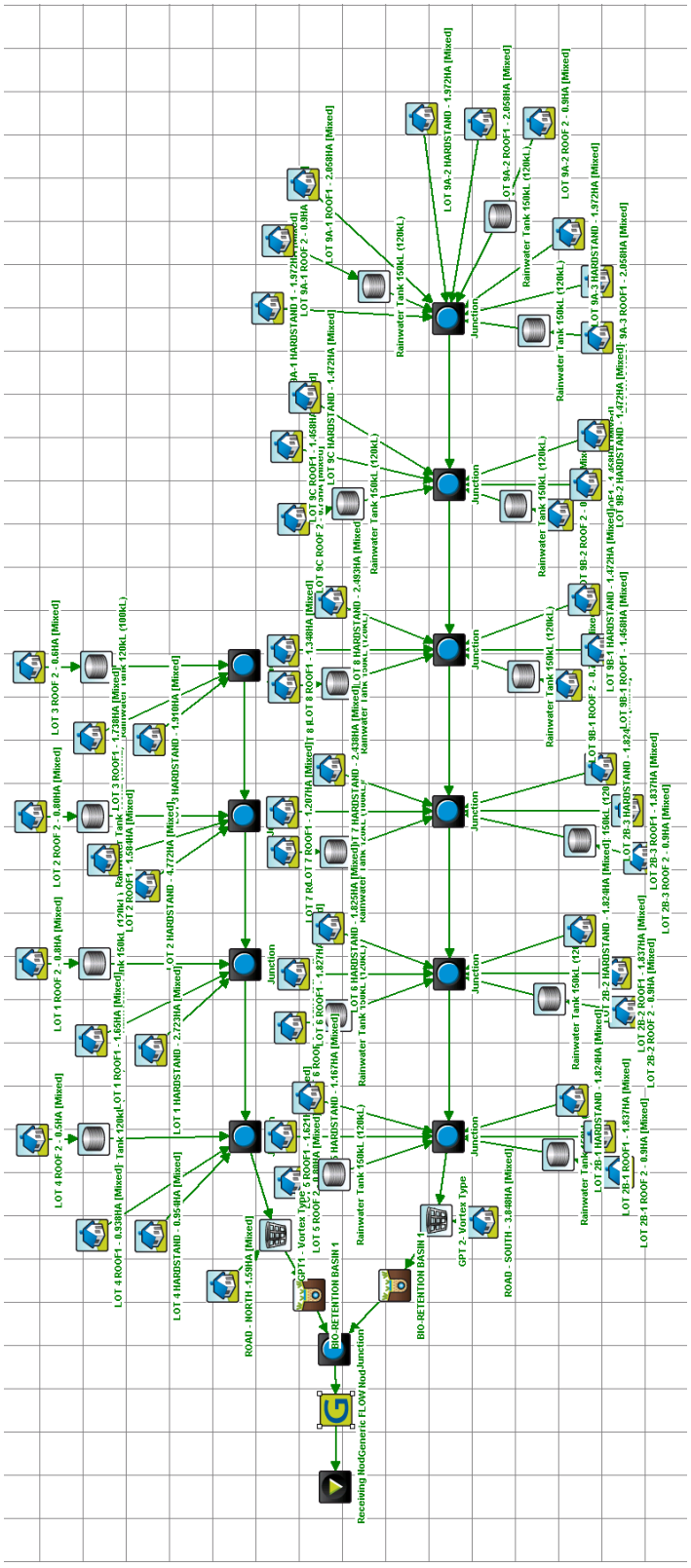

Figure 7.2. Post-development SEI Music Model Layout

8 STORMWATER QUALITY CONTROLS

8.1 Regional Parameters

There is a need to provide design which incorporates the principles of Water Sensitive Urban Design (WSUD) and to target pollutants that are present in the stormwater to minimise the adverse impact these pollutants could have on receiving waters and to also meet the requirements specified by Penrith City Council.

PCC have nominated, in Section C3 of their *DCP 2014*, the requirements for stormwater quality to be performed on a catchment wide basis. These are presented in terms of annual percentage pollutant reductions on a developed catchment and are as follows:

Gross Pollutants	90%
Total Suspended Solids	85%
Total Phosphorus	60%
Total Nitrogen	45%
Total Hydrocarbons	90%
Free Oil and Grease	90%

8.2 Proposed Stormwater Treatment System

Developed impervious areas of the estate, including roof, hardstand, car parking, roads and other extensive impervious areas are required to be treated by the Stormwater Treatment Measures (STM's). The STM's shall be sized according to the whole catchment area of the development. The STM's for the estate are based on a treatment train approach at the estate level to ensure that all the objectives above are met.

Components of the treatment train for the estate are as follows:

- All development lots will require on-lot treatment measures which meet the load-based percentage requirements noted in **Section 8.1** and **Section 6.1**.
- Primary treatment of the whole of the development will be made via one of two GPT's. GPT's will be located at the downstream of the development and immediately upstream of the stormwater management basins.
- Tertiary treatment of the whole of the development will be made via bio-retention system within the estate stormwater management basins. Treatment will also be provided during construction through sediment measures.
- It is noted that stormwater from the upstream catchments will bypass treatment systems and are not included in the modelling. Undeveloped areas of the overall property within flood plains or the Southern Link Road corridor are also excluded from the models; and
- A portion of the future building roofs will also provide a level of treatment via rainwater reuse and settlement within the building rainwater tanks. Given however

that building layouts are subject to change during detail design, allowance for rainwater tank within the MUSIC model has not been made.

The estate stormwater management measures including OSD Basin, water quality measures (bio-retention and gross pollutant traps) are proposed to be dedicated to council in conjunction with the roads and other public infrastructure. Maintenance as such is expected to also transfer to council in conjunction with dedication of the systems. Further discussion on maintenance are contained in **Section 7** of this document.

The main detention storage areas are noted to be sited at a level approximately 1m below the bio-retention elements. This will ensure effective discharge of bio-retention filtration, however also assists in ensuring maximum storage capacity can be realised. Further this enables depth of water over the bio-retention elements to be limited.

Based on the design the water level over the basin would be 0.4m for >90% of all runoff events. A maximum of 0.9m would be realised for all events up to the 5% AEP (1 in 20 ARI), and maximum depths to 1.2m only realised very infrequently to the 1% AEP event.

The high flows are noted to bypass the bio-retention elements of the basins.

The operation of the bio-retention elements are considered suitable, in accordance with best practice and below normally acceptable maximum ponding depth over bio-retention elements of 1.5m.

8.3 Stormwater Quality Modelling

8.3.1 Introduction

The MUSIC model was chosen to model water quality. This model has been released by the Cooperative Research Centre for Catchment Hydrology (CRCCH) and is a standard industry model for this purpose. MUSIC (the Model for Urban Stormwater Improvement Conceptualisation) is suitable for simulating catchment areas of up to 100 km^2 and utilises a continuous simulation approach to model water quality.

By simulating the performance of stormwater management systems, MUSIC can be used to predict if these proposed systems and changes to land use are appropriate for their catchments and are capable of meeting specified water quality objectives (CRC 2002). The water quality constituents modelled in MUSIC and of relevance to this report include Total Suspended Solids (TSS), Total Phosphorus (TP) and Total Nitrogen (TN).

The pollutant retention criteria set out in PCC's DCP and nominated in **Section 6.**1 of this report were used as a basis for assessing the effectiveness of the selected treatment trains.

The MUSIC model "*13362.00 Kemps Creek Rev8.sqz*" was produced to examine the effectiveness of the water quality treatment train and to predict if council requirements have been achieved on an estate wide basis and on individual lots respectively. The layout of the MUSIC models are presented in **Appendix B**.

8.3.2 Rainfall Data

Six-minute pluviographic data which has been sourced from the Bureau of Meteorology (BOM) as nominated below. Evapo-transpiration data for the period was sourced from the Penrith Monthly Areal PET data set supplied with the MUSIC software.

Input	**Data Used**
Rainfall Station	67113 Penrith Lakes
Rainfall Period	1 Jan. 1999 – 31 Dec. 2008 (10 years)
Mean Annual Rainfall (mm)	712
Evapotranspiration	Penrith Monthly Areal PET
Model Timestep	6 minutes

8.3.3 Rainfall Runoff Parameters

Parameter	**Value**
Rainfall Threshold (mm)	1.40
Soil Storage Capacity (mm)	105
Initial Storage (% capacity)	30
Field Capacity (mm)	70
Infiltration Capacity Coefficient a	150
Infiltration Capacity exponent b	3.5
Initial Depth (mm)	10
Daily Recharge Rate (%)	25
Daily Baseflow Rate (%)	10
Daily Seepage Rate (%)	0

8.3.4 Pollutant Concentrations& Source Nodes

Pollutant concentrations for source nodes are not available from Penrith City Council. The source nodes used are based on the land use parameters defined by the nearby Blacktown City Council and are shown as per the **Table 8.1**:

Flow Type	Surface Type	TSS (log_{10} values)		TP (log_{10} values)		TN (log_{10} values)	
		Mean	Std Dev.	Mean	Std Dev.	Mean	Std Dev.
Baseflow	Roof	*	*	*	*	*	*
	Roads	*	*	*	*	*	*
	Landscaping	1.2	0.17	-0.85	0.19	0.11	0.12
Stormflow	Roof	1.30	0.32	-0.89	0.25	0.30	0.19
	Roads	2.43	0.32	-0.30	0.25	0.34	0.19
	Landscaping	2.15	0.32	-0.6	0.25	0.30	0.19

*Base flows are only generated from pervious areas; therefore these parameters are not relevant to impervious areas.

Table 8.1. Pollutant Concentrations

The MUSIC model has been setup with a treatment train approach based on the pollutant concentrations in **Table 8.1** above and the catchments shown on drawing **Co13362.00-DA400** in **Appendix A**.

8.3.5 Treatment Nodes

Bio-retention and Generic Treatment nodes have been used in the modelling of the development.

There are two proposed bio-retention basin which will be provided in accordance with industry best practice and the guidelines of the Monash University Facility for Advancing Water Bio-filtration with the following parameters:

Bio-retention System 1 – 4900m2

Parameter	**Value**
Storage Properties	
Extended Detention Depth	300 mm
Storage Surface Area	4200 m^2 (minimum)
Filter and Media Properties	
Filtration Area	4200**m^2
Saturated Hydraulic Conductivity	100 mm/hr
Filter Depth	500 mm

Bio-retention System 2 – 1500m2

Parameter	**Value**
Storage Properties	
Extended Detention Depth	300 mm
Storage Surface Area	1375 m^2 (minimum)
Filter and Media Properties	
Filtration Area	1375**m^2
Saturated Hydraulic Conductivity	100 mm/hr
Filter Depth	500 mm

** Nominated filtration area excludes all pits, scour protection and other structures which may be present in bio-retention basins.

8.3.6 Results

Table 8.3 shows the results of the MUSIC analysis. The reduction rate is expressed as a percentage and compares the post-development pollutant loads without treatment versus post-development loads with treatment.

	Source	**Residual Load**	**% Reduction**	**Target Met**
Total Suspended Solids (kg/yr)	150000	19200	87.1	Y
Total Phosphorus (kg/yr)	250	71.3	71.5	Y
Total Nitrogen (kg/yr)	999	549	45	Y
Gross Pollutants (kg/yr)	12100	0	100	Y

Table 8.3. MUSIC analysis results – Estate Model

These model results indicate that, through the use of the STM's in the treatment train, pollutant load reductions for Total Suspended Solids, Total Phosphorous, Total Nitrogen and Gross Pollutants will meet the requirements of Part 1 of Section C3 of their *DCP 2014* on an overall catchment basis.

8.3.7 Modelling Discussion

MUSIC modelling has been performed to assess the effectiveness of the selected treatment trains, at both an estate level and individual lot level, and to ensure that the pollutant retention requirements of Section C3 of their *DCP 2014* have been met.

The MUSIC modelling has shown that the proposed treatment train of STM's will provide stormwater treatment which will meet council requirements in an effective and economical manner.

Hydrocarbon removal cannot easily be modelled with MUSIC software. The proposed distribution/ storage facility would be expected to produce low source loadings of hydrocarbons. Potential sources of hydrocarbons would be limited to leaking engine sumps or for accidental fuel spills/leaks and leaching of bituminous pavements (car parking only). The potential for hydrocarbon pollution is low and published data from the CSIRO indicates that average concentrations from Industrial sites are in the order of 10mg/L and we would expect source loading from this site to be near to or below this concentration. Hydrocarbon pollution would also be limited to surface areas which will be treated via bio-retention swales which are predicted to achieve a 90% reduction of this pollutant.

Given the expected low source loadings of hydrocarbons and removal efficiencies of the treatment devices we consider that the requirements of the Penrith City Council have been met.

8.4 Stormwater Harvesting

Stormwater harvesting refers to the collection of stormwater from the developments internal stormwater drainage system for re-use in non-potable applications. Stormwater from the stormwater drainage system can be classified as either rainwater, where the flow is from roof areas only, or stormwater where the flow is from all areas of the development.

Rainwater harvesting will be provided for this development with re-use for non-potable applications as part of future individual building development applications. Internal uses include such applications as toilet flushing while external applications will be used for irrigation. The aim is to reduce the water demand for the development and to satisfy the requirements of PCC DCP2014.

In general terms the rainwater harvesting system will be an in-line tank for the collection and storage of rainwater. At times when the rainwater storage tank is full rainwater can pass through the tank and continue to be discharged via gravity into the stormwater drainage system. Rainwater from the storage tank will be pumped for distribution throughout the development in a dedicated non-potable water reticulation system.

Rainwater tanks are to be sized with reference to the NSW Department of Environment and Conservation document *Managing Urban Stormwater: Harvesting and Reuse*, using a simple water balance analysis to balance the supply and demand, based on the base water demands and a minimum demand reduction of 80%.

The final sizing of rainwater harvesting tanks will need to be assessed once the development layout and reuse demands for the facility are known in accordance with the NSW Department of environment and Conservation document Managing Urban Stormwater: Harvesting and Reuse.

8.5 Maintenance and Monitoring

It is important that each component of the water quality treatment train is properly operated and maintained. To achieve the design treatment objectives, an indicative maintenance schedule has been prepared (refer to **Table 8.5** below) to assist in the effective operation and maintenance of the various water quality components.

Note that inspection frequency may vary depending on site specific attributes and rainfall patterns in the area. In addition to the below nominated frequency it is recommended that inspections are made following large storm events.

As noted in earlier sections of the report, the estate stormwater management measures including the Estate Basins and estate water quality measures (bio-retention and gross pollutant traps) are proposed to be dedicated to council in conjunction with the roads and other public infrastructure. Maintenance obligations as such are expected to also transfer to council in conjunction with dedication of the systems.

Table 8.5. Indicative Maintenance Schedule

MAINTENANCE ACTION	FREQUENCY	RESPONSIBILITY	PROCEDURE
SWALES/ LANDSCAPED AREAS			
Check density of vegetation and ensure minimum height of 150mm is maintained. Check for any evidence of weed infestation	Six monthly	Maintenance Contractor	Replant and/or fertilise, weed and water in accordance with landscape consultant specifications
Inspect swale for excessive litter and sediment build up	Six monthly	Maintenance Contractor	Remove sediment and litter and dispose in accordance with local authorities' requirements.
Check for any evidence of channelisation and erosion	Six monthly/ After Major Storm	Maintenance Contractor	Reinstate eroded areas so that original, designed swale profile is maintained
Weed Infestation	Three Monthly	Maintenance Contractor	Remove any weed infestation ensuring all root ball of weed is removed. Replace with vegetation where required.
Inspect swale surface for erosion	Six Monthly	Maintenance Contractor	Replace top soil in eroded area and cover and secure with biodegradable fabric. Cut hole in fabric and revegetate.
ESTATE BIO-RETENTION BASIN			
Check all items nominated for SWALES/ LANDSCAPED AREAS above	Refer to SWALES/ LANDSCAPED AREAS section above	Refer to SWALES/ LANDSCAPED AREAS section above	Refer to SWALES/ LANDSCAPED AREAS section above
Check for sediment accumulation at inflow points	Six monthly/ After Major Storm	Maintenance Contractor	Remove sediment and dispose in accordance with local authorities' requirements.
Check for erosion at inlet or other key structures.	Six monthly/ After Major Storm	Maintenance Contractor	Reinstate eroded areas so that original, designed profile is maintained

MAINTENANCE ACTION	FREQUENCY	RESPONSIBILITY	PROCEDURE
Check for evidence of dumping (litter, building waste or other).	Six monthly	Maintenance Contractor	Remove waste and litter and dispose in accordance with local authorities' requirements.
Check condition of vegetation is satisfactory (density, weeds, watering, replating, mowing/ slashing etc)	Six monthly	Maintenance Contractor	Replant and/or fertilise, weed and water in accordance with landscape consultant specifications
Check for evidence of prolonged ponding, surface clogging or clogging of drainage structures	Six monthly/ After Major Storm 10-15 years	Maintenance Contractor	Remove sediment and dispose in accordance with local authorities' requirements. Replace filter media & planting – refer to appropriately qualified engineer or stormwater specialist
Check stormwater pipes and pits	Six monthly/ After Major Storm	Maintenance Contractor	Refer to INLET/ JUNCTION PIT section below.
ESTATE OSD BASIN			
Check all items nominated for SWALES/ LANDSCAPED AREAS above	Refer to SWALES/ LANDSCAPED AREAS section above	Refer to SWALES/ LANDSCAPED AREAS section above	Refer to SWALES/ LANDSCAPED AREAS section above
Inspect and remove any blockage from orifice	Six Monthly	Maintenance Contractor/ Owner	Remove grate and screen to inspect orifice.
Inspect trash screen and clean	Six Monthly	Maintenance Contractor/ Owner	Remove grate and screen if required to clean it.
Inspect flap valve and remove any blockage.	Six Monthly	Maintenance Contractor/ Owner	Remove grate. Ensure flap valve moves freely and remove any blockages or debris.

MAINTENANCE ACTION	FREQUENCY	RESPONSIBILITY	PROCEDURE
Inspect pit sump for damage or blockage.	Six Monthly	Maintenance Contractor/ Owner	Remove grate & screen. Remove sediment/ sludge build up and check orifice and flap valve is clear.
Inspect storage areas and remove debris/ mulch/ litter etc likely to block screens/ grates.	Six Monthly	Maintenance Contractor/ Owner	Remove debris and floatable materials.
Check attachment of orifice plate and screen to wall of pit	Annually	Maintenance Contractor	Remove grate and screen. Ensure plate or screen mounted securely, tighten fixings if required. Seal gaps if required.
Check orifice diameter is correct and retains sharp edge.	Five yearly	Maintenance Contractor	Compare diameter to design (see Work-as-Executed) and ensure edge is not pitted or damaged.
Check screen for corrosion	Annually	Maintenance Contractor	Remove grate and screen and examine for rust or corrosion, especially at corners or welds.
Inspect overflow weir and remove any blockage	Six monthly	Maintenance Contractor/ Owner	Ensure weir is free of blockage.
Inspect walls for cracks or spalling	Annually	Maintenance Contractor	Remove grate to inspect internal walls, repair as necessary.
Check step irons	Annually	Maintenance Contractor	Ensure fixings are secure and irons are free from corrosion.
RAINWATER TANK			
Check for any clogging and blockage of the first flush device	Monthly	Maintenance Contractor	First flush device to be cleaned out
Check for any clogging and blockage of the tank inlet - leaf/litter screen	Six monthly	Maintenance Contractor	Leaves and debris to be removed from the inlet leaf/litter screen

MAINTENANCE ACTION	FREQUENCY	RESPONSIBILITY	PROCEDURE
Check the level of sediment within the tank	Every two years	Maintenance Contractor	Sediment and debris to be removed from rainwater tank floor if sediment level is greater than the maximum allowable depth as specified by the hydraulic consultant
INLET & JUNCTION PITS			
Inside of pits	Six Monthly	Maintenance Contractor	Remove grate and inspect internal walls and base, repair where required. Remove any collected sediment, debris, litter.
Outside of pits	Four Monthly/ After Major Storm	Maintenance Contractor	Clean grate of collected sediment, debris, litter and vegetation.
STORMWATER SYSTEM			
General Inspection of complete stormwater drainage system	Bi-annually	Maintenance Contractor	Inspect all drainage structures noting any dilapidation in structures and carry out required repairs.

9 FLOODING

Consideration to flooding is required due to the proximity to South Creek. Reference to the *Updated South Creek Flood Study (rp6033rg_crt150128-Updated South Creek Flood Study (FINAL – Volume 1))*, shows flood levels and flood extent associated with overland flow associated with the adjacent South Creek. This report will be referred to as the *South Creek Study* from hereon.

As required by the SEAR's, a comprehensive flood assessment is required for the development. This assessment has been completed by Costin Roe Consulting and presented in a separate report, refer **Co13362.00-19.rpt**, and included as part of the EIS and SSDA submission documents.

As part of the assessment, the requirements of *Section 3.5 of PCC C3 Water Management DCP2014* (defines the requirements for flood liable land and relevant policy documents) have been considered. The requirements for development in flood liable land are based on the NSW Government *Floodplain Development Manual (2005)* document are also considered in the assessment.

The *South Creek Study* shows the property is adjacent to the zone of the 1% AEP event. The flood surface extent and level for the 1% AEP storm event, presented at the peak flow per the *South Creek Flood Study*, at the upstream boundary of the property can be seen to be 35.0m and 33.5m at the downstream boundary. Allowing for the council required freeboard of 500mm, the corresponding flood planning level for the development varies between RL 35.5m to 34.0m AHD.

The assessment by our office confirms the South Creek study levels and utilises a localised study and modelling area to confirm the effect of flooding on the development (ensuring planning levels are accounted), and also the effect of the development on flooding. The intention being to meet Councils DCP Part C3 requirements and to ensure no offsite affectation to upstream, downstream or adjoining properties.

It is noted that the built form development footprint presented in this report is clear of and does not impact the 1% AEP event and that all development lots are above the PMF flood water levels.

Refer separate report, **Co13362.00-19.rpt**, for comprehensive flood assessment and commentary.

10 EROSION & SEDIMENT CONTROL PLAN

An erosion and sediment control plan (ESCP) is included in drawings **Co13362.00-DA200, DA210 and DA250**. These plans show the works can proceed without polluting receiving waters. A detailed plan will be prepared after development consent is granted and before works commence.

10.1 General Conditions

1. The ESCP is to be read in conjunction with the engineering plans, and any other plans or written instructions that may be issued by the site manager, council inspector or other authorised representative in relation to development at the subject site.
2. Contractors will ensure that all soil and water management works are undertaken as instructed in this report and constructed following the guidelines stated in *Managing Urban Stormwater, Soils and Construction (1998) "The Blue Book"*, Landcom, and Penrith City Council's specifications.
3. All subcontractors will be informed by the site manager of their responsibilities in minimising the potential for sedimentation and soil erosion.

10.2 Land Disturbance

1. Where practicable, the soil erosion hazard on the site will be kept as low as possible and as recommended in **Table 10.1**.

Land Use	Limitation	Comments
Construction areas	Limited to 5 (preferably 2) metres from the edge of any essential construction activity as shown on the engineering plans.	All site workers will clearly recognise these areas that, where appropriate, are identified with barrier fencing (upslope) and sediment fencing (downslope), or similar materials.
Temporary construction access	Limited to a maximum width of 5 metres	The site manager will determine and mark the location of these zones onsite. All site workers will comply with these restrictions.
Remaining lands	Entry prohibited except for essential management works	

Table 10.1. Limitations to access

10.3 Erosion & Sediment Control Conditions

1. Clearly visible barrier fencing shall be installed as shown on drawing **Co13362.00-DA200 & DA210** and elsewhere at the discretion of the site superintendent to ensure traffic control and prohibit unnecessary site disturbance. Vehicular access to the site shall be limited to only those essential for construction work and they shall enter the site only through the stabilised access points.
2. Soil materials will be replaced in the same order they are removed from the ground. It is particularly important that all subsoils are buried and topsoils (landscaped areas only) remain on the surface at the completion of works.
3. The construction program should be scheduled so that the period of time from starting land disturbance to stabilisation is minimised.
4. Notwithstanding this, schedule works so that the duration from the conclusion of land shaping to completion of final stabilisation is less than 20 working days.
5. Land recently established with grass species will be watered regularly until an effective cover has properly established and plants are growing vigorously. Further application of seed might be necessary later in areas of inadequate vegetation establishment.
6. Where practical, foot and vehicular traffic will be kept away from all recently established areas
7. Earth batters shall be constructed in accordance with the Geotechnical Engineers Report or with as law a gradient as practical but not steeper than:
    - 2H:1V where slope length is less than 7 metres
    - 2.5H:1V where slope length is between 7 and 10 metres
    - 3H:1V where slope length is between 10 and 12 metres
    - 4H:1V where slope length is between 12 and 18 metres
    - 5H:1V where slope length is between 18 and 27 metres
    - 6H:1V where slope length is greater than 27 metres
8. All earthworks, including waterways/drains/spillways and their outlets, will be constructed to be stable in at least the design storm event of 1 in 2-year ARI (Q2).
9. During windy weather, large, unprotected areas will be kept moist (not wet) by sprinkling with water to keep dust under control. In the event water is not available in enough quantities, soil binders and/or dust retardants will be used, or the surface will be left in a cloddy state that resists removal by wind.

10.4 Pollution Control Conditions

1. Stockpiles will not be located within 5 metres of hazard areas, including likely areas of high velocity flows such as waterways, paved areas and driveways.
2. Sediment fences will:
   a) Be installed where shown on the drawings, and elsewhere at the discretion of the site superintendent to contain the coarser sediment fraction (including aggregated fines) as near as possible to their source.
   b) Have a catchment area not exceeding 720 square metres, a storage depth (including both settling and settled zones) of at least 0.6 metres, and internal dimensions that provide maximum surface area for settling, and
   c) Provide a return of 1 metre upslope at intervals along the fence where catchment area exceeds 720 square meters, to limit discharge reaching each section to 10 litres/second in a maximum 20-year t_c discharge.
3. Sediment removed from any trapping device will be disposed of in locations where further erosion and consequent pollution to down slope lands and waterways will not occur.
4. Water will be prevented from directly entering the permanent drainage system unless it is relatively sediment free (i.e. the catchment area has been permanently landscaped and/or likely sediment has been treated in an approved device). Nevertheless, stormwater inlets will be protected.
5. Temporary soil and water management structures will be removed only after the lands they are protecting are fully stabilised.

10.5 Waste Management Conditions

Acceptable bind will be provided for any concrete and mortar slurries, paints, acid washings, lightweight waste materials and litter. Clearance services are to be provided by the respective contractors at least weekly.

10.6 Site Inspection and Maintenance

1. A self-auditing program will be established based on a check sheet. A site inspection using the check sheet will be made by the site manager:
   - At least weekly;
   - Immediately before site closure; and
   - Immediately following rainfall events in excess of 5mm in any 24-hour period.

The self-audit will include:

- Recording the condition of every sediment control device;
- Recording maintenance requirements (if any) for each sediment control device;

- Recording the volumes of sediment removed from sediment retention systems, where applicable;
- Recording the site where sediment is disposed; and
- Forwarding a signed duplicate of the completed Check Sheet to the project manager/developer for their recording.

2. In addition, the site manager will be required to oversee the installation and maintenance of all soil and water management works on the site. The person shall be required to provide a short monthly written report to the superintendent. The responsible person will ensure that:
   - The plan is being implemented correctly;
   - Repairs are undertaken as required; and
   - Essential modifications are made to the plan if and when necessary.

   The report shall include a certificate that works have been carried out in accordance with the plan.
3. Waste bins will be emptied as necessary. Disposal of waste will be in a manner approved by the Site Superintendent.
4. Proper drainage will be maintained. To this end, drains (including inlet and outlet works) will be checked to ensure that they are operating as intended, especially that:
   - No low points exist that can fill and overtop in a large storm event;
   - Areas of erosion are repaired (e.g. lined with a suitable material) and/or velocity of flow is reduced appropriately through construction of small check dams and installing additional diversion upslope; and
   - Blockages are cleared (these might occur because of sediment pollution, sand/soil/spoil being deposited in or too close to them, breached by vehicle wheels, etc.).
5. Sand/soil/spoil materials placed closer than 2 metres from hazard areas will be removed. Such hazard areas include areas of high velocity water flows (e.g. waterways and gutters), paved areas and driveways.
6. Recently stabilised lands will be checked to ensure that erosion hazard has been effectively reduced. Any repairs will be initiated as appropriate.
7. Excessive vegetation growth will be controlled through mowing or slashing.
8. All sediment detention systems will be kept in good working condition. In particular, attention will be given to:
   a) Recent works to ensure they have not resulted in diversion of sediment laden water away from them;
   b) Degradable products to ensure they are replaced as required; and
   c) Sediment removal, to ensure the design capacity remains in the settling zone.
9. Any pollutants removed from sediment basins or litter traps will be disposed of in areas where further pollution to down slope lands and waterways should not occur.

10. Additional erosion and/or sediment control works will be constructed as necessary to ensure the desired protection is given to down slope lands and waterways, i.e. make ongoing changes to the plan where it proves inadequate in practice or is subjected to changes in conditions at the work site or elsewhere in the catchment.
11. Erosion and sediment control measures will be maintained in a functioning condition until all earthwork activities are completed and the site fully stabilised.
12. Litter, debris and sediment will be removed from the gross pollutant traps and trash racks as required.

11 SEAR's & AGENCY RESPONSE ITEMS

11.1 SEAR's Response Items

This section of the report covers items relating to the NSW Department of Planning and Environment SEARS letter dated 14 September 2018, reference SSD_9522, agency response letters from Penrith City Council (10 September 2018), NSW Department of Primary Industries (DPI) and NSW Office of Environment & Heritage (OEH).

Further reference to the EIS prepared by Willowtree Planning should be made for confirmation of how the SEAR's have been addressed for non-civil engineering or WCM related items.

SEARS - Flooding *A detailed hydrological and hydraulic assessment which includes the following:*	
Item 1.1	*A comprehensive assessment of the impact of flooding on the development for the full range of flood events to the probable maximum flood. This assessment should address the relevant provisions of the NSW Floodplain Development Manual (2005) including the potential effects of climate change, sea level rise and an increase in rainfall intensity.* Response Refer separate report by Costin Roe Consulting, **Co13362.00-19.rpt**, for comprehensive flood assessment which includes potential effects of climate change, sea level rise and increased rainfall runoff. The assessment includes a 10% increase in rainfall intensity. This increase is considered representative of potential climate change impacts for the Sydney metropolitan area (being consistent with projected rainfall increases in accordance with the New South Wales Department of Environment and Climate Change (DECC) 'Floodplain Risk Management Guideline Practical Consideration of Climate Change' (Table 1, October 2007).
Item 1.2	*Consideration of current flood behavior and impacts, including on the flood detention areas, how flood behavior and impacts will change due to the proposal and how these changes will be mitigated.* Response Refer separate report by Costin Roe Consulting, **Co13362.00-19.rpt**, for comprehensive flood assessment which includes the above items.
Item 1.3	*Assessments of the impact of the development on flood behavior (i.e. levels, velocities and duration of flooding) and on adjacent, downstream and upstream areas.* Response Refer separate report by Costin Roe Consulting, **Co13362.00-19.rpt**, for comprehensive flood assessment which includes the above items.

Item 1.4	*Detail proposed floor levels for all proposed habitable structures on the site having considered the full range of flood events up to the probable maximum flood.* Response Flood planning level of the site has been based on normal, social and industry accepted freeboard allowances for industrial development. A minimum level of 1% AEP plus 0.5m freeboard has been adopted. The adopted flood planning level is consistent with nearby industrial estates and council adopted policy. It is further noted that proposed development levels are higher than the PMF flood event. Refer earthworks drawings which confirm FPL's for the development.
Item 1.5	*Detail an emergency flood response plan for the site which includes consideration of a flood-free access to or from the development site in extreme flood events.* Response Refer separate report by Costin Roe Consulting, **Co13362.00-19.rpt**, for comprehensive flood assessment which includes flood response. It is noted that the site is clear of the post-development PMF event and on-site refuge is available.

SEARS - Soil and Water	
Item 2.1	*A description of how the proposal takes into consideration the South Creek Corridor Strategy and the land use vision for the South Creek Precinct in consultation with Infrastructure NSW and the Greater Sydney Commission.* Response Refer to EIS by Willowtree Planning for comprehensive discussion in relation to the South Creek Corridor Strategy and land vision for the South Creek Precinct.
Item 2.2	*Measures to protect the Warragamba Pipelines corridor from any works or activities associated with the development.* Response All works are proposed to be clear of the Warragamba Pipeline corridor noting a 60m allowance for a potential future rail corridor has been made between the pipeline corridor and the development. Perimeter fencing, and sediment controls are noted to be specified along the southern boundary of the future rail corridor. future common boundary of the development and pipeline corridor during construction. Any proposed level differences in the development will employ safe and stable batters,

	based on recommended slopes from a geotechnical investigation, or via retaining structure. No retaining is currently proposed for the development however future walls may be necessary for individual development sites. These would form part of future designs and development applications. All structures would be within development site and would not affect support or structures within the pipeline corridor. A 60m wide corridor has been included south of the water pipeline as provision for a future freight rail line, with no disturbance in this zone effectively providing a 60m buffer between the development and the water pipeline. It is noted that the built form development is clear of the 1% AEP flood extent hence there will be no post-development change to flood conditions in a 1% AEP flood event. Further that assessment of impacts during the 0.2% AEP have been made and these assessments confirm there are no impacts on the pipeline corridor for this higher order and less frequent storm event. It is expected that there would be limited change to water table as a result of this development, comprising generally filling works.
Item 2.3	*Details of how access to the Warragamba Pipelines corridor would be maintained, in consultation with Water NSW* Response Access to the pipeline corridor from Mamre Road would be maintained per existing conditions. No change to current access arrangements will occur due to the development. We reiterate there is a 60m buffer between the development area and the Sydney Water Pipeline Corridor for a potential future freight rail line.
Item 2.4	*A description of water demands and a breakdown of water supplies, including a detailed site water balance.* Response Refer **Section 4**, and subsequent **Sections 5** and **6**, for a comprehensive WCMP which confirms water supplies and reuse requirements. Note the water balance has been performed in respect to the proposed industrial development. A detailed *Service Infrastructure Assessment* has been completed by *Landpartners Built Environment Consultants* and is contained in their report SY073930.000. Reference to this document, included in the EIS should be made for detailed information pertaining to potable water demands and wastewater management. Further water balance information is included in **Section 8.4** in relation to proposed re-use of rainwater for non-potable demands. It is noted that detailed site water balance, such as those required for mining sites which involve items not relevant to this project like

	groundwater flows in mining voids, construction water, dust suppression, vehicle washdowns, material wash downs, ground water reuse or harvesting etc, is not relevant for this development. Noted demands for this site are use for potable/ drinking water for facility occupants, non-potable reuse (from rainwater) for irrigation and toilet flushing which will reduce demand on non-potable uses in the range of 50%. The requirements for water balance assessment are considered to have been addressed in the submitted documents. Refer **Sections 6.5, 6.6** and **8.4** of our this report.
Item 2.5	*Identification of any water licensing requirements under the Water Act 2012 or Water Management Act 2000.* Response We confirm that no water sharing plans or licensing considerations are relevant or proposed as part of the warehouse distribution estate development. Groundwater and/ or surface water will not be sourced as part of water sharing plans.
Item 2.6	*Details of proposed erosion and sediment controls during construction.* Response Refer **Section 10** of this report and associated drawings **Co13362.00-DA200, DA210 and DA250** for details of erosion and sediment control during construction.
Item 2.7	*A description of the surface and stormwater management system designed in accordance with Penrith City Councils WSUD Policy, including drainage design, on-site detention, and measures to treat or reuse water.* Response Refer **Section 6** of this report and associated drawings **Co13362.00-DA400 to DA419** for details of stormwater management and WSUD/WCM measures proposed for the operational phase of the development.
Item 2.8	*Characterisation of the nature and extent of any contamination on the site and surrounding area.* Response Refer to contamination assessment.
Item 2.9	*An assessment of potential impacts on surface and groundwater resources, drainage patterns, soil (stability, salinity and acid sulfate soils (, related infrastructure, watercourse and riparian land and proposed mitigation, management and monitoring measures.* Response We confirm that the development does not propose to utilise surface or

	groundwater water sources. An assessment of the impact on these items is not relevant for the warehouse distribution estate development. Reference to JBS&G Environmental investigation should be made in relation to salinity and acid sulfate soils. The report shows that low potential for these soils will be encountered on site.

We also provide the following confirmation of other SEAR's request items typical of similar industrial and warehouse SSDAs.

Soils and Water, Groundwater and Licensing	
Item 1	*Annual volumes of surface water and groundwater proposed to be taken by the activity (including through inflow and seepage) from each surface and groundwater source as defined by the relevant water sharing plan.* <u>Response</u> We confirm that no water sharing plans are relevant or proposed as part of the warehouse distribution center construction. Groundwater and/ or surface water will not be sourced as part of water sharing plans.
Item 2	*Assessment of any volumetric water licensing requirements (including those for ongoing water take following completion of the project).* <u>Response</u> We confirm that no volumetric licensing requirements are relevant or proposed as part of the warehouse distribution center construction.
Item 3	*The identification of an adequate and secure water supply for the life of the project. Confirmation that water can be sourced from an appropriately authorised and reliable supply.* <u>Response</u> We confirm that Sydney Water will perform water supply for the life of the project. Reduction in non-potable demand will be made via rainwater reuse, details of which are nominated in **Section 8.4** of this report.
Item 4	*A detailed and consolidated site water balance.* <u>Response</u> We confirm that water usage is consistent with industrial developments typical of the area. Water use will be for toilet flushing, hand washing, employee showers and irrigation with supply being made from rainwater reuse and Sydney Water. Overall water demand will be reduced by rainwater harvesting with proposed reduction in non-potable demands, Penrith City Council and the NSW Department of Environment and Conservation document *Managing Urban Stormwater: Harvesting and Reuse*, using a simple water balance analysis to balance the supply and

	demand. A minimum 100,000L tank is proposed for each future facility with a target reduction in non-potable demand as set out in **Section 6.1**.
Item 5	*A detailed assessment against the NSW Aquifer Interference Policy (2012) using DPI Water's assessment framework.* Response We confirm that the development will not affect groundwater and or aquifers. An assessment of the NSW Aquifer policy is not relevant for the warehouse distribution center construction.
Item 6	*Assessment of impacts on surface and ground water sources (both quality and quantity), related infrastructure, adjacent licensed water users, basic landholder rights, watercourses, riparian land, and groundwater dependent ecosystems, and measures proposed to reduce and mitigate these impacts.* Response We confirm that the development does not propose to utilise surface or groundwater water sources. An assessment of the impact on these items is not relevant for the warehouse distribution center construction. Surface water management, including conveyance of surface runoff, management of water quantity (through on-site detention) and water quantity (through on-site and estate wide management systems using WSUD principles and best practice pollution reduction objectives) has been proposed in the design. In relation to groundwater affectation, this is expected to be negligible. The geotechnical investigations undertaken by PSM did no encounter groundwater in any of the test locations. Further, the majority of the site and site earthworks involve filling, hence any interaction with existing groundwater or groundwater flow paths would negligible and hence not be impacted.
Item 7	*Full technical details and data of all surface and groundwater modelling.* Response We confirm the proposed development does not affect surface and groundwater water surface, as described in Item 6 above. We consider that groundwater modelling is not relevant for the proposed development. As there are no requirements to utilise groundwater sources, it is also not proposed or required to recharge the groundwater system. Surface storm water runoff is managed and disposed of as described in **Sections 6, 7 and 8** of this report.
Item 8	*Proposed surface and groundwater monitoring activities and*

	methodologies. Response We confirm the proposed development does not affect surface and groundwater water surface and that groundwater monitoring activities are not relevant for the proposed development.
Item 9	*Assessment of any potential cumulative impacts on water resources, and any proposed options to manage the cumulative impacts.* Response The development does not involve any cumulative impacts on water resources.
Item 10	*Consideration of relevant policies and guidelines as contained in attachment 1 of the SEAR document.* Response Consideration of the relevant policies and guidelines has been made. These are listed in the EIS by Willowtree Planning and Engineering Policies listed in **Section 13** of this report.

Water Management and Key Items	
	Key Relevant Legislative Instruments Response Consideration of the relevant policies and guidelines has been made. These are listed in the EIS by Willowtree Planning and Engineering Policies listed in **Section 13** of this report.
	Water Sharing Plans Response We confirm that no water sharing plans are relevant or proposed as part of the warehouse distribution center construction. Groundwater and/ or surface water will not be sourced as part of water sharing plans.
	Licensing Considerations Response We confirm that no water sharing plans or licensing considerations are relevant or proposed as part of the warehouse distribution center construction. Groundwater and/ or surface water will not be sourced as part of water sharing plans.

	Dam Safety Response No dams or detention basins with bund type dam walls are proposed by the development hence probability of dam break is low to negligible. Basins are to be fenced off where depth is greater than 0.6m, and areas subject to pedestrian access will be limited to 0.3m per PCC DCP..
	Surface Water Assessment Response We confirm that a Stormwater Management Plan has been produced for the proposed development which covers management of stormwater runoff including water quality and quantity. Reference to **Sections 6, 7 & 8** of this document should be made for confirmation of how the Water Sensitive Urban Design and management of quality and quantity has been addressed. We also confirm that no utilization of surface water runoff from water courses, rivers or dams is proposed or relevant as part of the warehouse distribution development.
	Groundwater Assessment Response Earthworks are proposed to facilitate industrial development. Section 5 of this report discusses the expected negligible impact on existing water table and groundwater over the site. We also confirm that no utilization of groundwater is proposed as part of the development. An assessment of groundwater is not relevant or proposed as part of the warehouse distribution project.
	Groundwater Dependent Ecosystems Response Earthworks are proposed to facilitate industrial development. Section 5 of this report discusses the expected negligible impact on existing water table and groundwater over the site. We also confirm that no utilization of groundwater is proposed as part of the development. An assessment of groundwater dependent ecosystems is not relevant or proposed as part of the warehouse distribution project.
	Watercourses, Wetlands and Riparian Land Response All basins are proposed to be located clear of 40m of South Creek. Works to the riparian land will be required for re-shaping and flood compensation storage. The disturbed areas are to be re-vegetated and ecology restored.

	Transport and Access Response A traffic assessment has been completed by ASON Group. A functional layout of the proposed intersection has been prepared based on the findings of the traffic study and included in the engineering drawing set completed for the application. Refer to **Appendix A** and **Section 4** of this report for the functional layout of the intersections.
	Services and Public Utilities Response An assessment of existing public utilities and their ability to service the development has been made. Please refer Landpartners report for the assessment.

11.2 Agency Response Items

This section of the report provides response to civil engineering items included in the agency responses from Penrith City Council (Letter Ref: ECM. 872857, 10 July 2019) and Water NSW (Letter Ref: D2019/67783, 6 July 2019).

It is to be noted that, in the period between the agency responses being provided and now, the proponent has altered the development layout, reducing the extent of development to be outside of the 1% AEP South Creek flood extent. The responses contained in this letter are consistent with the Masterplan 3 development layout. As such, many of the agency comments are addressed as a result of development no longer being proposed within the 1% AEP flood extent.

Authority Comments	*Response*
Penrith Council	
The proposal will provide for substantive cut and fill throughout the subject site noting that the majority of cut is maintained towards the Mamre Road frontage with fill to the proposed lots then extending in a westerly direction. A review of plans has identified in parts the proposed fill extending up from 4m to 4.5m in height from existing natural ground level. The extent of fill provided which is identified to be in the area of 2 million cubic metres is not considered appropriate as it is considered that this may create potential disturbances to overland flow and an immediate visual impact concern to its surrounds. It is not considered that the proposal has provided for appropriate justification for the proposed variances to the existing ground contours. In this regard, the amount of fill provided is also viewed with concern in relation to Clause 7.5 of the Penrith Local Environmental Plan – 'Protection of scenic character and landscape values' in which the subject site is identified as being located within.	The civil design and subsequent earthworks designs have been completed with a balance of regrading to suit large format buildings, drainage via inground pipes to the legal point of discharge (i.e. South Creek), and street presence of the estate to Mamre Road. The design accommodates existing overland flow paths and includes provision for conveyance of upstream overland flow via dedicated inground and overland flow routes through the development site. The visual impact is considered to be minimal. Generally filling through the centre of the development is around the 3-4m mark. Although there would be local filling to a depth of up to 4-5m this would generally be confined to gullies and existing basins. At the interface locations, levels differences along the southern boundary are at or less than 2m and similar on the south-west. Level differences will be managed through a landscaped zone with a combination of batters and retaining walls to ensure good visual amenity. Refer typical section on Drawing Co13362.00-DA300 and detailed sections for the development. Secondly in relation to visual ammenity – when viewing the site from Mamre Road, the vista will comprise a fall away from the road at an average of 1%. We expect this to integrate well with existing landform. Refer updated earthworks drawings and detailed site sections on drawings **Co13362.00-DA30** and **DA351** to **DA354**.

Authority Comments	***Response***
The provision of basins and associated infrastructure within the floodway is not supported. Whist some infrastructure may be suitable below the 1% AEP development, such as water quality infrastructure within the floodway will not be supported.	The built form development layout does not propose any works within the 1% AEP flood extent, hence this comment is considered to have been addressed.
The flood impact assessment must also assess the flood impacts to adjacent properties. When off-site flood impacts are assessed it should be considered a minimum 2km upstream and 2km downstream to avoid effects at the boundaries of flood modelling. The assessment shall also take into consideration recent surrounding land development.	Modelling included in separate report **Co13362.00-19.rpt**, has been updated to extend the upstream and downstream modelled boundary conditions to be 2kM as requested. As noted above, given the revised built form development is now not within the 1% AEP flood extent, flood impacts in the 1% AEP event are now NIL, hence considered to have been addressed.
A peer review of the flood modelling and flood impact assessment should be undertaken by an independent flood modelling consultant to ensure the flood modelling undertaken is appropriate.	An independent review has been completed by Advisian and all items have been responded to and any modelling adjustments addressed. Refer to separate response letter by Costin Roe Consulting and updated *Overland Flow Report* and modelling which includes full response to Advisian Peer Review.
An overland flow analysis of the catchment upstream of Mamre Road shall be considered in the overall stormwater management of the site.	Assessment of local flow paths has been included in the submitted civil/ WCMP documents. These are noted to have not been included in the *Overland Flow Report* which focusses on more substantial South Creek Flooding. This is due to the very minor nature of the flow paths being conveyed through and around the development site. Reference to **Sections 6.2** of this report, drawing **Co13362.00-DA420** and drawings **DA400, DA410-DA419** should be made.

Authority Comments	*Response*
The proposal includes a massively re-engineered solution to the South Creek floodplain and is inconsistent with the natural integrity of the South Creek system. This compromises South Creek, the Western Parkland City's future green spine, particularly in regard to amenity and environmental values.	The revised built form development layout does not propose any works within the 1% AEP flood extent, nor any major flood compensation works. This comment is considered to no longer be relevant and has been addressed.
The water management functions of the creek should be maintained. It is not considered appropriate to encourage or support the outdated mentality of providing a hard-engineered solution for the creek.	There are no hard-engineered solution proposed for South Creek in either the original proposal or current proposal submission. All proposed works are greater than 40m from the top of bank of South Creek. The revised built form development layout does not propose any works within the 1% AEP flood extent, hence this comment is considered to have been addressed. Drainage outlets from the development are proposed to be natural rock energy dissipators which are to be designed and constructed in accordance with NSW Office of Water requirements. Refer **Section 6.3** and **Figure 6.1** for discussion and general arrangement of discharge from the property to South Creek.
Any proposed flood storage within flood "Dead storage" to compensate the filling is not supported as this "dead storage" will not provide any flood storage as this will be filled before flooding occurs.	Dead storage has not been considered in flood storage calculations. It is further noted that the built form development layout does not propose any works within the 1% AEP flood extent, hence this comment is considered to have been addressed.
A dam dewatering management plan should be prepared for the dewatering of dams located at the site.	Dam dewatering methodology notes specific to civil engineering requirements are included in the erosion and sediment control drawings. Additional input to the engineering requirements noted above are to be sought from an ecologist in relation to fauna (eg snakes, turtles etc) and other ecological

Authority Comments	*Response*
	matters.
A review of the information provided indicates that Stage 1 will have on-lot stormwater treatment measures. No detailed information is provided in relation to what measures are proposed. As such, the report does not demonstrate compliance with Council's WSUD Policy requirements. Information on any stormwater treatment system will need to be dealt with at the DA stage of each lot.	The stormwater management strategy for the Masterplan 3 layout is based on the provision of end-of-line water quality and water quantity management through estate basins. The need for individual lot management systems is now limited to provision of rainwater tanks, or extra over WSUD which may suit the individual development, however not required to meet policy and estate management stormwater objectives. Detailed information relating to individual developments would be provided at Construction Certificate stage as part of an operational Stormwater Management Plan (SWMP) based on the objectives and framework set out in the report.
In this regard, it is suggested that the proponent give some more consideration to the final design and configuration of the basin during the detailed design stage. This should include but not be limited to the inlet design and flow configuration, sizing of basin, access provision for maintenance, configuration, and vegetation species to name a few considerations. In this regard, there are many technical design guidelines available to assist in any revised design.	Refer drawings in **Appendix A** for concept details of the proposed estate detention and water quality systems. It is noted that consideration to design items discussed in Penrith Council RtS will be made during detail design stage. The estate stormwater management measures including the Estate Basin, water quality measures (bio-retention and gross pollutant traps) are proposed to be dedicated to council in conjunction with the roads and other public infrastructure. Maintenance as such is expected to also transfer to council in conjunction with dedication of the systems.
In summary, all developments in Stage 1 would need to develop stormwater treatment strategies and submit in support of any development application. These would need to be consistent with the commitments made in the Civil Report and meet the requirements of Council's WSUD Policy.	Refer response above in relation to individual development measures, noting minimal lot management items are now required due to proposed estate level GPT and stormwater management basins.

Authority Comments	*Response*
The proposed bioretention system shall also be used as a sediment basin until the catchment is developed. This is an important consideration and the bioretention system should not be constructed until a minimum of 90% has been constructed.	Bio-retention systems are proposed for development treatment and these are to be used for sediment controls until such time that 90% of the upstream catchment has been developed or otherwise acceptably stabilised or managed. Stage specific sediment basins are included in the erosion and sediment control designs and these have been designed to suit the development layout.
Provide a water use strategy and supporting WSUD treatments are to be integrated with the engineering design;	A water use strategy and supporting WSUD have been included and set out in this WCMP.
Water NSW	
WaterNSW understands the Overland Flow Report prepared by Costin Roe Consulting (2019) analysed a full range of flood events for the site including the Probable Maximum Flood (PMF) level. The Overland Flow Report confirms that the proposed final levels can accommodate the proposed design, for which no adverse impacts to the existing flows would occur. However WaterNSW has serious concerns as to the potential impact of the flood waters on the Pipelines and the foundations with concentrated water flows and expected increased velocities from South Creek due to the development.	All works are proposed to be clear of the Warragamba Pipeline corridor noting a 60m allowance for a potential future rail corridor has been made between the pipeline corridor and the development. It is noted that the built form development is clear of the 1% AEP flood extent, hence there will be no post-development change to flood conditions in a 1% AEP flood event. Further that assessment of impacts during the 0.2% AEP have been made and these assessments confirm there are no impacts on the pipeline corridor for this higher order and less frequent storm event. Reference to separate overland flow report **Co13362.00-19.rpt** should be made for confirmation of flood impact assessments noted above. As such, this comment is considered to have been addressed.

Authority Comments	*Response*
WaterNSW requires that post-development flows that enter or are conveyed across the Pipelines corridor must be equal to or less than the pre-development flows for each storm event up to and including 1% AEP event.	The drainage proposed for the development is noted to propose discharge to South Creek. There is no part of the new development which is proposed to be directed toward the pipeline corridor. It is noted that there are no proposed works within the area provisioned for the 60m wide future rail corridor. Sheet flow from this area will maintain current flow as such and some of this flow is noted to pass through the pipeline corridor. The overall catchment draining in this direction is noted to be substantially less than pre-development hence will be less than pre-development. This comment is considered to have been addressed.
WaterNSW understands there will be a potential decrease in flood surface levels adjacent to the development on the eastern and western banks of South Creek, and upstream of the proposed development due to an increase in flood water storage capacity onsite. However, within the WaterNSW corridor directly adjacent to the development, an increase in flood levels is demonstrated in a post development scenario.	The revised built form development layout does not propose any works within the 1% AEP flood extent, hence no changes will occur between pre and post development for the 1% AEP event. Further, assessment of impacts during the 0.2% AEP have been made and these assessments confirm there are no impacts on the pipeline corridor for this higher order and less frequent storm event. Reference to separate overland flow report **Co13362.00-19.rpt** should be made for confirmation of flood impact assessments noted above. This comment is considered to have been addressed.
There is also potential for floodwaters to extend further up the Pipelines corridor than currently mapped due to the raised level of the development site resulting from earthworks, narrowing the flow path for stormwater. This also has the potential to result in scouring of the Pipelines corridor and destabilisation of the anchors and sills supporting the Pipelines. All development works must be undertaken in a	The revised built form development layout does not propose any works within the 1% AEP flood extent, hence no changes will occur between pre and post development for the 1% AEP event. Further, assessment of impacts during the 0.2% AEP have been made and these assessments confirm there are no impacts

Authority Comments	*Response*
manner that avoids any impact on the Pipelines infrastructure.	on the pipeline corridor for this higher order and less frequent storm event. Reference to separate overland flow report **Co13362.00-19.rpt** should be made for confirmation of flood impact assessments noted above. This comment is considered to have been addressed.
WaterNSW notes that for 1% AEP flood level of South Creek, the flood surface height varies in level from RL 35.20m AHD at the upstream southern end of the site to RL 33.60 m AHD at the downstream northern end of the site. Anecdotal reports from WaterNSW staff advise that during a minor rain event in early 2016, the floodwaters from South Creek reached the centre line of the Pipelines (RL 34.24).	The reported flood level from the 2016 event has noted for information purposes.
The Overland Flow Report (2019) notes that stormwater management measures have been designed to ensure that post-development stormwater flows will be attenuated to pre-development stormwater flows. These measures include conveyance of surface runoff, management of water quantity (through on-site detention) and water quality (through on-site and estate wide management systems) using Water Sensitive Urban Design principles and current best practice pollution reduction objectives. However, the modelling within Appendix B of the Overland Flow Report (2019) contradicts this and demonstrates an impact on WaterNSW assets.	The attenuation of stormwater runoff from the development presented in this report relates to locate runoff from the development site. The proposed stormwater management systems (including Estate Basins) attenuate post development runoff from the 89 Ha development site to pre-development runoff rates. The assessments included in the Overland Flow Report relate to impacts on regional flooding from the larger South Creek Catchment. The submitted documents confirm no increase in flow during local storm events, nor impacts to the pipeline corridor during regional South Creek flooding in either the 1% AEP flood event or 0.2% AEP flood event. This comment is considered to have been addressed.
If the above matters can be resolved with no net flooding or stormwater impact on the Pipelines corridor, WaterNSW offers the	The submitted development proposal and assessments are considered to meet all of WaterNSW requirements included in their

Authority Comments	***Response***
following comments and requirements for your consideration of the proposal.	RtS, as confirmed through various responses provided.
Final levels and design of the proposal must not result in an increase in overland flow water into the Pipeline corridor of either quantity, quality or velocity. The development must be designed, operated and maintained to ensure post-development flows do not exceed pre-development flows into and through the Pipelines Corridor.	There are no drainage flows from the development directed toward or onto the WaterNSW pipeline corridor.
Stormwater directed to or across the Pipelines corridor is not acceptable, except at approved point of discharge for the development.	There are no areas where stormwater is directed to or across the pipeline corridor.

12 CONCLUSION

This Civil Engineering Report has been prepared to assist with decision making and development approval regarding the development of 89 Ha of a 118 Ha land parcel surrounding the proposed Southern Link Road, existing Bakers Lane and Mamre Road, Erskine Park.

An overview of Penrith City Council requirements for stormwater and access has been provided to assist in the SSDA submission. Specific mention has been made to on-site detention and water quality requirements as required as part of the *Water Cycle Management Plan* for the estate.

A strategy for the management of stormwater quality and quantity has been provided based on the management measures to be provided in end-of-line estate level management basins. It is proposed that two combined detention and water quality systems are provided on the western flank of the development extent to manage post-development runoff to pre-development flow rates and to clean the water to Council and DPIE load based pollution reduction requirements.

The built form development is located in the vicinity of, however clear of the predicted 1% AEP South Creek flood extent. The floor levels of proposed buildings near South Creek will be set as a minimum to the 1% AEP flood level plus 0.5m freeboard in accordance with the requirements of Penrith City Council and the NSW Floodplain Development Manual. Reference to separate flood report and assessment by Costin Roe Consulting should be made in relation to flooding (refer report **Co13362.00-19a.rpt**)

13 REFERENCES

Managing Urban Stormwater: Harvesting and Reuse – 2006 (NSW DEC);

Managing Urban Stormwater: Source Control – 1998 (NSW EPA);

Managing Urban Stormwater: Treatment Techniques – 1997 (NSW EPA);

Managing Urban Stormwater: Soils & Construction – 2004(LANDCOM);

Penrith City Council – *WSUD Technical Guidelines*

Penrith City Council – *Water Sensitive Urban Design (WSUD) Policy*

Penrith City Council – DCP 2010 (Part C3); and

Water Sensitive Urban Design – "Technical Guidelines for Western Sydney" by URS Australia Pty Ltd, May 2004

Appendix A
Costin Roe Consulting Pty Ltd
SSDA Drawings

MAMRE SOUTH PRECINCT

657-708 MAMRE ROAD

KEMPS CREEK, NSW

DRAWING LIST:

DRAWING NO.	DRAWING TITLE
C013362.00-DA 100	DRAWING LIST & GENERAL NOTES
C013362.00-DA 200	EROSION & SEDIMENT CONTROL PLAN - STAGE 1
C013362.00-DA 210	EROSION & SEDIMENT CONTROL PLAN - STAGE 2
C013362.00-DA 220	EROSION & SEDIMENT CONTROL PLAN - STAGE 3
C013362.00-DA 250	EROSION & SEDIMENT CONTROL DETAILS
C013362.00-DA 300	BULK EARTHWORKS PLAN
C013362.00-DA 351	BULK EARTHWORKS PLAN SECTIONS - SHEET 1
C013362.00-DA 352	BULK EARTHWORKS PLAN SECTIONS - SHEET 2
C013362.00-DA 353	BULK EARTHWORKS PLAN SECTIONS - SHEET 3
C013362.00-DA 354	BULK EARTHWORKS PLAN SECTIONS - SHEET 4
C013362.00-DA 355	BULK EARTHWORKS PLAN SECTIONS - SHEET 5
C013362.00-DA 356	BULK EARTHWORKS PLAN SECTIONS - SHEET 6
C013362.00-DA 400	STORMWATER CATCHMENT PLAN
C013362.00-DA 410	CIVIL WORKS KEY PLAN
C013362.00-DA 411	CONCEPT CIVIL WORKS PLAN - SHEET 1
C013362.00-DA 412	CONCEPT CIVIL WORKS PLAN - SHEET 2
C013362.00-DA 413	CONCEPT CIVIL WORKS PLAN - SHEET 3
C013362.00-DA 414	CONCEPT CIVIL WORKS PLAN - SHEET 4
C013362.00-DA 415	CONCEPT CIVIL WORKS PLAN - SHEET 5
C013362.00-DA 416	CONCEPT CIVIL WORKS PLAN - SHEET 6
C013362.00-DA 417	CONCEPT CIVIL WORKS PLAN - SHEET 7
C013362.00-DA 418	CONCEPT CIVIL WORKS PLAN - SHEET 8
C013362.00-DA 419	CONCEPT CIVIL WORKS PLAN - SHEET 9
C013362.00-DA 420	OVERALL STORMWATER MANAGEMENT PLAN
C013362.00-DA 450	STORMWATER DRAINAGE DETAILS - SHEET 1
C013362.00-DA 455	BASIN SECTIONS-SHEET 1
C013362.00-DA 456	BASIN SECTIONS-SHEET 2
C013362.00-DA 460	STORMWATER DRAINAGE DETAILS - SHEET 2
C013362.00-DA 500	ROADWORKS DETAILS
C013362.00-DA 601	ROAD LONG SECTIONS - SHEET 1
C013362.00-DA 602	ROAD LONG SECTIONS - SHEET 2
C013362.00-DA 700	SOUTHERN LINK ROAD ALIGNMENT PLAN

RETAINING WALL NOTES :

1. ALL COMPONENTS AND INSTALLATION SHALL COMPLY WITH AS4678 AND THE STANDARDS REFERRED TO THEREIN.
2. MINIMUM BEARING CAPACITY OF FOUNDATION TO BE AS FOLLOWS :
   a. H MAX. 2.0m = 100 kPa
   b. H MAX. 3.5m = 150 kPa
   c. H MAX. 5.0m = 200 kPa
   BEFORE COMMENCEMENT OF CONSTRUCTION THE FOUNDATION SHALL BE INSPECTED AND VERIFIED BY A QUALIFIED GEOTECHNICAL ENGINEER.
3. WHERE MINIMUM BEARING IS NOT ACHIEVABLE OR NOT MEETING DESIGN REQUIREMENT, THE FOUNDATION MATERIAL IS TO BE EXCAVATED AND REPLACED WITH APPROVED MATERIAL PLACED IN ACCORDANCE WITH THE FILLING SPECIFICATION TO A MINIMUM COMPACTION OF 100% SMDD AND PLACED WITHIN 2% OF OMC.
4. MINIMUM SURCHARGE LOADS TO BE APPLIED AS FOLLOWS U.N.O.
5. ON PLAN :
   a. LIVE LOAD = 20 kPa
   b. DEAD LOAD = 5 kPa
   c. CONSTRUCTION TRAFFIC LIVE LOAD = 10 kPa
6. MINIMUM WALL EMBEDMENT AT THE TOE OF THE WALL TO BE 300mm MINIMUM UNLESS NOTED OTHERWISE.
7. DESIGN LIFE OF STRUCTURE IS TO BE 100 YEARS.
8. TIED WALLS ARE TO BE TEMPORARILY PROPPED AT TOP UNTIL SUCH TIME THE TOP OF WALL IS TIED TO THE SLAB AND 28-DAY CONCRETE STRENGTH HAS BEEN ACHIEVED.
9. CONSTRUCTION EQUIPMENT WEIGHING MORE THAN 500KG STATIC WEIGHT IS TO BE KEPT BACK 1.5m FROM THE REAR FACE OF THE WALL FACING UNITS. COMPACTION OF THE SELECT FILL MATERIAL WITHIN THE 1.5m STRIP ADJACENT TO THE WALL SHALL BE ACHIEVED BY LIGHT MECHANICAL TAMPERS (VIBRATING PLATE, TRENCH COMPACTOR OR SIMILAR) TO GIVE THE SAME DENSITY AS IN THE REMAINDER OF THE SELECT FILL.
10. ALL DESIGN AND CONSTRUCT WALL SYSTEM TO BE COMPLETED IN ACCORDANCE WITH THESE NOTES.

GENERAL NOTES:

G1 THESE DRAWINGS SHALL BE READ IN CONJUNCTION WITH ALL ARCHITECTURAL AND OTHER CONSULTANTS' DRAWINGS AND SPECIFICATIONS AND WITH SUCH OTHER WRITTEN INSTRUCTIONS AS MAY BE ISSUED DURING THE COURSE OF THE CONTRACT. ANY DISCREPANCY SHALL BE REFERRED TO THE ENGINEER BEFORE PROCEEDING WITH THE WORK.

G2 ALL MATERIALS AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE RELEVANT AND CURRENT STANDARDS AUSTRALIA CODES AND WITH THE BY-LAWS AND ORDINANCES OF THE RELEVANT BUILDING AUTHORITIES EXCEPT WHERE VARIED BY THE PROJECT SPECIFICATION.

G3 ALL DIMENSIONS SHOWN SHALL BE VERIFIED BY THE BUILDER ON SITE. ENGINEER'S DRAWINGS SHALL NOT BE SCALED FOR DIMENSIONS. ENGINEER'S DRAWINGS ISSUED IN ANY ELECTRONIC FORMAT MUST NOT BE USED FOR DIMENSIONAL SETOUT. REFER TO THE ARCHITECT'S DRAWINGS FOR ALL DIMENSIONAL SETOUT INFORMATION.

G4 DURING CONSTRUCTION THE STRUCTURE SHALL BE MAINTAINED IN A STABLE CONDITION AND NO PART SHALL BE OVERSTRESSED. TEMPORARY BRACING SHALL BE PROVIDED BY THE BUILDER TO KEEP THE WORKS AND EXCAVATIONS STABLE AT ALL TIMES.

G5 UNLESS NOTED OTHERWISE ALL LEVELS ARE IN METRES AND ALL DIMENSIONS ARE IN MILLIMETRES.

G6 ALL WORKS SHALL BE UNDERTAKEN IN ACCORDANCE WITH ACCEPTABLE SAFETY STANDARDS & APPROPRIATE SAFETY SIGNS SHALL BE INSTALLED AT ALL TIMES DURING THE PROGRESS OF THE JOB.

EROSION CONTROL NOTES

ALL CONTROL WORK INCLUDING DIVERSION BANKS AND CATCH DRAINS, V-DRAINS AND SILT FENCES SHALL BE COMPLETED DIRECTLY FOLLOWING THE COMPLETION OF THE EARTHWORKS.

1. SILT FENCES AND SILT FENCE RETURNS SHALL BE ERECTED CONVEX TO THE CONTOUR TO POND WATER.
2. HAY BALE BARRIERS AND GEOFABRIC FENCES ARE TO BE CONSTRUCTED TO TOE OF BATTER, PRIOR TO COMMENCEMENT OF EARTHWORKS, IMMEDIATELY AFTER CLEARING OF VEGETATION AND BEFORE REMOVAL OF TOP SOIL.
3. ALL TEMPORARY EARTH BERMS, DIVERSION AND SILT DAM EMBANKMENTS ARE TO BE MACHINE COMPACTED, SEEDED AND MULCHED FOR TEMPORARY VEGETATION COVER AS SOON AS THEY HAVE BEEN FORMED.
4. CLEAR WATER IS TO BE DIVERTED AWAY FROM DISTURBED GROUND AND INTO THE DRAINAGE SYSTEM.
5. THE CONTRACTOR IS RESPONSIBLE FOR MAINTAINING AND PROVIDING ON GOING ADJUSTMENT TO EROSION CONTROL MEASURES AS REQUIRED DURING CONSTRUCTION.
6. ALL SEDIMENT TRAPPING STRUCTURES AND DEVICES ARE TO BE INSPECTED AFTER STORMS FOR STRUCTURAL DAMAGE OR CLOGGING, TRAPPED MATERIAL IS TO BE REMOVED TO A SAFE, APPROVED LOCATION.
7. ALL FINAL EROSION PREVENTION MEASURES INCLUDING THE ESTABLISHMENT OF GRASSING ARE TO BE MAINTAINED UNTIL THE END OF THE DEFECTS LIABILITY PERIOD.
8. ALL EARTHWORKS AREAS SHALL BE ROLLED ON A REGULAR BASIS TO SEAL THE EARTHWORKS.
9. ALL FILL AREAS ARE TO BE LEFT WITH A BUND AT THE TOP OF THE SLOPE AT THE END OF EACH DAYS EARTHWORKS. THE HEIGHT OF THE BUND SHALL BE A MINIMUM OF 200MM.
10. ALL CUT AND FILL SLOPES ARE TO BE SEEDED AND HYDROMULCHED WITHIN 10 DAYS OF COMPLETION OF FORMATION.
11. AFTER REVEGETATION OF THE SITE IS COMPLETE AND THE SITE IS STABLE IN THE OPINION OF A SUITABLY QUALIFIED PERSON ALL TEMPORARY WORK SUCH AS SILT FENCE, DIVERSION DRAINS ETC SHALL BE REMOVED.
12. ALL TOPSOIL STOCKPILES ARE TO BE SUITABLY COVERED TO THE SATISFACTION OF THE SITE MANAGER TO PREVENT WIND AND WATER EROSION.
13. ANY AREA THAT IS NOT APPROVED BY THE CONTRACT ADMINISTRATOR FOR CLEARING OR DISTURBANCE BY THE CONTRACTOR'S ACTIVITIES SHALL BE CLEARLY MARKED AND SIGN POSTED, FENCED OFF OR OTHERWISE APPROPRIATELY PROTECTED AGAINST ANY SUCH DISTURBANCE.
14. ALL STOCKPILE SITES SHALL BE SITUATED IN AREAS APPROVED FOR SUCH USE BY THE SITE MANAGER. A 6m BUFFER ZONE SHALL EXIST BETWEEN STOCKPILE SITES AND ANY STREAM OR FLOW PATH. ALL STOCKPILES SHALL BE ADEQUATELY PROTECTED FROM EROSION AND CONTAMINATION OF THE SURROUNDING AREA BY USE OF THE MEASURES APPROVED IN THE EROSION AND SEDIMENTATION CONTROL PLAN.
15. ACCESS AND EXIT AREAS SHALL INCLUDE SHAKE-DOWN OR OTHER METHODS APPROVED BY THE SITE MANAGER FOR THE REMOVAL OF SOIL MATERIALS FORM MOTOR VEHICLES.
16. THE CONTRACTOR IS TO ENSURE RUNOFF FROM ALL AREAS WHERE THE NATURAL SURFACE IS DISTURBED BY CONSTRUCTION, INCLUDING ACCESS ROADS, DEPOT AND STOCKPILE SITES, SHALL BE FREE OF POLLUTANTS BEFORE IT IS EITHER DISPERSED TO STABLE AREAS OR DIRECTED TO NATURAL WATERCOURSES.
17. THE CONTRACTOR SHALL PROVIDE AND MAINTAIN SLOPES, CROWNS AND DRAINS ON ALL EXCAVATIONS AND EMBANKMENTS TO ENSURE SATISFACTORY DRAINAGE AT ALL TIMES WATER SHALL NOT BE ALLOWED TO POND ON THE WORKS UNLESS SUCH PONDING IS PART OF AN APPROVED ESCP / SWMP.

ELECTRONIC INFORMATION NOTES:

1. THE ISSUED DRAWINGS IN HARD COPY OR PDF FORMAT TAKE PRECEDENCE OVER ANY ELECTRONICALLY ISSUED INFORMATION, LAYOUTS OR DESIGN MODELS.
2. THE CONTRACTOR'S DIRECT AMENDMENT OR MANIPULATION OF THE DATA OR INFORMATION THAT MIGHT BE CONTAINED WITHIN AN ENGINEER-SUPPLIED DIGITAL TERRAIN MODEL AND ITS SUBSEQUENT USE TO UNDERTAKE THE WORKS WILL BE SOLELY AT THE DISCRETION OF AND THE RISK OF THE CONTRACTOR.
3. THE CONTRACTOR IS REQUIRED TO HIGHLIGHT ANY DISCREPANCIES BETWEEN THE DIGITAL TERRAIN MODEL AND INFORMATION PROVIDED IN THE CONTRACT AND/OR DRAWINGS AND IS REQUIRED TO SEEK CLARIFICATION FROM THE SUPERINTENDENT.
4. THE ENGINEER WILL NOT BE LIABLE OR RESPONSIBLE FOR THE POSSIBLE ON-GOING NEED TO UPDATE THE DIGITAL TERRAIN MODEL, SHOULD THERE BE ANY AMENDMENTS OR CHANGES TO THE DRAWINGS OR CONTRACT INITIATED BY THE CONTRACTOR.

SURVEY NOTE:

COORDINATES AND DESIGN DRAWINGS ARE BASED ON GROUND SURVEY COORDINATE SYSTEM MGA2020 (ZONE 56). TO CONVERT TO GRID (ALLOWING FOR THE GEODESIC CURVATURE OF THE EARTH) PLEASE NOTE THE ORIGIN PM33568 (E:294645.403 N:6253924.312) AND SCALE FACTOR 1.000109.
REFER TO BOXALL SURVEY 10129-005-TOPO REV B FOR DETAILS.

REINFORCED EARTH RETAINING WALL NOTES :

1. ALL COMPONENTS AND INSTALLATION SHALL COMPLY WITH AS4678 AND THE STANDARDS REFERRED TO THEREIN.
2. MINIMUM HEIGHT (H) TO GEOGRID REINFORCEMENT LENGTH (L) TO BE 1.0.
3. MINIMUM BEARING CAPACITY OF FOUNDATION (BASED ON MINIMUM H/L RATIO OF 1.0) TO BE AS FOLLOWS :
   a. H MAX. 2.0m = 100 kPa
   b. H MAX. 3.5m = 150 kPa
   c. H MAX. 5.0m = 200 kPa
   BEFORE COMMENCEMENT OF CONSTRUCTION THE FOUNDATION SHALL BE INSPECTED AND VERIFIED BY A QUALIFIED GEOTECHNICAL ENGINEER.
4. WHERE MINIMUM BEARING IS NOT ACHIEVABLE OR NOT MEETING DESIGN REQUIREMENT, THE FOUNDATION MATERIAL IS TO BE EXCAVATED AND REPLACED WITH APPROVED MATERIAL PLACED IN ACCORDANCE WITH THE FILLING SPECIFICATION TO A MINIMUM COMPACTION OF 100% SMDD AND PLACED WITHIN 2% OF OMC.
5. MINIMUM SURCHARGE LOADS TO BE APPLIED AS FOLLOWS U.N.O. ON PLAN:
   a. LIVE LOAD = 20 kPa
   b. DEAD LOAD = 5 kPa
   c. CONSTRUCTION TRAFFIC LIVE LOAD = 10 kPa
6. THE GEOGRIDS SHALL BE OF THE TYPE AND INDEX STRENGTH NOMINATED ON THE DRAWINGS. THE MINIMUM GEOGRIDS SHALL BE A SINGLE LENGTH IN THE DIRECTION OF DESIGN TENSION, NOT LAPPED, MAKING PROVISION FOR CONNECTION TO THE FACING ACROSS THE WHOLE WIDTH OF THE FACING AND PROVIDING FOR THE SPECIFIED ANCHORAGE WITHIN THE DESIGNATED ANCHORAGE ZONE. GEOGRIDS SHALL COVER THE WHOLE OF THE PLAN AREA BEHIND THE WALL FOR THE SPECIFIED ANCHORAGE LENGTH AND SHALL BE LAPPED WITH ADJACENT SECTIONS IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS.
7. MINIMUM WALL EMBEDMENT AT THE TOE OF THE WALL TO BE 300mm.
8. DESIGN LIFE OF STRUCTURE IS TO BE 100 YEARS.
9. SELECT BACKFILL MATERIAL WITHIN THE REINFORCED SOIL BLOCK SHALL BE SOUND GRANULAR MATERIAL OF NATURAL OR INDUSTRIAL ORIGIN, NON-EXPANSIVE, FREE FROM ORGANIC OR OTHER DELETERIOUS MATERIAL CONFORMING TO THE PHYSICAL, CHEMICAL AND ELECTROCHEMICAL LIMITS AS SPECIFIED AND SHALL NOT BE SUBJECT TO BREAKDOWN UNDER COMPACTION. THE SELECT BACKFILL MATERIAL IS TO HAVE THE FOLLOWING PARAMETERS:
   a. MINIMUM INTERNAL FRICTION, Ø = 34°
   b. EFFECTIVE COHESION, C' = 0 kPa
   c. UNIT WEIGHT = 21 kN/m³
   d. PH BETWEEN 4 AND 9.
10. SELECT BACKFILL IS TO BE PLACED AND COMPACTED IN LAYERS NOT MORE THAN 300mm (LOOSE). COMPACTION TO NOT LESS THAN 100% SMDD WILL BE ACHIEVED AND MATERIAL PLACED WITHIN 2% OF OMC. DENSITY TESTING SHALL BE PERFORMED IN EACH COMPACTED LIFT IN ACCORDANCE WITH AS3798.
11. PROVIDE A DRAINAGE LAYER DIRECTLY BEHIND THE FACING UNITS IN A MINIMUM 300mm WIDE 12-20mm AGGREGATE LAYER. FACING UNIT VOIDS TO BE FILLED WITH AGGREGATE. PROVIDE 100mm MINIMUM AG. DRAIN IN GEOTEXTILE SOCK AT TOE OF WALL FACING AND CONNECT TO DRAINAGE SYSTEM AT 30m MAX. SPACING.
12. THE NEED FOR A CHIMNEY DRAIN OR DRAINAGE AT THE REAR OF THE MASS SOIL BLOCK IS TO BE CONFIRMED ON SITE BY THE GEOTECHNICAL ENGINEER AND DESIGNER FOLLOWING PREPARATION OF THE FOUNDATION AND PRIOR TO CONSTRUCTION OF THE MASS SOIL BLOCK.
13. CONSTRUCTION EQUIPMENT WEIGHING MORE THAN 500kG STATIC WEIGHT IS TO BE KEPT BACK 1.5m FROM THE REAR FACE OF THE WALL FACING UNITS. COMPACTION OF THE SELECT FILL MATERIAL WITHIN THE 1.5m STRIP ADJACENT TO THE WALL SHALL BE ACHIEVED BY LIGHT MECHANICAL TAMPERS (VIBRATING PLATE, TRENCH COMPACTOR OR SIMILAR) TO GIVE THE SAME DENSITY AS IN THE REMAINDER OF THE SELECT FILL.
14. ALL DESIGN AND CONSTRUCT WALL SYSTEM TO BE COMPLETED IN ACCORDANCE WITH THESE NOTES.

LOCALITY PLAN
NOT TO SCALE

FOR DEVELOPMENT APPLICATION

AMENDMENTS	DATE	ISSUE
ISSUED FOR DEVELOPMENT APPLICATION	24.07.20	F
ISSUED FOR DEVELOPMENT APPLICATION	08.05.20	E
ISSUED FOR DEVELOPMENT APPLICATION	01.05.20	D
REVISED DRAWING LIST	01.11.19	C
ISSUED FOR DEVELOPMENT APPLICATION	07.12.18	B
ISSUED FOR DEVELOPMENT APPLICATION	15.10.18	A

ALTIS PROPERTY PARTNERS

CLIENT: FRASERS PROPERTY

PROJECT: MAMRE SOUTH PRECINCT
657 - 708 MAMRE ROAD
KEMPS CREEK, 2178, NSW

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
MW	MC	APRIL '18	MW	A0	AS SHOWN	C013362.00-DA100

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DRAWING TITLE: DRAWING LIST AND GENERAL NOTES

DRAWING No: C013362.00-DA100 ISSUE: F

LEGEND:

PROVIDE 1m RETURNS TO SILT FENCE AT 30m MAX. INTERVALS.
TYPICAL (N.S.O.P.)

- SILT FENCE WITH CATCH DRAIN
- SILT FENCE ONLY
- DIVERSION DRAIN

EROSION CONTROL NOTES:

REFER TO DRAWING DA100 FOR EROSION CONTROL NOTES

SEDIMENTATION BASIN NOTE:

FOR SEDIMENT & EROSION CONTROL DETAILS REFER TO DRAWING C01362.00-C250.

SEDIMENTATION BASIN SIZING BASED ON RECOMMENDATIONS OF 'SOILS AND CONSTRUCTION, MANAGING URBAN STORMWATER-THE BLUE BOOK', CAPACITY BASED UPON 5 DAY RAINFALL DEPTH AT 85th PERCENTILE INTENSITY (32.2mm).

APPROXIMATE AREA OF DISTURBED SITE = 88.80Ha

SEDIMENTATION BASINS TO COLLECT RUN-OFF IN EXTREME RAINFALL EVENTS. COLLECTED RUN-OFF TO BE ASSESSED BY A QUALIFIED LABORATORY FOR DOUSING RATES OF ALUM OR GYPSUM TO ENSURE COAGULATION OF SEDIMENTS PRIOR TO WATER BEING DISCHARGED TO COUNCIL STORMWATER SYSTEM.

EACH BASIN IS TO HAVE A MARKER PLACED AS PER THE DETAIL TO INDICATE WHEN SEDIMENT IS TO BE REMOVED. REMOVED SEDIMENT IS TO BE CLASSED AND DEWATERED PRIOR TO REMOVAL FROM SITE.

ALLOWANCE TO BE MADE DURING BENCHING OF SITE TO ENSURE RUN-OFF IS DIRECTED TO SEDIMENTATION BASINS.

NOTES:
1. ASSUME TYPE D SOIL (CLAY/SILTY CLAY)
2. ASSUME GROUP D SOIL (HIGH PLASTICITY AND SHRINK/SWELL PROPERTIES)

SOIL TYPE ASSESSED FROM GEOTECHNICAL REPORT.

SEDIMENT BASIN A:

CATCHMENT AREA	= 19.73Ha
REQUIRED BASIN VOLUME	= 4668m³
BASE DIMENSION (LxB)	= 70m x 40.0m
TOP DIMENSION (LxB)	= 79.0m x 49.0m
MAX SIDE SLOPE	= 1V:3H
DEPTH	= 1.5m
PROVIDED BASIN VOLUME	= 4982m³

SEDIMENT BASIN B:

CATCHMENT AREA	= 43.34Ha
REQUIRED BASIN VOLUME	= 10387m³
BASE DIMENSION (LxB)	= 80.0m x 80.0m
TOP DIMENSION (LxB)	= 89.0m x 89.0m
MAX SIDE SLOPE	= 1V:3H
DEPTH	= 1.5m
PROVIDED BASIN VOLUME	= 10721m³

SEDIMENT BASIN C:

CATCHMENT AREA	= 25.73Ha
REQUIRED BASIN VOLUME	= 6134m³
BASE DIMENSION (LxB)	= 75.0m x 50.0m
TOP DIMENSION (LxB)	= 84.0m x 59.0m
MAX SIDE SLOPE	= 1V:3H
DEPTH	= 1.5m
PROVIDED BASIN VOLUME	= 6509m³

DP 229770
No. 654
DP 154739
SOUTH CREEK 1% AEP FLOOD EXTENT
SILT FENCE
SEDIMENT BASIN A
REFER NOTE
DIVERSION DRAIN
34
DP 1118173
No. 657-703
(SEE NOTE 3.)
ESTATE BASIN TO BE USED AS SEDIMENT BASIN DURING EARTHWORKS AND PRIOR TO CONSTRUCTION OF ROADS AND INFRASTRUCTURE. REFER TO SEDIMENT BASIN NOTES FOR REQUIRED SIZING.
ROAD (vide Gov. Gaz. No. 36 dated 21/2/2020)
20.115 WIDE
ROAD (vide Gov. Gaz. No. 94 dated 27/7/2007)
PROPOSED CONSTRUCTION ENTRY .
PROVIDE STABILISED CONSTRUCTION ENTRY
REFER TO DETAILS ON DA250
SOUTH CREEK 1% AEP FLOOD EXTENT
SILT FENCE
1
DP 1018318
No. 707A
NOMINAL STOCKPILE LOCATION
X
DP 421633
No. 707-711
Y
DP 421633
No. 713-755
SILT FENCE
SEDIMENT BASIN B
REFER NOTE
ESTATE BASINS TO BE USED AS SEDIMENT BASIN DURING EARTHWORKS AND PRIOR TO CONSTRUCTION OF ROADS AND INFRASTRUCTURE. REFER TO SEDIMENT BASIN NOTES FOR REQUIRED SIZING.
SEDIMENT BASIN C
REFER NOTE
22
DP 258414
No. 757-769
DIVERSION DRAIN
(A)
417
SOUTH CREEK 1% AEP FLOOD EXTENT
SILT FENCE
(B)
23
DP 258414
No. 771-781

EROSION AND SEDIMENT CONTROL PLAN - STAGE 1
SCALE 1:1500

15m 0 15 30 45 60 75 90 105 120 135 150m
SCALE 1:1500 AT A0 SHEET SIZE

FOR DEVELOPMENT APPLICATION

AMENDMENTS	DATE	ISSUE
ISSUED FOR DEVELOPMENT APPLICATION	01.05.20	F
ISSUED FOR DEVELOPMENT APPLICATION	11.02.20	E
ISSUED FOR DEVELOPMENT APPLICATION	01.11.19	D
LOT NUMBERS REVISED	14.05.19	C
ISSUED FOR DEVELOPMENT APPLICATION	17.10.18	B
ISSUED FOR DEVELOPMENT APPLICATION	15.10.18	A

AMENDMENTS	DATE	ISSUE
ISSUED FOR DEVELOPMENT APPLICATION	24.07.20	H
ISSUED FOR DEVELOPMENT APPLICATION	04.05.20	G

AMENDMENTS	DATE	ISSUE

ALTIS PROPERTY PARTNERS

CLIENT: FRASERS PROPERTY

PROJECT: MAMRE SOUTH PRECINCT
657 - 708 MAMRE ROAD
KEMPS CREEK, 2178, NSW

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF.
HW	MC	APRIL '18	HW	A0	AS SHOWN	C01362.00-DA200

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DRAWING TITLE: EROSION AND SEDIMENT CONTROL PLAN STAGE 1

DRAWING No. C01362.00-DA200 ISSUE H

LEGEND:

PROVIDE 1m RETURNS TO SILT FENCE AT 30m MAX. INTERVALS.
TYPICAL (N.S.O.P.)

- SILT FENCE WITH CATCH DRAIN
- SILT FENCE ONLY
- DIVERSION DRAIN

EROSION CONTROL NOTES:

REFER TO DRAWING DA100 FOR EROSION CONTROL NOTES

SEDIMENTATION BASIN NOTE:

FOR SEDIMENT & EROSION CONTROL DETAILS REFER TO DRAWING C013362.00-DA250.

SEDIMENTATION BASIN SIZING BASED ON RECOMMENDATIONS OF 'SOILS AND CONSTRUCTION, MANAGING URBAN STORMWATER-THE BLUE BOOK': CAPACITY BASED UPON 5 DAY RAINFALL DEPTH AT 85th PERCENTILE INTENSITY (32.2mm).

APPROXIMATE AREA OF DISTURBED SITE = 88.80Ha

SEDIMENTATION BASINS TO COLLECT RUN-OFF IN EXTREME RAINFALL EVENTS. COLLECTED RUN-OFF TO BE ASSESSED BY A QUALIFIED LABORATORY FOR DOUSING RATES OF ALUM OR GYPSUM TO ENSURE COAGULATION OF SEDIMENTS PRIOR TO WATER BEING DISCHARGED TO COUNCIL STORMWATER SYSTEM.

EACH BASIN IS TO HAVE A MARKER PLACED AS PER THE DETAIL TO INDICATE WHEN SEDIMENT IS TO BE REMOVED. REMOVED SEDIMENT IS TO BE CLASSED AND DEWATERED PRIOR TO REMOVAL FROM SITE.

ALLOWANCE TO BE MADE DURING BENCHING OF SITE TO ENSURE RUN-OFF IS DIRECTED TO SEDIMENTATION BASINS.

NOTES:
1. ASSUME TYPE D SOIL (CLAY/SILTY CLAY)
2. ASSUME GROUP D SOIL (HIGH PLASTICITY AND SHRINK/SWELL PROPERTIES)

SOIL TYPE ASSESSED FROM GEOTECHNICAL REPORT.

SEDIMENT BASIN A:

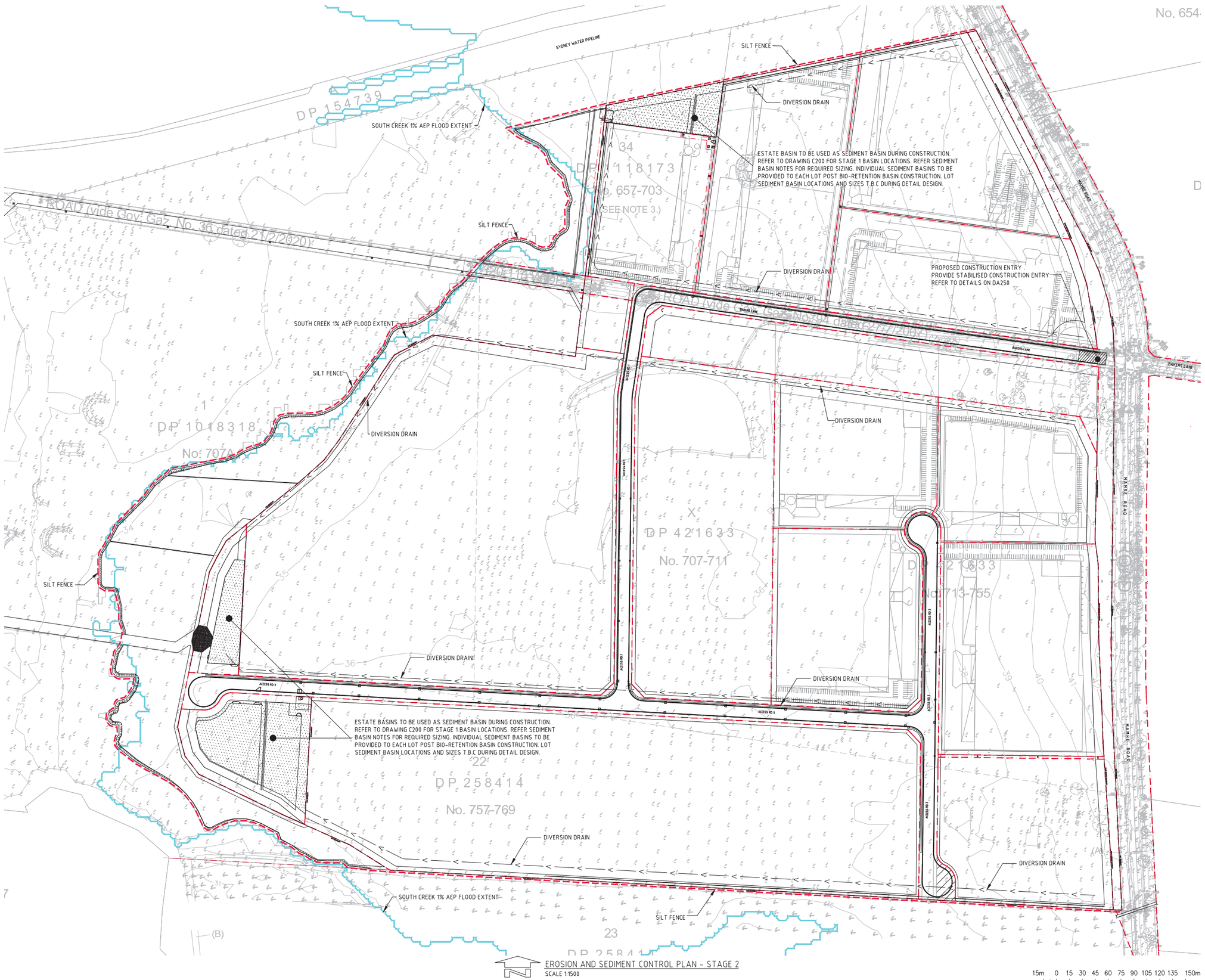
CATCHMENT AREA	= 19.73Ha
REQUIRED BASIN VOLUME	= 4668m³
BASE DIMENSION (LxB)	= 70m x 40.0m
TOP DIMENSION (LxB)	= 79.0m x 49.0m
MAX SIDE SLOPE	= 1V:3H
DEPTH	= 1.5m
PROVIDED BASIN VOLUME	= 4982m³

SEDIMENT BASIN B:

CATCHMENT AREA	= 43.34Ha
REQUIRED BASIN VOLUME	= 10387m³
BASE DIMENSION (LxB)	= 80.0m x 80.0m
TOP DIMENSION (LxB)	= 89.0m x 89.0m
MAX SIDE SLOPE	= 1V:3H
DEPTH	= 1.5m
PROVIDED BASIN VOLUME	= 10721m³

SEDIMENT BASIN C:

CATCHMENT AREA	= 25.73Ha
REQUIRED BASIN VOLUME	= 6134m³
BASE DIMENSION (LxB)	= 75.0m x 50.0m
TOP DIMENSION (LxB)	= 84.0m x 59.0m
MAX SIDE SLOPE	= 1V:3H
DEPTH	= 1.5m
PROVIDED BASIN VOLUME	= 6509m³



EROSION AND SEDIMENT CONTROL PLAN - STAGE 2
SCALE 1:1500

15m 0 15 30 45 60 75 90 105 120 135 150m
SCALE 1:1500 AT A0 SHEET SIZE

FOR DEVELOPMENT APPLICATION

AMENDMENTS	DATE	ISSUE
ISSUED FOR DEVELOPMENT APPLICATION	24.07.20	F
ISSUED FOR DEVELOPMENT APPLICATION	04.05.20	E
ISSUED FOR DEVELOPMENT APPLICATION	01.05.20	D
LOT NUMBERS REVISED	14.05.19	C
ISSUED FOR DEVELOPMENT APPLICAITON	05.03.19	B
ISSUED FOR DEVELOPMENT APPLICAITON	15.10.18	A

AMENDMENTS	DATE	ISSUE
ISSUED FOR DEVELOPMENT APPLICATION	03.08.20	G

AMENDMENTS	DATE	ISSUE

ALTIS PROPERTY PARTNERS

CLIENT: FRASERS PROPERTY

PROJECT: MAMRE SOUTH PRECINCT
657 - 708 MAMRE ROAD
KEMPS CREEK, 2178, NSW

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
MW	MC	APRIL '18	MW	A0	AS SHOWN	C013362.00-DA210

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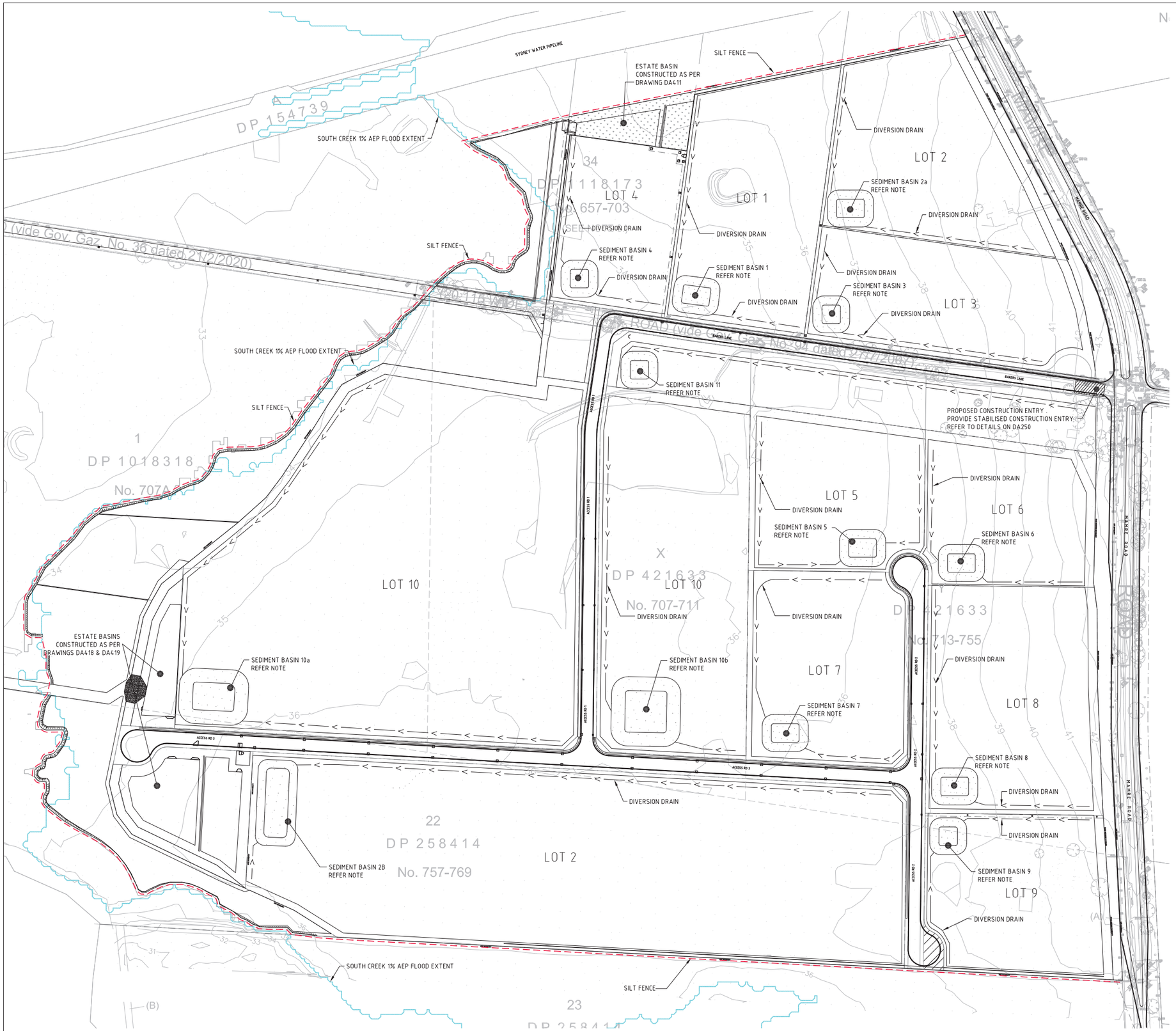
DRAWING TITLE: EROSION AND SEDIMENT CONTROL PLAN STAGE 2

DRAWING No: C013362.00-DA210 ISSUE: G



EROSION AND SEDIMENT CONTROL PLAN - STAGE 3
SCALE 1:1500

LEGEND:

PROVIDE 1m RETURNS TO SILT FENCE AT 30m MAX. INTERVALS. TYPICAL (N.S.O.P.)

- SILT FENCE WITH CATCH DRAIN
- SILT FENCE ONLY
- DIVERSION DRAIN

EROSION CONTROL NOTES:

REFER TO DRAWING DA100 FOR EROSION CONTROL NOTES

SEDIMENTATION BASIN NOTE:

FOR SEDIMENT & EROSION CONTROL DETAILS REFER TO DRAWING C013362.00-DA250.

SEDIMENTATION BASIN SIZING BASED ON RECOMMENDATIONS OF 'SOILS AND CONSTRUCTION, MANAGING URBAN STORMWATER-THE BLUE BOOK'. CAPACITY BASED UPON 5 DAY RAINFALL DEPTH AT 85th PERCENTILE INTENSITY (32.2mm).

APPROXIMATE AREA OF DISTURBED SITE = 88.80Ha

SEDIMENTATION BASINS TO COLLECT RUN-OFF IN EXTREME RAINFALL EVENTS. COLLECTED RUN-OFF TO BE ASSESSED BY A QUALIFIED LABORATORY FOR DOUSING RATES OF ALUM OR GYPSUM TO ENSURE COAGULATION OF SEDIMENTS PRIOR TO WATER BEING DISCHARGED TO COUNCIL STORMWATER SYSTEM.

EACH BASIN IS TO HAVE A MARKER PLACED AS PER THE DETAIL TO INDICATE WHEN SEDIMENT IS TO BE REMOVED. REMOVED SEDIMENT IS TO BE CLASSED AND DEWATERED PRIOR TO REMOVAL FROM SITE.

ALLOWANCE TO BE MADE DURING BENCHING OF SITE TO ENSURE RUN-OFF IS DIRECTED TO SEDIMENTATION BASINS.

NOTES:
1. ASSUME TYPE D SOIL (CLAY/SILTY CLAY)
2. ASSUME GROUP D SOIL (HIGH PLASTICITY AND SHRINK/SWELL PROPERTIES)

SOIL TYPE ASSESSED FROM GEOTECHNICAL REPORT.

SEDIMENT BASIN 1:		**SEDIMENT BASIN 7:**	
CATCHMENT AREA	= 5.17Ha	CATCHMENT AREA	= 3.59Ha
REQUIRED BASIN VOLUME	= 1248m³	REQUIRED BASIN VOLUME	= 867m³
BASE DIMENSION (LxB)	= 20.0m x 30.0m	BASE DIMENSION (LxB)	= 20.0m x 20.0m
TOP DIMENSION (LxB)	= 29.0m x 39.0m	TOP DIMENSION (LxB)	= 29.0m x 29.0m
MAX SIDE SLOPE	= 1V:3H	MAX SIDE SLOPE	= 1V:3H
DEPTH	= 1.5m	DEPTH	= 1.5m
PROVIDED BASIN VOLUME	= 1277m³	PROVIDED BASIN VOLUME	= 911m³
SEDIMENT BASIN 2a:		**SEDIMENT BASIN 8:**	
CATCHMENT AREA	= 4.77Ha	CATCHMENT AREA	= 4.60Ha
REQUIRED BASIN VOLUME	= 1152m³	REQUIRED BASIN VOLUME	= 1111m³
BASE DIMENSION (LxB)	= 20.0m x 30.0m	BASE DIMENSION (LxB)	= 20.0m x 30.0m
TOP DIMENSION (LxB)	= 29.0m x 39.0m	TOP DIMENSION (LxB)	= 29.0m x 39.0m
MAX SIDE SLOPE	= 1V:3H	MAX SIDE SLOPE	= 1V:3H
DEPTH	= 1.5m	DEPTH	= 1.5m
PROVIDED BASIN VOLUME	= 1277m³	PROVIDED BASIN VOLUME	= 1277m³
SEDIMENT BASIN 2b:		**SEDIMENT BASIN 9:**	
CATCHMENT AREA	= 13.68Ha	CATCHMENT AREA	= 2.09Ha
REQUIRED BASIN VOLUME	= 3304m³	REQUIRED BASIN VOLUME	= 505m³
BASE DIMENSION (LxB)	= 25.0m x 75.0m	BASE DIMENSION (LxB)	= 15.0m x 15.0m
TOP DIMENSION (LxB)	= 34.0m x 84.0m	TOP DIMENSION (LxB)	= 24.0m x 24.0m
MAX SIDE SLOPE	= 1V:3H	MAX SIDE SLOPE	= 1V:3H
DEPTH	= 1.5m	DEPTH	= 1.5m
PROVIDED BASIN VOLUME	= 3523m³	PROVIDED BASIN VOLUME	= 581m³
SEDIMENT BASIN 3:		**SEDIMENT BASIN 10a:**	
CATCHMENT AREA	= 3.73Ha	CATCHMENT AREA	= 16.03Ha
REQUIRED BASIN VOLUME	= 901m³	REQUIRED BASIN VOLUME	= 3871m³
BASE DIMENSION (LxB)	= 20.0m x 20.0m	BASE DIMENSION (LxB)	= 50.0m x 45.0m
TOP DIMENSION (LxB)	= 29.0m x 29.0m	TOP DIMENSION (LxB)	= 59.0m x 59.0m
MAX SIDE SLOPE	= 1V:3H	MAX SIDE SLOPE	= 1V:3H
DEPTH	= 1.5m	DEPTH	= 1.5m
PROVIDED BASIN VOLUME	= 911m³	PROVIDED BASIN VOLUME	= 3871m³
SEDIMENT BASIN 4:		**SEDIMENT BASIN 10b:**	
CATCHMENT AREA	= 2.35Ha	CATCHMENT AREA	= 7.81Ha
REQUIRED BASIN VOLUME	= 4765m³	REQUIRED BASIN VOLUME	= 4113m³
BASE DIMENSION (LxB)	= 20.0m x 15.0m	BASE DIMENSION (LxB)	= 50.0m x 50.0m
TOP DIMENSION (LxB)	= 29.0m x 24.0m	TOP DIMENSION (LxB)	= 59.0m x 59.0m
MAX SIDE SLOPE	= 1V:3H	MAX SIDE SLOPE	= 1V:3H
DEPTH	= 1.5m	DEPTH	= 1.5m
PROVIDED BASIN VOLUME	= 4982m³	PROVIDED BASIN VOLUME	= 4466m³
SEDIMENT BASIN 5:		**SEDIMENT BASIN 11:**	
CATCHMENT AREA	= 4.24Ha	CATCHMENT AREA	= 3.72Ha
REQUIRED BASIN VOLUME	= 1024m³	REQUIRED BASIN VOLUME	= 898m³
BASE DIMENSION (LxB)	= 20.0m x 30.0m	BASE DIMENSION (LxB)	= 20.0m x 20.0m
TOP DIMENSION (LxB)	= 29.0m x 39.0m	TOP DIMENSION (LxB)	= 29.0m x 20.0m
MAX SIDE SLOPE	= 1V:3H	MAX SIDE SLOPE	= 1V:3H
DEPTH	= 1.5m	DEPTH	= 1.5m
PROVIDED BASIN VOLUME	= 1277m³	PROVIDED BASIN VOLUME	= 911m³
SEDIMENT BASIN 6:			
CATCHMENT AREA	= 4.02Ha		
REQUIRED BASIN VOLUME	= 971m³		
BASE DIMENSION (LxB)	= 20.0m x 30.0m		
TOP DIMENSION (LxB)	= 29.0m x 39.0m		
MAX SIDE SLOPE	= 1V:3H		
DEPTH	= 1.5m		
PROVIDED BASIN VOLUME	= 1277m³		

15m 0 15 30 45 60 75 90 105 120 135 150m
SCALE 1:1500 AT A0 SHEET SIZE

FOR DEVELOPMENT APPLICATION

AMENDMENTS	DATE	ISSUE
ISSUED FOR DEVELOPMENT APPLICATION	03.08.20	F
ISSUED FOR DEVELOPMENT APPLICATION	24.07.20	E
ISSUED FOR DEVELOPMENT APPLICATION	14.07.20	D
ISSUED FOR DEVELOPMENT APPLICATION	08.05.20	C
ISSUED FOR DEVELOPMENT APPLICATION	04.05.20	B
ISSUED FOR DEVELOPMENT APPLICATION	01.05.20	A

AMENDMENTS DATE ISSUE | AMENDMENTS DATE ISSUE | AMENDMENTS DATE ISSUE

D

ALTIS PROPERTY PARTNERS

CLIENT: FRASERS PROPERTY

PROJECT: MAMRE SOUTH PRECINCT
657 - 708 MAMRE ROAD
KEMPS CREEK, 2178, NSW

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF
MW	MC	APRIL '18	MW	A0	AS SHOWN	C013362.00-DA220

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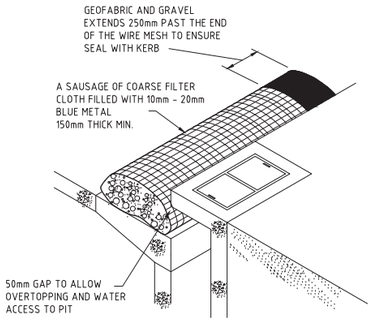
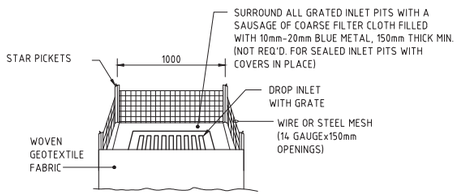
DRAWING TITLE: EROSION AND SEDIMENT CONTROL PLAN STAGE 3

DRAWING No: C013362.00-DA220 ISSUE: F

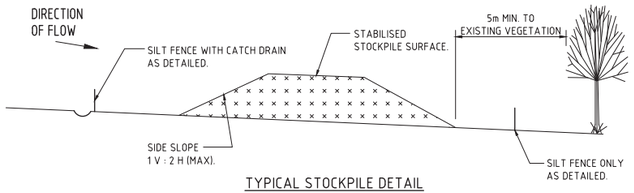


KERB INLET PIT CONTROL
N.T.S

NOTE : ADOPT ABOVE DETAILS AROUND ALL PITS WITHIN AREA ENCOMPASSED BY SILT FENCE & TO PITS ON THE ROAD ADJACENT TO SITE BOUNDARY.



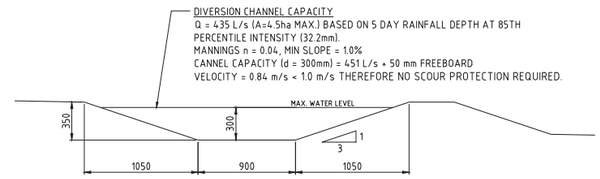
GRATED INLET PIT FILTER DETAIL
N.T.S



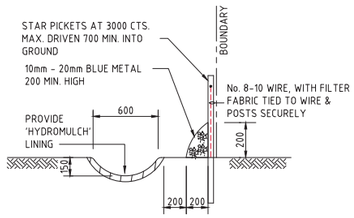
TYPICAL STOCKPILE DETAIL
N.T.S.

STOCKPILE NOTES

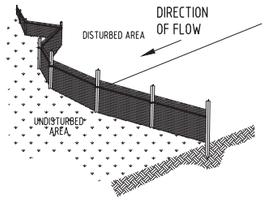
1. PLACE ALL STOCKPILES IN LOCATIONS MORE THAN 5m FROM EXISTING VEGETATION, ROADS & HAZARD AREAS.
2. CONSTRUCT ON THE CONTOUR AS LOW, FLAT ELONGATED MOUNDS. SIDE SLOPE TO BE 1 V: 2 H MAX.
3. WHERE THERE IS SUFFICIENT AREA, TOPSOIL STOCKPILES SHALL BE LESS THAN 2m IN HEIGHT.
4. WHERE STOCKPILES ARE TO BE IN PLACE FOR MORE THAN 10 DAYS, STABILISE USING WOOD CHIP MULCH - 16 TONNE/Ha.
5. CONSTRUCT SILT FENCE WITH CATCH DRAIN ON UPSLOPE SIDE TO DIVERT WATER AROUND STOCKPILES & SILT FENCE ONLY 1 TO 2m DOWNSLOPE AS SHOWN.



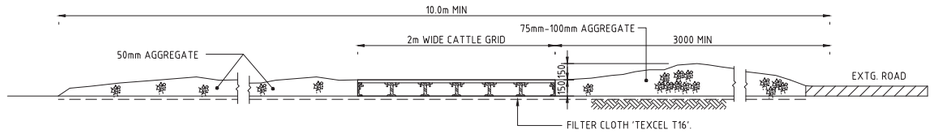
3000 WIDE DIVERSION DRAIN SECTION
SCALE 1:20



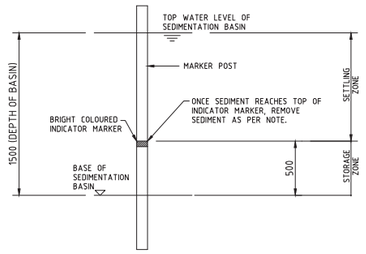
TYPICAL OPEN DRAIN & SILT FENCE
SCALE 1:20



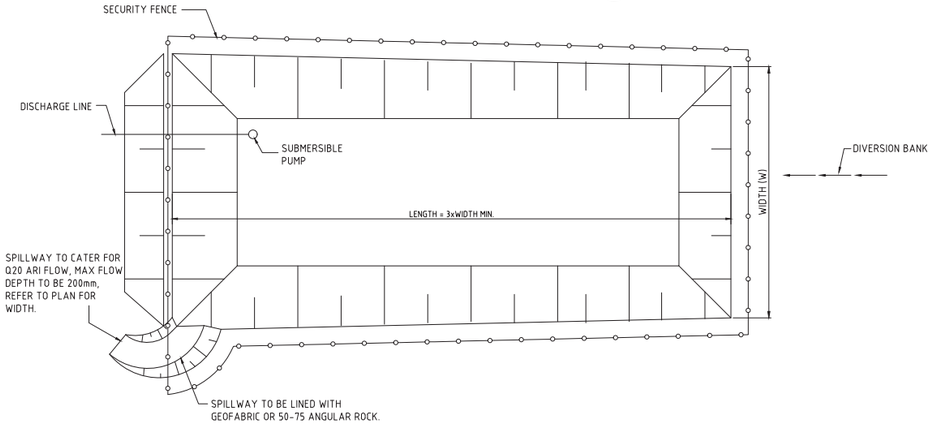
TYPICAL SILT FENCE DETAIL
N.T.S.
PROVIDE 1m RETURNS AT 30m INTERVALS.
TYPICAL



SECTION 1:20 (1 / DA200) : STABILISED CONSTRUCTION ENTRANCE 'TRUCK SHAKER'

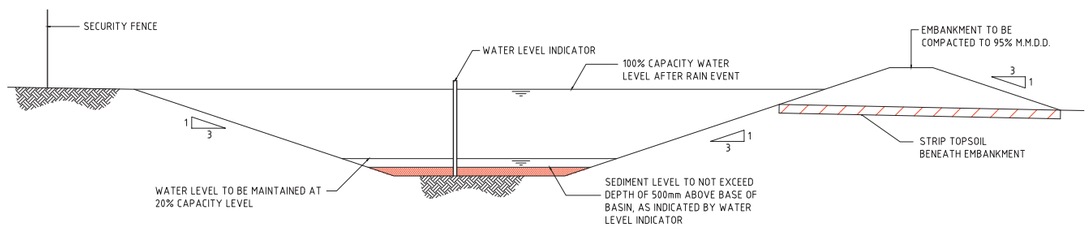


SEDIMENT STORAGE MARKER
SCALE 1:20



SEDIMENT CONTROL POND NOTES:

1. TYPE D BASIN IS REQUIRED.
2. VOLUME OF TYPE D POND SHALL BE AS NOMINATED ON DRAWING DA200. NOMINAL POND LOCATIONS AND NOMINAL DIMENSIONS.
3. SEDIMENT BUILD UP TO NOT EXCEED 33% TOTAL CAPACITY OF POND.
4. WATER LEVEL TO BE MAINTAINED AT 20% CAPACITY DURING SETTLING PERIOD.
5. LENGTH TO WIDTH RATIO TO BE 3:1 MIN. TYPICAL DEPTH TO BE 1.5m.
6. PROVIDE SECURITY FENCE TO POND FOR SAFETY.
7. DEWATERING OF POND TO BE PERFORMED TO THE BOTTOM OF THE SEDIMENT SETTLING ZONE FOLLOWING ACHIEVEMENT OF WQO's. MANAGEMENT OF DOSAGE AND DISCHARGE TO BE ACHIEVED IN A TIMELY MANNER BEFORE THE NEXT RAIN EVENT AND WITHIN 5 DAYS OF THE INITIAL RAINFALL EVENT.
8. WATER TO BE DOSED WITH GYPSUM TO ACCELERATE SETTLEMENT OF SUSPENDED SOLIDS
9. GYPSUM DOSAGE RATE TO BE APPLIED AT APPROX. 32kg PER 100 CUBIC METRE OF COLLECTED RUNOFF.
10. THE USE OF ALUM AS A FLOCULANT IS NOT RECOMMENDED AND IS TO BE USED ONLY FOLLOWING CONSULTATION WITH AND ACCEPTANCE FROM GOLD COAST CITY COUNCIL ESC OFFICERS.
11. DISCHARGE FROM POND IS PERMISSIBLE WHEN THE WATER PH IS 6.5-8.5 AND IS CLARIFIED TO AT OR BELOW A TSS OF 50mg/L (75 NTU). CLARIFICATION WOULD GENERALLY BE ACHIEVED IN 36-72 HOURS WITH THE USE OF GYPSUM.
12. DEWATERING SHALL BE DONE IN SUCH A MANNER AS TO REMOVE THE RELATIVELY CLEAN WATER WITHOUT REMOVING OR DISTURBING THE SEDIMENT THAT HAS SETTLED. THE PUMP INTAKE PIPE IS NOT TO REST ON THE SETTLED SEDIMENT LAYER.
13. IF WATER EXCEEDS TSS OF 50mg/L (75 NTU) DURING DEWATERING, PUMPING IS TO CEASE.
14. RECORDS ARE TO BE KEPT (ON-SITE AT ALL TIMES) OF ALL MEASUREMENT PRIOR TO, DURING AND AFTER DISCHARGE. RECORDS TO BE MADE AVAILABLE TO COUNCIL OFFICERS UPON REQUEST.



TYPICAL SEDIMENT CONTROL BASIN SECTION
SCALE 1:50

200mm 0 500 1000 1500 2000mm
SCALE 1:20 AT A0 SIZE PLOT
500mm 0 1 2 3 4 5m
SCALE 1:50 AT A0 SIZE PLOT
2m 0 5 10 15 20 25m
SCALE 1:250 AT A0 SIZE PLOT

FOR DEVELOPMENT APPLICATION

AMENDMENTS	DATE	ISSUE
ISSUED FOR DEVELOPMENT APPLICATION	24.07.20	D
ISSUED FOR DEVELOPMENT APPLICATION	01.05.20	C
ISSUED FOR DEVELOPMENT APPLICATION	01.11.19	B
ISSUED FOR DEVELOPMENT APPLICATION	15.10.18	A

ALTIS PROPERTY PARTNERS

CLIENT: FRASERS PROPERTY

PROJECT: MAMRE SOUTH PRECINCT
657 - 708 MAMRE ROAD
KEMPS CREEK, 2178, NSW

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
MW	MC	APRIL '18	MW	A0	AS SHOWN	C013362.00-DA250

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DRAWING TITLE: EROSION & SEDIMENT CONTROL DETAILS

DRAWING No: C013362.00-DA250 ISSUE: D

EARTHWORKS VOLUMES

TOPSOIL VOLUME:

CUT	= - 175 000 m^3

EARTHWORKS VOLUMES:

CUT	= - 61 800m^3
FILL	= + 2 076 600 m^3
ALLOWANCE FOR DETAILED EXCAVATION (1250m^3/Ha)	= - 109 600 m^3
BALANCE	= + 1 905 200 m^3 (IMPORT)

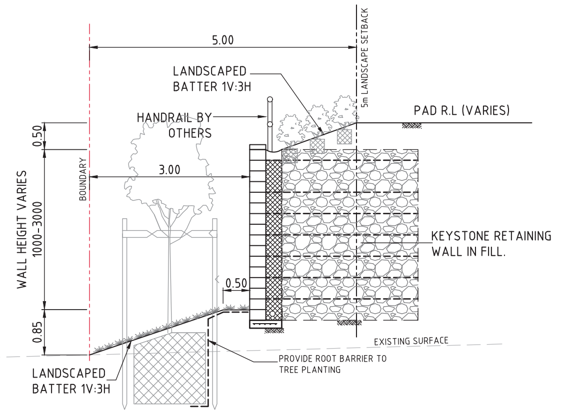
EARTHWORK VOLUMES ARE APPROXIMATE ONLY & ARE CALCULATED ASSUMING A MINIMAL TOPSOIL STRIP OF 200mm. NO ALLOWANCE HAS BEEN MADE FOR EROSION AND SEDIMENT CONTROL, BULKING, COMPACTION OF FILLED SOILS.

REFER TO DRAWING DA200 & DA210 FOR EROSION AND SEDIMENT CONTROL PLAN.

THE EXISTING SURFACE IS BASED ON SURVEY & DESIGN INFORMATION PROVIDED. THIS SURVEY IS MOST CURRENT HOWEVER IT MAY NOT ACCURATELY REFLECT ACTUAL GROUND LEVELS OR STOCKPILES ETC ON SITE. IT IS THE CONTRACTORS RESPONSIBILITY TO CONFIRM VOLUMES AND ALLOWANCES FOR EARTHWORKS.

LEGEND

- PRE DEVELOPED 1% AEP FLOOD EXTENT
- PRE DEVELOPED 0.5% AEP FLOOD EXTENT
- PRE DEVELOPED 0.2% AEP FLOOD EXTENT
- PRE DEVELOPED PMF FLOOD EXTENT

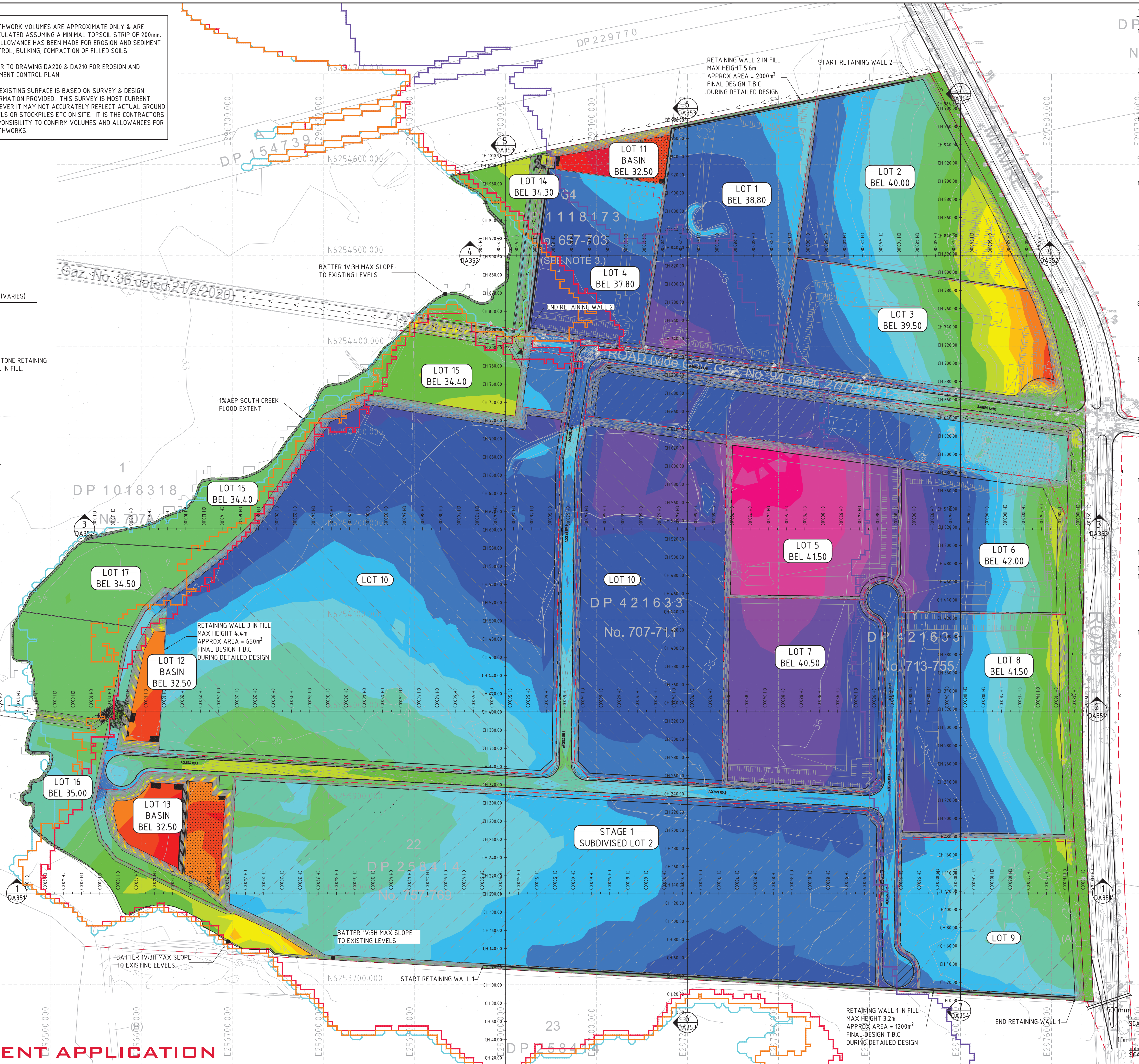


TYPICAL SECTION THROUGH LANDSCAPE SETBACK AT NORTH AND SOUTH BOUNDARY

SCALE 1:50

LEVELS NOTE:

LEVELS SHOWN ARE WITHIN +/-500mm OF FINAL LEVELS. FINAL LEVELS T.B.C DURING DETAIL DESIGN STAGE



SITE PREPARATION NOTES :

1. ALL EARTHWORKS SHALL BE COMPLETED GENERALLY IN ACCORDANCE WITH THE GUIDELINES SPECIFIED BY THE GEOTECHNICAL REPORT PSM3276-100L PROVIDED BY PELLS SULLIVAN MEYNINK DATED 09.04.17
2. EXISTING LEVELS ARE BASED ON INFORMATION PROVIDED BY BOXALL TITLED 10129-005-TOPO REV B DATED 12.06.20.
3. STRIP ANY TOP SOIL OR DELETERIOUS MATERIAL AND DISPOSE OF FROM SITE OR STORE AS DIRECTED.
4. COMPLETE CUT TO FILL EARTHWORKS TO ACHIEVE THE REQUIRED LEVELS AS INDICATED ON THE DRAWINGS WITHIN A TOLERANCE OF +0mm/-10mm THROUGH BUILDING PADS/PAVEMENTS AND +0mm/-20mm ELSEWHERE.
5. PREPARE STEEP BATTERS TO RECEIVE FILL BY CONSTRUCTING BENCHING TO FACILITATE FILL PLACEMENT AND COMPACTION.
6. AREAS TO RECEIVE FILL (THAT ARE NOT ON BENCHED BATTERS) AND AREAS IN CUT SHALL BE PROOF ROLLED TO IDENTIFY ANY SOFT HEAVING MATERIAL. SOFT MATERIAL SHALL BE BOXED OUT AND REMOVED PRIOR TO FILL PLACEMENT. PROOF ROLLING TO BE INSPECTED BY A GEOTECHNICAL ENGINEER OR THE EARTHWORKS DESIGNER.
7. SITE WON FILL SHALL BE COMPACTED IN MAXIMUM 300mm LAYERS AND TO DRY OR HILF DENSITY RATIOS (STANDARD COMPACTION) OF BETWEEN 98% AND 103%. THE PLACEMENT MOISTURE VARIATION OR HILF MOISTURE VARIATION SHALL BE CONTROLLED TO BE BETWEEN 2% DRY AND 2% WET.
8. IMPORTED FILL SHALL BE COMPACTED IN MAXIMUM 300mm LAYERS AND TO DRY OR HILF DENSITY RATIOS (STANDARD COMPACTION) OF BETWEEN 98% AND 103%. THE PLACEMENT MOISTURE VARIATION OR HILF MOISTURE VARIATION SHALL BE CONTROLLED TO BE BETWEEN 2% DRY AND 2% WET.
9. ALL ENGINEERED FILL PARTICLES SHALL BE ABLE TO BE INCORPORATED WITHIN A SINGLE LAYER. FURTHER, LESS THAN 30% OF PARTICLES SHALL BE RETAINED ON THE 37.5 MM SIEVE. ENGINEERED FILL SHALL BE ABLE TO BE TESTED IN ACCORDANCE WITH THE STANDARD COMPACTION METHOD (AS1289.5.4.1) OR HILF TEST METHOD (AS1289.5.7.1). THESE METHODS REQUIRE LESS THAN 20% RETAINED ON THE 37.5 MM SIEVE. WHERE BETWEEN 20% AND 30% OF PARTICLES ARE RETAINED ON THE 37.5 MM SIEVE THE ABOVE TEST METHODS SHALL STILL BE ADOPTED AND TEST REPORTS ANNOTATED APPROPRIATELY. THESE REQUIREMENTS SHOULD BE MET BY THE MATERIAL AFTER PLACEMENT AND COMPACTION
10. ALL THE EARTHWORKS UNDERTAKEN AND THE SUBGRADE CONDITION IN THE CUT AREAS [IN THE STATED PERIOD] ARE DOCUMENTED IN THE REPORTS AND HAVE BEEN UNDERTAKEN IN ACCORDANCE WITH THE SPECIFICATION.
11. PRIOR TO ANY EARTHWORKS, EROSION CONTROL AS OUTLINED IN THE EROSION AND SEDIMENTATION CONTROL PLAN SHALL BE COMPLETED.
12. EXISTING ROCK, IF ANY, SHALL BE REMOVED BY HEAVY ROCK BREAKING OR RIPPING.
13. MATCH EXISTING LEVELS AT BATTER INTERFACE.
14. CONTRACTOR TO MATCH EXISTING LEVELS AT THE INTERFACE OF EARTHWORKS AND EXISTING SURFACE AT BATTER LOCATIONS OR WHERE NO RETAINING WALLS ARE PRESENT. ANY DISCREPANCY BETWEEN DESIGN AND EXISTING LEVELS TO BE REFERRED TO THE ENGINEER FOR DIRECTION OR ADJUSTMENTS TO DESIGN LEVELS.
15. DURING EARTHWORKS THE CONTRACTOR IS TO ENSURE ALL AREAS ARE FREE DRAINING & WILL NOT RETAIN WATER DURING RAINFALL. PROVIDE TEMPOARY MEASURES AS REQUIRED TO ENSURE FREE FLOWING RUNOFF THROUGH MANAGED DRAINAGE PATHS, DIVERSION DRAINS OR OTHER SUITABLE DISPOSAL METHOD AS AGREED DURING THE WORKS. REFER ANY CONCERNS TO THE ENGINEER. REFER TO EROSION AND SEDIMENT CONTROL DRAWINGS AND NOTES.

DEPTH RANGE

No.	FROM DEPTH	TO DEPTH	COLOUR
1	-4.000	-3.500	
2	-3.500	-3.000	
3	-3.000	-2.500	
4	-2.500	-2.000	
5	-2.000	-1.500	
6	-1.500	-1.000	
7	-1.000	-0.500	
8	-0.500	0.000	
9	0.000	0.500	
10	0.500	1.000	
11	1.000	1.500	
12	1.500	2.000	
13	2.000	2.500	
14	2.500	3.000	
15	3.000	3.500	
16	3.500	4.000	
17	4.000	4.500	
18	4.500	5.000	
19	5.000	5.500	
20	5.500	6.000	
21	6.000	6.500	
22	6.500	7.000	

500mm 0 1 2 3 4 5m

SCALE 1:50 AT A0 SHEET SIZE

15m 0 15 30 45 60 75 90 105 120 135 150m

SCALE 1:1500 AT A0 SHEET SIZE

FOR DEVELOPMENT APPLICATION

AMENDMENTS	DATE	ISSUE
ISSUED FOR DEVELOPMENT APPLICATION	01.11.19	F
REVISED DEVELOPMENT EXTENT	06.09.19	E
PAD NUMBERS REVISED	14.05.19	D
ISSUED FOR DEVELOPMENT APPLICATION	05.03.18	C
ISSUED FOR DEVELOPMENT APPLICATION	15.10.18	B
ISSUED FOR INFORMATION	03.07.18	A

AMENDMENTS	DATE	ISSUE
REVISED MASTERPLAN	14.07.20	L
REVISED MASTERPLAN	08.05.20	K
REVISED MASTERPLAN	04.05.20	J
REVISED MASTERPLAN	01.05.20	I
REVISED MASTERPLAN	24.04.20	H
ISSUED FOR DEVELOPMENT APPLICATION	06.02.20	G

AMENDMENTS	DATE	ISSUE
LOT NUMBER REVISION	03.08.20	N
REVISED MASTERPLAN	24.07.20	M

ALTIS PROPERTY PARTNERS

CLIENT: FRASERS PROPERTY

PROJECT: MAMRE SOUTH PRECINCT
657 - 708 MAMRE ROAD
KEMPS CREEK, 2178, NSW

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
MW	MC	APRIL16	MW	A0	AS SHOWN	C013362.00DA300

CONSULT AUSTRALIA

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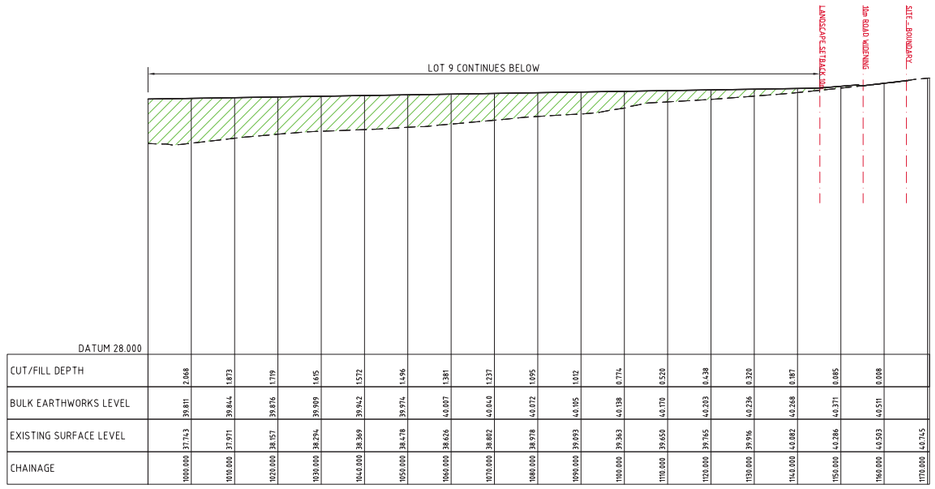
DRAWING TITLE: BULK EARTHWORKS CUT/FILL PLAN

DRAWING No: C013362.00-DA300

ISSUE: N



LEGEND:
LEVELS DATUM IS AHD.

- BULK EARTHWORKS PROFILE
- EXISTING SURFACE PROFILE
- 1% AEP FLOOD LEVEL
- 0.5% AEP FLOOD LEVEL
- 0.2% AEP FLOOD LEVEL
- PMF FLOOD LEVEL
- ▨ - AREA IN FILL
- ▨ - AREA IN CUT

DATUM 28.000

CUT/FILL DEPTH	2.068	1.873	1.719	1.615	1.572	1.496	1.381	1.237	1.095
BULK EARTHWORKS LEVEL	39.811	39.844	39.876	39.909	39.942	39.974	40.007	40.040	40.072
EXISTING SURFACE LEVEL	37.743	37.971	38.157	38.294	38.369	38.478	38.626	38.802	38.978
CHAINAGE	1000.000	1010.000	1020.000	1030.000	1040.000	1050.000	1060.000	1070.000	1080.000

CUT/FILL DEPTH	1.012	0.774	0.520	0.438	0.320	0.187	0.085	0.008	
BULK EARTHWORKS LEVEL	40.105	40.138	40.170	40.203	40.236	40.268	40.371	40.511	
EXISTING SURFACE LEVEL	39.093	39.363	39.650	39.765	39.916	40.082	40.286	40.503	40.745
CHAINAGE	1090.000	1100.000	1110.000	1120.000	1130.000	1140.000	1150.000	1160.000	1170.000

LONGITUDINAL SECTION - BULK EARTHWORKS 1

HORIZONAL SCALE 1:500
VERTICAL SCALE 1:100

DATUM 28.000

CUT/FILL DEPTH	1.673	1.741	1.769	1.766	1.792	1.865	1.871	1.889	1.901	1.893
BULK EARTHWORKS LEVEL	38.288	38.322	38.355	38.388	38.421	38.455	38.488	38.521	38.554	38.588
EXISTING SURFACE LEVEL	36.615	36.581	36.586	36.622	36.629	36.590	36.617	36.632	36.654	36.695
CHAINAGE	500.000	510.000	520.000	530.000	540.000	550.000	560.000	570.000	580.000	590.000

CUT/FILL DEPTH	1.945	1.992	2.034	2.044	2.079	2.113	2.121	2.150	2.208	2.277
BULK EARTHWORKS LEVEL	38.621	38.654	38.687	38.719	38.752	38.786	38.819	38.852	38.886	38.919
EXISTING SURFACE LEVEL	36.675	36.661	36.653	36.676	36.673	36.672	36.698	36.702	36.677	36.642
CHAINAGE	600.000	610.000	620.000	630.000	640.000	650.000	660.000	670.000	680.000	690.000

CUT/FILL DEPTH	2.333	2.384	2.412	2.431	2.421	2.427	2.516	2.572	2.588	2.575
BULK EARTHWORKS LEVEL	38.952	38.986	39.019	39.052	39.085	39.118	39.151	39.184	39.217	39.250
EXISTING SURFACE LEVEL	36.620	36.601	36.607	36.621	36.664	36.691	36.634	36.612	36.629	36.675
CHAINAGE	700.000	710.000	720.000	730.000	740.000	750.000	760.000	770.000	780.000	790.000

CUT/FILL DEPTH	2.520	2.482	2.521	2.523	2.506	2.489	2.489	2.495	2.506	2.533
BULK EARTHWORKS LEVEL	39.284	39.318	39.351	39.385	39.419	39.453	39.487	39.521	39.554	39.588
EXISTING SURFACE LEVEL	36.764	36.836	36.831	36.862	36.913	36.964	36.997	37.026	37.049	37.055
CHAINAGE	800.000	810.000	820.000	830.000	840.000	850.000	860.000	870.000	880.000	890.000

CUT/FILL DEPTH	2.561	2.546	2.494	2.481	2.186	2.145	2.075	1.875	1.970	2.045	
BULK EARTHWORKS LEVEL	39.622	39.656	39.690	39.726	39.475	39.560	39.708	39.712	39.746	39.778	
EXISTING SURFACE LEVEL	37.061	37.110	37.197	37.245	37.289	37.415	37.633	37.837	37.775	37.733	
CHAINAGE	900.000	910.000	920.000	930.000	940.000	950.000	960.000	970.000	980.000	990.000	

LONGITUDINAL SECTION - BULK EARTHWORKS 1

HORIZONAL SCALE 1:500
VERTICAL SCALE 1:100

DATUM 28.000

CUT/FILL DEPTH										-0.166
BULK EARTHWORKS LEVEL										35.000
EXISTING SURFACE LEVEL	33.661	34.071	34.449	34.522	34.635	34.857	34.974	35.034	35.100	35.166
CHAINAGE	10.000	20.000	30.000	40.000	50.000	60.000	70.000	80.000	90.000	100.000

CUT/FILL DEPTH	-0.203	-0.203	-0.188	-0.108	-0.155	-0.186	-0.293	0.135	0.066	-0.556
BULK EARTHWORKS LEVEL	35.000	35.000	35.000	35.000	35.000	35.000	35.020	35.595	35.552	34.975
EXISTING SURFACE LEVEL	35.203	35.203	35.188	35.108	35.155	35.186	35.314	35.460	35.486	35.531
CHAINAGE	110.000	120.000	130.000	140.000	150.000	160.000	170.000	180.000	190.000	200.000

CUT/FILL DEPTH	-2.082	0.920	1.762	1.751	1.700	1.657	1.636	1.617	1.628	1.640
BULK EARTHWORKS LEVEL	33.500	36.547	37.428	37.454	37.480	37.506	37.535	37.567	37.600	37.633
EXISTING SURFACE LEVEL	35.582	35.627	35.666	35.704	35.780	35.849	35.898	35.951	35.972	35.993
CHAINAGE	210.000	220.000	230.000	240.000	250.000	260.000	270.000	280.000	290.000	300.000

CUT/FILL DEPTH	1.171	1.093	1.096	1.125	1.157	1.216	1.286	1.310	1.329	1.351
BULK EARTHWORKS LEVEL	37.665	37.696	37.728	37.759	37.792	37.825	37.858	37.892	37.925	37.958
EXISTING SURFACE LEVEL	36.493	36.604	36.632	36.634	36.635	36.609	36.572	36.581	36.595	36.607
CHAINAGE	310.000	320.000	330.000	340.000	350.000	360.000	370.000	380.000	390.000	400.000

CUT/FILL DEPTH	1.365	1.409	1.450	1.460	1.459	1.481	1.517	1.553	1.587	
BULK EARTHWORKS LEVEL	37.991	38.024	38.057	38.090	38.123	38.156	38.189	38.222	38.255	
EXISTING SURFACE LEVEL	36.626	36.616	36.607	36.630	36.664	36.675	36.673	36.669	36.668	
CHAINAGE	410.000	420.000	430.000	440.000	450.000	460.000	470.000	480.000	490.000	

LONGITUDINAL SECTION - BULK EARTHWORKS 1

HORIZONAL SCALE 1:500
VERTICAL SCALE 1:100

1m 0 1 2 3 4 5 6 7 8 9 10m
SCALE 1:100 AT A0 SHEET SIZE

5m 0 10 20 30 40 50m
SCALE 1:500 AT A0 SHEET SIZE

FOR DEVELOPMENT APPLICATION

AMENDMENTS	DATE	ISSUE	AMENDMENTS	DATE	ISSUE	AMENDMENTS	DATE	ISSUE
ISSUED FOR DEVELOPMENT APPLICATION	04.05.20	F						
ISSUED FOR DEVELOPMENT APPLICATION	01.05.20	E						
ISSUED FOR DEVELOPMENT APPLICATION	24.04.20	D						
ISSUED FOR DEVELOPMENTS APPLICATION	06.02.20	C	LOT NUMBER REVISION	03.08.20	I			
ISSUED FOR DEVELOPMENTS APPLICATION	01.11.19	B	ISSUES FOR DEVELOPMENT APPLICATION	24.07.20	H			
ISSUED FOR INFORMATION	06.09.19	A	REVISED MASTERPLAN	14.07.20	G			

ALTIS PROPERTY PARTNERS

CLIENT
FRASERS PROPERTY

PROJECT
MAMRE SOUTH PRECINCT
657 - 708 MAMRE ROAD
KEMPS CREEK, 2178, NSW

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
MW	MC	APRIL '18	MW	A0	AS SHOWN	C013362.00-DA351

CONSULT AUSTRALIA

Costin Roe Consulting Pty Ltd.
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Level 1, 8 Windmill Street
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Tel: (02) 9251-7699 Fax: (02) 9241-3731
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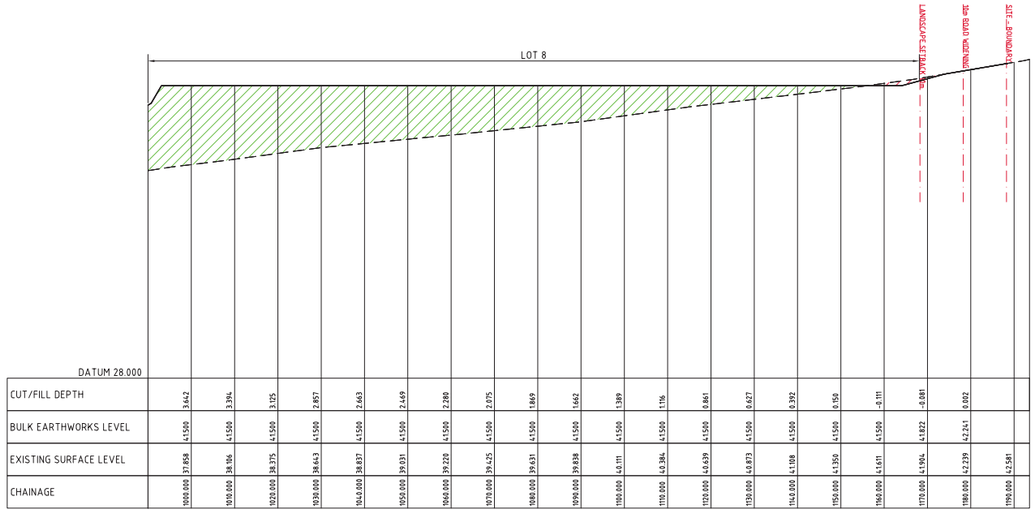
DRAWING TITLE
BULK EARTHWORKS SECTIONS
SHEET 1

DRAWING No C013362.00-DA351
ISSUE I



CUT/FILL DEPTH	3.642	3.394	3.125	2.857	2.663	2.469	2.280	2.075	1.869	1.662	1.389	1.116	0.861	0.627	0.392	0.150	-0.111	-0.081	0.002		
BULK EARTHWORKS LEVEL	41.500	41.500	41.500	41.500	41.500	41.500	41.500	41.500	41.500	41.500	41.500	41.500	41.500	41.500	41.500	41.500	41.500	41.822	42.241		
EXISTING SURFACE LEVEL	37.858	38.106	38.375	38.643	38.837	39.031	39.220	39.425	39.631	39.838	40.111	40.384	40.639	40.873	41.108	41.350	41.611	41.904	42.239	42.581	
CHAINAGE	1000.000	1010.000	1020.000	1030.000	1040.000	1050.000	1060.000	1070.000	1080.000	1090.000	1100.000	1110.000	1120.000	1130.000	1140.000	1150.000	1160.000	1170.000	1180.000	1190.000	

LONGITUDINAL SECTION – BULK EARTHWORKS 2

HORIZONAL SCALE 1:500
VERTICAL SCALE 1:100

CUT/FILL DEPTH	1.458	1.501	1.539	1.603	1.650	1.745	1.823	1.895	2.008	2.242	2.318	2.151	1.207	2.003	2.884	2.926	2.974	2.974	2.973	2.969	2.937	2.900	2.887	2.892	2.887
BULK EARTHWORKS LEVEL	37.429	37.465	37.501	37.537	37.573	37.609	37.645	37.681	37.716	37.752	37.789	37.669	36.773	37.582	38.469	38.505	38.541	38.577	38.613	38.649	38.685	38.721	38.757	38.793	38.829
EXISTING SURFACE LEVEL	35.971	35.964	35.962	35.934	35.923	35.864	35.822	35.785	35.709	35.510	35.471	35.518	35.566	35.579	35.585	35.579	35.567	35.603	35.640	35.680	35.748	35.821	35.869	35.901	35.942
CHAINAGE	500.000	510.000	520.000	530.000	540.000	550.000	560.000	570.000	580.000	590.000	600.000	610.000	620.000	630.000	640.000	650.000	660.000	670.000	680.000	690.000	700.000	710.000	720.000	730.000	740.000

CUT/FILL DEPTH	2.928	2.968	3.005	3.043	3.082	4.595	4.615	4.635	4.655	4.666	4.584	4.579	4.574	4.562	4.537	4.504	4.427	4.330	4.241	4.119	3.968	3.800	3.325	2.357	3.026	
BULK EARTHWORKS LEVEL	38.865	38.900	38.936	38.972	39.008	40.500	40.500	40.500	40.500	40.500	40.500	40.500	40.500	40.500	40.500	40.500	40.500	40.500	40.500	40.500	40.500	40.500	40.295	39.626	40.606	
EXISTING SURFACE LEVEL	35.936	35.932	35.931	35.929	35.925	35.905	35.885	35.865	35.845	35.834	35.916	35.921	35.926	35.938	35.963	35.996	36.073	36.170	36.259	36.381	36.532	36.700	36.971	37.269	37.580	
CHAINAGE	750.000	760.000	770.000	780.000	790.000	800.000	810.000	820.000	830.000	840.000	850.000	860.000	870.000	880.000	890.000	900.000	910.000	920.000	930.000	940.000	950.000	960.000	970.000	980.000	990.000	

LONGITUDINAL SECTION – BULK EARTHWORKS 2

HORIZONAL SCALE 1:500
VERTICAL SCALE 1:100

CUT/FILL DEPTH					0.469	0.468	0.442	0.432	0.429	0.426	0.468	0.280	0.080	-1.017	-2.209	-2.323	-2.437	1.279	1.223	1.106	1.037	0.964	0.890	0.834
BULK EARTHWORKS LEVEL					34.698	34.701	34.701	34.701	34.701	34.701	34.746	34.634	34.500	33.548	32.500	32.500	32.500	36.304	36.340	36.375	36.410	36.444	36.479	36.514
EXISTING SURFACE LEVEL	34.227	34.151	34.116	34.151	34.230	34.233	34.259	34.269	34.272	34.275	34.278	34.354	34.420	34.565	34.709	34.823	34.937	35.025	35.117	35.269	35.373	35.480	35.589	35.680
CHAINAGE	10.000	20.000	30.000	40.000	50.000	60.000	70.000	80.000	90.000	100.000	110.000	120.000	130.000	140.000	150.000	160.000	170.000	180.000	190.000	200.000	210.000	220.000	230.000	240.000

CUT/FILL DEPTH	0.805	0.781	0.781	0.769	0.754	0.801	0.843	0.867	0.892	0.915	0.955	0.999	1.042	1.086	1.118	1.150	1.151	1.142	1.189	1.233	1.247	1.312	1.354	1.380	1.407	
BULK EARTHWORKS LEVEL	36.548	36.583	36.618	36.652	36.687	36.722	36.757	36.791	36.826	36.861	36.895	36.930	36.965	36.999	37.036	37.072	37.104	37.140	37.176	37.212	37.248	37.285	37.321	37.357	37.393	
EXISTING SURFACE LEVEL	35.743	35.802	35.837	35.883	35.933	35.921	35.914	35.924	35.934	35.946	35.940	35.931	35.922	35.914	35.918	35.922	35.953	35.998	35.988	35.980	36.002	35.973	35.966	35.977	35.986	
CHAINAGE	250.000	260.000	270.000	280.000	290.000	300.000	310.000	320.000	330.000	340.000	350.000	360.000	370.000	380.000	390.000	400.000	410.000	420.000	430.000	440.000	450.000	460.000	470.000	480.000	490.000	

LONGITUDINAL SECTION – BULK EARTHWORKS 2

HORIZONAL SCALE 1:500
VERTICAL SCALE 1:100

1m 0 1 2 3 4 5 6 7 8 9 10m
SCALE 1:100 AT A0 SHEET SIZE

5m 0 10 20 30 40 50m
SCALE 1:500 AT A0 SHEET SIZE

FOR DEVELOPMENT APPLICATION

AMENDMENTS	DATE	ISSUE	AMENDMENTS	DATE	ISSUE	AMENDMENTS	DATE	ISSUE
ISSUED FOR DEVELOPMENT APPLICATION	04.05.20	F						
ISSUED FOR DEVELOPMENT APPLICATION	01.05.20	E						
ISSUED FOR DEVELOPMENT APPLICATION	24.04.20	D						
ISSUED FOR DEVELOPMENTS APPLICATION	06.02.20	C	LOT NUMBER REVISION	03.08.20	I			
ISSUED FOR DEVELOPMENTS APPLICATION	01.11.19	B	ISSUES FOR DEVELOPMENT APPLICATION	24.07.20	H			
ISSUED FOR INFORMATION	06.09.19	A	REVISED MASTERPLAN	14.07.20	G			

ALTIS
PROPERTY PARTNERS

CLIENT
FRASERS
PROPERTY

PROJECT
MAMRE SOUTH PRECINCT
657 – 708 MAMRE ROAD
KEMPS CREEK, 2178, NSW

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
MW	MC	APRIL '18	MW	A0	AS SHOWN	C013362.00-DA352

CONSULT AUSTRALIA

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Tel: (02) 9251-7699 Fax: (02) 9241-3731
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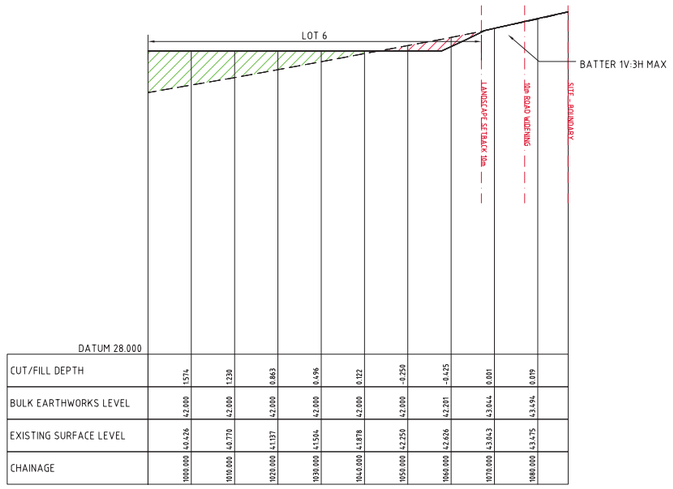
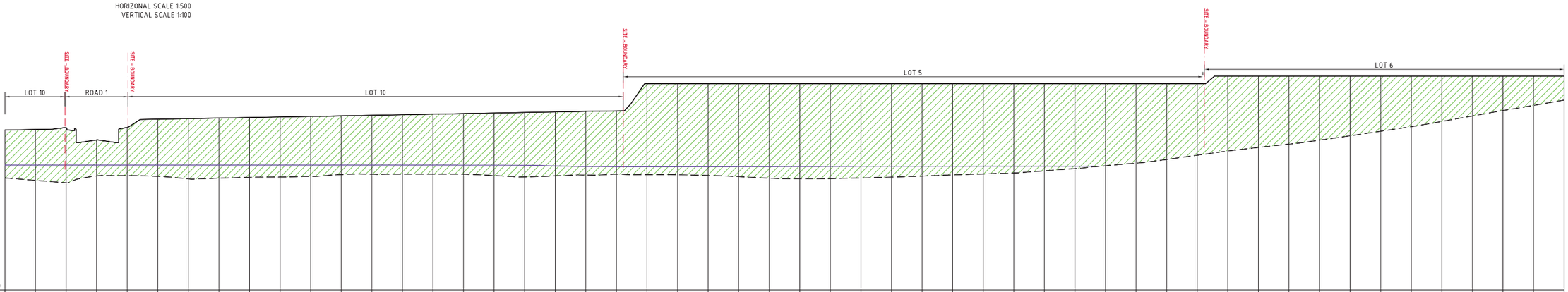
Costin Roe Consulting
PRECISION | COMMUNICATION | ACCOUNTABILITY

DRAWING TITLE
BULK EARTHWORKS SECTIONS
SHEET 2

DRAWING No C013362.00-DA352
ISSUE I





DATUM 28.000

CUT/FILL DEPTH	1.574	1.230	0.863	0.496	0.122	-0.250	-0.425	0.001	0.019
BULK EARTHWORKS LEVEL	42.000	42.000	42.000	42.000	42.000	42.000	42.201	43.044	43.494
EXISTING SURFACE LEVEL	40.426	40.770	41.137	41.504	41.878	42.250	42.626	43.043	43.475
CHAINAGE	1000.000	1010.000	1020.000	1030.000	1040.000	1050.000	1060.000	1070.000	1080.000

LONGITUDINAL SECTION - BULK EARTHWORKS 3

HORIZONAL SCALE 1:500
VERTICAL SCALE 1:100

LEGEND:
LEVELS DATUM IS AHD.

───	- BULK EARTHWORKS PROFILE
– – – –	- EXISTING SURFACE PROFILE
───	- 1% AEP FLOOD LEVEL
───	- 0.5% AEP FLOOD LEVEL
───	- 0.2% AEP FLOOD LEVEL
───	- PMF FLOOD LEVEL
🟩	- AREA IN FILL
🟥	- AREA IN CUT

DATUM 28.000

CUT/FILL DEPTH	3.328	3.596	2.355	3.151	3.740	3.947	3.935	3.913	3.933	3.931	3.845	3.860	3.890	3.922	3.972	4.096	4.218	4.189	4.170	4.142	5.955	5.959	6.006	6.083	6.187
BULK EARTHWORKS LEVEL	38.500	38.607	37.815	38.638	39.179	39.215	39.251	39.287	39.322	39.358	39.394	39.431	39.468	39.505	39.542	39.579	39.616	39.653	39.690	39.720	41.500	41.500	41.500	41.500	41.500
EXISTING SURFACE LEVEL	35.171	35.011	35.460	35.487	35.439	35.268	35.316	35.374	35.389	35.427	35.549	35.572	35.578	35.583	35.570	35.484	35.399	35.464	35.520	35.578	35.545	35.541	35.494	35.417	35.313
CHAINAGE	500.000	510.000	520.000	530.000	540.000	550.000	560.000	570.000	580.000	590.000	600.000	610.000	620.000	630.000	640.000	650.000	660.000	670.000	680.000	690.000	700.000	710.000	720.000	730.000	740.000

CUT/FILL DEPTH	6.227	6.213	6.170	6.114	6.050	5.972	5.907	5.842	5.702	5.553	5.372	5.198	4.959	4.681	4.905	4.672	4.457	4.198	3.912	3.615	3.314	2.972	2.613	2.255	1.921
BULK EARTHWORKS LEVEL	41.500	41.500	41.500	41.500	41.500	41.500	41.500	41.500	41.500	41.500	41.500	41.500	41.500	41.500	42.000	42.000	42.000	42.000	42.000	42.000	42.000	42.000	42.000	42.000	42.000
EXISTING SURFACE LEVEL	35.273	35.287	35.330	35.386	35.450	35.528	35.593	35.658	35.798	35.947	36.128	36.302	36.541	36.819	37.095	37.328	37.543	37.802	38.088	38.385	38.686	39.028	39.387	39.745	40.079
CHAINAGE	750.000	760.000	770.000	780.000	790.000	800.000	810.000	820.000	830.000	840.000	850.000	860.000	870.000	880.000	890.000	900.000	910.000	920.000	930.000	940.000	950.000	960.000	970.000	980.000	990.000

LONGITUDINAL SECTION - BULK EARTHWORKS 3

HORIZONAL SCALE 1:500
VERTICAL SCALE 1:100

DATUM 28.000

CUT/FILL DEPTH				0.452	0.637	0.638	0.609	0.606	0.614	0.611	0.602	0.594	0.580	0.553	0.526	0.503	1.401	3.226	3.173	3.133	2.937	2.744	2.660	2.616	2.571
BULK EARTHWORKS LEVEL				34.199	34.400	34.400	34.400	34.400	34.400	34.400	34.400	34.400	34.400	34.400	34.400	34.400	35.410	37.351	37.381	37.412	37.445	37.482	37.518	37.561	37.599
EXISTING SURFACE LEVEL	33.713	33.730	33.768	33.747	33.763	33.762	33.791	33.794	33.786	33.789	33.798	33.806	33.820	33.847	33.874	33.897	34.009	34.125	34.209	34.279	34.508	34.738	34.858	34.945	35.029
CHAINAGE	10.000	20.000	30.000	40.000	50.000	60.000	70.000	80.000	90.000	100.000	110.000	120.000	130.000	140.000	150.000	160.000	170.000	180.000	190.000	200.000	210.000	220.000	230.000	240.000	250.000

CUT/FILL DEPTH	2.514	2.401	2.448	2.532	2.618	2.678	2.716	2.634	2.590	2.666	2.743	2.791	2.835	2.887	2.937	2.989	3.048	3.110	3.171	3.237	3.191	2.945	2.984	3.133
BULK EARTHWORKS LEVEL	37.635	37.671	37.707	37.743	37.779	37.815	37.851	37.887	37.923	37.959	37.995	38.031	38.067	38.103	38.139	38.175	38.211	38.247	38.283	38.319	38.355	38.391	38.427	38.463
EXISTING SURFACE LEVEL	35.122	35.270	35.259	35.212	35.161	35.138	35.135	35.254	35.334	35.293	35.253	35.240	35.232	35.216	35.203	35.187	35.163	35.138	35.112	35.083	35.164	35.446	35.443	35.331
CHAINAGE	260.000	270.000	280.000	290.000	300.000	310.000	320.000	330.000	340.000	350.000	360.000	370.000	380.000	390.000	400.000	410.000	420.000	430.000	440.000	450.000	460.000	470.000	480.000	490.000

LONGITUDINAL SECTION - BULK EARTHWORKS 3

HORIZONAL SCALE 1:500
VERTICAL SCALE 1:100

1m 0 1 2 3 4 5 6 7 8 9 10m
SCALE 1:100 AT A0 SHEET SIZE

5m 0 10 20 30 40 50m
SCALE 1:500 AT A0 SHEET SIZE

FOR DEVELOPMENT APPLICATION

AMENDMENTS	DATE	ISSUE	AMENDMENTS	DATE	ISSUE	AMENDMENTS	DATE	ISSUE
ISSUED FOR DEVELOPMENT APPLICATION	04.05.20	F						
ISSUED FOR DEVELOPMENT APPLICATION	01.05.20	E						
ISSUED FOR DEVELOPMENT APPLICATION	24.04.20	D						
ISSUED FOR DEVELOPMENTS APPLICATION	06.02.20	C	LOT NUMBER REVISION	03.08.20	I			
ISSUED FOR DEVELOPMENTS APPLICATION	01.11.19	B	ISSUES FOR DEVELOPMENT APPLICATION	24.07.20	H			
ISSUED FOR INFORMATION	06.09.19	A	REVISED MASTERPLAN	14.07.20	G			

ALTIS PROPERTY PARTNERS

CLIENT
FRASERS PROPERTY

PROJECT
MAMRE SOUTH PRECINCT
657 - 708 MAMRE ROAD
KEMPS CREEK, 2178, NSW

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
MW	MC	APRIL '18	MW	A0	AS SHOWN	C013362.00-DA353

CONSULT AUSTRALIA

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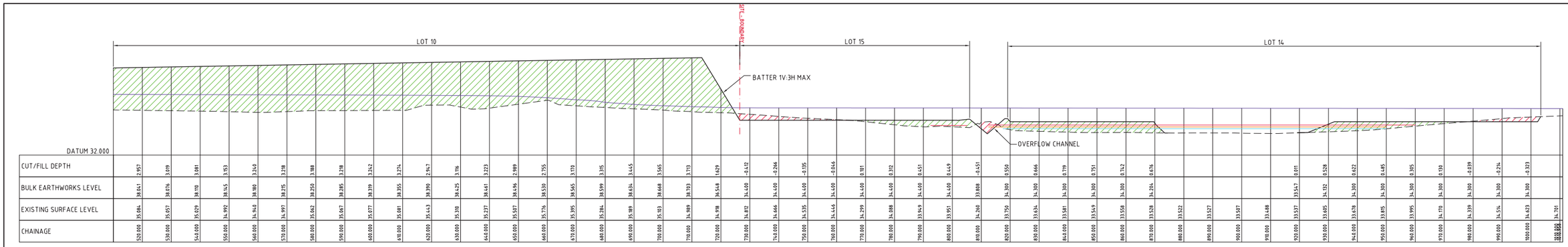
email: mail@costinroe.com.au ©

Costin Roe Consulting
PRECISION | COMMUNICATION | ACCOUNTABILITY

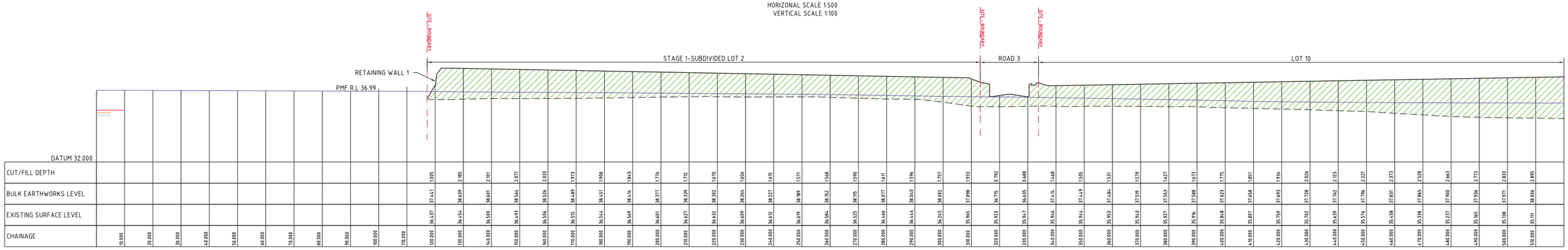
DRAWING TITLE
BULK EARTHWORKS SECTIONS
SHEET 3

DRAWING No C013362.00-DA353
ISSUE I



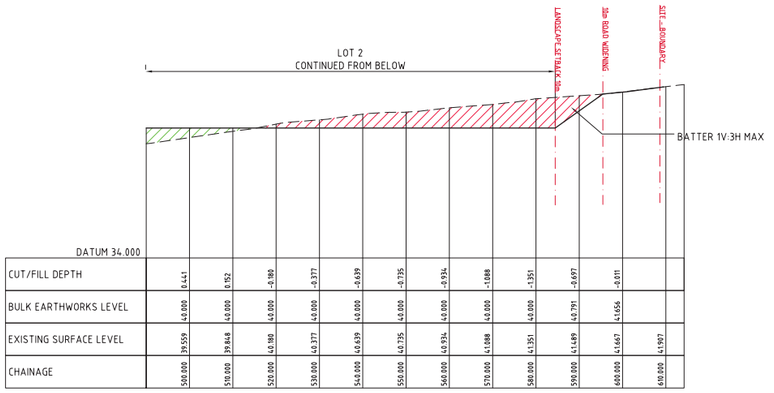
LONGITUDINAL SECTION - BULK EARTHWORKS 5

HORIZONAL SCALE 1:500
VERTICAL SCALE 1:100



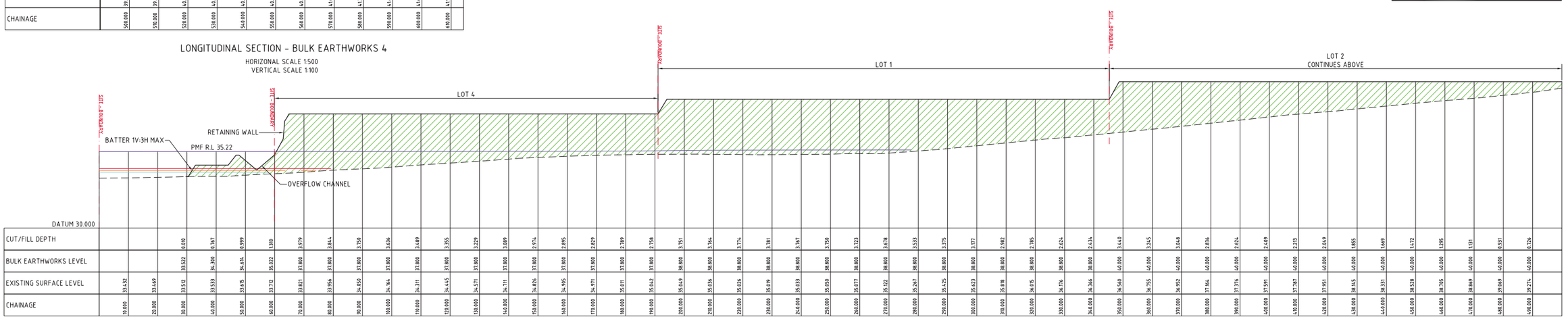
LONGITUDINAL SECTION - BULK EARTHWORKS 5

HORIZONAL SCALE 1:500
VERTICAL SCALE 1:100



LONGITUDINAL SECTION - BULK EARTHWORKS 4

HORIZONAL SCALE 1:500
VERTICAL SCALE 1:100



LONGITUDINAL SECTION - BULK EARTHWORKS 4

HORIZONAL SCALE 1:500
VERTICAL SCALE 1:100

LEGEND:

LEVELS DATUM IS AHD.

- BULK EARTHWORKS PROFILE
- EXISTING SURFACE PROFILE
- 1% AEP FLOOD LEVEL
- 0.5% AEP FLOOD LEVEL
- 0.2% AEP FLOOD LEVEL
- PMF FLOOD LEVEL
- AREA IN FILL
- AREA IN CUT

1m 0 1 2 3 4 5 6 7 8 9 10m
SCALE 1:100 AT A0 SHEET SIZE

5m 0 10 20 30 40 50m
SCALE 1:500 AT A0 SHEET SIZE

FOR DEVELOPMENT APPLICATION

AMENDMENTS	DATE	ISSUE
ISSUED FOR DEVELOPMENT APPLICATION	04.05.20	F
ISSUED FOR DEVELOPMENT APPLICATION	01.05.20	E
ISSUED FOR DEVELOPMENT APPLICATION	24.04.20	D
ISSUED FOR DEVELOPMENTS APPLICATION	06.02.20	C
ISSUED FOR INFORMATION	01.11.19	B
ISSUED FOR INFORMATION	06.09.19	A
LOT NUMBER REVISION	03.08.20	I
ISSUES FOR DEVELOPMENT APPLICATION	24.07.20	H
REVISED MASTERPLAN	14.07.20	G

ALTIS PROPERTY PARTNERS

CLIENT: FRASERS PROPERTY

PROJECT: MAMRE SOUTH PRECINCT
657 - 708 MAMRE ROAD
KEMPS CREEK, 2178, NSW

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF.
MW	MC	APRIL '18	MW	A0	AS SHOWN	C013362.00-DA354

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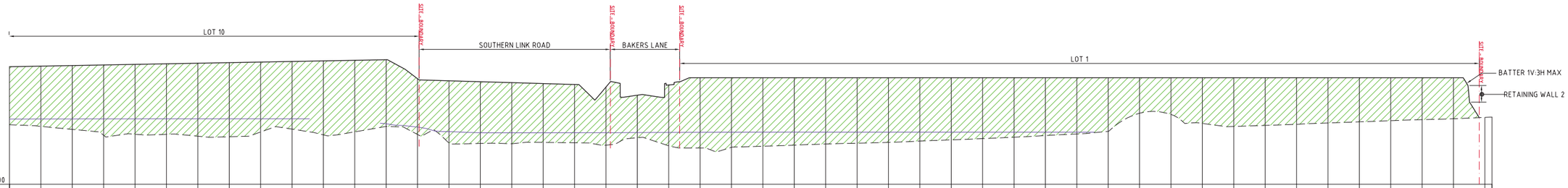
Costin Roe Consulting

PRECISION | COMMUNICATION | ACCOUNTABILITY

DRAWING TITLE: BULK EARTHWORKS SECTIONS SHEET 4

DRAWING No: C013362.00-DA354

ISSUE



LEGEND:
LEVELS DATUM IS AHD.

———	- BULK EARTHWORKS PROFILE
– – – –	- EXISTING SURFACE PROFILE
—	- 1% AEP FLOOD LEVEL
—	- 0.5% AEP FLOOD LEVEL
—	- 0.2% AEP FLOOD LEVEL
—	- PMF FLOOD LEVEL
🟩	- AREA IN FILL
🟥	- AREA IN CUT

CUT/FILL DEPTH	3.850	4.075	4.489	4.460	4.501	4.660	4.732	4.464	4.320	4.724	4.567	4.261
BULK EARTHWORKS LEVEL	39.540	39.577	39.614	39.651	39.688	39.725	39.763	39.800	39.837	39.874	39.911	39.949
EXISTING SURFACE LEVEL	35.690	35.502	35.125	35.192	35.187	35.065	35.030	35.335	35.517	35.150	35.344	35.688
CHAINAGE	490.000	500.000	510.000	520.000	530.000	540.000	550.000	560.000	570.000	580.000	590.000	600.000

CUT/FILL DEPTH	3.555	3.963	3.942	3.901	3.756	3.722	3.707	2.711	3.881	4.487	4.443	4.375
BULK EARTHWORKS LEVEL	38.729	38.602	38.543	38.485	38.426	38.367	38.199	37.681	38.336	38.800	38.800	38.800
EXISTING SURFACE LEVEL	35.174	34.639	34.602	34.584	34.670	34.645	34.492	34.970	34.454	34.313	34.357	34.425
CHAINAGE	610.000	620.000	630.000	640.000	650.000	660.000	670.000	680.000	690.000	700.000	710.000	720.000

CUT/FILL DEPTH	4.306	4.234	4.184	4.127	4.046	3.969	3.889	3.799	3.694	3.592	3.423	2.270
BULK EARTHWORKS LEVEL	38.800	38.800	38.800	38.800	38.800	38.800	38.800	38.800	38.800	38.800	38.800	38.800
EXISTING SURFACE LEVEL	34.494	34.566	34.616	34.673	34.754	34.831	34.911	35.001	35.106	35.208	35.377	36.530
CHAINAGE	730.000	740.000	750.000	760.000	770.000	780.000	790.000	800.000	810.000	820.000	830.000	840.000

CUT/FILL DEPTH	2.342	2.920	3.115	3.046	2.977	2.892	2.818	2.745	2.679	2.621	
BULK EARTHWORKS LEVEL	38.800	38.800	38.800	38.800	38.800	38.800	38.800	38.800	38.800	38.800	
EXISTING SURFACE LEVEL	36.458	35.880	35.685	35.754	35.823	35.908	35.982	36.055	36.121	36.179	36.265
CHAINAGE	850.000	860.000	870.000	880.000	890.000	900.000	910.000	920.000	930.000	940.000	950.000

LONGITUDINAL SECTION - BULK EARTHWORKS 6

HORIZONAL SCALE 1:500
VERTICAL SCALE 1:100

CUT/FILL DEPTH	2.288	3.068	2.962	2.873	2.797	2.722	2.658	2.555	2.470	2.428	2.428	2.461
BULK EARTHWORKS LEVEL	38.575	39.344	39.306	39.269	39.231	39.193	39.156	39.118	39.080	39.043	39.005	38.967
EXISTING SURFACE LEVEL	36.287	36.276	36.345	36.395	36.434	36.471	36.498	36.564	36.611	36.615	36.577	36.506
CHAINAGE	10.000	20.000	30.000	40.000	50.000	60.000	70.000	80.000	90.000	100.000	110.000	120.000

CUT/FILL DEPTH	2.479	2.509	2.521	2.533	2.525	2.574	2.705	2.626	1.723	1.631	2.619	2.662
BULK EARTHWORKS LEVEL	38.929	38.891	38.854	38.816	38.778	38.740	38.702	38.665	37.728	37.636	38.629	38.665
EXISTING SURFACE LEVEL	36.450	36.382	36.332	36.283	36.253	36.166	35.997	36.038	36.005	36.005	36.010	36.003
CHAINAGE	130.000	140.000	150.000	160.000	170.000	180.000	190.000	200.000	210.000	220.000	230.000	240.000

CUT/FILL DEPTH	2.762	2.822	2.866	2.881	2.914	2.945	2.954	2.950	2.939	2.926	2.955	2.992
BULK EARTHWORKS LEVEL	38.701	38.736	38.771	38.806	38.841	38.877	38.912	38.946	38.981	39.016	39.051	39.086
EXISTING SURFACE LEVEL	35.940	35.914	35.905	35.925	35.927	35.932	35.957	35.997	36.042	36.090	36.097	36.094
CHAINAGE	250.000	260.000	270.000	280.000	290.000	300.000	310.000	320.000	330.000	340.000	350.000	360.000

CUT/FILL DEPTH	3.034	3.092	3.161	3.208	3.225	3.262	3.368	3.429	3.494	3.538	3.597	3.707	3.850
BULK EARTHWORKS LEVEL	39.121	39.155	39.190	39.225	39.259	39.294	39.329	39.363	39.398	39.433	39.467	39.503	39.540
EXISTING SURFACE LEVEL	36.087	36.063	36.029	36.017	36.035	36.031	35.960	35.934	35.904	35.895	35.871	35.795	35.690
CHAINAGE	370.000	380.000	390.000	400.000	410.000	420.000	430.000	440.000	450.000	460.000	470.000	480.000	490.000

LONGITUDINAL SECTION - BULK EARTHWORKS 6

HORIZONAL SCALE 1:500
VERTICAL SCALE 1:100

1m 0 1 2 3 4 5 6 7 8 9 10m
SCALE 1:100 AT A0 SHEET SIZE

5m 0 10 20 30 40 50m
SCALE 1:500 AT A0 SHEET SIZE

FOR DEVELOPMENT APPLICATION

AMENDMENTS	DATE	ISSUE	AMENDMENTS	DATE	ISSUE	AMENDMENTS	DATE	ISSUE
ISSUES FOR DEVELOPMENT APPLICATION	24.07.20	F						
REVISED MASTERPLAN	14.07.20	E						
ISSUED FOR DEVELOPMENT APPLICATION	04.05.20	D						
ISSUED FOR DEVELOPMENT APPLICATION	01.05.20	C						
ISSUED FOR DEVELOPMENT APPLICATION	24.04.20	B						
ISSUED FOR DEVELOPMENTS APPLICATION	06.02.20	A	LOT NUMBER REVISION	03.08.20	G			

ALTIS
PROPERTY PARTNERS

CLIENT
FRASERS
PROPERTY

PROJECT
MAMRE SOUTH PRECINCT
657 - 708 MAMRE ROAD
KEMPS CREEK, 2178, NSW

CONSULT AUSTRALIA

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
MW	MC	APRIL '18	MW	A0	AS SHOWN	C013362.00-DA355

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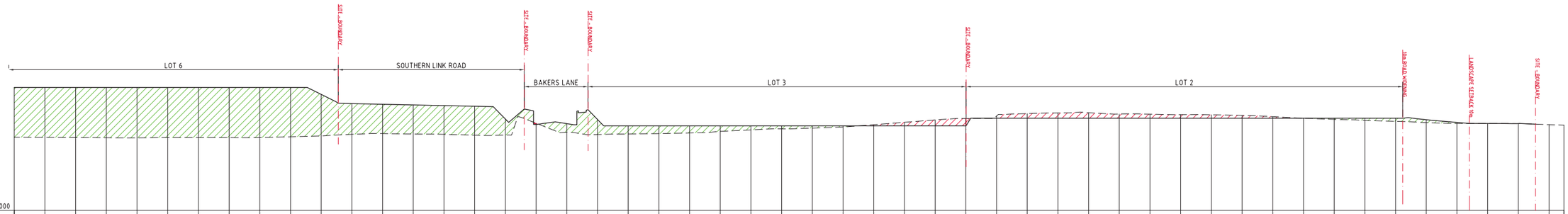
PRECISION | COMMUNICATION | ACCOUNTABILITY

DRAWING TITLE
BULK EARTHWORKS SECTIONS
SHEET 5

DRAWING No C013362.00-DA355
ISSUE G



LEGEND:
LEVELS DATUM IS AHD.

———	- BULK EARTHWORKS PROFILE
– – –	- EXISTING SURFACE PROFILE
—	- 1% AEP FLOOD LEVEL
—	- 0.5% AEP FLOOD LEVEL
—	- 0.2% AEP FLOOD LEVEL
—	- PMF FLOOD LEVEL
🟩	- AREA IN FILL
🟥	- AREA IN CUT

DATUM 34.000

CUT/FILL DEPTH	3.246	3.259	3.274	3.280	3.265	3.262	3.267	3.260	3.211	2.707
BULK EARTHWORKS LEVEL	42.000	42.000	42.000	42.000	42.000	42.000	42.000	42.000	42.000	41.551
EXISTING SURFACE LEVEL	38.754	38.741	38.726	38.720	38.735	38.738	38.733	38.740	38.789	38.844
CHAINAGE	490.000	500.000	510.000	520.000	530.000	540.000	550.000	560.000	570.000	580.000

CUT/FILL DEPTH	2.002	1.908	1.891	1.873	1.881	1.048	-0.081	0.559	0.983	0.526
BULK EARTHWORKS LEVEL	40.950	40.905	40.862	40.819	40.776	39.949	39.590	39.646	39.919	39.500
EXISTING SURFACE LEVEL	38.948	38.996	38.971	38.946	38.895	38.901	39.670	39.087	38.936	38.974
CHAINAGE	590.000	600.000	610.000	620.000	630.000	640.000	650.000	660.000	670.000	680.000

CUT/FILL DEPTH	0.505	0.465	0.361	0.263	0.196	0.146	0.076	-0.075	-0.231	-0.387
BULK EARTHWORKS LEVEL	39.500	39.500	39.500	39.500	39.500	39.500	39.500	39.500	39.500	39.500
EXISTING SURFACE LEVEL	38.995	39.035	39.139	39.237	39.304	39.354	39.424	39.575	39.731	39.887
CHAINAGE	690.000	700.000	710.000	720.000	730.000	740.000	750.000	760.000	770.000	780.000

CUT/FILL DEPTH	-0.479	-0.139	-0.300	-0.341	-0.356	-0.269	-0.259	-0.228	-0.223	-0.183
BULK EARTHWORKS LEVEL	39.500	40.000	40.000	40.000	40.000	40.000	40.000	40.000	40.000	40.000
EXISTING SURFACE LEVEL	39.979	40.139	40.300	40.341	40.356	40.269	40.259	40.228	40.223	40.183
CHAINAGE	790.000	800.000	810.000	820.000	830.000	840.000	850.000	860.000	870.000	880.000

CUT/FILL DEPTH	-0.100	0.006	0.078	0.144	0.206	0.190	0.066	0.000	0.001	
BULK EARTHWORKS LEVEL	40.000	40.000	40.000	40.000	40.000	39.901	39.723	39.653	39.648	
EXISTING SURFACE LEVEL	40.100	39.994	39.922	39.856	39.794	39.711	39.657	39.652	39.646	39.579
CHAINAGE	890.000	900.000	910.000	920.000	930.000	940.000	950.000	960.000	970.000	980.000

LONGITUDINAL SECTION - BULK EARTHWORKS 7

HORIZONAL SCALE 1:500
VERTICAL SCALE 1:100

DATUM 34.000

CUT/FILL DEPTH	1.683	2.187	1.935	1.722	1.515	1.627	1.741	1.686	1.560	1.555
BULK EARTHWORKS LEVEL	39.491	40.203	40.177	40.146	40.114	40.082	40.050	40.018	39.986	39.953
EXISTING SURFACE LEVEL	37.808	38.016	38.241	38.424	38.599	38.455	38.308	38.332	38.426	38.398
CHAINAGE	10.000	20.000	30.000	40.000	50.000	60.000	70.000	80.000	90.000	100.000

CUT/FILL DEPTH	1.576	1.677	1.634	1.673	1.817	1.936	1.888	2.297	3.630	3.615
BULK EARTHWORKS LEVEL	39.920	39.887	39.855	39.820	39.782	39.745	39.708	40.131	41.500	41.500
EXISTING SURFACE LEVEL	38.344	38.210	38.221	38.147	37.965	37.809	37.820	37.834	37.870	37.885
CHAINAGE	110.000	120.000	130.000	140.000	150.000	160.000	170.000	180.000	190.000	200.000

CUT/FILL DEPTH	3.549	3.461	3.339	3.200	3.060	2.924	2.803	2.683	2.564	2.491
BULK EARTHWORKS LEVEL	41.500	41.500	41.500	41.500	41.500	41.500	41.500	41.500	41.500	41.500
EXISTING SURFACE LEVEL	37.951	38.039	38.161	38.300	38.440	38.576	38.697	38.817	38.936	39.009
CHAINAGE	210.000	220.000	230.000	240.000	250.000	260.000	270.000	280.000	290.000	300.000

CUT/FILL DEPTH	2.425	2.363	2.350	2.358	2.366	2.378	2.443	2.524	2.589	2.600
BULK EARTHWORKS LEVEL	41.500	41.500	41.500	41.500	41.500	41.500	41.500	41.500	41.500	41.500
EXISTING SURFACE LEVEL	39.075	39.137	39.150	39.142	39.134	39.122	39.057	38.976	38.911	38.900
CHAINAGE	310.000	320.000	330.000	340.000	350.000	360.000	370.000	380.000	390.000	400.000

CUT/FILL DEPTH	2.640	2.658	3.156	3.178	3.210	3.230	3.239	3.242	3.246
BULK EARTHWORKS LEVEL	41.500	41.500	42.000	42.000	42.000	42.000	42.000	42.000	42.000
EXISTING SURFACE LEVEL	38.860	38.842	38.844	38.822	38.790	38.770	38.761	38.758	38.754
CHAINAGE	410.000	420.000	430.000	440.000	450.000	460.000	470.000	480.000	490.000

LONGITUDINAL SECTION - BULK EARTHWORKS 7

HORIZONAL SCALE 1:500
VERTICAL SCALE 1:100

FOR DEVELOPMENT APPLICATION

AMENDMENTS	DATE	ISSUE	AMENDMENTS	DATE	ISSUE	AMENDMENTS	DATE	ISSUE
ISSUES FOR DEVELOPMENT APPLICATION	24.07.20	F						
REVISED MASTERPLAN	14.07.20	E						
ISSUED FOR DEVELOPMENT APPLICATION	04.05.20	D						
ISSUED FOR DEVELOPMENT APPLICATION	01.05.20	C						
ISSUED FOR DEVELOPMENT APPLICATION	24.04.20	B						
ISSUED FOR DEVELOPMENTS APPLICATION	06.02.20	A	LOT NUMBER REVISION	03.08.20	G			

ALTIS
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FRASERS
PROPERTY

PROJECT
MAMRE SOUTH PRECINCT
657 - 708 MAMRE ROAD
KEMPS CREEK, 2178, NSW

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
MW	MC	APRIL '18	MW	A0	AS SHOWN	C013362.00-DA356

CONSULT AUSTRALIA

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DRAWING TITLE
BULK EARTHWORKS SECTIONS
SHEET 6

DRAWING No C013362.00-DA356
ISSUE G

LEGEND:

- DENOTES CATCHMENT BOUNDARIES
- CATCHMENT TO BASIN 2
- CATCHMENT TO BASIN 1
- RECREATIONAL CATCHMENT
- SOUTHERN LINK ROAD CATCHMENT AREA

CATCHMENT BASIN 2
0.56 HA

CATCHMENT LOTS 1, 2A, 3, & 4
14.31 HA

CATCHMENT SOUTHERN LINK ROAD
0.35 HA

CATCHMENT ROAD NORTH
1.38 HA

CATCHMENT SOUTHERN LINK ROAD
3.88 HA

CATCHMENT EX 4
25.68 HA

CATCHMENT EX 1
5.48 HA

CATCHMENT EX 2
7.24 HA

CATCHMENT EX 3
32.60 HA

SOUTH CREEK 1% AEP
FLOOD EXTENT

CATCHMENT RE1 & RE2
7.95 Ha

CATCHMENT LOT 10
14.89 Ha

CATCHMENT LOTS 5, 6, 7, 8, 9, 10
23.80 Ha

CATCHMENT BASIN 1
2.37 HA

CATCHMENT ROADS SOUTH
3.64 HA

CATCHMENT LOT 2B
13.68 Ha

CATCHMENT EX 3 TO PASS
THROUGH EXISTING BOX
CULVERTS UNDER MAMRE ROAD
AND BYPASS DEVELOPMENT SITE.
REFER TO DA420

SYDNEY WATER PIPELINE

MAMRE ROAD

BAKERS LANE

CREEK

CATCHMENT PLAN
SCALE 1:2000

REFER TO DRAWING DA420 FOR OVERALL SWMP INFORMATION

20m 0 50 100 150 200m
SCALE 1:2000 AT A0 SHEET SIZE

FOR DEVELOPMENT APPLICATION

AMENDMENTS	DATE	ISSUE
ISSUED FOR DEVELOPMENT APPLICATION	11.02.20	F
ISSUED FOR DEVELOPMENT APPLICATION	14.11.19	E
ISSUED FOR DEVELOPMENT APPLICATION	01.11.19	D
ISSUED FOR DEVELOPMENT APPLICATION	12.03.19	C
ISSUED FOR DEVELOPMENT APPLICATION	17.10.18	B
ISSUED FOR DEVELOPMENT APPLICATION	15.10.18	A

AMENDMENTS	DATE	ISSUE
LOT NUMBER REVISION	03.08.20	J
ISSUED FOR DEVELOPMENT APPLICATION	24.07.20	I
ISSUED FOR DEVELOPMENT APPLICATION	06.05.20	H
ISSUED FOR DEVELOPMENT APPLICATION	01.05.20	G

AMENDMENTS	DATE	ISSUE

ALTIS PROPERTY PARTNERS

CLIENT
FRASERS PROPERTY

PROJECT
MAMRE SOUTH PRECINCT
657 - 708 MAMRE ROAD
KEMPS CREEK, 2178, NSW

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
MW	MC	APRIL '18	MW	A0	AS SHOWN	C013362.00-DA400

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Costin Roe Consulting

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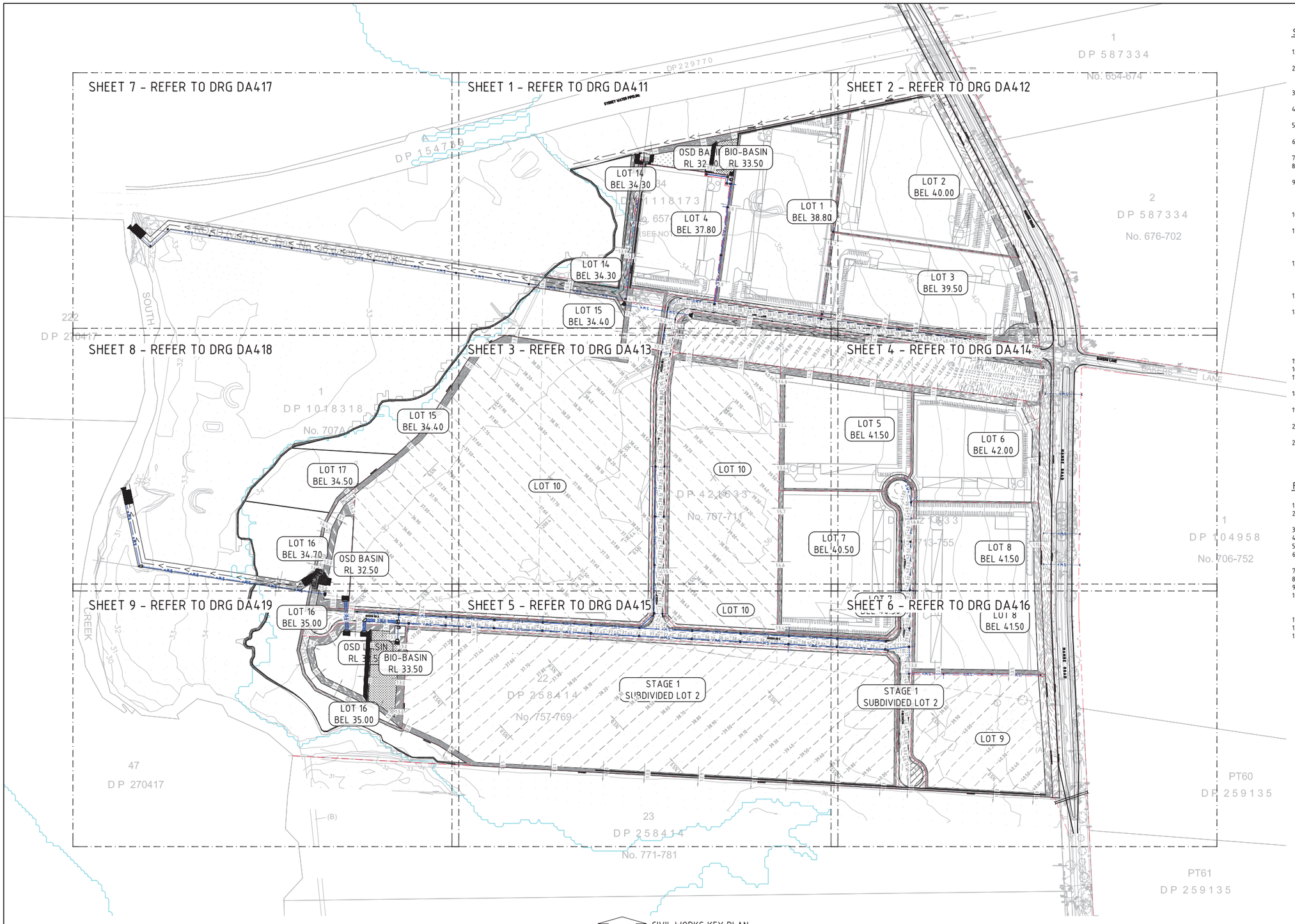
DRAWING TITLE
CATCHMENT PLAN

DRAWING No C013362.00-DA400

ISSUE J



CIVIL WORKS KEY PLAN
SCALE 1:2000

STORMWATER DRAINAGE NOTES:

1. ALL STORMWATER WORKS TO BE COMPLETED IN ACCORDANCE WITH AUSTRALIAN STANDARD AS3500.3:2003 PLUMBING AND DRAINAGE, PART 3: STORMWATER DRAINAGE.
2. THE MINOR (PIPED) SYSTEM HAS BEEN DESIGNED FOR THE 1 IN 20 YEAR ARI STORM EVENT AND THE MAJOR (OVERLAND) SYSTEM HAS BEEN DESIGNED FOR THE 1 IN 100 YEAR ARI STORM EVENT.
3. ALL FINISHED PAVEMENT LEVELS SHALL BE AS INDICATED ON CIVIL WORKS PLANS PLANS DA411-DA419.
4. PIT SIZES SHALL BE AS INDICATED IN THE SCHEDULE WHILE PIPE SIZES AND DETAILS ARE PROVIDED ON PLAN.
5. EXISTING STORMWATER PIT LOCATIONS AND INVERT LEVELS TO BE CONFIRMED BY SURVEY PRIOR TO COMMENCING WORKS ON SITE.
6. ALL STORMWATER PIPES Φ375 OR GREATER SHALL BE CLASS 2 (WITH HS2 SUPPORT) REINFORCED CONCRETE WITH RUBBER RING JOINTS UNLESS NOTED OTHERWISE.
7. ALL PIPES UP TO AND INCLUDING Φ300 TO BE uPVC GRADE SN8 UNO.
8. PIPE CLASS NOMINATED ARE FOR IN-SERVICE LOADING CONDITIONS ONLY. CONTRACTOR IS TO MAKE ANY NECESSARY ADJUSTMENTS REQUIRED FOR CONSTRUCTION CONDITIONS.
9. ALL CONCRETE PITS GREATER THAN 1000mm DEEP SHALL BE REINFORCED USING N12-200 EACH WAY CENTERED IN WALL AND BASE. LAP MINIMUM 300mm WHERE REQUIRED. ALL CONCRETE FOR PITS SHALL BE F'c 32 MPA. PRECAST PITS MAY BE USED WITH THE APPROVAL OF THE ENGINEER.
10. IN ADDITION TO ITEM 6 ABOVE, ALL CONCRETE PITS GREATER THAN 3000mm DEEP SHALL HAVE WALLS AND BASE THICKNESS INCREASED TO 200mm.
11. PIPES SHALL BE LAID AS PER PIPE LAYING DETAILS. PARTICULAR CARE SHALL BE TAKEN TO ENSURE THAT THE PIPE IS FULLY AND EVENLY SUPPORTED. RAM AND PACK FILLING AROUND AND UNDER BACK OF PIPES AND PIPE FAUCETS, WITH NARROW EDGED RAMMERS OR OTHER SUITABLE TAMPING DETAILS.
12. CONCRETE PIPES UNDER, OR WITHIN THE ZONE OF INFLUENCE OF PAVED AREAS SHALL BE LAID USING HS2 TYPE SUPPORT, AS A MINIMUM, IN ACCORDANCE WITH AS 3725. AGGREGATE BACKFILL SHALL NOT BE USED FOR PIPE BEDDING AND OR HAUNCH/SIDE SUPPORT.
13. WHERE PIPE LINES ENTER PITS, PROVIDE 2m LENGTH OF STOCKING WRAPPED SLOTTED Φ100 uPVC TO EACH SIDE OF PIPE.
14. ALL SUBSOIL DRAINAGE LINES SHALL BE Φ100 SLOTTED uPVC WITH APPROVED FILTER WRAP LAID IN 300mm WIDE GRANULAR FILTER UNLESS NOTED OTHERWISE. LAY SUBSOIL LINES TO MATCH FALLS OF LAND AND/OR 1 IN 200 MINIMUM. PROVIDE CAPPED CLEANING EYE (RODDING POINT) AT UPSTREAM END OF LINE AND AT 30m MAX. CTS. PROVIDE SUBSOIL LINES TO ALL PAVEMENT/ LANDSCAPED INTERFACES, TO REAR OF RETAINING WALLS (AS NOMINATED BY STRUCTURAL ENGINEER) AND AS SHOWN ON PLAN.
15. ALL PIPE GRADES 1 IN 100 MINIMUM UNO.
16. PROVIDE STEP IRONS IN PITS DEEPER THAN 1000mm.
17. MIN. 600 COVER TO PIPE OBVERT BENEATH ROADS & MIN. 400 COVER BENEATH LANDSCAPED AND PEDESTRIAN AREAS.
18. PIT COVERS IN TRAFFICABLE PAVEMENT SHALL BE CLASS D 'HEAVY DUTY', THOSE LOCATED IN NON-TRAFFICABLE AREAS SHALL BE CLASS B 'MEDIUM DUTY' U.N.O.
19. PROVIDE CLEANING EYES (RODDING POINTS) TO PIPES AT ALL CORNERS AND T-JUNCTIONS WHERE NO PITS ARE PRESENT.
20. DOWN PIPES (DP) TO BE AS PER HYDRAULIC ENGINEERS DETAILS WITH CONNECTOR TO MATCH DP SIZE U.N.O. ON PLAN. PROVIDE CLEANING EYE AT GROUND LEVEL.
21. PIPE LENGTHS NOMINATED ON PLAN OR LONGSECTIONS ARE MEASURED FROM CENTER OF PITS TO THE NEAREST 0.5m AND DO NOT REPRESENT ACTUAL LENGTH. THE CONTRACTOR IS TO ALLOW FOR THIS.

FINISHED LEVELS PLAN NOTES:

1. LEVELS DATUM IS A.H.D.
2. ALL CONTOUR LINES & SPOT LEVELS INDICATE FINISHED PAVEMENT LEVELS U.N.O. ON PLAN.
3. THE MAJOR CONTOUR INTERVAL IS 0.5m
4. THE MINOR CONTOUR INTERVAL IS 0.1m.
5. MINIMUM PAVEMENT GRADE IS TO BE 1:100 (1%).
6. MAXIMUM PAVEMENT GRADE IS TO BE 1:20 (5%) IN CARPARKING AREAS AND 1:25 (4%) ELSEWHERE.
7. MAXIMUM RAMP GRADES ARE TO BE 1:12 (8.3%) U.N.O. ON PLAN
8. PROVIDE MINIMUM 3.0m LONG TRANSITION WHERE CHANGES GRADE EXCEDE 1:20 (5%).
9. PERMANENT BATTER SLOPES ARE TO HAVE A MAXIMUM GRADE OF 1V:3H.
10. ALL BATTER SLOPE WITH GRADES AT OR EXCEEDING 1V:6H ARE TO BE TURFED IMMEDIATELY OR APPROPRIATE EROSION CONTROL IS TO BE PROVIDED TO THE SATISFACTION OF THE ENGINEER.
11. ALL ACCESS ROADS TO HAVE A CROSSFALL OF 3% AS INDICATED ON PLAN.
12. ALL FOOTPATHS ARE TO FALL AWAY FROM THE BOUNDARY AT 2.5% NOMINAL. GRADE.
13. ALL PAVEMENTS ARE TO BE SET AT 50mm BELOW THE FINISHED FLOOR LEVEL OF THE WAREHOUSE AND OFFICE AREAS.

20m 0 50 100 150 200m
SCALE 1:2000 AT A0 SHEET SIZE

FOR DEVELOPMENT APPLICATION

AMENDMENTS	DATE	ISSUE
ISSUED FOR DEVELOPMENT APPLICATION	01.11.19	F
LOT NUMBERS REVISED	14.05.19	E
ISSUED FOR DEVELOPMENT APPLICATION	29.03.19	D
ISSUED FOR DEVELOPMENT APPLICATION	05.03.19	C
ISSUED FOR DEVELOPMENT APPLICATION	15.10.18	B
ISSUED FOR INFORMATION	03.07.18	A

AMENDMENTS	DATE	ISSUE
UPDATED TO REVISED MASTERPLAN	03.08.20	L
MINOR ADJUSTMENTS	24.07.20	K
UPDATED TO REVISED MASTERPLAN	14.07.20	J
UPDATED TO REVISED MASTERPLAN	08.05.20	I
UPDATED TO REVISED MASTERPLAN	01.05.20	H
ISSUED FOR DEVELOPMENT APPLICATION	11.02.20	G

AMENDMENTS	DATE	ISSUE

ALTIS PROPERTY PARTNERS

CLIENT: FRASERS PROPERTY

PROJECT: MAMRE SOUTH PRECINCT
657 - 708 MAMRE ROAD
KEMPS CREEK, 2178, NSW

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
MW	MC	APRIL '18	MW	A0	AS SHOWN	C013362.00-DA418

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Costin Roe Consulting
PRECISION | COMMUNICATION | ACCOUNTABILITY

DRAWING TITLE: CIVIL WORKS KEY PLAN
DRAWING No: C013362.00-DA410 ISSUE: L

PIT SCHEDULE - LINE A

PIT No.	TYPE	SIZE	COMMENT
PIT A1	K.I.P	900x900	2400 LINTEL ON GRADE
PIT A2	K.I.P	900x900	2400 LINTEL ON GRADE
PIT A3	K.I.P	900x900	2400 LINTEL ON GRADE
PIT A4	K.I.P	900x900	2400 LINTEL ON GRADE
PIT A5	K.I.P	900x900	2400 LINTEL ON GRADE
PIT A6	K.I.P	1800x1800	2400 LINTEL ON GRADE
PIT A7	K.I.P	1800x1800	2400 LINTEL ON GRADE
PIT A8	K.I.P	2100x2100	2400 LINTEL SAG
PIT A9	S.J.P	2100x1200	
PIT A10	S.J.P	2100x1200	
PIT A11	S.J.P	2100x2100	
PIT A12	S.J.P	1200x1200	
PIT A13	S.J.P	1200x1200	
PIT A14	S.J.P	2100x1200	
PIT A15	K.I.P	900x900	2400 LINTEL ON GRADE
PIT A16	K.I.P	900x900	2400 LINTEL ON GRADE
PIT A17	K.I.P	900x900	2400 LINTEL ON GRADE
PIT A18	K.I.P	900x900	2400 LINTEL ON GRADE
PIT A19	K.I.P	900x900	2400 LINTEL ON GRADE
PIT A20	K.I.P	900x900	2400 LINTEL SAG
PIT A21	K.I.P	900x900	2400 LINTEL ON GRADE
PIT A22	K.I.P	900x900	2400 LINTEL ON GRADE
PIT A23	K.I.P	900x900	2400 LINTEL SAG
PIT A24	K.I.P	900x900	2400 LINTEL ON GRADE
PIT A25	K.I.P	900x900	2400 LINTEL ON GRADE
PIT A26	K.I.P	900x900	2400 LINTEL SAG
PIT A27	S.J.P	1200x1200	
PIT A28	S.J.P	1500x1500	
PIT A29	NOT USED		
PIT A30	S.J.P	900x900	
PIT A31	S.J.P	900x900	
PIT A32	S.J.P	900x900	
PIT A33	S.J.P	900x900	
PIT A34	S.J.P	900x900	
PIT A35	S.J.P	900x900	
PIT A36	S.J.P	900x900	
PIT A37	S.J.P	900x900	
PIT A38	S.J.P	900x900	

NOTE:
STORMWATER SYSTEM IS CONCEPT ONLY AND SUBJECT TO CHANAGE DURING DETAILED DESIGN

PIT SCHEDULE - LINE B

PIT No.	TYPE	SIZE	COMMENT
PIT B1	S.G.G.P	1500x1500	
PIT B2	S.G.G.P	1200x1200	
PIT B3	S.G.G.P	1200x1200	
PIT B4	K.I.P	1200x1200	2400 LINTEL ON GRADE
PIT B5	K.I.P	1800x1800	2400 LINTEL SAG
PIT B6	K.I.P	1800x1800	2400 LINTEL ON GRADE
PIT B7	K.I.P	1800x1800	2400 LINTEL ON GRADE
PIT B8	K.I.P	2100x2100	2400 LINTEL ON GRADE
PIT B9	K.I.P	2100x2100	2400 LINTEL ON GRADE
PIT B10	K.I.P	2100x2100	2400 LINTEL ON GRADE
PIT B11	K.I.P	2100x2100	2400 LINTEL ON GRADE
PIT B12	K.I.P	2100x2100	2400 LINTEL ON GRADE
PIT B13	K.I.P	2100x2100	2400 LINTEL ON GRADE
PIT B14	K.I.P	2100x2100	2400 LINTEL ON GRADE
PIT B15	K.I.P	2100x2100	2400 LINTEL ON GRADE
PIT B16	K.I.P	4200x5000	2400 LINTEL SAG
PIT B17	K.I.P	5000x5000	2400 LINTEL ON GRADE
PIT B18	K.I.P	900x900	2400 LINTEL ON GRADE
PIT B19	NOT USED		
PIT B20	NOT USED		
PIT B21	NOT USED		
PIT B22	NOT USED		
PIT B23	NOT USED		
PIT B24	K.I.P	900x900	2400 LINTEL ON GRADE
PIT B25	K.I.P	1200x1200	2400 LINTEL ON GRADE
PIT B26	K.I.P	1500x1500	2400 LINTEL ON GRADE
PIT B27	K.I.P	1800x1800	2400 LINTEL ON GRADE
PIT B28	K.I.P	1800x1800	2400 LINTEL ON GRADE
PIT B29	K.I.P	900x900	2400 LINTEL ON GRADE
PIT B30	K.I.P	1200x1200	2400 LINTEL ON GRADE
PIT B31	K.I.P	900x900	2400 LINTEL ON GRADE
PIT B32	K.I.P	1800x1800	2400 LINTEL ON GRADE
PIT B33	K.I.P	1800x1800	2400 LINTEL ON GRADE
PIT B34	K.I.P	2100x2100	2400 LINTEL ON GRADE
PIT B35	K.I.P	2100x2100	2400 LINTEL ON GRADE
PIT B36	K.I.P	2100x2100	2400 LINTEL ON GRADE
PIT B37	K.I.P	2100x2100	2400 LINTEL ON GRADE
PIT B38	K.I.P	2100x2100	2400 LINTEL ON GRADE
PIT B39	K.I.P	2100x2100	2400 LINTEL ON GRADE
PIT B40	K.I.P	2100x2100	2400 LINTEL ON GRADE
PIT B41	K.I.P	2100x2100	2400 LINTEL ON GRADE
PIT B42	K.I.P	2100x2100	2400 LINTEL SAG
PIT B43	K.I.P	1200x1200	2400 LINTEL ON GRADE
PIT B44	K.I.P	1500x1500	2400 LINTEL ON GRADE
PIT B45	K.I.P	1800x1800	2400 LINTEL ON GRADE
PIT B46	K.I.P	1800x1800	2400 LINTEL ON GRADE
PIT B47	K.I.P	1800x1800	2400 LINTEL SAG
PIT B48	S.J.P	1200x1200	2400 LINTEL ON GRADE
PIT B49	K.I.P	900x900	2400 LINTEL ON GRADE
PIT B50	K.I.P	1200x1200	2400 LINTEL SAG
PIT B51	NOT USED		
PIT B52	S.J.P	5000x3200	
PIT B53	K.I.P	2100x2100	2400 LINTEL ON GRADE

LEGEND:

LEVELS DATUM IS AHD.

EXISTING SITE LEVELS AND DETAILS BASED ON SURVEY INFORMATION PROVIDED BY MONTEATH & POWYS SURVEYORS DATED 20.03.17.

- SJP, SEALED JUNCTION PIT
- KIP, KERB INLET PIT
- FIP, FIELD INLET PIT
- OVERLAND FLOW DIRECTION
- PROPOSED DRAINAGE LINE
- EXISTING DRAINAGE LINE
- SUBSOIL LINE
- FINISHED PAVEMENT CONTOUR (MAJOR) 0.5m INTERVALS
- FINISHED PAVEMENT CONTOUR (MINOR) 0.1m INTERVALS
- FINISHED PAVEMENT SPOT HEIGHT

SYDNEY WATER PIPELINE

PROVIDE GRASSED SWALE FOR DRAINAGE FROM MAMRE ROAD. Q100 PEAK FLOW FROM UPSTREAM CATCHMENT = 5.5m3/s CHANNEL CAPACITY =16.3m3/S CHANNEL SLOPE = 0.5% mANNINGS n = 0.04 SIDE BATTER = 1:3 MAX MAX DEPTH = 1.05m SHOWN INDICATIVE ONLY SUBJECT TO DETAILED DESIGN

RETAINING WALL 2 KEYSTONE WALL IN FILL MAX HEIGHT 5.6m

ESTATE BASIN 2
STORAGE CAPACITY = 8550m³
OSD MAX DEPTH = 2.1m
BIO-RETENTON SURFACE AREA = 1390m²
BIO-RETENTON MAX DEPTH = 1.2m
HYDRAULIC CONDUCTIVITY = 100mm/hr
FILTER DEPTH = 500mm
EXTENDED DETENTION = 300mm

BASIN BUND MIN RL 35.00

10m WIDE CONCRETE WEIR AT RL 34.50
PROVIDE 10mx10m RIP RAP MATRESS LOCATION TO ALIGN WITH CHANNEL FOR BASIN OVERFLOW

PROVIDE HEADWALL AND ENERGY DISSIPATER TO SUIT 100ø PIPE AT EACH OUTLET LOCATION

OSD BASIN RL 32.50

BIO-BASIN RL 33.50

PROVIDE HEADWALL AND ENERGY DISSIPATER TO SUIT 1800ø PIPE

PROVIDE HEADWALL AND ENERGY DISSIPATER TO SUIT 900ø PIPE

BASIN OUTLET PIPE TO DISCHARGE TO SOUTH CREEK

PROVIDE HEADWALL AND ENERGY DISSIPATER TO SUIT 525ø PIPE

RETAINING WALL 2 KEYSTONE WALL IN FILL MAX HEIGHT 5.6m

HIGH FLOW PIPE TO OSD BASIN

GROSS POLLUTANT TRAP. ROCLA CDS UNIT OR APPROVED EQUIVALENT. TO BE INSTALLED OFFLINE. LOW FLOW PIPE TO BIO-RETENTION BASIN

PROVIDE 15mx10m WIDE STORMWATER EASMENT THROUGH LOT 4

DRAINAGE CONNECTION POINT PROVIDE 1200ø STUB

DRAINAGE CONNECTION POINT PROVIDE 900ø STUB

PROVIDE 3m WIDE STORMWATER EASMENT THROUGH LOT 4

LOT 14 BEL 34.30

LOT 4 BEL 37.80

LOT 1 BEL 38.80

LOT 15 BEL 34.40

OVERLAND FLOW PATH TO SOUTH CREEK. PROVIDE LOCALISED DEPRESSION WITH 1:6 MAX BATTERS. FINAL CONFIGURATION T.C.B DURING DETAILED DESIGN

OUTLET PIPE FROM ESTATE BASIN 2 TO DISCHARGE TO SOUTH CREEK

END RETAINING WALL 2

SHARED FOOTPATH 2.5m WIDE

SOUTHERN LINK ROAD SUBJECT TO FUTURE DETAILED DESIGN

PROVIDE CULVERT UNDER ROAD FOR OVERLAND FLOW

BAKERS LANE

BREAKLINE - REFER TO DRAWING C013362.00-DA417

BREAKLINE - REFER TO DRAWING C013362.00-DA412

BREAKLINE - REFER TO DRAWING C013362.00-DA414

CIVIL WORKS PLAN - SHEET 1
1:500 SCALE

5m 0 10 20 30 40 50m
SCALE 1:500 AT A0 SHEET SIZE

FOR DEVELOPMENT APPLICATION

AMENDMENTS	DATE	ISSUE
ISSUED FOR DEVELOPMENT APPLICATION	14.11.19	F
ISSUED FOR DEVELOPMENT APPLICATION	01.11.19	E
LOT NUMBERS REVISED	14.05.19	D
ISSUED FOR DEVELOPMENT APPLICATION	05.03.19	C
ISSUED FOR DEVELOPMENT APPLICATION	15.10.18	B
ISSUED FOR INFORMATION	03.07.18	A

AMENDMENTS	DATE	ISSUE
ISSUES FOR DEVELOPMENT APPLICATION	24.07.20	L
REVISED MASTERPLAN	14.07.20	K
ISSUED FOR DEVELOPMENT APPLICATION	08.05.20	J
ISSUED FOR DEVELOPMENT APPLICATION	06.05.20	I
ISSUED FOR DEVELOPMENT APPLICATION	01.05.20	H
ISSUED FOR DEVELOPMENT APPLICATION	11.02.20	G

AMENDMENTS	DATE	ISSUE
LOT NUMBER REVISION	03.08.20	M

ALTIS PROPERTY PARTNERS

CLIENT: FRASERS PROPERTY

PROJECT: MAMRE SOUTH PRECINCT
657 - 708 MAMRE ROAD
KEMPS CREEK, 2178, NSW

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
MW	MC	APRIL '18	MW	A0	AS SHOWN	C013362.00-DA411

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Costin Roe Consulting
PRECISION | COMMUNICATION | ACCOUNTABILITY

DRAWING TITLE: CONCEPT CIVIL WORKS PLAN SHEET 1

DRAWING No: C013362.00-DA411 ISSUE: M

PROVIDE GRASSED SWALE FOR DRAINAGE
FROM MAMRE ROAD. Q100 PEAK FLOW
FROM UPSTREAM CATCHMENT = 5.5m3/s
CHANNEL CAPACITY =16.3m3/S
CHANNEL SLOPE = 0.5%
mANNINGS n = 0.04
SIDE BATTER = 1:3 MAX
MAX DEPTH = 1.05m
SHOWN INDICATIVE ONLY SUBJECT TO
DETAILED DESIGN

START RETAINING WALL 2

SITE BOUNDARY

EXISTING CULVERT TO BE EXTENDED TO
OUTSIDE REVISED 50m ROAD CORRIDOR.
EXTENT OF WORKS T.BC DURING DETAIL
DESIGN STAGE

MAMRE ROAD DRAINAGE DESIGN
SHOWN INDICATIVELY AND SUBJECT
TO FUTURE DETAILED DESIGN

ROAD WIDENING BOUNDARY

SITE BOUNDARY

MAMRE ROAD

LOT 2
BEL 40.00

LOT 3
BEL 39.50

DRAINAGE CONNECTION POINT
PROVIDE 900ø STUB

PROVIDE 3m WIDE STORMWATER
EASEMENT THROUGH LOT 3

DRAINAGE CONNECTION POINT
PROVIDE 900ø STUB

SHARED FOOTPATH 2.5m WIDE

PIT A5

PIT A4

BREAKLINE - REFER TO DRAWING C013362.00-DA411

BREAKLINE - REFER TO DRAWING C013362.00-DA414

PIT SCHEDULE:

REFER TO DA411 FOR PIT SCHEDULE.

LEGEND:

LEVELS DATUM IS AHD.

EXISTING SITE LEVELS AND DETAILS BASED ON SURVEY INFORMATION PROVIDED BY MONTEATH & POWYS SURVEYORS DATED 20.03.17.

- SJP, SEALED JUNCTION PIT
- KIP, KERB INLET PIT
- FIP, FIELD INLET PIT
- OVERLAND FLOW DIRECTION
- SW – PROPOSED DRAINAGE LINE
- SW – EXISTING DRAINAGE LINE
- SS – SUBSOIL LINE
- 35.00 – FINISHED PAVEMENT CONTOUR (MAJOR) 0.5m INTERVALS
- 35.10 – FINISHED PAVEMENT CONTOUR (MINOR) 0.1m INTERVALS
- +35.10 – FINISHED PAVEMENT SPOT HEIGHT

CIVIL WORKS PLAN - SHEET 2
1:500 SCALE

5m 0 10 20 30 40 50m
SCALE 1:500 AT A0 SHEET SIZE

FOR DEVELOPMENT APPLICATION

AMENDMENTS	DATE	ISSUE
ISSUED FOR DEVELOPMENT APPLICATION	14.11.19	F
ISSUED FOR DEVELOPMENT APPLICATION	01.11.19	E
LOT NUMBERS REVISED	14.05.19	D
ISSUED FOR DEVELOPMENT APPLICATION	05.03.19	C
ISSUED FOR DEVELOPMENT APPLICATION	15.10.18	B
ISSUED FOR INFORMATION	03.07.18	A

AMENDMENTS	DATE	ISSUE
ISSUES FOR DEVELOPMENT APPLICATION	24.07.20	L
REVISED MASTERPLAN	14.07.20	K
ISSUED FOR DEVELOPMENT APPLICATION	08.05.20	J
ISSUED FOR DEVELOPMENT APPLICATION	06.05.20	I
ISSUED FOR DEVELOPMENT APPLICATION	01.05.20	H
ISSUED FOR DEVELOPMENT APPLICATION	11.02.20	G

AMENDMENTS	DATE	ISSUE
LOT NUMBER REVISION	03.08.20	M

ALTIS PROPERTY PARTNERS

CLIENT: FRASERS PROPERTY

PROJECT
MAMRE SOUTH PRECINCT
657 - 708 MAMRE ROAD
KEMPS CREEK, 2178, NSW

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
MW	ML	APRIL '18	MW	A0	AS SHOWN	C013362.00-DA412

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Costin Roe Consulting

PRECISION | COMMUNICATION | ACCOUNTABILITY

DRAWING TITLE
CONCEPT CIVIL WORKS PLAN
SHEET 2

DRAWING No: C013362.00-DA412 ISSUE: M

BREAKLINE - REFER TO DRAWING C013362.00-DA411

BREAKLINE - REFER TO DRAWING C013362.00-DA418

BREAKLINE - REFER TO DRAWING C013362.00-DA414

SITE BOUNDARY

SOUTHERN LINK ROAD SUBJECT TO FUTURE DETAILED DESIGN

ACCESS RD 1

PIT A23

PIT A22

375ø

SHARED FOOTPATH 2.5m WIDE

DRAINAGE CONNECTION POINT PROVIDE 825ø STUB

DRAINAGE CONNECTION POINT PROVIDE 825ø STUB

825ø

PIT B44

PIT B43

LOT 10

1200ø

PIT B45

PIT B48

DRAINAGE CONNECTION POINT PROVIDE 825ø STUB

1350ø

PIT B46

PIT B49

375ø

SHARED FOOTPATH 2.5m WIDE

LOT 10

LOT 7
BEL 40.50

PIT SCHEDULE:
REFER TO DA411 FOR PIT SCHEDULE.

LEGEND:

LEVELS DATUM IS AHD.

EXISTING SITE LEVELS AND DETAILS BASED ON SURVEY INFORMATION PROVIDED BY MONTEATH & POWYS SURVEYORS DATED 20.03.17.

- SJP, SEALED JUNCTION PIT
- KIP, KERB INLET PIT
- FIP, FIELD INLET PIT
- OVERLAND FLOW DIRECTION
- PROPOSED DRAINAGE LINE
- EXISTING DRAINAGE LINE
- SUBSOIL LINE
- 35.00 – FINISHED PAVEMENT CONTOUR (MAJOR) 0.5m INTERVALS
- 35.10 – FINISHED PAVEMENT CONTOUR (MINOR) 0.1m INTERVALS
- +35.10 – FINISHED PAVEMENT SPOT HEIGHT

CIVIL WORKS PLAN - SHEET 3
1:500 SCALE

BREAKLINE - REFER TO DRAWING C013362.00-DA415

5m 0 10 20 30 40 50m
SCALE 1:500 AT A0 SHEET SIZE

FOR DEVELOPMENT APPLICATION

AMENDMENTS	DATE	ISSUE
ISSUED FOR DEVELOPMENT APPLICATION	11.02.20	F
ISSUED FOR DEVELOPMENT APPLICATION	01.11.19	E
LOT NUMBERS REVISED	14.05.19	D
ISSUED FOR DEVELOPMENT APPLICATION	05.03.19	C
ISSUED FOR DEVELOPMENT APPLICATION	15.10.18	B
ISSUED FOR INFORMATION	03.07.18	A

AMENDMENTS	DATE	ISSUE
LOT NUMBER REVISION	03.08.20	L
ISSUES FOR DEVELOPMENT APPLICATION	24.07.20	K
REVISED MASTERPLAN	14.07.20	J
ISSUED FOR DEVELOPMENT APPLICATION	08.05.20	I
ISSUED FOR DEVELOPMENT APPLICATION	04.05.20	H
ISSUED FOR DEVELOPMENT APPLICATION	01.05.20	G

AMENDMENTS	DATE	ISSUE

ALTIS PROPERTY PARTNERS

CLIENT: FRASERS PROPERTY

PROJECT: MAMRE SOUTH PRECINCT
657 - 708 MAMRE ROAD
KEMPS CREEK, 2178, NSW

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
HW	MC	APRIL '18	HW	A0	AS SHOWN	C013362.00-DA413

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Costin Roe Consulting

PRECISION | COMMUNICATION | ACCOUNTABILITY

DRAWING TITLE: CONCEPT CIVIL WORKS PLAN SHEET 3

DRAWING No: C013362.00-DA413 ISSUE: L

BREAKLINE - REFER TO DRAWING C013362.00-DA412

BREAKLINE - REFER TO DRAWING 13362.00-DA413

BREAKLINE - REFER TO DRAWING C013362.00-DA416

BAKERS LANE

MAMRE ROAD

SOUTHERN LINK ROAD SUBJECT TO FUTURE DETAILED DESIGN

PROVIDE GRASSED SWALE FOR DRAINAGE
FROM MAMRE ROAD Q100 PEAK FLOW
FROM UPSTREAM CATCHMENT = 1.08m3/s
CHANNEL CAPACITY =1.25m3/S
CHANNEL SLOPE = 1%
mANNINGS n = 0.04
SIDE BATTER = 1:4 MAX
MAX DEPTH = 0.55m
SHOWN INDICATIVE ONLY SUBJECT TO DETAILED DESIGN

REFER TO FUNCTIONAL LAYOUT DRAWINGS FOR INTERSECTION CONCEPTS

INTERSECTION DRAINAGE DESIGN SHOWN INDICATIVELY AND SUBJECT TO FUTURE DETAILED DESIGN

EXISTING CULVERT TO BE EXTENDED TO OUTSIDE REVISED 50m ROAD CORRIDOR. EXTENT OF WORKS T.BC DURING DETAIL DESIGN STAGE

LOT 5
BEL 41.50

LOT 6
BEL 42.00

LOT 8
BEL 41.50

DRAINAGE CONNECTION POINT
PROVIDE 825Ø STUB

FOOTPATH 1.5m WIDE

ACCESS RD 2

PROVIDE GRASSED SWALE FOR DRAINAGE FROM MAMRE ROAD
Q100 PEAK FLOW FROM UPSTREAM CATCHMENT = 1.46m3/s
CHANNEL CAPACITY =1.58m3/S
CHANNEL SLOPE = 1%
mANNINGS n = 0.04
SIDE BATTER = 1:4 MAX
MAX DEPTH = 0.6m

PIT SCHEDULE:
REFER TO DA411 FOR PIT SCHEDULE.

LEGEND:
LEVELS DATUM IS AHD.

EXISTING SITE LEVELS AND DETAILS BASED ON SURVEY INFORMATION PROVIDED BY MONTEATH & POWYS SURVEYORS DATED 20.03.17.

- SJP, SEALED JUNCTION PIT
- KIP, KERB INLET PIT
- FIP, FIELD INLET PIT
- OVERLAND FLOW DIRECTION
- PROPOSED DRAINAGE LINE
- EXISTING DRAINAGE LINE
- SUBSOIL LINE
- FINISHED PAVEMENT CONTOUR (MAJOR) 0.5m INTERVALS
- FINISHED PAVEMENT CONTOUR (MINOR) 0.1m INTERVALS
- FINISHED PAVEMENT SPOT HEIGHT

5m 0 10 20 30 40 50m
SCALE 1:500 AT A0 SHEET SIZE

CIVIL WORKS PLAN - SHEET 4
1:500 SCALE

FOR DEVELOPMENT APPLICATION

AMENDMENTS	DATE	ISSUE
ISSUED FOR DEVELOPMENT APPLICATION	14.11.19	F
ISSUED FOR DEVELOPMENT APPLICATION	01.11.19	E
ISSUED FOR DEVELOPMENT APPLICATION	29.03.19	D
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AMENDMENTS	DATE	ISSUE
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REVISED MASTERPLAN	14.07.20	K
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ISSUED FOR DEVELOPMENT APPLICATION	04.05.20	I
ISSUED FOR DEVELOPMENT APPLICATION	01.05.20	H
ISSUED FOR DEVELOPMENT APPLICATION	11.02.20	G

AMENDMENTS	DATE	ISSUE
LOT NUMBER REVISION	03.08.20	M

ALTIS PROPERTY PARTNERS

CLIENT: FRASERS PROPERTY

PROJECT
MAMRE SOUTH PRECINCT
657 - 708 MAMRE ROAD
KEMPS CREEK, 2178, NSW

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
MW	MC	APRIL '18	MW	A0	AS SHOWN	C013362.00-DA414

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Costin Roe Consulting

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DRAWING TITLE
CONCEPT CIVIL WORKS PLAN
SHEET 4

DRAWING No C013362.00-DA414 ISSUE M

BREAKLINE - REFER TO DRAWING C013362.00-DA413

BREAKLINE - REFER TO DRAWING C013362.00-DA419

BREAKLINE - REFER TO DRAWING 13362.00-DA416

LOT 10

LOT 10

ACCESS RD 1

ACCESS RD 3

SHARED FOOTPATH 2.5m WIDE

PRAM RAMP

FOOTPATH 1.5m WIDE

FOOTPATH 1.5m WIDE

DRAINAGE CONNECTION POINT
PROVIDE 825ø STUB

DRAINAGE CONNECTION POINT
PROVIDE 825ø STUB

DRAINAGE CONNECTION POINT
PROVIDE 825ø STUB

DRAINAGE CONNECTION POINT
PROVIDE 1050ø STUB

DRAINAGE CONNECTION POINT
PROVIDE 900ø STUB

PIT B40 1800ø
PIT B14 1800ø
PIT B39 1800ø
PIT B13 1800ø
PIT B38 1800ø
PIT B12 1800ø
PIT B37 1800ø
PIT B11 1800ø
PIT B47 1650ø
PIT B50 1825ø
PIT B36 1650ø
PIT B10 1650ø
PIT B35 1650ø
PIT B9 1650ø
PIT B34 1650ø
PIT B8 1500ø

STAGE 1
SUBDIVIDED LOT 2

SITE BOUNDARY

SITE BOUNDARY

LEGEND:

LEVELS DATUM IS AHD.

EXISTING SITE LEVELS AND DETAILS BASED ON SURVEY INFORMATION PROVIDED BY MONTEATH & POWYS SURVEYORS DATED 20.03.17.

- SJP, SEALED JUNCTION PIT
- KIP, KERB INLET PIT
- FIP, FIELD INLET PIT
- OVERLAND FLOW DIRECTION
- PROPOSED DRAINAGE LINE
- EXISTING DRAINAGE LINE
- SUBSOIL LINE
- FINISHED PAVEMENT CONTOUR (MAJOR) 0.5m INTERVALS
- FINISHED PAVEMENT CONTOUR (MINOR) 0.1m INTERVALS
- FINISHED PAVEMENT SPOT HEIGHT

CIVIL WORKS PLAN - SHEET 5
1:500 SCALE

PIT SCHEDULE:
REFER TO DA411 FOR PIT SCHEDULE.

5m 0 10 20 30 40 50m
SCALE 1:500 AT A0 SHEET SIZE

FOR DEVELOPMENT APPLICATION

AMENDMENTS	DATE	ISSUE
ISSUED FOR DEVELOPMENT APPLICATION	14.11.19	F
ISSUED FOR DEVELOPMENT APPLICATION	01.11.19	E
LOT NUMBERS REVISED	14.05.19	D
ISSUED FOR DEVELOPMENT APPLICATION	05.03.19	C
ISSUED FOR DEVELOPMENT APPLICATION	15.10.18	B
ISSUED FOR INFORMATION	03.07.18	A

AMENDMENTS	DATE	ISSUE
ISSUED FOR DEVELOPMENT APPLICATION	24.07.20	L
REVISED MASTERPLAN	14.07.20	K
ISSUED FOR DEVELOPMENT APPLICATION	08.05.20	J
ISSUED FOR DEVELOPMENT APPLICATION	04.05.20	I
ISSUED FOR DEVELOPMENT APPLICATION	01.05.20	H
ISSUED FOR DEVELOPMENT APPLICATION	11.02.20	G

AMENDMENTS	DATE	ISSUE
LOT NUMBER REVISION	03.08.20	M

ALTIS PROPERTY PARTNERS

CLIENT
FRASERS PROPERTY

PROJECT
MAMRE SOUTH PRECINCT
657 - 708 MAMRE ROAD
KEMPS CREEK, 2178, NSW

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
MW	MC	APRIL '18	MW	A0	AS SHOWN	C013362.00-DA415

Costin Roe Consulting Pty Ltd.
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email: mail@costinroe.com.au

Costin Roe Consulting

PRECISION | COMMUNICATION | ACCOUNTABILITY

DRAWING TITLE
CIVIL WORKS PLAN
SHEET 5

DRAWING No C013362.00-DA415 ISSUE M

BREAKLINE - REFER TO DRAWING C013362.00-DA414

BREAKLINE - REFER TO DRAWING 13362.00-DA415

LOT 7
BEL 40.50

LOT 8
BEL 41.50

LOT 9

STAGE 1
SUBDIVIDED LOT 2

ACCESS RD 2

MAMRE ROAD

FOOTPATH 1.5m WIDE

PROVIDE GRASSED SWALE FOR DRAINAGE FROM MAMRE ROAD.
Q100 PEAK FLOW FROM UPSTREAM CATCHMENT = 1.46m3/s
CHANNEL CAPACITY =1.58m3/S
CHANNEL SLOPE = 1%
mANNINGS n = 0.04
SIDE BATTER = 1:4 MAX
MAX DEPTH = 0.6m

DRAINAGE CONNECTION POINT
PROVIDE 825ø STUB

PROVIDE 1500sq FIELD INLET PIT IN ACCORDANCE WITH PENRITH CITY COUNCIL SD2002 & PROVIDE CONNECTION INTO ROAD DRAINAGE SYSTEM

PROVIDE 3m WIDE STORMWATER EASEMENT

DRAINAGE CONNECTION POINT
PROVIDE 825ø STUB

EXISTING BOX CULVERTS TO BE EXTENDED TO OUTSIDE REVISED 50m ROAD CORRIDOR. EXTENT OF WORKS T.BC DURING DETAIL DESIGN STAGE

EXISTING BOX CULVERTS

REFER TO DRAWING DA420 FOR UPSTREAM CATCHMENT APPROX 32.2HA. TO BE CONVEYED THROUGH EXISTING CULVERT

EXISTING FLOW PATH TO SOUTH CREEK MAINTAINED

SITE BOUNDARY

ROAD WIDENING BOUNDARY

LEGEND:

LEVELS DATUM IS AHD.

EXISTING SITE LEVELS AND DETAILS BASED ON SURVEY INFORMATION PROVIDED BY MONTEATH & POWYS SURVEYORS DATED 20.03.17.

- SJP, SEALED JUNCTION PIT
- KIP, KERB INLET PIT
- FIP, FIELD INLET PIT
- OVERLAND FLOW DIRECTION
- PROPOSED DRAINAGE LINE
- EXISTING DRAINAGE LINE
- SUBSOIL LINE
- FINISHED PAVEMENT CONTOUR (MAJOR) 0.5m INTERVALS
- FINISHED PAVEMENT CONTOUR (MINOR) 0.1m INTERVALS
- FINISHED PAVEMENT SPOT HEIGHT

PIT SCHEDULE:

REFER TO DA411 FOR PIT SCHEDULE.

CIVIL WORKS PLAN - SHEET 6
1:500 SCALE

5m 0 10 20 30 40 50m
SCALE 1:500 AT A0 SHEET SIZE

FOR DEVELOPMENT APPLICATION

AMENDMENTS	DATE	ISSUE	AMENDMENTS	DATE	ISSUE	AMENDMENTS	DATE	ISSUE
ISSUED FOR DEVELOPMENT APPLICATION	01.11.19	F	REVISED MASTERPLAN	14.07.20	L			
LOT NUMBERS REVISED	14.05.19	E	ISSUED FOR DEVELOPMENT APPLICATION	08.05.20	K			
ISSUED FOR DEVELOPMENT APPLICATION	29.03.19	D	ISSUED FOR DEVELOPMENT APPLICATION	04.05.20	J			
ISSUED FOR DEVELOPMENT APPLICATION	05.03.19	C	ISSUED FOR DEVELOPMENT APPLICATION	01.05.20	I			
ISSUED FOR DEVELOPMENT APPLICATION	15.10.18	B	ISSUED FOR DEVELOPMENT APPLICATION	11.02.20	H	LOT NUMBER REVISION	03.08.20	N
ISSUED FOR INFORMATION	03.07.18	A	ISSUED FOR DEVELOPMENT APPLICATION	14.11.19	G	ISSUES FOR DEVELOPMENT APPLICATION	24.07.20	M

ALTIS PROPERTY PARTNERS

CLIENT
FRASERS PROPERTY

PROJECT
MAMRE SOUTH PRECINCT
657 - 708 MAMRE ROAD
KEMPS CREEK, 2178, NSW

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
MW	MC	APRIL '18	MW	A0	AS SHOWN	C013362.00-DA416

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DRAWING TITLE
CIVIL WORKS PLAN
SHEET 6

DRAWING No C013362.00-DA416 ISSUE N

LEGEND:

LEVELS DATUM IS AHD.

EXISTING SITE LEVELS AND DETAILS BASED ON SURVEY INFORMATION PROVIDED BY MONTEATH & POWYS SURVEYORS DATED 20.03.17.

- ⊠ – SJP, SEALED JUNCTION PIT
- KIP, KERB INLET PIT
- FIP, FIELD INLET PIT
- OVERLAND FLOW DIRECTION
- SW – PROPOSED DRAINAGE LINE
- SW – EXISTING DRAINAGE LINE
- SS – SUBSOIL LINE
- 35.00 – FINISHED PAVEMENT CONTOUR (MAJOR) 0.5m INTERVALS
- 35.10 – FINISHED PAVEMENT CONTOUR (MINOR) 0.1m INTERVALS
- +35.10 – FINISHED PAVEMENT SPOT HEIGHT

PIT SCHEDULE:

REFER TO DA411 FOR PIT SCHEDULE.

OUTLET PIPE FROM ESTATE BASIN 2 TO DISCHARGE TO SOUTH CREEK. PROVIDE HEADWALL AND RIP-RAP ENERGY DISSIPATER

PIT A37

PIT A36

PIT A35

PIT A34

PIT A38

525Ø

OVERLAND FLOW PATH TO SOUTH CREEK. PROVIDE LOCALISED DEPRESSION WITH 1:6 MAX BATTERS. FINAL CONFIGURATION T.C.B DURING DETAILED DESIGN

OVERLAND FLOW PATH TO SOUTH CREEK. PROVIDE LOCALISED DEPRESSION WITH 1:6 MAX BATTERS. FINAL CONFIGURATION T.C.B DURING DETAILED DESIGN

SOUTH

BREAKLINE - REFER TO DRAWING 13362.00-DA4.11

BREAKLINE - REFER TO DRAWING C013362.00-DA418

5m 0 10 20 30 40 50m

SCALE 1:500 AT A0 SHEET SIZE

FOR DEVELOPMENT APPLICATION

CIVIL WORKS PLAN - SHEET 7

1:500 SCALE

AMENDMENTS	DATE	ISSUE
REVISED MASTERPLAN	04.05.20	F
REVISED MASTERPLAN	01.05.20	E
LOT NUMBERS REVISED	14.05.19	D
ISSUED FOR DEVELOPMENT APPLICATION	05.03.19	C
ISSUED FOR DEVELOPMENT APPLICATION	15.10.18	B
ISSUED FOR INFORMATION	03.07.18	A

AMENDMENTS	DATE	ISSUE
ISSUES FOR DEVELOPMENT APPLICATION	03.08.20	J
ISSUES FOR DEVELOPMENT APPLICATION	24.07.20	I
REVISED MASTERPLAN	16.07.20	H
REVISED MASTERPLAN	08.05.20	G

AMENDMENTS	DATE	ISSUE

ALTIS PROPERTY PARTNERS

CLIENT: FRASERS PROPERTY

PROJECT: MAMRE SOUTH PRECINCT
657 - 708 MAMRE ROAD
KEMPS CREEK, 2178, NSW

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
MW	MC	APRIL '18	MW	A0	AS SHOWN	C013362.00-DA417

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DRAWING TITLE: CIVIL WORKS PLAN SHEET 7

DRAWING No: C013362.00-DA417 ISSUE: J

BREAKLINE – REFER TO DRAWING C013362.00-DA417

LEGEND:

LEVELS DATUM IS AHD.

EXISTING SITE LEVELS AND DETAILS BASED ON SURVEY INFORMATION PROVIDED BY MONTEATH & POWYS SURVEYORS DATED 20.03.17.

- ⊠ – SJP, SEALED JUNCTION PIT
- KIP, KERB INLET PIT
- FIP, FIELD INLET PIT
- OVERLAND FLOW DIRECTION
- SW – PROPOSED DRAINAGE LINE
- SW – EXISTING DRAINAGE LINE
- SS – SUBSOIL LINE
- 35.00 – FINISHED PAVEMENT CONTOUR (MAJOR) 0.5m INTERVALS
- 35.10 – FINISHED PAVEMENT CONTOUR (MINOR) 0.1m INTERVALS
- +35.10 – FINISHED PAVEMENT SPOT HEIGHT

PIT SCHEDULE:

REFER TO DA411 FOR PIT SCHEDULE.

OUTLET PIPE FROM ESTATE BASIN 1 TO DISCHARGE TO SOUTH CREEK. PROVIDE HEADWALL AND RIP-RAP ENERGY DISSIPATER

2x675φ

PIT 852

OVERLAND FLOW PATH TO SOUTH CREEK. PROVIDE LOCALISED DEPRESSION WITH 1:6 MAX BATTERS. FINAL CONFIGURATION T.C.B DURING DETAILED DESIGN

LOT 15
BEL 34.40

LOT 17
BEL 34.50

LOT 16
BEL 34.70

SITE BOUNDARY

BASIN ACCESS TRACK. MIN R.L 35.50

10m WIDE CONCRETE DRIVE -OVER WEIR AT RL 34.50
PROVIDE 10m×10m RIP RAP MATRESS
LOCATION TO ALIGN WITH CHANNEL FOR BASIN OVERFLOW

OSD BASIN
RL 32.50

RETAINING WALL 3
KEYSTONE WALL IN FILL
MAX HEIGHT 4.2m

BREAKLINE – REFER TO DRAWING 13362.00-DA413

BREAKLINE – REFER TO DRAWING C013362.00-DA419

CIVIL WORKS PLAN – SHEET 8
1:500 SCALE

5m 0 10 20 30 40 50m
SCALE 1:500 AT A0 SHEET SIZE

FOR DEVELOPMENT APPLICATION

AMENDMENTS	DATE	ISSUE
REVISED MASTERPLAN	04.05.20	F
REVISED MASTERPLAN	01.05.20	E
LOT NUMBERS REVISED	14.05.19	D
ISSUED FOR DEVELOPMENT APPLICATION	05.03.18	C
ISSUED FOR DEVELOPMENT APPLICATION	15.10.18	B
ISSUED FOR INFORMATION	03.07.18	A

AMENDMENTS	DATE	ISSUE
LOT NUMBER REVISION	03.08.20	J
ISSUES FOR DEVELOPMENT APPLICATION	24.07.20	I
REVISED MASTERPLAN	14.07.20	H
REVISED MASTERPLAN	08.05.20	G

AMENDMENTS	DATE	ISSUE

ALTIS PROPERTY PARTNERS

CLIENT: FRASERS PROPERTY

PROJECT: MAMRE SOUTH PRECINCT
657 – 708 MAMRE ROAD
KEMPS CREEK, 2178, NSW

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
MW	ML	APRIL '18	MW	A0	AS SHOWN	C013362.00-DA418

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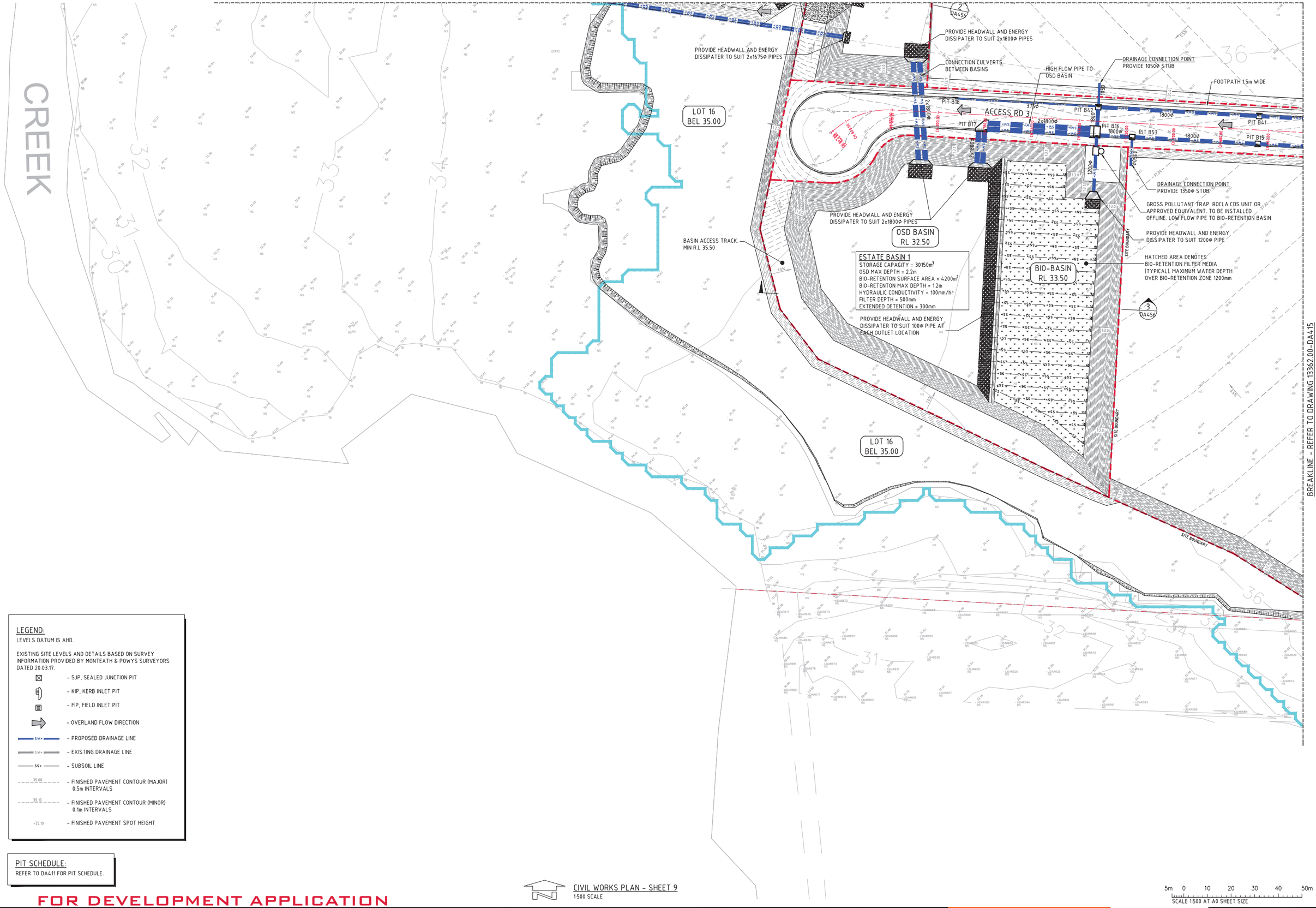
PRECISION | COMMUNICATION | ACCOUNTABILITY

DRAWING TITLE: CIVIL WORKS PLAN
SHEET 8

DRAWING No: C013362.00-DA418 ISSUE: J

BREAKLINE - REFER TO DRAWING C013362.00-DA418



LEGEND:

LEVELS DATUM IS AHD.

EXISTING SITE LEVELS AND DETAILS BASED ON SURVEY INFORMATION PROVIDED BY MONTEATH & POWYS SURVEYORS DATED 20.03.17.

- SJP, SEALED JUNCTION PIT
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- FIP, FIELD INLET PIT
- OVERLAND FLOW DIRECTION
- PROPOSED DRAINAGE LINE
- EXISTING DRAINAGE LINE
- SUBSOIL LINE
- FINISHED PAVEMENT CONTOUR (MAJOR) 0.5m INTERVALS
- FINISHED PAVEMENT CONTOUR (MINOR) 0.1m INTERVALS
- FINISHED PAVEMENT SPOT HEIGHT

PIT SCHEDULE:

REFER TO DA411 FOR PIT SCHEDULE.

FOR DEVELOPMENT APPLICATION

CIVIL WORKS PLAN - SHEET 9
1:500 SCALE

5m 0 10 20 30 40 50m
SCALE 1:500 AT A0 SHEET SIZE

AMENDMENTS	DATE	ISSUE
REVISED MASTERPLAN	01.05.20	F
LOT NUMBERS REVISED	14.05.19	E
ISSUED FOR DEVELOPMENT APPLICATION	29.03.19	D
ISSUED FOR DEVELOPMENT APPLICATION	05.03.19	C
ISSUED FOR DEVELOPMENT APPLICATION	15.10.18	B
ISSUED FOR INFORMATION	03.07.18	A

AMENDMENTS	DATE	ISSUE
LOT NUMBER REVISION	03.08.20	K
ISSUES FOR DEVELOPMENT APPLICATION	24.07.20	J
REVISED MASTERPLAN	14.07.20	I
REVISED MASTERPLAN	08.05.20	H
REVISED MASTERPLAN	04.05.20	G

AMENDMENTS	DATE	ISSUE

ALTIS PROPERTY PARTNERS

CLIENT: FRASERS PROPERTY

PROJECT: MAMRE SOUTH PRECINCT
657 - 708 MAMRE ROAD
KEMPS CREEK, 2178, NSW

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
MW	MC	APRIL '18	MW	A0	AS SHOWN	C013362.00-DA419

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DRAWING TITLE: CIVIL WORKS PLAN SHEET 9
DRAWING No: C013362.00-DA419
ISSUE: K

BASIN DISCHARGE VIA UNDERGROUND PIPE SYSTEM TO SOUTH CREEK. PROVIDE HEADWALL AND SCOUR PROTECTION TO OUTLET

OVERFLOW FROM BASIN 2 TO THROUGH DEFINED FLOW PATH

OVERFLOW FROM UNDEVELOPED FUTURE SOUTHERN LINK ROAD CORRIDOR TO DISCHARGE THROUGH NATURAL GULLIES AND OVERLAND FLOW PATH TOWARDS SOUTH CREEK

1% AEP FLOOD EXTENT FROM SOUTH CREEK

BASIN DISCHARGE VIA UNDERGROUND PIPE SYSTEM TO SOUTH CREEK. PROVIDE HEADWALL AND SCOUR PROTECTION TO OUTLET

OVERFLOW FROM BASIN 2 TO THROUGH DEFINED FLOW PATH

1% AEP FLOOD EXTENT FROM SOUTH CREEK

SOUTH CREEK

SOUTH CREEK

ESTATE BASIN BASIN 2
BASIN TO TREAT STROMWATER RUNOFF FROM NORTHERN CATCHMENT. REFER TO DRAWING DA417. UNDEVELOPED CATCHMENTS FROM UPSTREAM AND SOUTHERN LINK ROAD TO BYPASS BASIN 2

PROVIDE OPEN CHANNEL FLOW PATH FROM MAMRE ROAD AND UPSTREAM CATCHMENTS DRAINAGE RUNOFF

EXISTING TRAPPED LOW POINT. FUTURE MAMRE ROAD UPGRADE WORKS STORMWATER DISCHARGE POINT.

EXISTING FLOW PATH FROM MAMRE ROAD AND UPSTREAM CATCHMENTS DRAINAGE RUNOFF

END OF LINE GROSS POLLUTANT TRAP TO SERVICE NORTHERN ESTATE CATCHMENT. TO BE INSTALLED UPSTREAM TO ESTATE BASIN

RUNOFF FROM UPSTREAM CATCHMENTS TO BE CONVEYED THROUGH SITE VIA OPEN SWALE SUBJECT TO FUTURE DETAILED DESIGN.

CULVERT SYSTEM TO CONVEY UPSTREAM CATCHMENTS AND UNDEVELOPED SOUTHERN LINK ROAD CATCHMENT UNDER ACCESS ROAD AND TOWARDS SOUTH CREEK

END OF LINE GROSS POLLUTANT TRAP TO SERVICE SOUTHERN ESTATE CATCHMENT. TO BE INSTALLED UPSTREAM TO ESTATE BASIN

ESTATE BASIN 1
BASIN TO TREAT STROMWATER RUNOFF FROM SOUTHERN CATCHMENT. REFER TO DRAWING DA418

EXISTING FLOW PATH FROM MAMRE ROAD AND UPSTREAM CATCHMENTS DRAINAGE RUNOFF

MAMRE ROAD

EXISTING CULVERT TO BE EXTENDED TO OUTSIDE FUTURE 50m ROAD WIDENING CORRIDOR. EXISTING CULVERT TO BE CONFIRMED BY SURVEY. EXTENT OF WORKS T.BC DURING DETAIL DESIGN STAGE

RUNOFF FROM UPSTREAM CATCHMENTS TO BE CONVEYED THROUGH SITE VIA OPEN SWALE. REFER TO DRAWING DA419. EX CATCHMENTS 7.0Ha. SUBJECT TO FUTURE DETAILED DESIGN

PIPES EASEMENT THROUGH LOT 9 TO CONVEY FLOWS FROM UPSTREAM CATCHMENT

EXISTING CULVERT TO BE EXTENDED TO OUTSIDE FUTURE 50m ROAD WIDENING CORRIDOR. EXISTING CULVERT TO BE CONFIRMED BY SURVEY. EXTENT OF WORKS T.BC DURING DETAIL DESIGN STAGE

EXISTING BOX CULVERTS

EXISTING FLOW PATH TO SOUTH CREEK MAINTAINED

NOTE:
REFER TO DRAWING DA400 FOR OVERALL CATCHMENT

LEGEND:

LEVELS DATUM IS AHD.

EXISTING SITE LEVELS AND DETAILS BASED ON SURVEY INFORMATION PROVIDED BY MONTEATH & POWYS DATED 20.03.17.

30.00 - FLOOD LEVEL CONTOUR (MAJOR) 1m INTERVALS

30.20 - FLOOD LEVEL CONTOUR (MINOR) 0.2m INTERVALS

- OVERLAND FLOW PATH

FOR DEVELOPMENT APPLICATION

OVERALL STORMWATER MANAGEMENT PLAN
SCALE 1:1750

17.5m 0 17.5 35 52.5 70 87.5 105 122.5 140 157.5 175m
SCALE 1:1750 AT A0 SHEET SIZE

AMENDMENTS	DATE	ISSUE
ISSUED FOR DEVELOPMENT APPLICATION	01.05.20	F
ISSUED FOR DEVELOPMENT APPLICATION	11.02.20	E
ISSUED FOR DEVELOPMENT APPLICATION	27.11.19	D
ISSUED FOR DEVELOPMENT APPLICATION	01.11.19	C
ISSUED FOR DEVELOPMENT APPLICATION	12.03.19	B
ISSUED FOR DEVELOPMENT APPLICATION	07.12.18	A

AMENDMENTS	DATE	ISSUE
LOT NUMBER REVISION	03.08.20	J
ISSUED FOR DEVELOPMENT APPLICATION	24.07.20	I
ISSUED FOR DEVELOPMENT APPLICATION	08.05.20	H
ISSUED FOR DEVELOPMENT APPLICATION	06.05.20	G

AMENDMENTS	DATE	ISSUE

ALTIS PROPERTY PARTNERS

CLIENT: FRASERS PROPERTY

PROJECT: MAMRE SOUTH PRECINCT
657 - 708 MAMRE ROAD
KEMPS CREEK, 2178, NSW

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
MW	MC	APRIL '18	MW	A0	AS SHOWN	C013362.00-DA420

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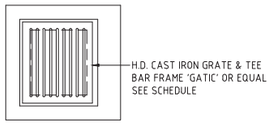
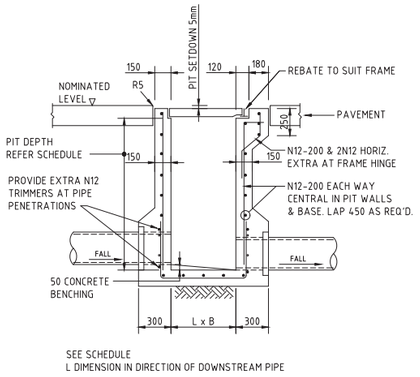
DRAWING TITLE: OVERALL STORMWATER MANAGEMENT PLAN

DRAWING No: C013362.00-DA420 ISSUE: J

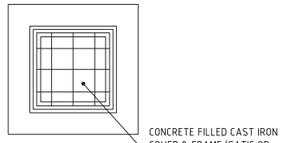


PLAN
SCALE 1:20

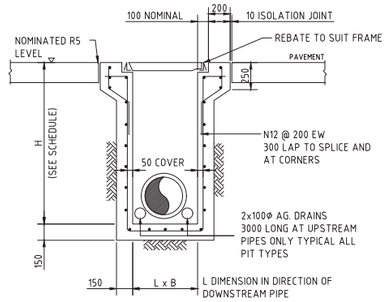


SECTION
SCALE 1:20

SINGLE GRATED GULLY PIT - SGGP

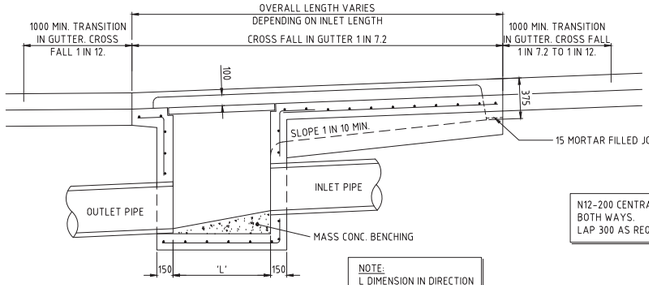


PLAN
1:20



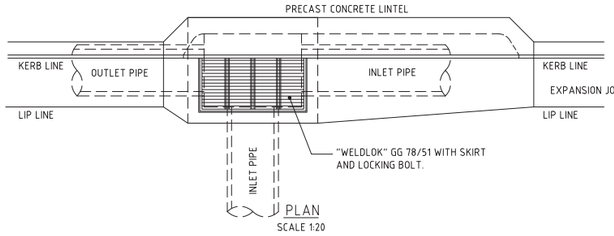
SECTION
SCALE 1:20

SEALED JUNCTION PIT - SJP



NOTE:
L DIMENSION IN DIRECTION OF DOWNSTREAM PIPE

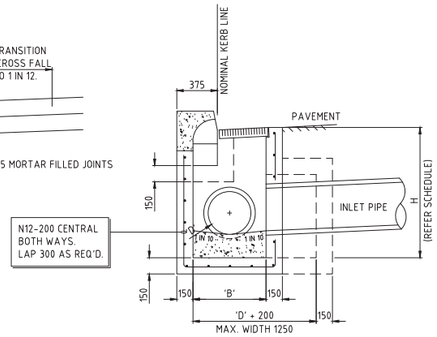
LONG SECTION
SCALE 1:20



PLAN
SCALE 1:20

KERB INLET PIT - KIP

NOTE:
DETAIL SHOWN FOR INFORMATION ONLY. CONTRACTOR TO ADOPT DETAIL AS PER PCC STANDARD DRAWING SD2001 FOR ALL STANDARD KERB INLET PITS

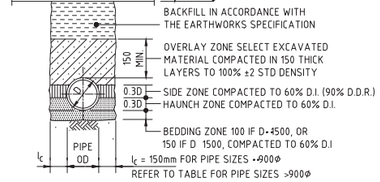


CROSS SECTION
SCALE 1:20

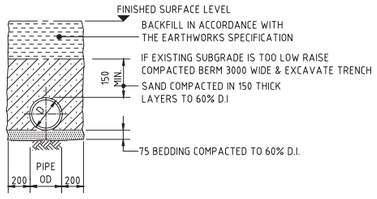
CONCRETE QUALITY					
ELEMENT	SLUMP	AGGREGATE (MAX. SIZE)	CEMENT TYPE	ADMIXTURE	F'c (MPa)
PIT	80	20	GP	NIL	32

NOTES:

1. WHERE GULLY PIT IS LOCATED ON KERB RETURNS OR BULB OF CUL-DE-SACS PROVIDE CURVED PRECAST CONCRETE LINTELS.
2. SAG PITS SHALL HAVE LINTEL PLACED CENTRALLY ABOUT THE GRATE.
3. ALL REINFORCING TO HAVE 30 MIN. CLAER CONCRETE COVER.
4. FOR PITS DEEPER THAN 1200mm CLIMB RAILS SHALL BE PROVIDED.



TYPE HS2 SUPPORT TO CONCRETE PIPES UNDER PAVEMENT
SCALE 1:20
D •4350, MAX FILL = 4.0m
D >1350, MAX FILL = 3.0m



SUPPORT TO uPVC PIPES
SCALE 1:20

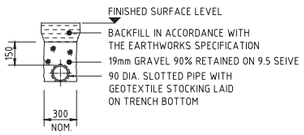
BEDDING & HAUNCH MATERIAL GRADING	
SIEVE SIZE (mm)	WEIGHT PASSING (%)
19.0	100
2.36	100 TO 50
0.60	90 TO 50
0.30	60 TO 10
0.15	25 TO 0
0.075	10 TO 0

SIDE ZONE WIDTH	
PIPE SIZE (mm)	l_c (mm)
•900Φ	150
1050Φ	175
1200Φ	200
1350Φ	225
1500Φ	250
1650Φ	275
1800Φ	300

ENGINEER TO SPECIFY TRENCH WIDTHS FOR PIPE SIZES GREATER THAN 1800Φ

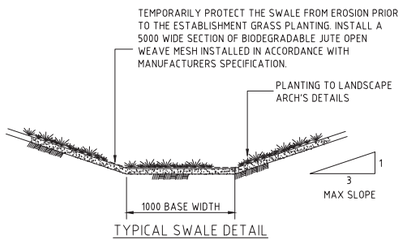
SIDE ZONE MATERIAL GRADING	
SIEVE SIZE (mm)	WEIGHT PASSING (%)
75.0	100
9.5	100 TO 50
2.36	100 TO 50
0.60	50 TO 15
0.075	25 TO 0

SELECT FILL MATERIAL IN ACCORDANCE WITH TABLE 1 AS 3725

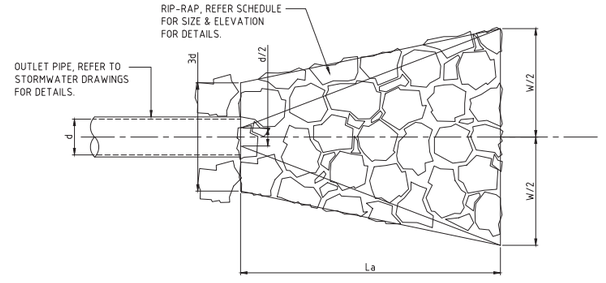


SUPPORT TO AGRICULTURAL DRAIN
SCALE 1:20

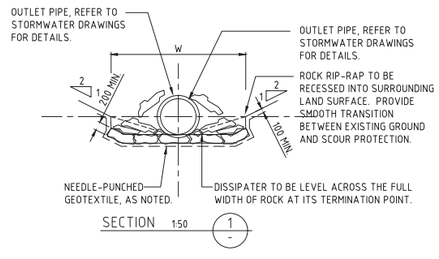
SIDE ZONE MATERIAL GRADING	
SIEVE SIZE (mm)	WEIGHT PASSING (%)
19.0	100
9.5	100 TO 50
2.6	100 TO 30
0.60	50 TO 15
0.075	25 TO 0



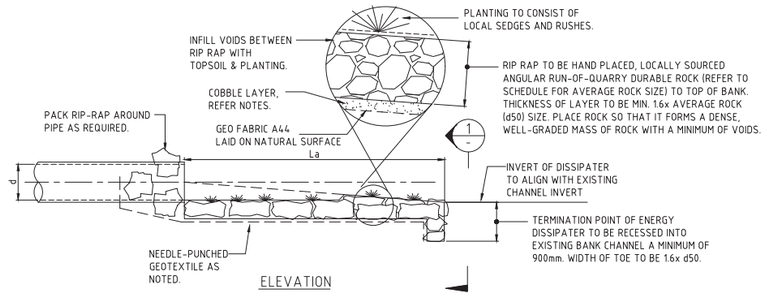
TYPICAL SWALE DETAIL
1:20
ADOPT AS REQUIRED



PLAN VIEW



SECTION 1:50 (1 / -)



ELEVATION

STORMWATER OUTLET DISSIPATER

SCALE 1:50

DISSIPATER NOTES:

1. ALIGN STRUCTURE EVENLY WITH BANK.
2. LOCATE STRUCTURE AT INVERT LEVEL OF STREAM AND POINT IN A DOWNSTREAM DIRECTION.
3. PIPE TO REST ON, AND BE PACKED IN, BY RIP-RAP (SIZE AS NOTED).
4. DISCHARGE INTO STREAM WHERE BEDROCK IS PRESENT, OTHERWISE SCOUR PROTECT AS REQUIRED.
5. SCOUR PROTECT THE OPPOSITE BANK AS REQUIRED. SCOUR PROTECTION TO BE PROVIDED WHERE OPPOSITE BANK IS WITHIN 12-14 TIMES THE PIPE DIAMETER.
6. RIP-RAP TO CONSIST OF ANGULAR RUN-OF-QUARRY ROCK (d50= 300mm MINIMUM) AS NOTED IN THE SCHEDULE. RIP-RAP TO BE MINIMUM THICKNESS OF RIP-RAP LAYER TO BE 1.6x AVERAGE ROCK SIZE (d50).
7. RIP-RAP IS TO BE PLACED OVER A 200mm LAYER OF 140mm COBBLES OVER NEEDLE-PUNCHED GEOFAB A44.
8. PLACE ROCK SO THAT IT FORMS A DENSE, WELL-GRADED MASS OF ROCK WITH A MINIMUM OF VOIDS. THE FINISHED RIP-RAP SURFACE SHOULD BE FREE OF POCKETS OF SMALL ROCK OR CLUSTERS OF LARGE ROCKS.
9. GAPS IN RIP-RAP TO BE HAND PACKED WITH TOPSOIL & PLANTED WITH NATIVE SEDGES & RUSHES TO PROVIDE. THE INTENT IS FOR THERE TO BE NO VOIDS BETWEEN RIP-RAP BOULDERS.
10. ENSURE THE FINISHED ROCK SURFACE BLENDS WITH THE SURROUNDING GROUND LEVELS. NO OVERFALL OR PROTRUSION OF ROCK SHOULD BE APPARENT.
11. ENSURE THAT STORMWATER FROM SURROUNDING GROUND IS FREE TO ENTER THE STRUCTURE WITHOUT CAUSING UNDESIRABLE PONDING OR SCOUR.

500mm 0 1 2 3 4 5m
SCALE 1:50 AT A0 SIZE SHEET

200mm 0 500 1000 1500 2000mm
SCALE 1:20 AT A0 SIZE SHEET

FOR DEVELOPMENT APPLICATION

AMENDMENTS	DATE	ISSUE
ISSUED FOR DEVELOPMENT APPLICATION	01.05.20	C
ISSUED FOR DEVELOPMENT APPLICATION	01.11.19	B
ISSUED FOR DEVELOPMENT APPLICATION	15.10.18	A

ALTIS PROPERTY PARTNERS

CLIENT: FRASERS PROPERTY

PROJECT: MAMRE SOUTH PRECINCT
657 - 708 MAMRE ROAD
KEMPS CREEK, 2178, NSW

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
MW	MC	APRIL '18	MW	A0	AS SHOWN	C013362.00-DA450

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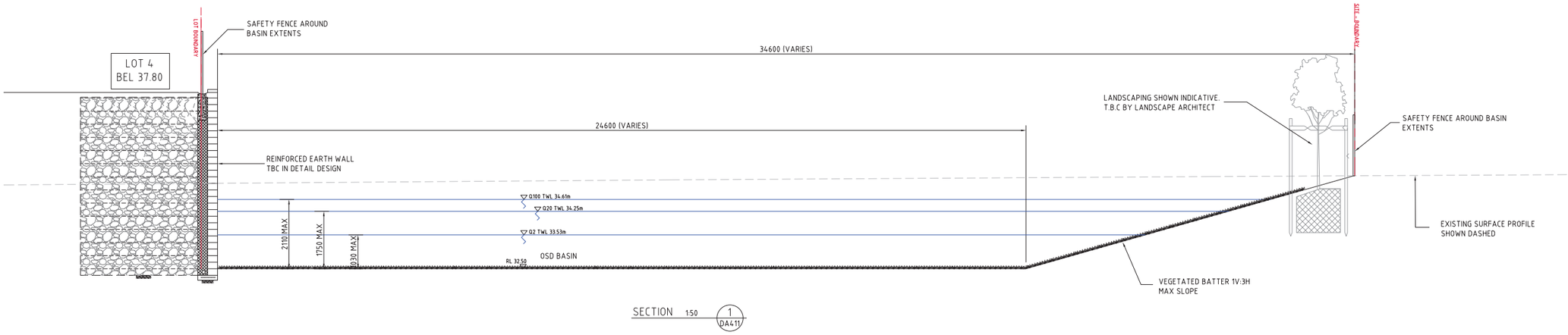
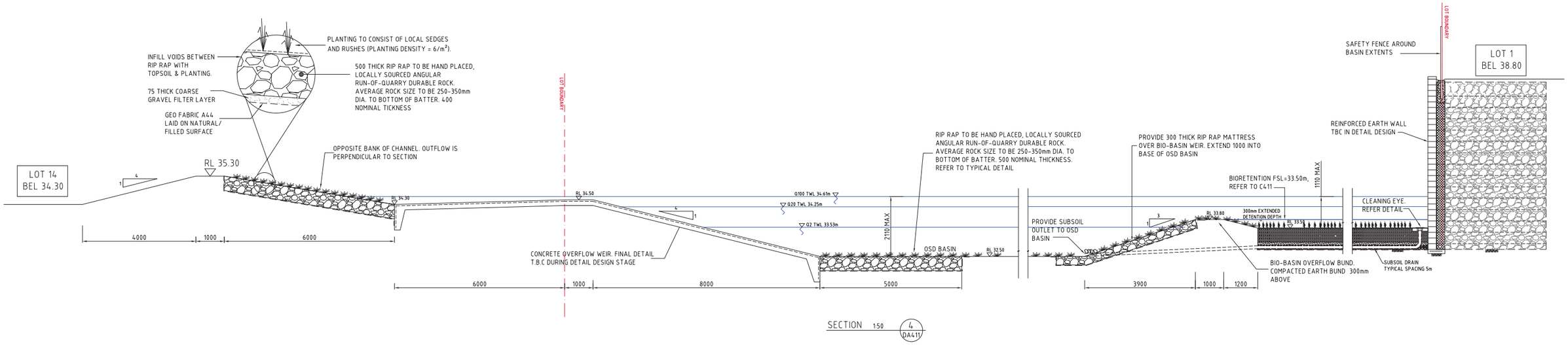
DRAWING TITLE: STORMWATER DRAINAGE DETAILS - SHEET 1

DRAWING No: C013362.00-DA450

ISSUE: C



SECTION 1:50 (1 / DA411)



SECTION 1:50 (4 / DA411)

1m 0 1 2 3 4 5 6 7 8 9 10m
SCALE 1:100 AT A0 SIZE SHEET

FOR DEVELOPMENT APPLICATION

AMENDMENTS	DATE	ISSUE
LOT NUMBER REVISION	03.08.20	D
ISSUED FOR DEVELOPMENT APPLICATION	24.07.20	C
ISSUED FOR DEVELOPMENT APPLICATION	04.05.20	B
ISSUED FOR DEVELOPMENT APPLICATION	01.05.20	A

ALTIS PROPERTY PARTNERS

CLIENT: FRASERS PROPERTY

PROJECT: MAMRE SOUTH PRECINCT
657 - 708 MAMRE ROAD
KEMPS CREEK, 2178, NSW

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF
MW	MC	APRIL '18	MW	A0	AS SHOWN	C013362.00-DA455

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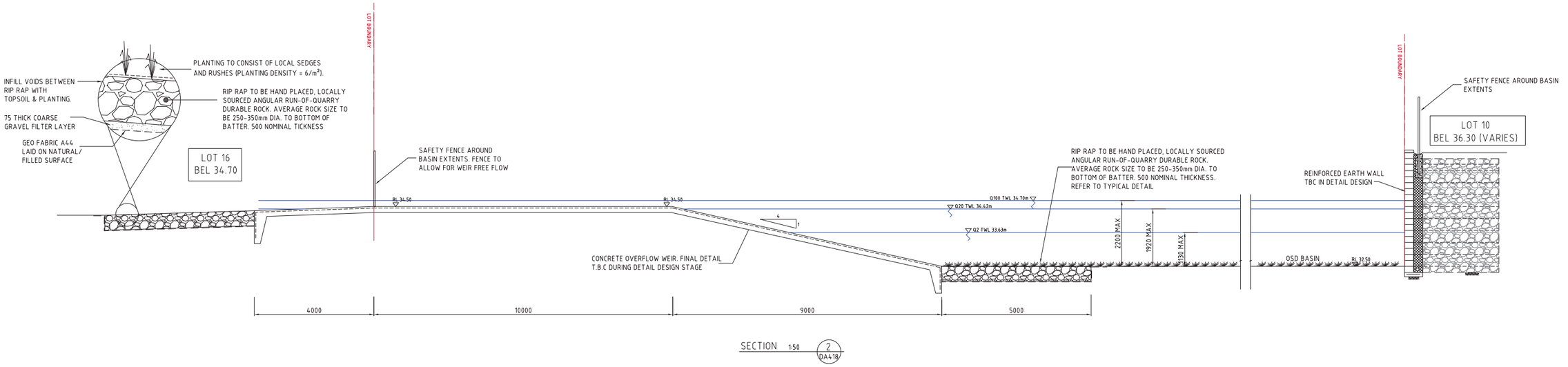
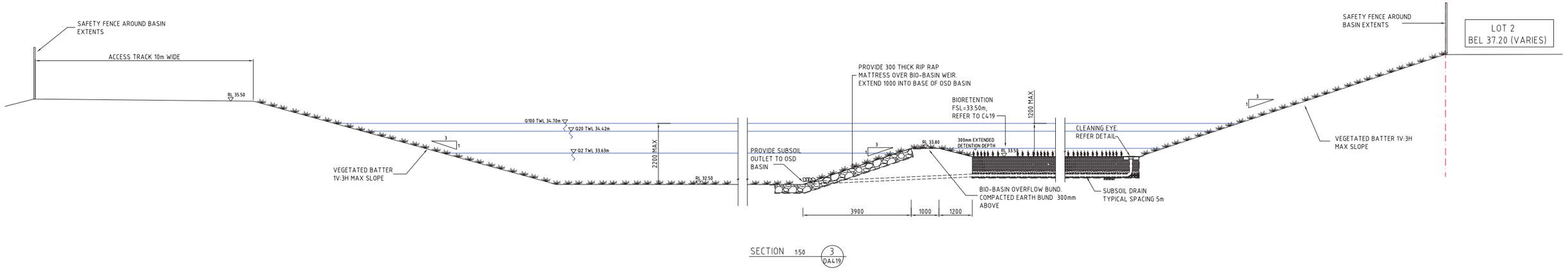
DRAWING TITLE: BASIN SECTIONS SHEET 1

DRAWING No: C013362.00-DA455 ISSUE: D



SECTION 1:50 (2 / DA418)



SECTION 1:50 (3 / DA419)

1m 0 1 2 3 4 5 6 7 8 9 10m
SCALE 1:100 AT A0 SIZE SHEET

FOR DEVELOPMENT APPLICATION

AMENDMENTS	DATE	ISSUE
LOT NUMBER REVISED	03.08.20	C
LOT NUMBER REVISED	28.07.20	B
ISSUED FOR DEVELOPMENT APPLICATION	24.07.20	A

AMENDMENTS DATE ISSUE | AMENDMENTS DATE ISSUE

ALTIS PROPERTY PARTNERS

CLIENT: FRASERS PROPERTY

PROJECT: MAMRE SOUTH PRECINCT
657 - 708 MAMRE ROAD
KEMPS CREEK, 2178, NSW

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
MW	MC	APRIL '18	MW	A0	AS SHOWN	C013362.00 DA456

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DRAWING TITLE: BASIN SECTIONS SHEET 2

DRAWING No: C013362.00-DA456 ISSUE: C

BIO-RETENTION NOTES:

FILTER MEDIA TO BE LOAMY SAND WITH A PERMEABILITY NOT LESS THAN 200mm/hr. FILTER MEDIA TO BE FREE OF RUBBISH, DELETERIOUS MATERIAL, TOXICANTS, DECLARED PLANTS AND LOCAL WEEDS, AND IS TO NOT BE HYDROPHOBIC.

FILTER MEDIA TO HAVE THE FOLLOWING COMPOSITION RANGE:

CLAY & SILT (<0.05mm)	<3%
VERY FINE SAND (0.05-0.15mm)	5-30%
FINE SAND (0.15-0.25mm)	10-30%
MEDIUM TO COARSE SAND (0.25-1.00mm)	40-60%
COARSE SAND (1.0-2.0mm)	7-10%
FINE GRAVEL (2.0-3.4mm)	<3%

FILTER MEDIA THAT DOES NOT MEET THE FOLLOWING CRITERIA SHALL BE REJECTED:

a. ORGANIC MATTER CONTENT TO BE IDEALLY WITHIN 1% TO 3% (W/W) AND TO BE NO GREATER THAN 5%(W/W).
b. PH TO BE BETWEEN 5.5 AND 7.5
c. PHOSPHOROUS CONTENT TO BE NO GREATER THAN 35mg/kg

FILTER MEDIA TO BE ASSESSED BY QUALIFIED HORTICULTURALIST TO ENSURE CAPABILITY OF SUPPORTING PLANT LIFE.

DRAINAGE LAYER TO BE CLEAN GRAVEL 5-7mm.

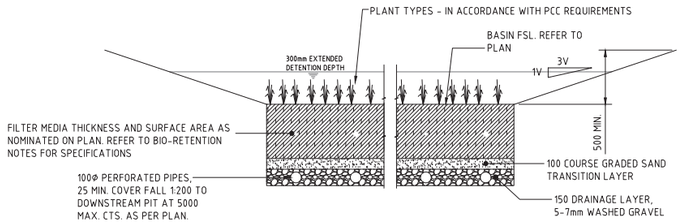
PROVIDE 100mm TOPSOIL AND TEMPORARY EROSION PROTECTION (JUTEMASTER OR EQUIV) TO SWALE BATTER SLOPES AND ADJACENT LANDSCAPED AREAS. NOTE THAT NO TOPSOIL IS TO BE PLACED OVER FILTRATION MEDIA. PROVIDE SILT FENCE TO TOP OF BANK UNTIL SUCH TIME AS THIS STABILISING AND VEGETATION HAS BEEN COMPLETED.

BIO-RETENTION TO BE PARTIALLY INSTALLED, FOLLOWING COMPLETION OF THE ROAD, WITH THE TOP 75-100mm OF FILTER MEDIA REPLACED WITH A FINE TO COARSE SAND UNDERLAIN WITH A GEOTEXTILE LAYER (REFER TO DETAIL). FOLLOWING COMPLETION OF THE UPSTREAM DEVELOPMENT AND SITE STABILISATION, THE SAND IS TO BE REMOVED, REPLACED WITH FILTER MATERIAL AND PLANTED OUT. REFER TO TEMPORARY BIO-BASIN DETAIL

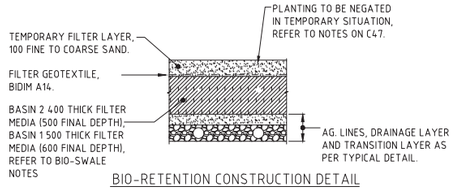
PRIOR TO PLANTING, THE TOP 100mm OF THE BIORETENTION FILTER MEDIA IS TO BE AMELIORATED WITH APPROPRIATE ORGANIC MATTER, FERTILISER AND TRACE ELEMENTS TO AID PLANT ESTABLISHMENT AS PER THE TABLE BELOW:

TABLE: RECIPE FOR AMELIORATING TOP 100mm OF BIORETENTION FILTER MEDIA

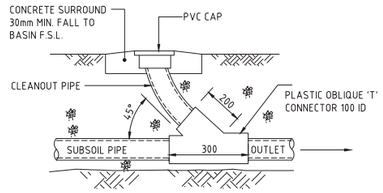
CONSTITUENT	QUANTITY (kg/m2 OF FILTER AREA)
GRANULATED POULTRY MANURE FINES	50
SUPERPHOSPHATE	2
MAGNESIUM SULPHATE	3
POTASSIUM SULPHATE	2
TRACE ELEMENT MIX	1
FERTILISER NPK (16.4.14)	4
LIME	20



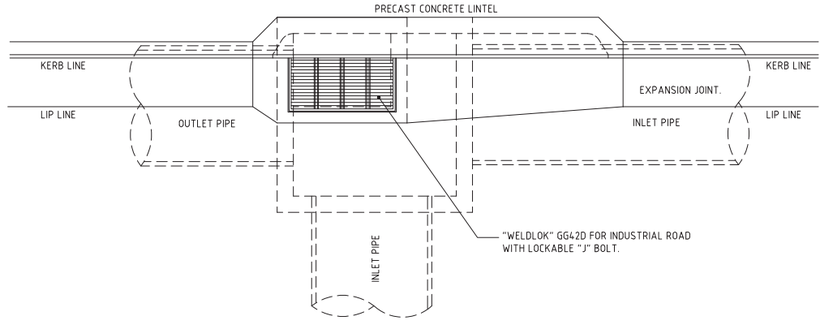
TYPICAL BIO-RETENTION DETAIL
1:20



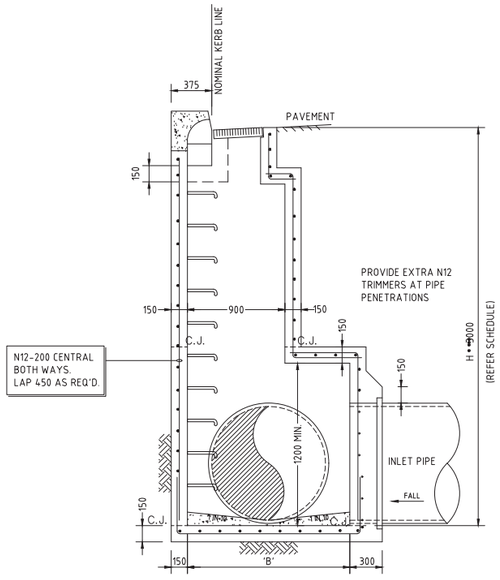
BIO-RETENTION CONSTRUCTION DETAIL
SCALE 1:20
TEMPORARY DETAIL FOR USE DURING CONSTRUCTION & SITE STABILISATION PERIOD - REFER TO NOTES FOR IMPLIMENTATION PERIODS.



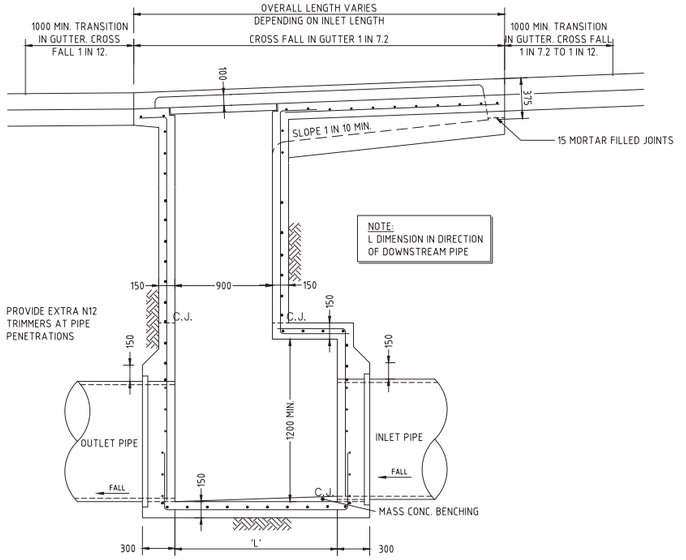
CLEANOUT EYE ELEVATION
SCALE 1:20
DENOTED C.E. ON PLAN



PLAN
SCALE 1:20



CROSS SECTION.
SCALE 1:20

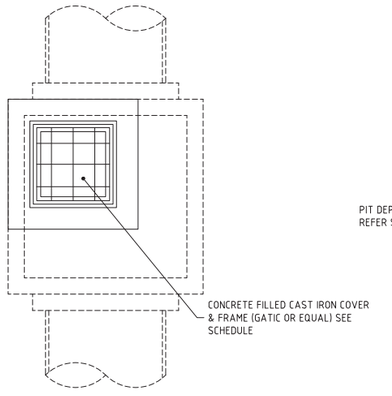


LONG SECTION.
SCALE 1:20

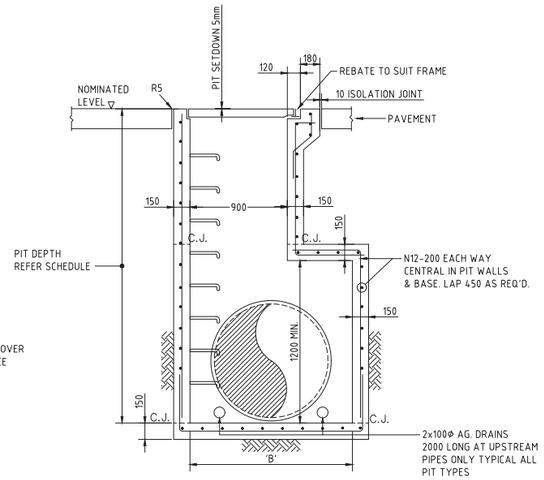
TAPERED KERB INLET PIT - KIP

SUBSOIL NOT SHOWN FOR CLARITY.
PIT DETAIL TO BE ADOPTED TO PIT SIZE GREATER THAN 1200x1200

NOTE:
DETAIL SHOWN FOR INFORMATION ONLY. FINAL DETAIL TO BE PROVIDED DURING DETAIL DESIGN STAGE



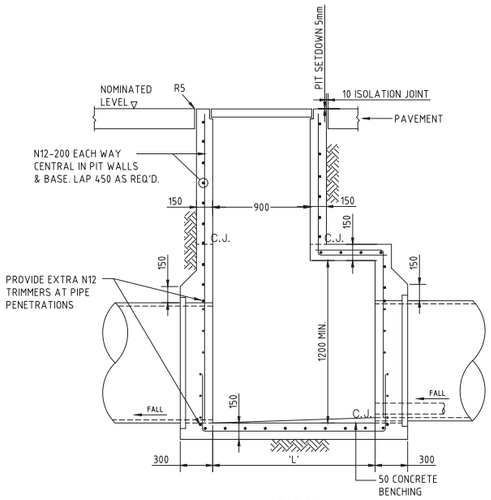
PLAN
SCALE 1:20



SECTION
SCALE 1:20

TAPERED SEALED JUNCTION PIT - SJP

PIT DETAIL TO BE ADOPTED TO PIT SIZE GREATER THAN 1200x1200



SECTION
SCALE 1:20

TAPERED SEALED JUNCTION PIT - SJP

PIT DETAIL TO BE ADOPTED TO PIT SIZE GREATER THAN 1200x1200

200mm 0 500 1000 1500 2000mm
SCALE 1:20 AT A0 SIZE SHEET

FOR DEVELOPMENT APPLICATION

AMENDMENTS	DATE	ISSUE
ISSUED FOR DEVELOPMENT APPLICATION	01.05.20	C
ISSUED FOR DEVELOPMENT APPLICATION	01.11.19	B
ISSUED FOR DEVELOPMENT APPLICATION	15.10.18	A

CLIENT: ALTIS PROPERTY PARTNERS / FRASERS PROPERTY

PROJECT: MAMRE SOUTH PRECINCT
657 - 708 MAMRE ROAD
KEMPS CREEK, 2178, NSW

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
MW	MC	APRIL '18	MW	A0	AS SHOWN	C013362.00-DA440

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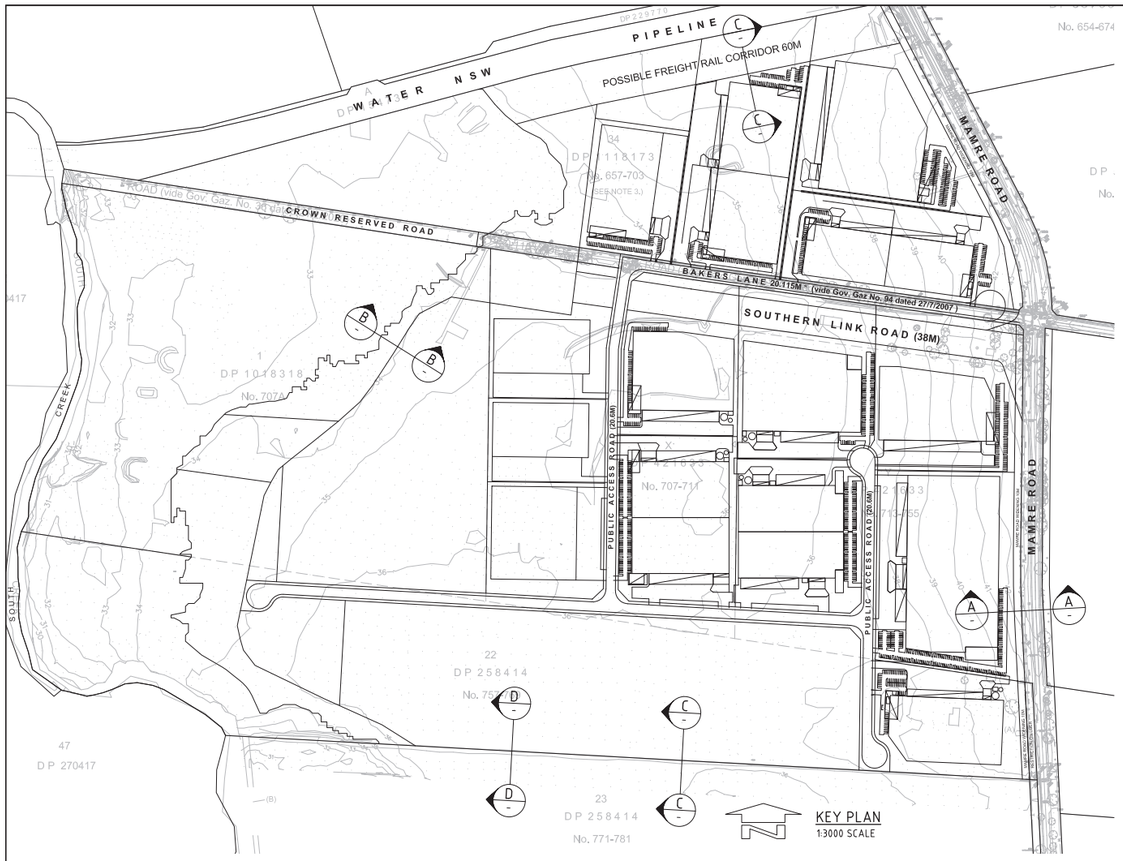
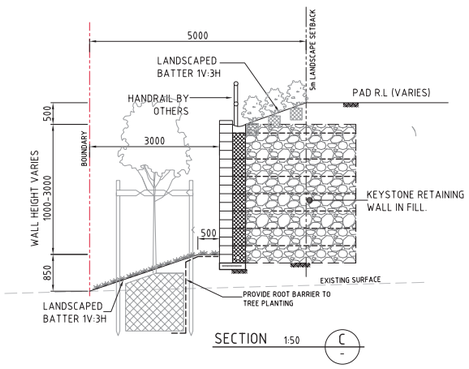
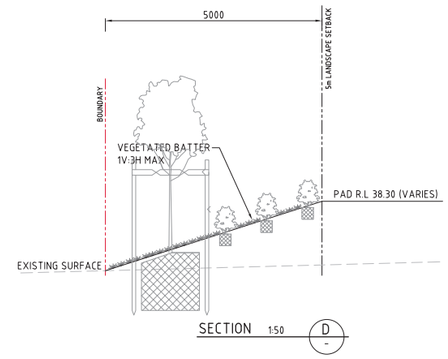
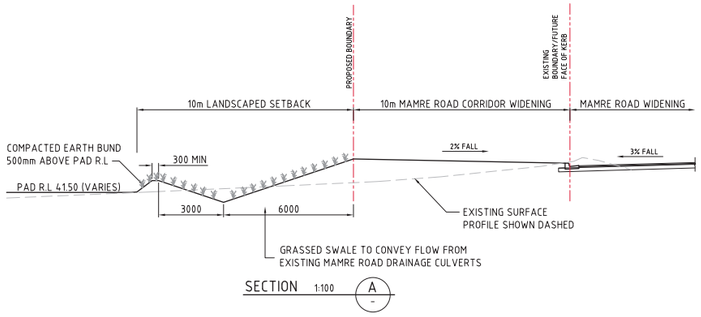
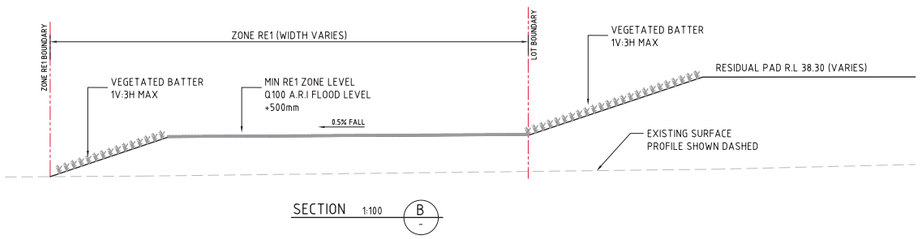
DRAWING TITLE: STORMWATER DRAINAGE DETAILS - SHEET 2
DRAWING No: C013362.00-DA460
ISSUE: C











500mm 0 1 2 3 4 5m
SCALE 1:50 AT A0 SHEET SIZE

1m 0 1 2 3 4 5 6 7 8 9 10m
SCALE 1:100 AT A0 SHEET SIZE

30m 0 50 100 150 200 250 300m
SCALE 1:3000 AT A0 SHEET SIZE

FOR DEVELOPMENT APPLICATION

AMENDMENTS	DATE	ISSUE
REVISED SECTIONS	06.07.20	C
REVISED DETAIL AS CLOUDED	02.07.20	B
ISSUED FOR DEVELOPMENT APPLICATION	29.05.20	A

AMENDMENTS DATE ISSUE | AMENDMENTS DATE ISSUE

ALTIS PROPERTY PARTNERS

CLIENT: FRASERS PROPERTY

PROJECT: MAMRE SOUTH PRECINCT
657 - 708 MAMRE ROAD
KEMPS CREEK, 2178, NSW

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
MW	MC	APRIL '18	MW	A0	AS SHOWN	C013362.00-DA480

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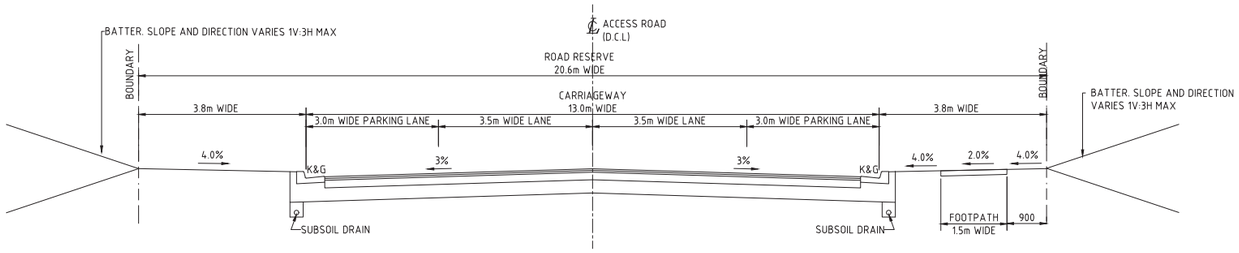
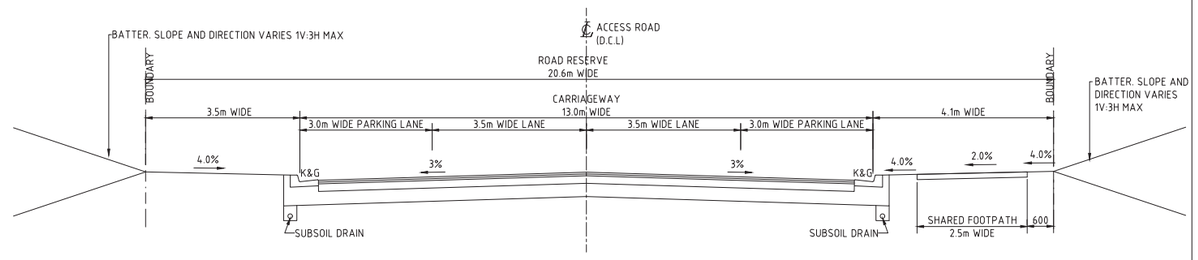
DRAWING TITLE: TYPICAL SECTIONS

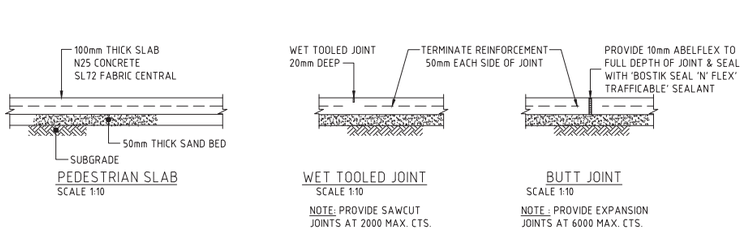
DRAWING No: C013362.00-DA480 ISSUE: C



TYPICAL CROSS SECTION - ACCESS ROAD 2&3
SCALE 1:50



TYPICAL CROSS SECTION - BAKERS LANE & ACCESS ROAD 1
SCALE 1:50



PEDESTRIAN SLAB
SCALE 1:10

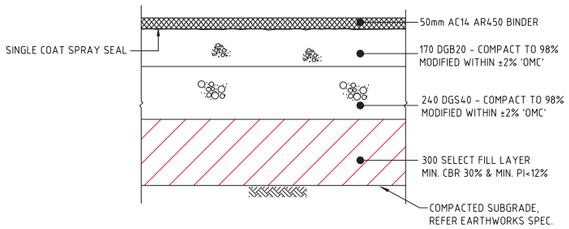
WET TOOLED JOINT
SCALE 1:10

NOTE: PROVIDE SAWCUT JOINTS AT 2000 MAX. CTS.

BUTT JOINT
SCALE 1:10

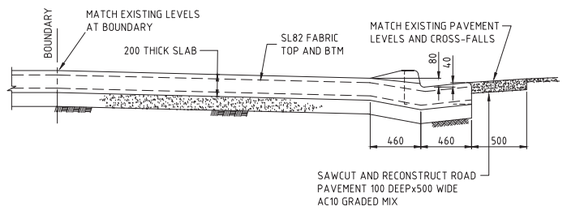
NOTE : PROVIDE EXPANSION JOINTS AT 6000 MAX. CTS.

PEDESTRIAN SLAB DETAILS

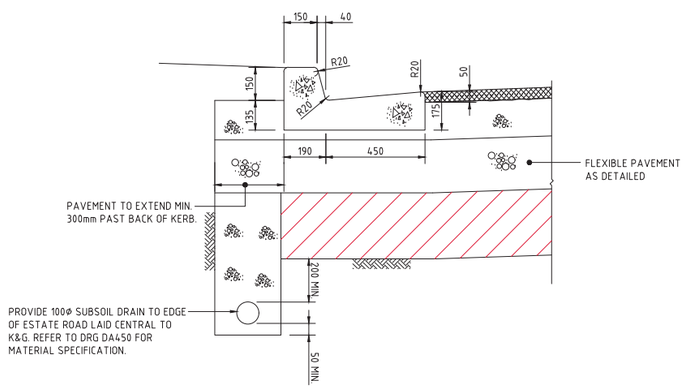


ACCESS ROAD PAVEMENT DETAIL

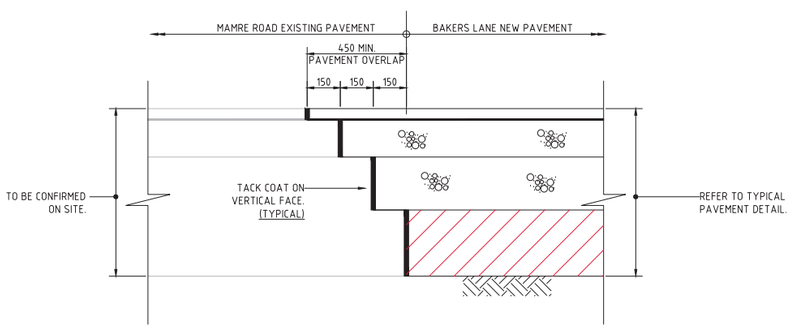
SCALE 1:10
DESIGN TRAFFIC $1x10^7$ ESA's
DESIGN CBR VALUE OF 2%
NOTE: FINAL DESIGN SUBJECT TO FURTHER TESTING TO CONFIRM CBR VALUE



INDUSTRIAL VEHICULAR CROSS OVER DETAIL - IVC
SCALE 1:20

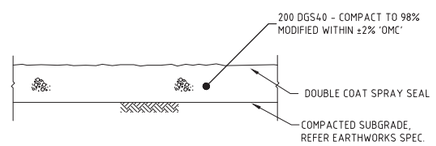


PENRITH CITY COUNCIL KERB & GUTTER
SCALE 1:10



TYPICAL NEW / EXISTING PAVEMENT INTERFACE DETAIL

SCALE 1:10



BASIN ACCESS TRAIL PAVEMENT DETAIL

SCALE 1:10
DESIGN TRAFFIC $5x10^4$ ESA's
DESIGN CBR VALUE OF 2%

500mm 0 1 2 3 4 5m
SCALE 1:50 AT A0 SIZE SHEET

100mm 0 200 400 600 800 1000mm
SCALE 1:10 AT A0 SIZE SHEET

200mm 0 500 1000 1500 2000mm
SCALE 1:20 AT A0 SIZE SHEET

FOR DEVELOPMENT APPLICATION

AMENDMENTS	DATE	ISSUE
ISSUED FOR DEVELOPMENT APPLICATION	24.07.20	E
REVISED CROSS SECTIONS	06.07.20	D
ISSUED FOR DEVELOPMENT APPLICATION	01.05.20	C
ISSUED FOR DEVELOPMENT APPLICATION	01.11.19	B
ISSUED FOR DEVELOPMENT APPLICATION	15.10.18	A

AMENDMENTS DATE ISSUE

AMENDMENTS DATE ISSUE

ALTIS PROPERTY PARTNERS

CLIENT FRASERS PROPERTY

PROJECT
MAMRE SOUTH PRECINCT
657 - 708 MAMRE ROAD
KEMPS CREEK, 2178, NSW

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
MW	MC	APRIL '18	MW	A0	AS SHOWN	C013362.00-DA500

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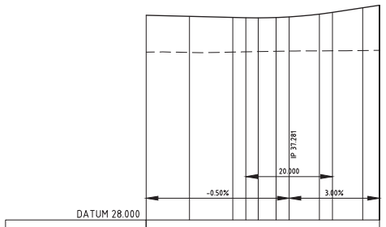
DRAWING TITLE
ROADWORKS DETAILS

DRAWING No C013362.00-DA500 ISSUE E



CHAINAGE	EXISTING SURFACE LEVEL	FINISHED SURFACE LEVEL	CUT/FILL DEPTH
990.000	35.743	37.446	1.703
1000.000	35.729	37.396	1.668
1010.000	35.746	37.346	1.600
1013.000	35.757	37.331	1.574
1015.857	35.767	37.324	1.557
1020.000	35.782	37.339	1.558
1023.000	35.792	37.369	1.577
1030.000	35.803	37.499	1.696
1033.000	35.806	37.581	1.776
1040.000	35.818	37.791	1.973
1043.855	35.829	37.907	2.078

HORIZONTAL GEOMETRY

LONGITUDINAL SECTION - CL BAKERS LANE & ACCESS ROAD 1

HORIZONAL SCALE 1:500
VERTICAL SCALE 1:100

HORIZONTAL GEOMETRY

CHAINAGE	EXISTING SURFACE LEVEL	FINISHED SURFACE LEVEL	CUT/FILL DEPTH
510.000	34.799	38.166	3.367
514.571	34.79	38.135	3.350
514.581	34.79	38.135	3.349
520.000	34.767	38.099	3.332
530.000	34.724	38.032	3.307
540.000	34.659	37.965	3.306
550.000	34.597	37.898	3.301
550.771	34.59	37.892	3.299
560.000	34.465	37.831	3.365
570.000	33.933	37.764	3.831
580.000	34.078	37.697	3.619
582.500	34.056	37.680	3.624
588.017	34.065	37.661	3.596
588.761	34.07	37.662	3.594
590.000	34.072	37.664	3.592
597.500	34.135	37.716	3.581
600.000	34.165	37.745	3.580
610.000	34.291	37.860	3.569
620.000	34.411	37.975	3.564
630.000	34.453	38.090	3.637
640.000	34.474	38.205	3.731
650.000	34.561	38.321	3.760
660.000	36.231	38.436	2.205
670.000	36.241	38.551	2.310
678.197	36.16	38.645	2.486
680.000	36.141	38.666	2.525
685.000	36.088	38.724	2.636
690.000	35.996	38.774	2.779
692.044	35.96	38.791	2.834
700.000	35.807	38.834	3.027
705.918	35.695	38.844	3.149
710.000	35.619	38.839	3.221
715.000	35.524	38.821	3.297
720.000	35.430	38.796	3.366
730.000	35.242	38.746	3.505
740.000	35.053	38.696	3.643
750.000	35.404	38.646	3.242
760.000	35.451	38.596	3.145
770.000	35.511	38.546	3.036
780.000	35.557	38.496	2.939
790.000	35.502	38.446	2.944
800.000	35.456	38.396	2.941
810.000	35.325	38.346	3.021
820.000	35.222	38.296	3.074
830.000	35.216	38.246	3.030
840.000	35.196	38.196	3.000
850.000	35.161	38.146	2.986
860.000	35.133	38.096	2.963
870.000	35.156	38.046	2.890
880.000	35.184	37.996	2.812
890.000	35.246	37.946	2.700
900.000	35.322	37.896	2.574
910.000	35.368	37.846	2.478
920.000	35.402	37.796	2.394
930.000	35.420	37.746	2.327
940.000	35.462	37.696	2.235
950.000	35.490	37.646	2.156
960.000	35.553	37.596	2.043
970.000	35.601	37.546	1.945
980.000	35.671	37.496	1.825
990.000	35.743	37.446	1.703
1000.000	35.729	37.396	1.668

LONGITUDINAL SECTION - CL BAKERS LANE & ACCESS ROAD 1

HORIZONAL SCALE 1:500
VERTICAL SCALE 1:100

HORIZONTAL GEOMETRY

CHAINAGE	EXISTING SURFACE LEVEL	FINISHED SURFACE LEVEL	CUT/FILL DEPTH
0.000	44.976	44.920	-0.056
10.000	44.406	44.620	0.214
20.000	43.941	44.320	0.379
30.000	43.429	44.020	0.591
40.000	42.957	43.720	0.763
50.000	42.548	43.420	0.872
60.000	42.180	43.120	0.940
70.000	41.808	42.820	1.012
80.000	41.384	42.520	1.136
90.000	40.998	42.220	1.222
100.000	40.665	41.920	1.255
110.000	40.399	41.620	1.221
120.000	40.131	41.320	1.189
123.236	40.055	41.223	1.168
130.000	39.889	41.033	1.144
140.000	39.786	40.802	1.016
143.236	39.712	40.739	1.027
150.000	39.484	40.629	1.145
160.000	39.149	40.514	1.365
163.236	39.047	40.489	1.442
170.000	38.822	40.444	1.622
180.000	38.525	40.377	1.851
190.000	38.252	40.310	2.058
200.000	38.035	40.243	2.208
210.000	37.823	40.176	2.352
220.000	37.643	40.109	2.466
230.000	37.463	40.042	2.579
240.000	37.282	39.975	2.693
250.000	37.105	39.908	2.803
260.000	36.930	39.841	2.910
270.000	36.758	39.774	3.015
280.000	36.582	39.707	3.124
283.755	36.53	39.681	3.155
283.888	36.52	39.681	3.156
290.000	36.431	39.640	3.209
300.000	36.297	39.573	3.275
310.000	36.141	39.506	3.365
320.000	36.022	39.439	3.416
330.000	35.818	39.372	3.554
340.000	35.711	39.305	3.593
350.000	35.605	39.238	3.632
360.000	35.506	39.171	3.664
370.000	35.439	39.104	3.665
380.000	35.359	39.037	3.678
390.000	35.234	38.970	3.736
400.000	35.150	38.903	3.753
410.000	35.120	38.836	3.716
420.000	35.003	38.769	3.766
430.000	34.793	38.702	3.909
440.000	34.898	38.635	3.736
450.000	34.812	38.568	3.755
460.000	34.989	38.501	3.512
470.000	34.964	38.434	3.469
480.000	34.869	38.367	3.497
481.192	34.87	38.359	3.488
481.759	34.87	38.355	3.484
490.000	34.742	38.300	3.557
500.000	34.827	38.233	3.405
510.000	34.799	38.166	3.367
514.571	34.79	38.135	3.350
514.581	34.79	38.135	3.349
520.000	34.767	38.099	3.332

LONGITUDINAL SECTION - CL BAKERS LANE & ACCESS ROAD 1

HORIZONAL SCALE 1:500
VERTICAL SCALE 1:100

1m 0 1 2 3 4 5 6 7 8 9 10m
SCALE 1:100 AT A0 SHEET SIZE

5m 0 10 20 30 40 50m
SCALE 1:500 AT A0 SHEET SIZE

FOR DEVELOPMENT APPLICATION

AMENDMENTS	DATE	ISSUE
REVISED MASTERPLAN	24.07.20	E
REVISED MASTERPLAN	01.05.20	D
ISSUED FOR DEVELOPMENT APPLICATION	01.11.19	C
ISSUED FOR DEVELOPMENT APPLICATION	29.03.19	B
ISSUED FOR DEVELOPMENT APPLICATION	15.10.18	A

ALTIS PROPERTY PARTNERS

CLIENT
FRASERS PROPERTY

PROJECT
MAMRE SOUTH PRECINCT
657 - 708 MAMRE ROAD
KEMPS CREEK, 2178, NSW

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
MW	MC	APRIL '18	MW	A0	AS SHOWN	C013362.00-DA601

CONSULT AUSTRALIA

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email: mail@costinroe.com.au ©

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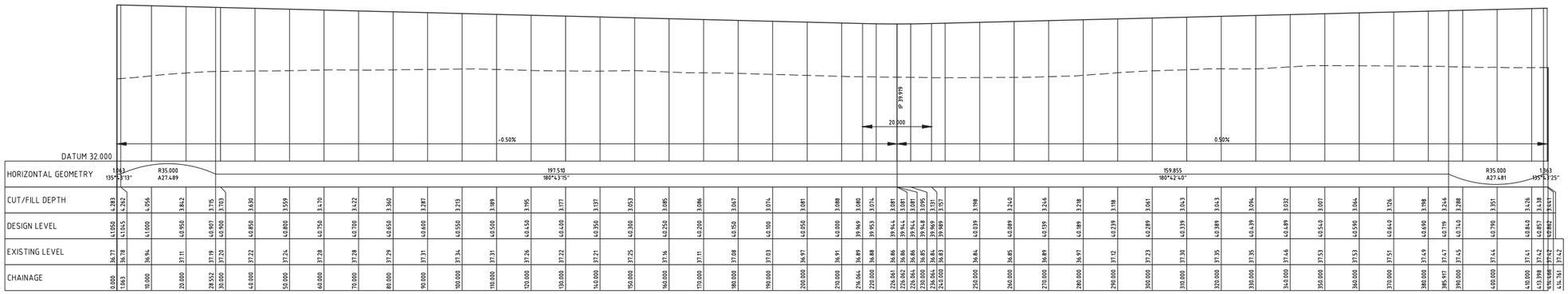
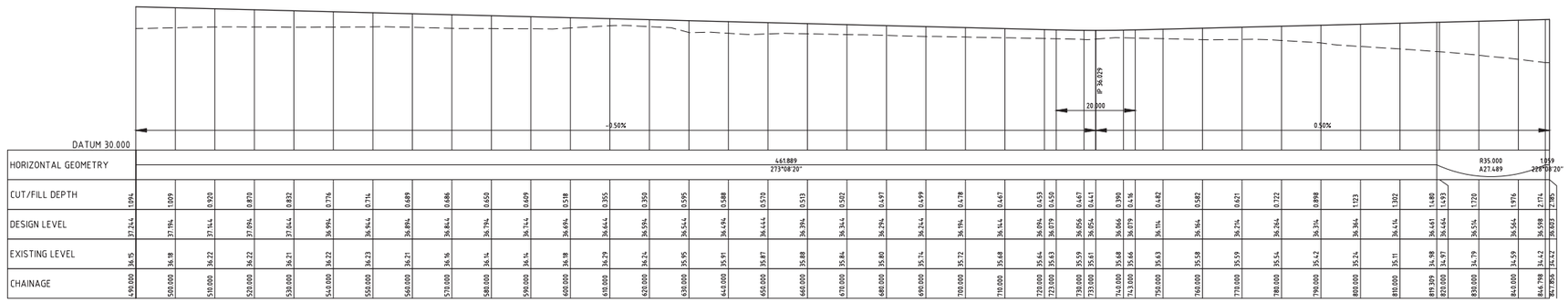
DRAWING TITLE
ROAD LONG SECTIONS
SHEET 1

DRAWING No C013362.00-DA601
ISSUE E



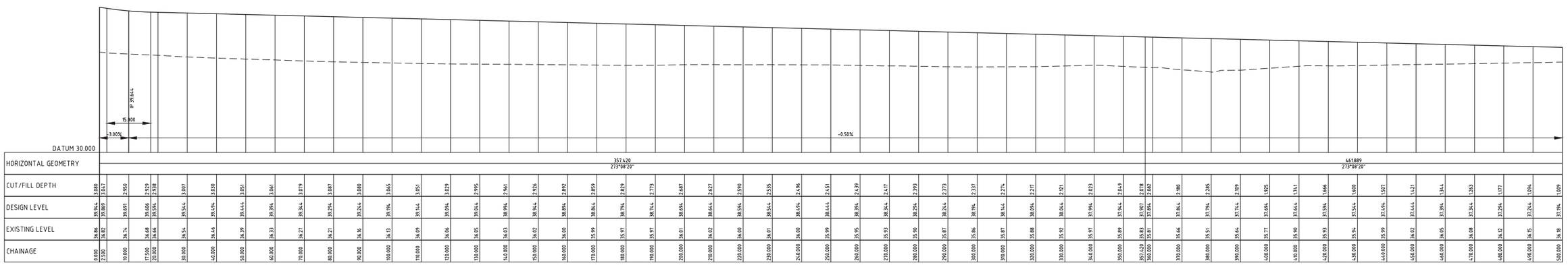
LONGITUDINAL SECTION - CL ACCESS RD 2

HORIZONAL SCALE 1:500
VERTICAL SCALE 1:100



LONGITUDINAL SECTION - CL ACCESS RD 3

HORIZONAL SCALE 1:500
VERTICAL SCALE 1:100



LONGITUDINAL SECTION - CL ACCESS RD 3

HORIZONAL SCALE 1:500
VERTICAL SCALE 1:100

1m 0 1 2 3 4 5 6 7 8 9 10m
SCALE 1:100 AT A0 SHEET SIZE

5m 0 10 20 30 40 50m
SCALE 1:500 AT A0 SHEET SIZE

FOR DEVELOPMENT APPLICATION

AMENDMENTS	DATE	ISSUE
REVISED MASTERPLAN	24.07.20	E
ISSUED FOR DEVELOPMENT APPLICATION	01.05.20	D
ISSUED FOR DEVELOPMENT APPLICATION	11.02.20	C
ISSUED FOR DEVELOPMENT APPLICATION	31.10.19	B
ISSUED FOR DEVELOPMENT APPLICATION	15.10.19	A

AMENDMENTS DATE ISSUE | AMENDMENTS DATE ISSUE | AMENDMENTS DATE ISSUE

ALTIS PROPERTY PARTNERS

CLIENT
FRASERS PROPERTY

PROJECT
MAMRE SOUTH PRECINCT
657 - 708 MAMRE ROAD
KEMPS CREEK, 2178, NSW

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
MW	MC	APRIL '18	MW	A0	AS SHOWN	C013362.00-DA602

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Costin Roe Consulting

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DRAWING TITLE
ROAD LONG SECTIONS
SHEET 2

DRAWING No. C013362.00-DA602 ISSUE E

SOUTHERN LINK ROAD 38m WIDE - OPTION 3

OPTION 3
CROSSING OF PIPELINE STRUCTURE AND EXTENSIVE BRIDGES ACROSS THE 1% AEP FLOOD EXTENT

ALTIS FIRST ESTATE

MINIMUM HORIZONTAL RADIUS 650m

SOUTH CREEK

SYDNEY CATCHMENT AUTHORITY PIPELINE

POSSIBLE RAIL FREIGHT CORRIDOR 60m WIDE

MAMRE ROAD

SYDNEY CATCHMENT AUTHORITY PIPELINE

POSSIBLE RAIL FREIGHT CORRIDOR 60m WIDE

LUDDENHAM ROAD

OPTION 1
STRAIGHT ALIGNMENT PROVIDES EFFICIENCY OF BRIDGE STRUCTURE AND AVOIDS CLASHES WITH EXISTING PROPERTIES

SOUTHERN LINK ROAD 38m WIDE - OPTION 1

INITIAL STRAIGHT SECTION PROVIDED FOR SAFE SIGHT DISTANCE

PROPOSED INTERSECITON LOCATION AS PER NSW DEPARTMENT OF PLANNING REPORT - BROADER WSEA SOUTHERN LINK ROAD NETWORK BY AECOM DATED 06 MAY 2014

SOUTHERN LINK ROAD 38m WIDE

SOUTH CREEK 1% AEP FLOOD EXTENT

MINIMUM HORIZONTAL RADIUS 650m

COSGROVES CREEK

SOUTHERN LINK ROAD 38m WIDE - OPTION 2

PROPOSED INDUSTRIAL ESTATE

MAMRE ROAD

OPTION 2
CURVED ALIGNMENT CLASH WITH TWIN CREEK GOLF COURSE AND REQUIRED ADDITIONAL COSGROVES CREEK CROSSING STRUCTURES

TWIN CREEK RESIDENTIAL ESTATE

LEGEND:

LEVELS DATUM IS AHD.

EXISTING SITE LEVELS AND DETAILS BASED ON SURVEY INFORMATION PROVIDED BY MONTEATH & POWYS DATED 20.03.17.

30.00 - FLOOD LEVEL CONTOUR (MAJOR) 1m INTERVALS

30.20 - FLOOD LEVEL CONTOUR (MINOR) 0.2m INTERVALS

20m 0 50 100 150 200 250m

SCALE 1:2500 AT A0 SHEET SIZE

SOUTHERN LINK ROAD - ALIGNMENT PLAN
SCALE 1:2500

FOR INFORMATION ONLY

AMENDMENTS	DATE	ISSUE
ISSUED FOR INFORMATION	24.07.20	E
ISSUED FOR INFORMATION	01.05.20	D
ISSUED FOR INFORMATION	11.02.20	C
ISSUED FOR INFORMATION	01.11.19	B
ISSUED FOR INFORMATION	06.12.18	A

AMENDMENTS DATE ISSUE | AMENDMENTS DATE ISSUE

ALTIS PROPERTY PARTNERS

CLIENT: FRASERS PROPERTY

PROJECT: MAMRE SOUTH PRECINCT
657 - 708 MAMRE ROAD
KEMPS CREEK, 2178, NSW

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
MW	MC	APRIL '18	MW	A0	AS SHOWN	C013362.00-DA700

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Costin Roe Consulting

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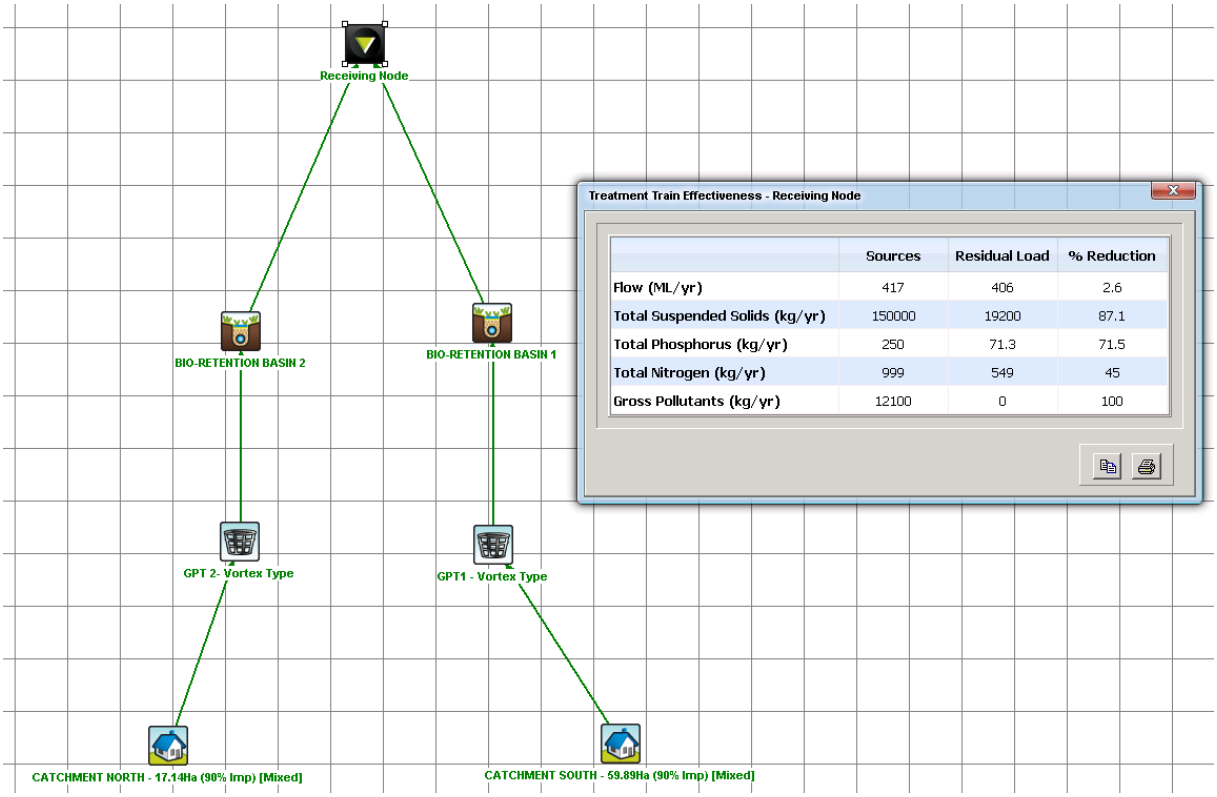
DRAWING TITLE: SOUTHERN LINK ROAD ALIGNMENT PLAN

DRAWING No: C013362.00-DA700 ISSUE: E

Appendix B
MUSIC Results



	Sources	Residual Load	% Reduction
Flow (ML/yr)	417	406	2.6
Total Suspended Solids (kg/yr)	150000	19200	87.1
Total Phosphorus (kg/yr)	250	71.3	71.5
Total Nitrogen (kg/yr)	999	549	45
Gross Pollutants (kg/yr)	12100	0	100

Appendix C
SSD 9522 SEAR's
Dated 14/9/18

NSW GOVERNMENT | Planning & Environment

Planning Services
Industry Assessments
Contact: Bianca Thornton
Phone: 02 8217 2040
Email: bianca.thornton@planning.nsw.gov.au

Our Ref: SSD 9522

Mr Andrew Cowan
Director, Willowtree Planning
Suite 4, Level 7, 100 Walker Street
NORTH SYDNEY NSW 2060

Email: acowan@willowtp.com.au

Dear Mr Cowan

State Significant Development – Planning Secretary's Environmental Assessment Requirements
Kemps Creek Warehouse and Logistics Hub (SSD 9522)

Please find attached the Planning Secretary's Environmental Assessment Requirements (SEARs) for the preparation of an Environmental Impact Statement (EIS) for the above-mentioned development. **Attachment 1** provides guidelines which may assist in the preparation of the EIS.

The attached SEARs have been prepared in consultation with the relevant government agencies and Penrith City Council (see **Attachment 2**). The SEARs are based on the scoping report prepared by Willowtree Planning, dated 15 August 2018.

Please note the Planning Secretary may alter the SEARs at any time. You must consult further with the Department if you do not lodge a development application (DA) and EIS for the development within two years of the date of issue of these SEARs.

I wish to emphasise the importance of effective and genuine community consultation and the need for the proposal to proactively respond to the community's concerns. A comprehensive, detailed and genuine community consultation and engagement process must be undertaken during the preparation of the EIS. This process must ensure the community is informed of the development and engaged with issues of concern to it. Sufficient information must be provided to the community to enable a good understanding of the development and any potential impacts.

If the proposal is likely to have a significant impact on matters of National Environmental Significance, it may require an approval under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). If an EPBC Act approval is required, please advise accordingly, as the Commonwealth approval process may be integrated into the NSW approval process, and supplementary SEARs may need to be issued.

Please contact the Department at least **two weeks** before you lodge the EIS and any associated documentation for the development. This will enable the Department to confirm:

- the applicable fee (see Division 1AA, Part 15 of the *Environmental Planning and Assessment Regulation 2000*)
- consultation and public exhibition arrangements.

If you have any enquiries, please contact Bianca Thornton on the details above.

Yours sincerely

C. Ritchie 14/9/18

Chris Ritchie
Director
Industry Assessments
as the delegate of the Planning Secretary

Planning Secretary's Environmental Assessment Requirements

Section 4.12(8) of the *Environmental Planning and Assessment Act 1979* Schedule 2 of the *Environmental Planning and Assessment Regulation 2000*

Application Number	SSD 9522
Project Name	Kemps Creek Warehouse and Logistics Hub
Development	Establishment of a warehouse and logistics hub, comprising: • site-wide earthworks, infrastructure and internal road network • construction and operation of 11 warehouses comprising 165,186 square metres (m^2) of floor space (152,485 m^2 warehouse and 7,700 m^2 office) • 816 parking spaces • subdivision.
Location	657-769 Mamre Road, Kemps Creek in the Penrith Local Government Area (Lot 34 DP1118173, Lot X DP421633, Lot 1 DP1018318, Lot Y DP421633 and Lot 22 DP258414)
Applicant	Frasers Property Industrial Construction Pty Ltd and Altis Property Partners Pty Ltd
Date of Issue	14 September 2018
General Requirements	The environmental impact statement (EIS) must be prepared in accordance with, and meet the minimum requirements of, clauses 6 and 7 of Schedule 2 of the *Environmental Planning and Assessment Regulation 2000* (the Regulation). In addition, the EIS must include: • a detailed description of the development, including: – the need for the proposed development – justification for the proposed development – likely staging of the development – likely interactions between the development and existing, approved and proposed operations in the vicinity of the site – plans of any proposed building works • consideration of all relevant environmental planning instruments, including identification and justification of any inconsistencies with these instruments • a risk assessment of the potential environmental impacts of the development, identifying the key issues for further assessment • a detailed assessment of the key issues specified below, and any other significant issues identified in this risk assessment, which includes: – a description of the existing environment, using sufficient baseline data – an assessment of the potential impacts of all stages of the development, including any cumulative impacts, taking into consideration relevant guidelines, policies, plans and statutes – a description of the measures that would be implemented to avoid, minimise, mitigate and if necessary, offset the potential impacts of the development, including proposals for adaptive management and/ or contingency plans to manage significant risks to the environment • a consolidated summary of all the proposed environmental management and monitoring measures, highlighting commitments included in the EIS. The EIS must also be accompanied by a report from a qualified quantity surveyor providing: • a detailed calculation of the capital investment value (CIV) (as defined in clause 3 of the Regulation) of the proposal, including details of all assumptions and

	prepared on company letterhead and indicate applicable GST component of the CIV • an estimate of jobs that will be created during the construction and operational phases of the proposed development • certification that the information provided is accurate at the date of preparation.
Key issues	The EIS must address the following specific matters: • **Statutory and Strategic Context** – including: – detailed justification that the proposed land use is permissible, taking into consideration the State Environmental Planning Policy (Western Sydney Employment Area) 2009 – details of any proposed consolidation or subdivision of land – demonstration that the proposal is consistent with all relevant planning strategies, environmental planning instruments, adopted precinct plans, draft district plan(s) and adopted management plans and justification for any inconsistencies. The following must be addressed: o State Environmental Planning Policy (Western Sydney Employment Area) 2009 o A Metropolis of Three Cities o Western City District Plan o Western Sydney Aerotropolis – Land Use and Infrastructure Implementation Plan – Stage 1: Initial Precincts o Western Sydney Freight Line corridor. • **Planning Agreement/Development Contributions** – demonstration that satisfactory arrangements have been or would be made to provide, or contribute to the provision of, necessary local and regional infrastructure required to support the development. • **Suitability of the Site** – including: – an analysis of site constraints, such as flooding impacts and future road and road corridors – a detailed justification that the site is suitable for the scale of the proposal and any constraints identified, having regard to the site's surrounds and the potential visual impact of the development. • **Community and Stakeholder Engagement** – including: – a detailed community and stakeholder participation strategy which identifies who in the community has been consulted and a justification for their selection, other stakeholders consulted and the form(s) of consultation, including a justification for this approach – a report on the results of the implementation of the strategy including issues raised by the community and surrounding land owners and occupiers that may be impacted by the proposal – details of how issues raised during community and stakeholder consultation have been addressed and whether they have resulted in changes to the proposal – details of the proposed approach to future community and stakeholder engagement based on the results of consultation. • **Urban Design and Visual** – including: – a visual impact assessment (including photomontages and perspectives) of the development layout and design (buildings and storage areas), including height, colour, scale, building materials and finishes, signage and lighting, having regard to surrounding residential receivers and clause 23 of the State Environmental Planning Policy (Western Sydney Employment Area) 2009, particularly in terms of potential impacts on: o nearby public and private receivers o significant vantage points in the broader public domain including Mamre Road – consideration of the layout and design of the development having regard to the surrounding vehicular, pedestrian and cycling networks

- detailed plans showing suitable landscaping which incorporates endemic species
- a design report that establishes design guidelines and development parameters, and includes diagrams, illustrations and drawings to clarify the design intent of the proposal and which clearly demonstrates how design quality will be achieved in accordance with Clause 31 Design Principles of the State Environmental Planning Policy (Western Sydney Employment Area) 2009

- **Traffic and Transport** – including:
  - a quantitative Traffic Impact Assessment prepared in accordance with relevant Penrith City Council, Austroads and Roads and Maritime Services guidelines
  - details of all daily and peak traffic and transport movements likely to be generated by the development (vehicle type, public transport) during construction and indicative operation
  - impacts on the safety and capacity of the surrounding road network and access points, using SIDRA or similar modelling, to assess impacts from current traffic counts and cumulative traffic from existing and proposed development
  - demonstrate that sufficient loading/unloading, car parking and pedestrian and cyclist facilities have been provided for the development
  - details and a justification of access to, from and within the site (vehicular and pedestrian)
  - details of road upgrades, new roads or access points required for the development, if necessary
  - consideration of the western connection of the Southern Link Road and road widening requirements for Mamre Road, in consultation with RMS
  - consideration of the proposed Western Sydney Freight Line, including the width of the corridor and how this will be considered in the layout of the proposal, in consultation with TfNSW
  - details of how the proposal would allow connection to future land uses to the south of the site.
- **Flooding** – a detailed hydrological and hydraulic assessment which includes the following:
  - a comprehensive assessment of the impact of flooding on the development for the full range of flood events up to the probable maximum flood. This assessment should address any relevant provisions of the NSW Floodplain Development Manual (2005) including the potential effects of climate change, sea level rise and an increase in rainfall intensity
  - consideration of current flooding behaviour and impacts, including on flood detention areas, how flood behaviour and impacts will change due to the proposal and how these changes will be mitigated
  - assessment of the impact of the development on flood behaviour (i.e., levels, velocities and duration of flooding) and on adjacent, downstream and upstream areas
  - detail proposed floor levels for all proposed habitable structures on the site having considered the full range of flood events up to the probable maximum flood
  - detail an emergency response plan for the site, which includes consideration of a flood-free access to or from the development site in extreme flood events.
- **Soils and Water** – including:
  - a description of how the proposal takes into consideration the South Creek corridor strategy and the land use vision for the South Creek Precinct, in consultation with Infrastructure NSW and the Greater Sydney Commission
  - measures to protect the Warragamba Pipelines corridor from any works or activities associated with the development

	– details of how access to the Warragamba Piplines corridor would be maintained, in consultation with WaterNSW – a description of the water demands and a breakdown of water supplies, including a detailed site water balance – identification of any water licensing requirements under the *Water Act 1912* or *Water Management Act 2000* – details of proposed erosion and sediment controls during construction – a description of the surface and stormwater management system designed in accordance with Penrith City Council's Water Sensitive Urban Design Policy, including drainage design, on site detention, and measures to treat or re-use water – characterisation of the nature and extent of any contamination on the site and surrounding area – an assessment of potential impacts on surface and groundwater resources, drainage patterns, soil (stability, salinity and acid sulfate soils), related infrastructure, watercourses and riparian land and proposed mitigation, management and monitoring measures. • **Biodiversity** – including: – an assessment of the proposal's biodiversity impacts in accordance with the *Biodiversity Conservation Act 2016*, including the preparation of a Biodiversity Development Assessment Report (BDAR) where required under the Act, except where a waiver for preparation of a BDAR has been granted – describe how impacts upon critical vegetation and endangered species on site will be avoided and minimised. • **Infrastructure Requirements** – including: – a detailed written and/or geographical description of infrastructure required on the site – identification of any infrastructure upgrades required off-site to facilitate the development, and describe any arrangements to ensure that the upgrades will be implemented in a timely manner and maintained – an infrastructure delivery and staging plan, including a description of how infrastructure on and off-site will be co-ordinated and funded to ensure it is in place prior to the commencement of construction – an assessment of the impacts of the development (construction and operation) on existing infrastructure surrounding the site. • **Heritage** – including: – an Aboriginal Cultural Heritage Assessment Report prepared in consultation with Aboriginal people and in accordance with Office of Environment and Heritage guidelines – an assessment of European Heritage including potential impacts on the surrounding site and surrounding area, including any built landscape items, conservation areas, views and settings. • **Noise and Vibration**– including: – a quantitative noise and vibration impact assessment undertaken by a suitably qualified person in accordance with the relevant Environment Protection Authority guidelines and including an assessment of nearby sensitive receivers – cumulative impacts of other developments – details of proposed mitigation, management and monitoring measures. • **Hazards and Risk** – including: – a preliminary risk screening completed in accordance with *State Environmental Planning Policy No. 33 – Hazardous and Offensive Development* and *Applying SEPP 33* (DoP, 2011), with a clear indication of class, quantity and location of all dangerous goods and hazardous materials associated with the development. Should preliminary screening indicate that the project is "potentially hazardous" a preliminary hazard analysis (PHA) must be prepared in accordance with Hazardous Industry Planning Advisory

	Paper No. 6 – Guidelines for Hazard Analysis (DoP, 2011) and Multi-Level Risk Assessment (DoP, 2011). • **Bushfire** – including: – details of the storage of any flammable materials – an assessment against the requirements of *Planning for Bushfire Protection 2006*, particularly access and provision of water supply for firefighting purposes – a description of measures to ensure the proposal will not increase the bushfire risk to adjoining lands. • **Waste** – including: – details of the quantities and classification of all waste streams to be generated on site during construction and operation – details of waste storage, handling and disposal during construction and operation – details of the measures that would be implemented to ensure that the development is consistent with the aims, objectives and guidance in the NSW Waste Avoidance and Resource Recovery Strategy 2014-2021. • **Air Quality** – including: – an assessment of the air quality impacts (including dust) during construction and operation of the development, in accordance with the relevant Environment Protection Authority guidelines – details of proposed mitigation, management and monitoring measures. • **Social** – including the preparation of a social impact assessment, which: – identifies and analyses the potential social impacts of the development, from the points of view of the affected community/ies and other relevant stakeholders, i.e. how they expect to experience the project – considers how potential environmental changes in the locality may affect people's: way of life; community; access to and use of infrastructure, services, and facilities; culture; health and wellbeing; surroundings; personal and property rights; decision-making systems; and fears and aspirations, as relevant and considering how different groups may be disproportionately affected – assesses the significance of positive, negative, and cumulative social impacts considering likelihood, extent, duration, severity/scale, sensitivity/importance, and level of concern/interest – includes mitigation measures for likely negative social impacts, and any proposed enhancement measures – details how social impacts will be adaptively monitored and managed over time.
Plans and Documents	The EIS must include all relevant plans, architectural drawings, diagrams and relevant documentation required under Schedule 1 of the Regulation. You should provide these as part of the EIS rather than as separate documents.
Consultation	During the preparation of the EIS, you must consult with the relevant local, State or Commonwealth Government authorities, service providers, community groups and affected landowners. In particular you must consult with: • Penrith City Council • Greater Sydney Commission • Roads and Maritime Services • Transport for NSW • Office of Environment and Heritage • Environment Protection Authority • Fire and Rescue NSW • Rural Fire Service • Department of Industry – Crown Lands and Water • Sydney Water

	• WaterNSW • surrounding local residents and stakeholders • any other public transport or community service providers. The EIS must describe the consultation process and the issues raised, and identify where the design of the development has been amended in response to these issues. Where amendments have not been made to address an issue, a short explanation should be provided.
Further consultation after 2 years	If you do not lodge a Development Application and EIS for the development within 2 years of the issue date of these SEARs, you must consult further with the Secretary in relation to the preparation of the EIS.
References	The assessment of the key issues listed above must take into account relevant guidelines, policies, and plans as identified. While not exhaustive, the following attachment contains a list of some of the guidelines, policies, and plans that may be relevant to the environmental assessment of this proposal.

ATTACHMENT 1
Technical and Policy Guidelines

The following guidelines may assist in the preparation of the environmental impact statement. This list is not exhaustive and not all of these guidelines may be relevant to your proposal.

Many of these documents can be found on the following websites:
http://www.planning.nsw.gov.au
http://www.shop.nsw.gov.au/index.jsp
http://www.australia.gov.au/publications
http://www.epa.nsw.gov.au/
http://www.environment.nsw.gov.au/
http://www.dpi.nsw.gov.au/

Policies, Guidelines & Plans

Aspect	Policy / Methodology
Visual	
	Control of Obtrusive Effects of Outdoor Lighting (Standards Australia, AS 2482)
	State Environmental Planning Policy No 64 - Advertising and Signage
Traffic, Transport and Access	
	Roads Act 1993
	State Environmental Planning Policy (Infrastructure) 2007
	Guide to Traffic Generating Development (Roads and Maritime Services)
	Road Design Guide (Roads and Maritime Services)
	Austroads Guide to Traffic Management – Pt 12: Traffic Impacts of Development
	Austroads Guidelines for Planning and Assessment of Road Freight Access in Industrial Areas
	NSW Long Term Transport Master Plan
Soils and Water	
Soil	Australian and New Zealand Guidelines for the Assessment and Management of Contaminated Sites (ANZECC & NHMRC)
	National Environment Protection (Assessment of Site Contamination) Measure 1999 (NEPC)
	State Environmental Planning Policy No. 55 – Remediation of Land
	Managing Land Contamination - Planning Guidelines SEPP 55 – Remediation of Land (DUAP and EPA)
Acid Sulfate Soils	Acid Sulfate Soil Manual (ASSMAC)
Erosion and Sediment	Managing Urban Stormwater: Soils & Construction (Landcom)
	Design Manual for Soil Conservation Works - Technical Handbook No. 5 (Soil Conservation Service of NSW)
	Soil and Landscape Issues in Environmental Impact Assessment (DLWC)
	Wind Erosion – 2nd Edition
Groundwater	National Water Quality Management Strategy Guidelines for Groundwater Protection in Australia (ARMCANZ/ANZECC)
	NSW State Groundwater Policy Framework Document (DLWC)
	NSW State Groundwater Quality Protection Policy (DLWC)
	NSW State Groundwater Quantity Management Policy (DLWC) Draft
	The NSW State Groundwater Dependent Ecosystem Policy (DLWC)
	NSW Aquifer Interference Policy (NOW)

Policies, Guidelines & Plans

Aspect	Policy / Methodology
	Water Sharing Plan for the Greater Metropolitan Region Groundwater Sources (NOW) 2011
	Bunding and Spill Management (EPA)
Stormwater	Managing Urban Stormwater: Strategic Framework. Draft (EPA)
	Managing Urban Stormwater: Council Handbook. Draft (EPA)
	Managing Urban Stormwater: Treatment Techniques (EPA)
	Managing Urban Stormwater: Source Control. Draft (EPA)
	Managing Urban Stormwater: Harvesting and Reuse (DEC)
Wastewater	National Water Quality Management Strategy: Guidelines for Sewerage Systems - Effluent Management (ARMCANZ/ANZECC)
	National Water Quality Management Strategy: Guidelines for Sewerage Systems - Use of Reclaimed Water (ARMCANZ/ANZECC)
	National Water Quality Management Strategy - Guidelines For Water Recycling: Managing Health And Environmental Risks (Phase1) (EPHC, NRMMC & AHMC)
Biodiversity	
	The Biodiversity Assessment Method (OEH, 2017)
Heritage	
	Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW (OEH 2011)
	Code of Practice for the Archaeological Investigation of Aboriginal Objects in New South Wales (DECCW 2010)
	Draft Guidelines for Aboriginal Cultural Impact Assessment and Community Consultation (Department of Planning 2005)
	Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010 (DECCW 2010)
	Heritage Act 1977
Noise and Vibration	
	Assessing Vibration: A Technical Guide (DEC, 2006)
	Noise Policy for Industry (EPA, 2017)
	Environmental Criteria for Road Traffic Noise (EPA, 1999)
	Noise Guide for Local Government (EPA, 2013)
	Interim Construction Noise Guideline (DECC, 2009)
Hazards and Risk	
	State Environmental Planning Policy No. 33 – Hazardous and Offensive Development
	Applying SEPP 33 – Hazardous and Offensive Development Application Guidelines (DUAP)
	Hazardous Industry Planning Advisory Paper No. 6 – Guidelines for Hazard Analysis
	Planning Advisory Paper No. 4 – Risk Criteria for Land Use Safety Planning (DoP 2011)
Bushfire	
	Planning for Bushfire Protection (Rural Fire Service, 2006)
Waste	
	Waste Avoidance and Resource Recovery Strategy 2014-21 (EPA)
Air Quality	
	Protection of the Environment Operations (Clean Air) Regulation 2002
Air Quality	Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales (DEC)
	Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales (EPA 2016)
Greenhouse Gas	AGO Factors and Methods Workbook (AGO)

Policies, Guidelines & Plans

Aspect	Policy / Methodology
	Guidelines for Energy Savings Action Plans (DEUS, 2005)
Social	
	Social Impact Assessment Guideline (Department of Planning and Environment)

ATTACHMENT 2
Government Authority Responses to Request for Key Issues

PENRITH

Our reference: ECM 8346214
Contact: Gemma Bennett
Telephone: 4732 8285

10 September 2018

Department of Planning & Environment
Attn: Bianca Thornton
Planning Officer
Industry Assessments
GPO Box 39
SYDNEY NSW 2001

Via email: Bianca.thornton@planning.nsw.gov.au

Dear Ms Thornton,

Notification of SEARs – Kemps Creek Warehouse and Logistics Hub (SSD 9522) at 657-759 Mamre Road, Kemps Creek

I refer to your email regarding the Notice of SEARs – Kemps Creek Warehouse and Logistics Hub (SSD 9522) dated 21 August 2018.

The following comments are provided for your reference:

1. Strategic Planning, Permissibility and Orderly Development

- The applicant appears to be reliant on clause 12 of State Environmental Planning Policy (Western Sydney Employment Area) 2009 to provide permissibility for the land use. However, clause 12 does not include provisions for permissibility for any land uses in unzoned land. Under the Policy -it states that (1) consent is required for development, and (2) the consent authority must consider adjoining land before granting consent. The surrounding land is predominantly zoned RU2 Rural Landscape under Penrith Local Environmental Plan 2010 and the proposed land use is currently expressly prohibited in the RU2 zone and is incompatible with the applicable zone objectives. As a result, it is therefore considered that, under the provisions of the SEPP, the proposal is currently not permissible or suitable for the reasons outlined below.

- While discussions between Council and the proponent in relation to rezoning of the land under SEPP (WSEA) 2009 were held earlier in 2018, it is understood that to date no Planning Proposals has been lodged.

- As the property is identified within the Mamre Road Precinct of the Western Sydney Aerotropolis Land Use and Infrastructure Implementation Plan (LUIIP) Stage 1: Initial Precincts (Department of Planning and Environment, August 2018), any large-scale proposal that alters development capability and permissible land uses should be approached with caution until the LUIIP Stage 2: Structure Plan and associated land use directions under the LUIIP are established. Approval of the proposal ahead of this direction has the potential to adversely impact the master planning of this area and the orderly development of the locality.

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2. Internal Road Design and Infrastructure

- The design and alignment of the Link Road is expected to continue to the west of the site over South Creek. The design of the Link Road should take into consideration the following constraints:
  - Future alignment and levels of the Link Road and bridge works over South Creek and the flooding impacts;
  - Impacts of the future Western Sydney Freight line between the Link Road and Water NSW pipe lines;
  - Temporary cul-de-sac at the western end of the Link Road for manoeuvring shall be provided for the largest vehicle access the site.

- The proposal needs to accommodate the future Western Sydney Freight (railway) line along the southern side of the Water NSW pipeline and may need to provide access for railway future maintenance work. This is yet to be resolved by RMS.

- The parallel road of Bakers lane and the Southern Link Road shall be reviewed. The need for a separate Bakers Lane road carriageway is not considered necessary and access to the proposed lots adjacent to the pipeline could be off a new cul-de-sac with a controlled intersection with the new link road.

- The proposed north/south Local Road should continue to the property boundary to set up access to future development to the south. The road should be upgraded to an industrial local collector road width and standard which would not isolate this development from future development to the south and minimise future access to Mamre Road. This would also remove the requirement for the proposed left in/left out onto Mamre Road. Consultation with RMS and Council will be required to determine the most appropriate road network strategy for the site with connectivity to future development to the south.

- Proposed development and subdivision works adjacent to the Warragamba Pipelines corridor shall conform to the Water NSW requirements as per Part C13 Infrastructure and Services of Penrith Development Control Plan 2014.

- The section of Reserved Road 20.115 under DP 1118173 (also known as Bakers Lane) on the submitted plans is currently an unformed/sealed access track and may be classified as a Crown Road reserve. The developer is to seek confirmation from Crown Lands.

- Splay corners within the corner lots shall be provided at road intersections.

- Typical road types/cross-sections, footpath, cycleway, lighting have not been provided as part of this assessment.

3. Traffic Management

- Suitable provision is made to accommodate and service the development in terms of traffic and transport. On-site car parking is proposed to support the use of the site, so as to not adversely affect the surrounding road network, and maintain all traffic flow within the RMS Environmental Amenity Standards.

- It is noted that signalised intersections and left in/left out arrangements to Mamre road are sought, which are supported in principle.

- Council is yet to resolve with RMS the critical issue being the Southern Link Road alignment, intersection with Mamre Road and the extension alignment of the Southern Link Road to the west of Mamre Road. Council is lobbying for the

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Southern Link Road and roads to the east of the site to be State classified roads due to their position in the road hierarchy.

4. Stormwater and Flooding

- The provision of basins and associated infrastructure within the floodway is not supported. Whilst some infrastructure may be suitable below the 1% AEP development within the floodway will not be supported.

- The applicant shall consider water quality and quantity measures within each individual development. Water quality and quantity measures for stormwater runoff for the public roads shall also be considered and maintained by the registered proprietor and/or community estate – not Council.

- The development site consists of several lots located within South Creek floodplain. The proposed development will impact on flooding as filling (and constructing buildings) is proposed.

- The flood map attached shows the floodway (red), flood storage (green), flood fringe (yellow), the PMF (light green) and the Flood Planning Area limits. As the proposed filling is well within the flood storage areas a detailed flood impact assessment report is required at planning stage that references adopted South Creek Flood Study and recognises areas that are not developable due to flood constraints. The majority of lots within the planning proposal are coded as FA lots and as such detail is required how water traverses through the site. The cumulative loss of flood storage across the South Creek catchment shall be addressed.

- The flood impact assessment must also assess the flood impacts to adjacent properties. When off-site flood impacts are assessed it should be considered a minimum of 2km upstream and 2km downstream to avoid effects at the boundaries of flood modelling. The assessment shall also take into consideration the recent land development under SSD 7173 –Mamre West Land north of the pipe lines.

- A peer review of the flood modelling and flood impact assessment should be undertaken by an independent flood modelling consultant to ensure the flood modelling undertaken is appropriate to the site.

- An overland flow analysis of the catchment upstream of Mamre Road shall be considered in the overall stormwater management of the site.

- We understand (without detail) that the Department of Planning are commissioning a study of the South Creek catchment to determine water quality and quantity targets including environmental impacts, development areas and constraints. Until Council have further detail of this study the Department should be consulted regarding development of this kind along the corridor.

5. Water Sensitive Urban Design

- An overarching Water Sensitive Urban Design (WSUD) Strategy is to be prepared that details the WSUD objectives and how stormwater quality control measures will be implemented to meet pollutant retention targets. The WSUD Strategy must include details of all proposed stormwater treatment measures (approximate size and location, type, configuration etc), and indicate whether the treatment measures will remain in private ownership. As discussed it is preferable that these treatment measures remain in private/community title ownership as per the approach taken for Erskine Business Park.

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- Any proposed stormwater treatment strategy will need to be informed by high level stormwater quantity and quality modelling using MUSIC. The modelling must use the parameters included in Section 4 of the WSUD Technical Guidelines, as developed for Penrith. A copy of the electronic MUSIC model (i.e.*sqz file) will need to be provided with the design meeting the following pollution retention criteria:
  - - 90% Gross Pollutants;
  - - 85% Total Suspended Solids (TSS);
  - - 60% Phosphorous (TP);
  - - 45% Nitrogen (TN).

- The WSUD Strategy for the site will need to document how potable water conservation targets will be met as per the WSUD Policy requirements. Details on how stormwater harvesting and reuse will be incorporated into the development should be provided. The development provides significant opportunities for stormwater harvesting and at least 80% of non-potable demand should be provided for by rainwater tanks.

- Any changes to the flow rate and flow duration within receiving watercourses as a result of the development shall be limited as far as practicable. Evidence should be provided to show that natural flow paths, discharge points and runoff volumes from the site are retained and maintained as far as possible.

- The subdivision plans for the site should include indicative areas set aside for drainage/WSUD measures, to ensure adequate site area is allocated for these functions early in the layout planning.

- With regards to the riparian corridor, any changes to the existing drainage line will need to be in accordance with the requirements of the NSW Department of Industry – Natural Resources Access Regulator (NRAR). Further to this, a vegetation management plan which meets the Department's guidelines should be prepared which provides detailed guidance on the management requirements for this area.

- Any impacts to South Creek should be minimised and the preference should be to restore the riparian corridor to the standards recommended by the NSW NRAR. Controlled activity approvals for all works within 40m of the creek will also need to be obtained.

6. Environmental Management

- The Environmental Impact Statement (EIS) prepared to support the SSD application should provide a detailed and comprehensive description of the proposal. All environmental impacts of the proposal will need to be identified in the EIS and supported by technical assessment reports prepared by appropriately qualified persons and in accordance with applicable legislation, guidelines and standards.

- It is noted that the document submitted commits to a range of investigations and assessments (contamination, air quality, etc.), however it does not confirm that a formal acoustic assessment will be carried out. Given the proximity to residential receivers (Twin Creeks), and other sensitive receivers (aged care facility and nearby schools), an Acoustic Report should be required to be prepared, with consideration given to construction and operational noise impacts, including those associated with traffic movements and the use of plant and equipment.

- In relation to land contamination, it is important to note that all remediation works in the Penrith local government area require development consent at present, in

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line with the requirements of SREP 20 and SEPP 55. Should any site investigations identify contaminated land, consent for remediation works should be sought as a part of this application.

- Appropriate consideration also needs to be given to the potential impacts to flora and fauna. As the site is bordered by South Creek to the west and is mapped as containing Cumberland Plain Woodland, the various state and federal requirements for assessment need to be met. The document has confirmed that investigations are already underway to address this aspect.

As a result of the above permissibility and orderly development concerns, a position from the Department on the provisions of State Environmental Planning Policy (Western Sydney Employment Area) 2009 with respect to permissibility is requested, as this will impact upon the assessment and review of any application pursued.

Should you require any further information or would like to discuss this matter further, please no not hesitate to contact Gemma Bennett on (02) 4732 8285.

Yours faithfully

Gavin Cherry
Development Assessment Coordinator

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DOC18/604121
SSD 9522

Bianca Thornton
Planning Officer – Industry Assessments
NSW Department of Planning and Environment
GPO Box 39
SYDNEY NSW 2001

Request for SEARs - Warehouse and logistics hub 657-769 Mamre Road, Kemps Creek (SSD 9522)

Dear Ms Thornton

I refer to your e-mail dated 21 August 2018 requesting input from the Office of Environment and Heritage (OEH) on the Secretary's Environment Assessment Requirements for the above State Significant development.

Please find attached OEH's environmental assessment requirements in Attachment 1.

Aboriginal Cultural Heritage
OEH records indicate that a number of Aboriginal Cultural Heritage items are located on this site and the requirements attached must be addressed.

Biodiversity
The *Biodiversity Conservation Act 2016 (BC Act)* provides a framework and tools to avoid, minimise and offset impacts on biodiversity. Cumberland Plain Woodland (CPW) Critically Endangered Ecological Community (CEEC) exists on the site and is proposed to be cleared across the site. The total area of CPW patches comprises approximately 5ha whereas the total area of the site is 112ha. OEH considers that through better site planning that these areas of CPW can be protected and retained, rather than cleared. The development proposed currently fails to address the BC Act objectives of avoiding and minimising impacts.

South Creek is located along the sites western boundary. The State Environmental Planning Policy (Western Sydney Employment Area) 2009 (WSEA) Land Application Map shows that the subject site is not yet zoned nor is it located within an Industrial Release Area pursuant to Clause 29. The SEPP aims to protect and enhance land to which this Policy applies through appropriate environmental conservation zones, environmentally sensitive development and rehabilitation of remnant vegetation and areas with biodiversity value.

The following SEPP aims are relevant to this proposal and must be addressed in the siting and design of the proposal:
(c) to rezone land for employment or environmental conservation purposes

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(e) to ensure that development occurs in a logical, environmentally sensitive and cost-effective manner and only after a development control plan (including specific development controls) has been prepared for the land concerned
(f) to conserve and rehabilitate areas that have a high biodiversity or heritage or cultural value, in particular areas of remnant vegetation.

Given the above SEPP aims, OEH recommends that the South Creek Corridor should be protected and conserved. It is noted that the existing zoning under this SEPP for nearby creeks such as Ropes Creek and its tributaries is E2 Environmental Conservation. Impacts to significant vegetation should be avoided with areas identified as high biodiversity and conservation value, including the riparian corridor along South Creek on the site and 40m from the top of the bank, protected through a suitable conservation zoning and shown as reserved for future E2 Environmental Conservation Zone on the development proposal plans.

Further, this would be consistent with the SEPP's aims and the following strategies and planning priorities that are directly relevant to this proposal in the Western City District Plan:

- **Planning Priority W13:** Creating a Parkland City urban structure and identity, with South Creek as a defining spatial element

This gives effect to the regional plan A *Metropolis of Three Cities* Objective 26: A cool and green parkland city in the South Creek corridor. A *Metropolis of Three Cities'* vision for South Creek Corridor is to transform its water management, while using the creek corridor to form the spine of the Western Parkland City. This conceptualises a green corridor that provides sites for parks, walking and cycling trails, community facilities, and ecological services including nutrient capture, urban cooling, and local habitat. Innovative approaches will be needed to incorporate specific landscape and waterway features into the design of new urban communities.

The district plan also notes that in recently established neighbourhoods, **environment zones** have been used along major waterways, making a step towards a green parkland city.

The South Creek Urban Design Principles (figure 21 of the Western City District Plan) require that for new business and industrial areas, the plan encourages creek facing employment hubs and recreation spaces for workers. For this site, OEH encourages retention of the CPW and that the area be protected and incorporated into the design of the development. This would also be consistent with the District Plans following two priorities:

- **Planning Priority W14:** Protecting and enhancing bushland and biodiversity
- **Planning Priority W15:** Increasing urban tree canopy cover and delivering Green Grid connections

The district plan states that South Creek is a priority Corridor on the green grid and it is intended to create a continuous open space corridor along the entirety of South Creek that provides ecological protection and enhancement, better stormwater treatment and a regionally significant corridor for recreation uses.

Flooding
The flood requirements outlined in the table attached must be included in the SEARs.

Sustainability
OEH also recommends that the NSW and ACT Governments Regional Climate Modelling (NARCliM) climate change projections developed for the Sydney Metropolitan area are used to inform the building design and asset life of the project. These include over 100 climate variables, including temperature, rainfall, hot days and cold nights, severe Forest Fire Danger Index (FFDI) and are publicly available online and at fine resolution (10km and hourly intervals) for 20-year time periods: 2020–2039 near future and long-term 2060–2079. Further, sustainable design measures such as green roofs should be incorporated into the project design to maximise the long-term Ecologically Sustainable Development outcomes of the proposal.

In this regard, under the heading Ecologically Sustainable Development of the draft SEARs, OEH recommends the following items are added.

- The development incorporates green walls, green roof and/or a cool roof into the design
- The climate change projections developed for the Sydney Metropolitan area are used to inform the building design and asset life of the project

→ Relevant Data and Guidelines:

- NSW and ACT Government Regional Climate Modelling (NARCliM) climate change projections are used to inform the building design
- OEH (2015) Urban Green Cover in NSW Technical Guidelines.

A separate response may be provided on heritage matters by the Heritage Division of OEH as delegate of the Heritage Council of NSW. If you have any queries about this advice, please contact Svetlana Kotevska on 8837 6040 or by email at Svetlana.kotevska@environment.nsw.gov.au.

Yours sincerely

S. Harrison 06/09/18

SUSAN HARRISON
Senior Team Leader - Planning
Greater Sydney
Communities and Greater Sydney Delivery Division

Attachment 1: OEH Recommended Environmental Assessment Requirements – Request for SEARs - Warehouse and logistics hub 657-769 Mamre Road, Kemps Creek (SSD 9522)

Biodiversity
1. Biodiversity impacts related to the proposed development are to be assessed in accordance with Section 7.9 of the Biodiversity Conservation Act 2016 using the Biodiversity Assessment Method (BAM) and documented in a Biodiversity Development Assessment Report (BDAR). The BDAR must include information in the form detailed in the *Biodiversity Conservation Act 2016* (s6.12), *Biodiversity Conservation Regulation 2017* (s6.8) and the Biodiversity Assessment Method.
2. The BDAR must document the application of the avoid, minimise and offset hierarchy including assessing all direct, indirect and prescribed impacts in accordance with the Biodiversity Assessment Method.
3. The BDAR must include details of the measures proposed to address the offset obligation as follows; a. The total number and classes of biodiversity credits required to be retired for the development/project; b. The number and classes of like-for-like biodiversity credits proposed to be retired; c. The number and classes of biodiversity credits proposed to be retired in accordance with the variation rules; d. Any proposal to fund a biodiversity conservation action; e. Any proposal to conduct ecological rehabilitation (if a mining project); f. Any proposal to make a payment to the Biodiversity Conservation Fund. g. If seeking approval to use the variation rules, the BDAR must contain details of the reasonable steps that have been taken to obtain requisite like-for-like biodiversity credits.
4. The BDAR must be submitted with all digital spatial data associated with the survey and assessment as per Appendix 11 of the BAM.
5. The BDAR must be prepared by a person accredited in accordance with the Accreditation Scheme for the Application of the Biodiversity Assessment Method Order 2017 under s6.10 of the *Biodiversity Conservation Act 2016*.

Aboriginal cultural heritage

6. The EIS must identify and describe the Aboriginal cultural heritage values that exist across the whole area that will be affected by the development and document these in an Aboriginal Cultural Heritage Assessment Report (ACHAR). This may include the need for surface survey and test excavation. The identification of cultural heritage values must be conducted in accordance with the Code of Practice for Archaeological Investigations of Aboriginal Objects in NSW (OEH 2010), and guided by the *Guide to investigating, assessing and reporting on Aboriginal Cultural Heritage in NSW* (OEH, 2011) and consultation with OEH regional branch officers. Note that Due Diligence is not designed for the assessment of a SSD and not a substitute for an ACHAR.

7. Consultation with Aboriginal people must be undertaken and documented in accordance with the *Aboriginal cultural heritage consultation requirements for proponents 2010* (DEWCC). The significance of cultural heritage values for Aboriginal people who have a cultural association with the land must be documented in the ACHAR.

8. Impacts on Aboriginal cultural heritage values are to be assessed and documented in the ACHAR. The ACHAR must demonstrate attempts to avoid impact upon cultural heritage values and identify any conservation outcomes. Where impacts are unavoidable, the ACHAR must outline measures proposed to mitigate impacts. Any objects recorded as part of the assessment must be documented and notified to OEH.

9. The assessment of cultural heritage values must include a surface survey undertaken by a qualified archaeologist in areas with potential for subsurface Aboriginal deposits. The result of the surface survey is to inform the need for targeted test excavation to better assess the integrity, extent, distribution, nature and overall significance of the archaeological record. The results of surface surveys and test excavations are to be documented in the ACHAR.

10. The ACHAR must outline procedures to be followed in the event Aboriginal burials or skeletal material is uncovered during construction to formulate appropriate measures to manage the impacts to this material.

Flooding hazards

11. The EIS must map the following features relevant to flooding as described in the Floodplain Development Manual 2005 (NSW Government 2005) including:
    a. Flood prone land.
    b. Flood planning area, the area below the flood planning level.
    c. Hydraulic categorisation (floodways and flood storage areas).
    d. Flood hazard

12. The EIS must describe flood assessment and modelling undertaken in determining the design flood levels for events, including a minimum of the 5% Annual Exceedance Probability (AEP), 1% AEP, flood levels and the probable maximum flood, or an equivalent extreme event.

13. The EIS must model the effect of the proposed development (including fill) on the flood behaviour under the following scenarios:
    a. Current flood behaviour for a range of design events as identified in 14 above. This includes the 0.5% and 0.2% AEP year flood events as proxies for assessing

sensitivity to an increase in rainfall intensity of flood producing rainfall events due to climate change.

14. Modelling in the EIS must consider and document:
   a. Existing council flood studies in the area and examine consistency to the flood behaviour documented in these studies.
   b. The impact on existing flood behaviour for a full range of flood events including up to the probable maximum flood, or an equivalent extreme flood.
   c. Impacts of the development on flood behaviour resulting in detrimental changes in potential flood affection of other developments or land. This may include redirection of flow, flow velocities, flood levels, hazard categories and hydraulic categories.
   d. Relevant provisions of the NSW Floodplain Development Manual 2005.

15. The EIS must assess the impacts on the proposed development on flood behaviour, including:
   a. Whether there will be detrimental increases in the potential flood affectation of other properties, assets and infrastructure.
   b. Consistency with Council floodplain risk management plans.
   c. Consistency with any Rural Floodplain Management Plans.
   d. Compatibility with the flood hazard of the land.
   e. Compatibility with the hydraulic functions of flow conveyance in floodways and storage in flood storage areas of the land.
   f. Whether there will be adverse effect to beneficial inundation of the floodplain environment, on, adjacent to or downstream of the site.
   g. Whether there will be direct or indirect increase in erosion, siltation, destruction of riparian vegetation or a reduction in the stability of river banks or watercourses.
   h. Any impacts the development may have upon existing community emergency management arrangements for flooding. These matters are to be discussed with the NSW SES and Council.
   i. Whether the proposal incorporates specific measures to manage risk to life from flood. These matters are to be discussed with the NSW SES and Council.
   j. Emergency management, evacuation and access, and contingency measures for the development considering the full range or flood risk (based upon the probable maximum flood or an equivalent extreme flood event). These matters are to be discussed with and have the support of Council and the NSW SES.
   k. Any impacts the development may have on the social and economic costs to the community as consequence of flooding.

Water and Soils

16. The EIS must map the following features relevant to water and soils including:
   a. Acid sulfate soils (Class 1, 2, 3 or 4 on the Acid Sulfate Soil Planning Map).

b. Rivers, streams, wetlands, estuaries (as described in s4.2 of the Biodiversity Assessment Method).
c. Wetlands as described in s4.2 of the Biodiversity Assessment Method.
d. Groundwater.
e. Groundwater dependent ecosystems.
f. Proposed intake and discharge locations.

17. The EIS must describe background conditions for any water resource likely to be affected by the development, including:
a. Existing surface and groundwater.
b. Hydrology, including volume, frequency and quality of discharges at proposed intake and discharge locations.
c. Water Quality Objectives (as endorsed by the NSW Government http://www.environment.nsw.gov.au/ieo/index.htm) including groundwater as appropriate that represent the community's uses and values for the receiving waters.
d. Indicators and trigger values/criteria for the environmental values identified at (c) in accordance with the ANZECC (2000) Guidelines for Fresh and Marine Water Quality and/or local objectives, criteria or targets endorsed by the NSW Government.
e. Risk-based Framework for Considering Waterway Health Outcomes in Strategic Land-use Planning Decisions http://www.environment.nsw.gov.au/research-and-publications/publications-search/risk-based-framework-for-considering-waterway-health-outcomes-in-strategic-land-use-planning

18. The EIS must assess the impacts of the development on water quality, including:
a. The nature and degree of impact on receiving waters for both surface and groundwater, demonstrating how the development protects the Water Quality Objectives where they are currently being achieved, and contributes towards achievement of the Water Quality Objectives over time where they are currently not being achieved. This should include an assessment of the mitigating effects of proposed stormwater and wastewater management during and after construction.
b. Identification of proposed monitoring of water quality.
c. Consistency with any relevant certified Coastal Management Program (or Coastal Zone Management Plan)

19. The EIS must assess the impact of the development on hydrology, including:
a. Water balance including quantity, quality and source.
b. Effects to downstream rivers, wetlands, estuaries, marine waters and floodplain areas.
c. Effects to downstream water-dependent fauna and flora including groundwater dependent ecosystems.
d. Impacts to natural processes and functions within rivers, wetlands, estuaries and floodplains that affect river system and landscape health such as nutrient flow,

aquatic connectivity and access to habitat for spawning and refuge (e.g. river benches).

e. Changes to environmental water availability, both regulated/licensed and unregulated/rules-based sources of such water.

f. Mitigating effects of proposed stormwater and wastewater management during and after construction on hydrological attributes such as volumes, flow rates, management methods and re-use options.

g. Identification of proposed monitoring of hydrological attributes.

11 September 2018

Our Reference: SYD18/01322 (A23972195)
Dept Ref: SSD 9522

Planning Officer
Industry Assessments
Department of Planning & Environment
GPO Box 39 SYDNEY NSW 2001

Attention: Bianca Thornton

Dear Sir/Madam,

SEARS REQUEST FOR WAREHOUSE & LOGISTICS HUB
657-769 MAMRE ROAD, KEMPS CREEK, PENRITH LGA

Reference is made to your email dated 21 August 2018 requesting Roads and Maritime Services (Roads and Maritime) to provide details of key issues and assessment requirements regarding the abovementioned development for inclusion in the Secretary's Environmental Assessment Requirements (SEARs).

Roads and Maritime require the following issues to be included in the transport and traffic impact assessment of the proposed development:

1. It is noted per the submission that there is multiple access points proposed on Mamre Road. Roads and Maritime reiterates that the Australian Guidelines "Planning for Road Safety" is based on the widely accepted principle of conflict reduction by separating the traffic movement and land access functions as much as possible. The number of access points should be minimised. Therefore the proposed development should have all its access from the Southern Link Road connection.

2. Daily and peak traffic movements likely to be generated by the proposed development including the impact on nearby intersections and the need/associated funding for upgrading or road improvement works (if required).

   The key intersections to be examined / modelled include:

   - Site Access Road / Mamre Road

3. Details of the proposed accesses and the parking provisions associated with the proposed development including compliance with the requirements of the relevant Australian Standards (ie: turn paths, sight distance requirements, aisle widths, etc).

4. Proposed number of car parking spaces and compliance with the appropriate parking codes.

5. Details of light and heavy vehicle movements (including vehicle type and likely arrival and departure times).

6. To ensure that the above requirements are fully addressed, the transport and traffic study must properly ascertain the cumulative study area traffic impacts associated with the development (and any other known proposed developments in the area). This process provides an opportunity to identify a package of traffic and transport infrastructure measures required to support future development. Regional and local intersection and road improvements, vehicular access options for adjoining sites, public transport needs, the timing and cost of infrastructure works and the identification of funding responsibilities associated with the development should be identified.

7. Roads and Maritime requires the Environmental Assessment report to assess the implications of the proposed development for non-car travel modes (including public transport use, walking and cycling); the potential for implementing a location-specific sustainable travel plan (eg 'Travelsmart' or other travel behaviour change initiative); and the provision of facilities to increase the non-car mode share for travel to and from the site. This will entail an assessment of the accessibility of the development site by public transport.

8. Roads and Maritime requires an assessment of the likely toxicity levels of loads transported on arterial and local roads to / from the site and, consequently, the preparation of an incident management strategy for crashes involving such loads, if relevant.

Should you have any further inquiries in relation to this matter, please do not hesitate to contact Hans Pilly Mootanah on telephone 8849 2076 or by email at development.sydney@rms.nsw.gov.au

Yours sincerely,

Pahee Rathan
A/Senior Land Use Assessment Coordinator
North West Precinct

Transport for NSW

Ms. Nikki Matthews
Planning Officer
Industry Assessments
Department of Planning and Environment
GPO Box 39
SYDNEY NSW 2001

Dear Ms. Matthews

Request for Secretary's Environmental Assessment Requirements (SEARs) – SSD 9522 Warehouse and Logistics Hub - 657-769 Mamre Road, Kemps Creek

Thank you for your email dated 21 August 2018 requesting Transport for NSW (TfNSW) provide input to the Secretary's Environmental Assessment Requirements (SEARs) for the above State Significant Development (SSD).

Transport and Accessibility (Construction and Operation)

TfNSW advises that the Environmental Impact Statement (EIS) for the subject development should include a Traffic and Transport Impact Assessment that provides, but is not limited to, the following:

- details all daily and peak traffic and transport movements likely to be generated (light and heavy vehicle, public transport, pedestrian and cycle trips) during construction and operation of the development;
- details of the current daily and peak hour vehicle, public transport, pedestrian and bicycle movements and existing traffic and transport facilities provided on the road network located adjacent to the proposed development;
- an assessment of the operation of existing and future transport networks including public transport, pedestrian and bicycle provisions and their ability to accommodate the forecast number of trips to and from the development;
- details the type of heavy vehicles likely to be used (e.g. B-doubles) during the operation of the development and the impacts of heavy vehicles on nearby intersections;
- details of access to, from and within the site from the road network including intersection location, design and sight distance (i.e. turning lanes, swept paths, sight distance requirements);
- impact of the proposed development on existing and future public transport and walking and cycling infrastructure within and surrounding the site;
- an assessment of the existing and future performance of key intersections providing access to the site (Mamre Road and the First Estate Access Road), and any upgrades (road/ intersections) required as a result of the development;
- an assessment of predicted impacts on road safety and the capacity of the road network to accommodate the development;
- demonstrate the measures to be implemented to encourage employees of the development to make sustainable travel choices, including walking, cycling, public transport and car sharing;

- appropriate provision, design and location of on-site bicycle parking, and how bicycle provision will be integrated with the existing bicycle network;
- details of the proposed number of car parking spaces and compliance with appropriate parking codes and justify the level of car parking provided on the site;
- details of access and parking arrangements for emergency vehicles;
- detailed plans of the proposed layout of the internal road network and parking provision on-site in accordance with the relevant Australian Standards;
- details of any likely dangerous goods to be transported on arterial and local roads to/from the site, if any, and the preparation of an incident management strategy, if necessary;
- the existing and proposed pedestrian and bicycle routes and end of trip facilities within the vicinity of and surrounding the site and to public transport facilities as well as measures to maintain road and personal safety in line with CPTED principles; and
- preparation of a draft Construction Traffic Management Plan which includes:
    - details of vehicle routes, number of trucks, hours of operation, access management and traffic control measures for all stages of construction;
    - assessment of cumulative impacts associated with other construction activities;
    - an assessment of road safety at key intersections;
    - details of anticipated peak hour and daily truck movements to and from the site;
    - details of access arrangements for workers to/from the site, emergency vehicles and service vehicle movements;
    - details of temporary cycling and pedestrian access during constructions;
    - an assessment of traffic and transport impacts during construction and how these impacts will be mitigated for any associated traffic, pedestrians, cyclists and public transport operations.

Consultation

During the preparation of the EIS, the applicant should consult with:

- Penrith City Council
- Roads and Maritime Services.

Proposed Western Sydney Freight Line

The public exhibition and the Statement of Environmental Effects for the Western Sydney Freight Line (WSFL) state the corridor in the vicinity of the proposed SSD to be 60-80m. The Preliminary Environmental Assessment identifies the future WSFL as a 40m corridor. Gazettal of the WSFL corridor is expected to be completed in the near future, and the proponent should continue to consult with TfNSW to ensure design of the proposal has accounted for the gazetted corridor width.

If the proposed SSD requires ground penetration and/or excavation to be done to a depth greater than 2m within a 25 metre proximity of the proposed Western Sydney Freight Line, TfNSW will require geotechnical, construction and survey documentation to be prepared and submitted. While, concurrence does not apply to this development application TfNSW advises that the proposal will be assessed in accordance with the requirements of clause 86(4) of the SEPP (Infrastructure) 2007.

If you require further information regarding the above, please don't hesitate to contact Lee Farrell, Transport Planner, via email at lee.farrell@transport.nsw.gov.au.

Yours sincerely

6/9/2018

Mark Ozinga
Principal Manager, Land Use Planning & Development
Freight, Strategy and Planning

CD18/07631

PO Box 398, Parramatta NSW 2124
Level 14, 169 Macquarie Street
Parramatta NSW 2150
www.waternsw.com.au
ABN 21 147 934 787

10 September 2018

Contact: *Alison Kniha*
Telephone: *02 9865 2505*
Our ref: *D2018/96427*

Bianca Thornton
Planning Officer
Industry Assessments
Department of Planning and Environment
GPO Box 39
Sydney NSW 2001

Dear Ms Thornton

Input on SEARs – Kemps Creek Warehouse and Logistics Hub (SSD 9522)

Thank you for your email dated 21 August 2018 requesting WaterNSW's input for the SEARs associated with the State Significant Development 9522 at Kemps Creek.

The subject site is immediately south of the Warragamba Pipelines, which are critical water supply infrastructure transporting raw water from Warragamba Dam to the Prospect water filtration plant. The infrastructure and corridor in which it is located are owned and managed by WaterNSW. The corridor is also a 'controlled area' under the *Water NSW Act 2014*, and entry is prohibited without the written consent of WaterNSW.

WaterNSW has reviewed the Preliminary Environmental Assessment (PEA) and associated documentation, and provides the following comments and requirements:

- The WaterNSW publication 'Guidelines for development adjacent to the Upper Canal and Warragamba Pipelines' should inform the preparation of the environmental impact statement (EIS) for the development. The Guidelines are available on WaterNSW's website.
- The PEA (15 August 2018; s3.5) states that consultation is occurring with WaterNSW. To date, WaterNSW has no record of consultation.
- Bulk earthworks, civil infrastructure works and construction have the potential to damage the Pipelines corridor and the infrastructure. Care must be exercised when undertaking development works in proximity to the corridor, and a dilapidation survey and vibration monitoring may be required. The EIS should demonstrate how the works will be undertaken in a manner that will protect WaterNSW land and infrastructure, including details and plans of any retaining walls or supporting batters, stockpiling locations, and management measures to address sediment and erosion control and potentially contaminated water discharge from the dam dewatering process. All controls should be consistent with Landcom's 'Managing Urban Stormwater: Soils and Construction (Vol 1 4th ed., 2004).
- Stormwater from the site currently flows north and west either into South Creek or directly across the Pipelines corridor. A number of large dams on the site also capture stormwater. It is important bulk earthworks and final levels and design of the proposal do not result in an increase in flows across the Pipeline corridor (including in South Creek) of either quantity or quality. The EIS should identify how stormwater management systems for the development will be designed, operated and maintained to ensure post-development flows do not exceed pre-development flows into and through the Pipelines corridor. Dam dewatering methodology should also be designed and undertaken to ensure no flows are above the normal levels

entering the Pipelines corridor. All stormwater management infrastructure must be accommodated within the development site and not encroach on WaterNSW land.

- The EIS must address security and fencing requirements along the boundary with the Pipelines corridor. Temporary construction fencing will be required while works are being undertaken, to be replaced by permanent security fencing to WaterNSW standards.
- Access to the Pipelines corridor is prohibited without the written access consent of WaterNSW. Information on obtaining access consents is available on the WaterNSW website and takes a minimum of 28 days to process.
- WaterNSW staff and contractors require 24-hour access into and out of the Pipelines corridor through the gates on Mamre Road. This access must be maintained unimpeded for security, operational and maintenance purposes.
- WaterNSW operates scour valves at South Creek on the western edge of the development site for the purposes of dewatering the Pipelines during shut down periods. The water is discharged directly into South Creek but can be discharged at a controlled rate to prevent flooding. There are also two air valves located on the Pipelines between South Creek and Mamre Road, and a cross connection and valves adjacent to Mamre Road.

WaterNSW requests that we are consulted on the EIS for this development, and that the Department continue to consult with us regarding proposals with the potential to impact our operational land and water supply infrastructure. Please email all correspondence to Environmental.Assessments@waternsw.com.au.

If you have any questions regarding this letter, please contact Alison Kniha at alison.kniha@waternsw.com.au.

Yours sincerely

MALCOLM HUGHES
Manager Catchment Protection

Bianca Thornton

From: Fire Safety <FireSafety@fire.nsw.gov.au>
Sent: Friday, 24 August 2018 8:47 AM
To: Bianca Thornton
Cc: Fire Safety
Subject: HPE CM: RE: Invitation to PFM & Request for SEARs - Proposed Kemps Creek Warehouse and Logistics Hub (SSD 9522)

Good morning Ms Thornton

Fire & rescue NSW (FRNSW) have reviewed aspects of the documentation submitted. Based upon our review we advise that we did not identify any unique fire hazards associated with the proposed development. Consequently, FRNSW does not have any specific requirements or comment in regard to the PEA.

It is our experience however that large developments such as these usually incorporate a number of alternative solutions to address compliance with the National Construction Code (NCC). Clause 144 of the Environmental Planning and Assessment Regulation 2000 requires certifying authorities to consult with FRNSW in specific circumstances – we envisage that any typical compliance matters, pertaining to fire and life safety, can be satisfactorily addressed within the C.144 and fire engineering brief processes.

Regards

STATION OFFICER MARK CASTELLI
TEAM LEADER – SPECIAL HAZARDS
INFRASTRUCTURE LIAISON UNIT

T: (02) 9742 7430 M: 0438 601 582
E: mark.castelli@fire.nsw.gov.au
1 Amarina Ave, Greenacre, NSW 2190
www.fire.nsw.gov.au

Bianca Thornton

From: Mohammed Rahman <mohammed.rahman@crownland.nsw.gov.au>
Sent: Wednesday, 5 September 2018 8:53 AM
To: Lands Ministerials; Bianca Thornton; Mohammed Rahman
Cc: Paul Layt
Subject: HPE CM: Fwd: FW: Invitation to PFM & Request for SEARs - Proposed Kemps Creek Warehouse and Logistics Hub (SSD 9522)
Attachments: Kemps Creek PEA - SSD 9522.pdf; Appendix 2_ QS Cost Estimate Letter.pdf; Appendix 3_ Preliminary Site Plan.pdf; Appenedix 3_ Draft Subdivision Plan.pdf; Appendix 2_ Capital Investment Value Summary.pdf; 10129-002-POBDY.PDF

Hi,
A Land status investigation on Proposed Kemps Creek Warehouse and Logistics Hub (SSD 9522) shows that there is no Crown land features exist. Therefore, no comments.
thank you.
Regards,

Mohammed H Rahman | Natural Resources Management Officer Sydney
Regional Services
Department of Industry, Lands and Water Division
PO Box 2185 DANGAR NSW 2309
T: 02 9842 8331 | F: 02 8836 5365 | E: mohammed.rahman@crownland.nsw.gov.au
W: www.crownland.nsw.gov.au

Appendix D
Site Survey

MGA2020

A
DP 154739

DP 229770

1
DP 587334
No. 654-674

2
DP 587334
No. 676-702

DP

34
DP 1118173
No. 657-703
(SEE NOTE 3.)

ROAD (vide Gov. Gaz. No. 36 dated 21/2/2020)

(20.115 WIDE)

ROAD (vide Gov. Gaz. No. 34 dated 27/7/1917)

MAMRE

BAKERS LANE

222
DP 270417

SOUTH

1
DP 1018318
No. 707A

X
DP 421633
No. 707-711

Y
DP 421633
No. 713-755

ROAD

1
DP 104958
No. 706-752

CREEK

22
DP 258414
No. 757-769

(A)

PT60
DP 259135

47
DP 270417

(B)

23
DP 258414
No. 771-781

PT61
DP 259135

(A) RESTRICTION ON USER (H107598)
(B) RIGHT OF WAY 6 WIDE & VARIABLE (DP610242)

Detail Survey Certificate (Clause 9)

I, Shawn LeClerc BEng (Geo) MIS of Boxall Surveyors, a surveyor registered under the Surveying and Spatial Information Act 2002, certify that the survey represented in this plan was made in accordance with Clause 9 of the Surveying and Spatial Information Regulation 2017 with regard to the location of the approximate boundaries shown on this plan.

Signature: Dated: 22-6-2020

Surveyor Identification No: 115
Surveyor registered under the Surveying and Spatial Information Act 2002

NOTES:

1. THE BOUNDARIES SHOWN ON THIS PLAN HAVE BEEN COMPILED FROM DEPOSITED PLANS ON PUBLIC RECORD. NO FIELD SURVEY HAS BEEN UNDERTAKEN TO DETERMINE THE ACCURACY OF THE BOUNDARIES.
2. ALL BOUNDARIES ARE SUBJECT TO FINAL SURVEY.
3. LOT 34 IN DP1118173 IS QUALIFIED AND LIMITED TITLE.
4. UNDERGROUND SERVICES SHOWN ATTACHED TO THIS PLAN ARE FROM SURVEY BY UTILITY MAPPING DRAWING NUMBER NSW20-0128-01 US R1 DATED 25-5-2020
5. CONTOURS ARE APPROXIMATE ONLY, PREFERENCE TO BE GIVEN TO SPOT HEIGHTS.
6. ONLY MAJOR TREES SHOWN.
7. PROJECT CO-ORDINATES ARE MGA2020 (ZONE 56).
   ORIGIN - PM33568 (E: 294645.403 N: 6253924.312)
   LOCAL SCALE FACTOR: 1.000109
8. AERIAL IMAGERY ACQUIRED ON THE 6TH & 7TH APRIL, 2020 BY UAV

PRINT IN COLOUR

LEGEND:
BOUNDARY LINE, BITUMEN LINE, TOP OF BANK, BOTTOM OF BANK, CONCRETE LINE, EASEMENT LINE, FENCE LINE, PAVERS LINE, EDGE OF TRACK, STORM WATER
GRATED DRAIN, HYDRANT, STOP VALVE, WATER METER, SURVEY MARK
COMMS PIT, GAS VALVE, TRAFFIC LIGHT, TRAFFIC CONTROL BOX, STREET SIGN
ELECTRICAL BOX, ELECTRICAL PILLAR, ELECTRICAL PIT, LIGHT POLE, POWER POLE

CLIENT: FRASERS PROPERTY

ADDRESS: 713-755 MAMRE ROAD KEMPS CREEK

boxall
PO Box 519 Sutherland NSW 1499 | Suite 8/49-51 Eton Street
02 9521 5737 | www.boxallsurveyors.com.au | ACN 114 644 058

TITLE: SITE DETAIL AND LEVELS

REV	DATE	REVISION DETAILS
A	5.06.2020	ADDITIONAL DETAILS ADDED
B	12.06.2020	ADDITIONAL DETAILS ADDED

ORIGIN LEVELS: PM 33567 RL 44.262
AZIMUTH: MGA20 DATUM: AHD
SURVEY: LC DATE: 06.04.2020
DRAWN: EL DATE: 22.06.2020
APPROVED: SL DATE: 22.06.2020
SCALE: 1:4000 SHEET 1 OF 1
DRAWING No: 10129-005-TOPO REV: B SIZE: A1

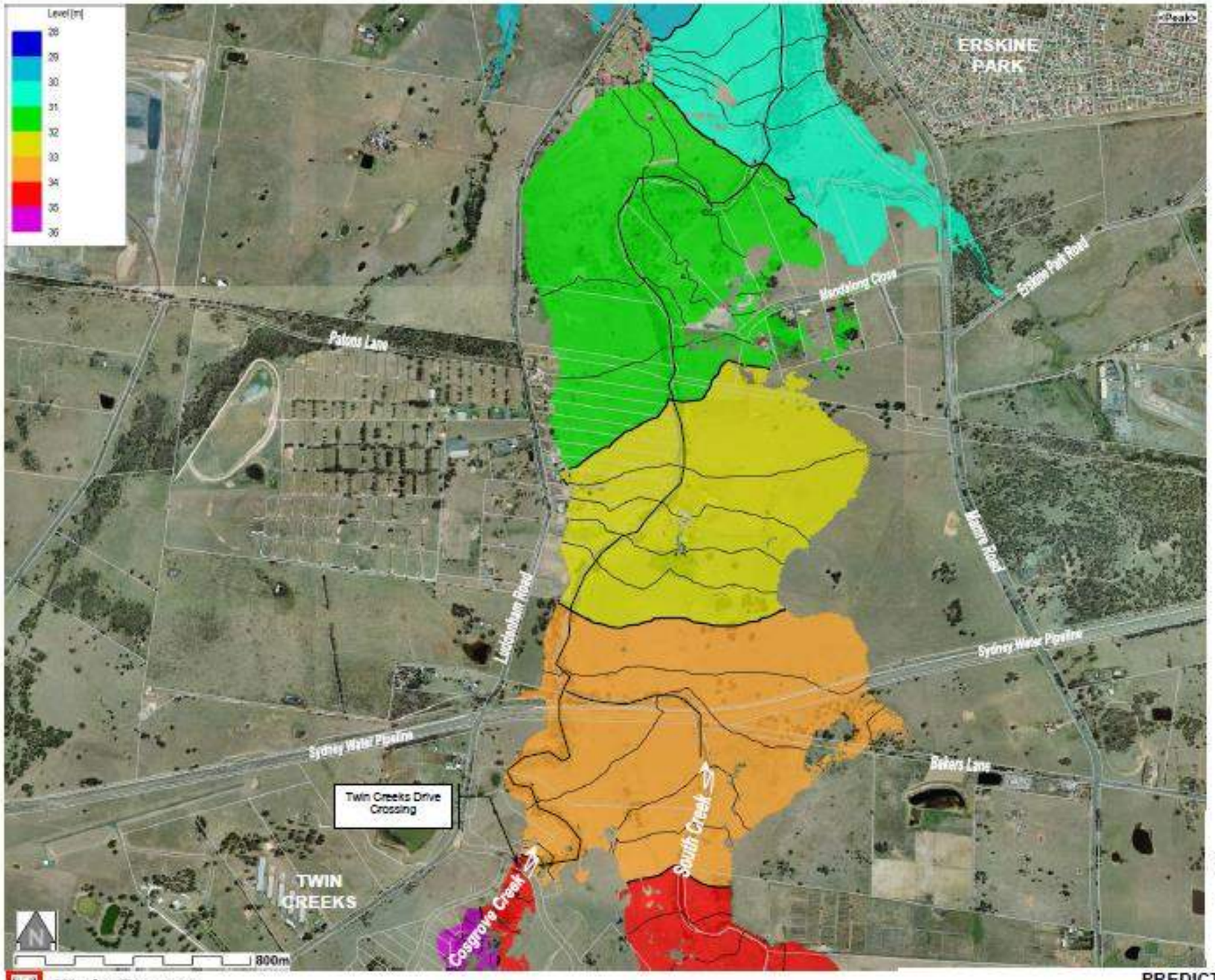
Appendix E

Flood Information Sourced from:

Updated South Creek Flood Study (rp6033rg_crt150128-Updated South Creek Flood Study (FINAL – Volume 1)

Worley Parsons, 2014

FIGURE 6.26



LEGEND:

Flood Level Contour at 1 metre interval

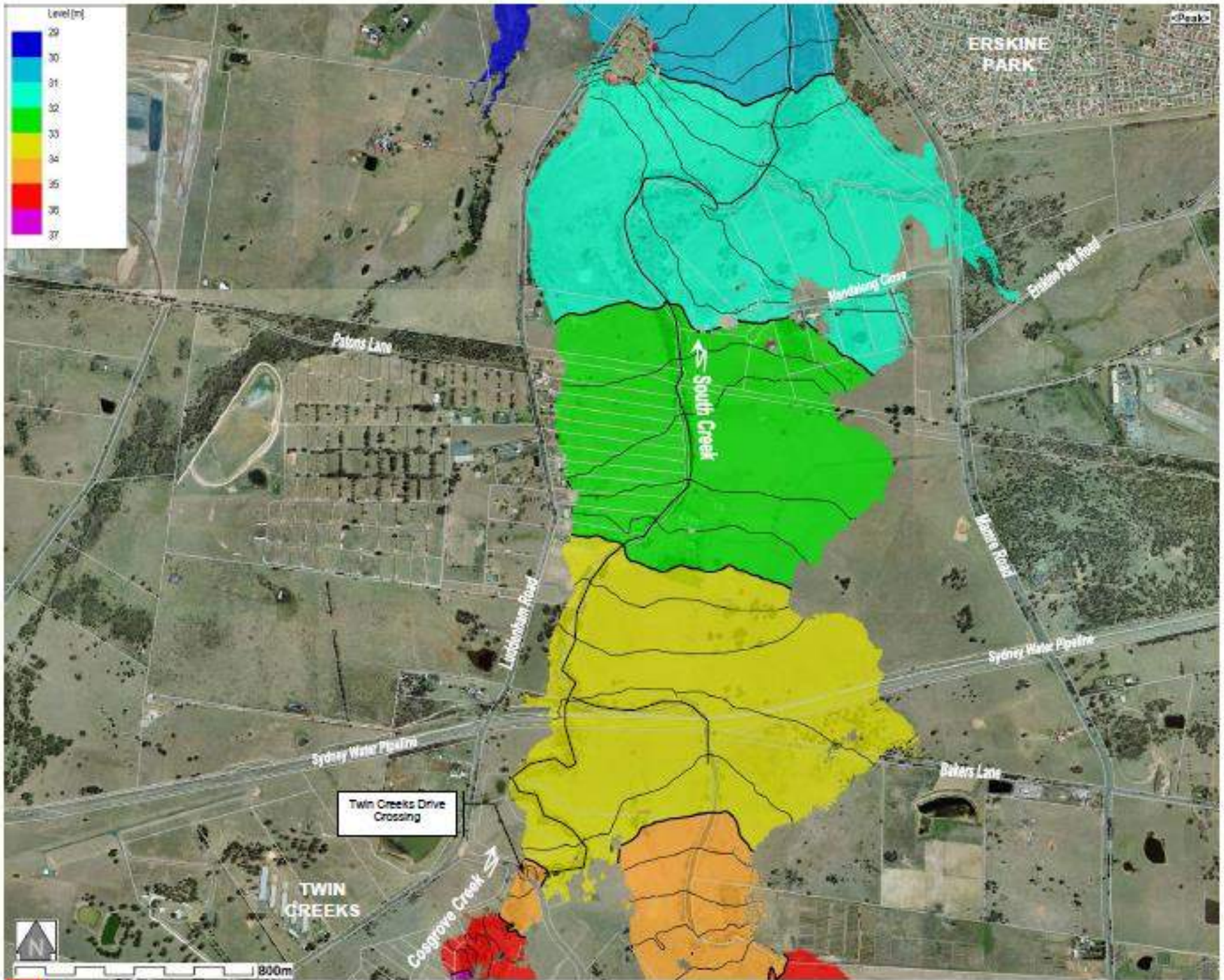
Flood Level Contour at 0.2 metre interval

WorleyParsons
resources & energy

Rp8033- South Creek Flood Study
lg8033g15r113-Fig 6.26-Peak 20yr ARI Levels (5 of 17).doc

PREDICTED FLOOD LEVELS AT THE PEAK OF THE 20 YEAR RECURRENCE FLOOD [EXTENT 5 OF 17]

FIGURE 6.43



LEGEND:

Flood Level Contour at 1 metre Interval

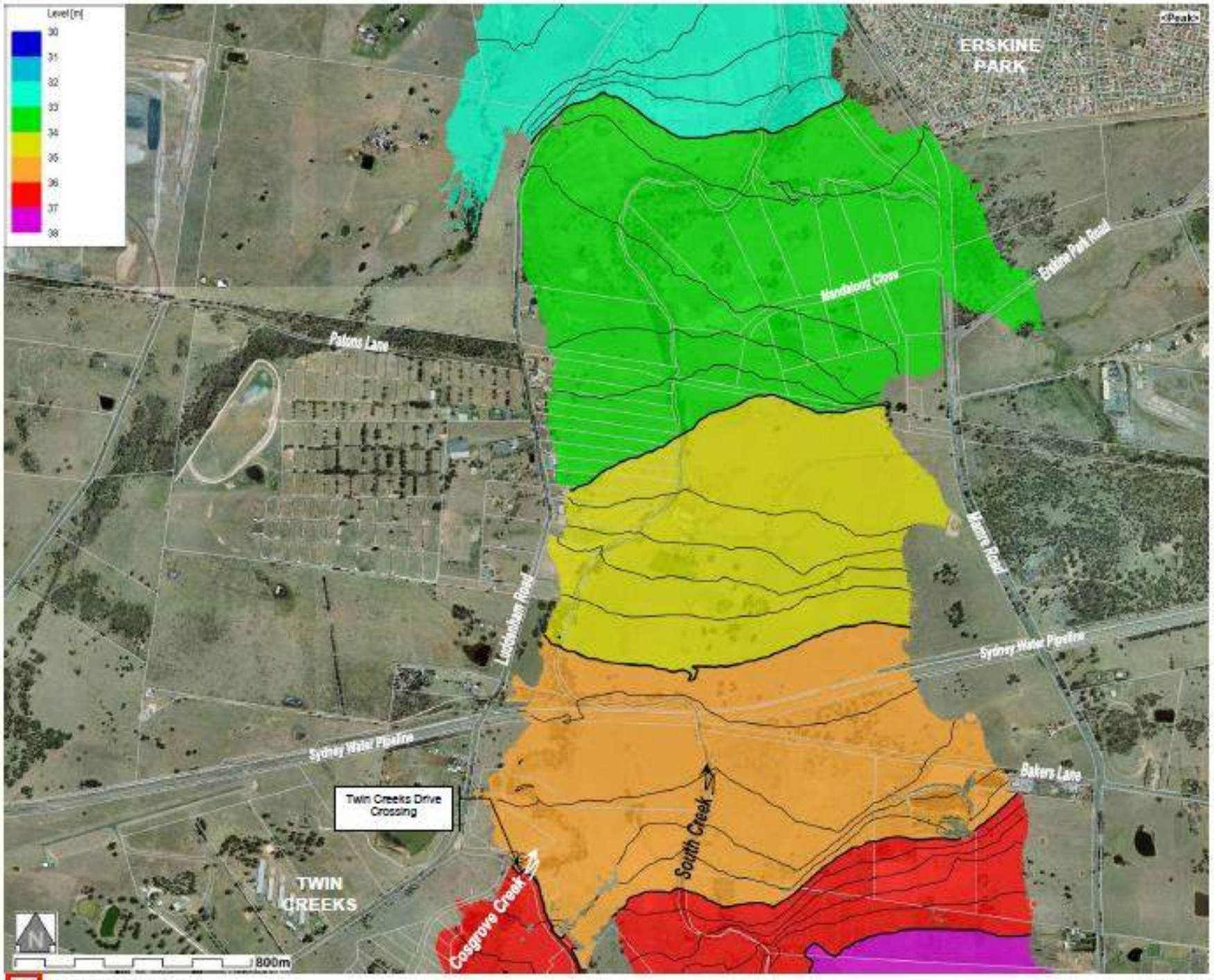
Flood Level Contour at 0.2 metre Interval

WorleyParsons
resources & energy

Rp8023- South Creek Flood Study
fg8023g150113-Fig 6.43-Peak 100yr ARI Levels (5 of 17).doc

PREDICTED FLOOD LEVELS AT THE PEAK OF THE 100 YEAR RECURRENCE FLOOD [EXTENT 5 OF 17]

FIGURE 6.77



WorleyParsons
resources & energy

Rpt8033- South Creek Flood Study
tg8033rg150113-Fig 6.77-Peak PMF Levels (5 of 17).doc

LEGEND:

Flood Level Contour at 1 metre Interval

Flood Level Contour at 0.2 metre Interval

PREDICTED FLOOD LEVELS AT THE PEAK OF THE PROBABLE MAXIMUM FLOOD [EXTENT 5 OF 17]

APPENDIX F
Sydney Water
Endorsement Letter (9 January 2020)

For approval
External

9 January 2020

Sydney WATER

Endorsement of Interim Options for Stage 1 Altis-Frasers site in Mamre Rd Precinct

It is recommended that Sydney Water endorses the interim options report (Attachment A) to provide water and wastewater services for Stage 1 of the Altis and Frasers study site at 657-769 Mamre Rd, Kemps Creek.

The planning proposal for rezoning of the Mamre Rd Precinct was put on display by DPIE on 20 November 2019. Sydney Water is expecting to finalise Strategic Planning of the precinct by February 2020. This will enable completion of Options Planning for Mamre Rd South Precinct by end of 2020, pending business case approval.

When Altis-Frasers submit a s73 application for this development, Sydney Water must confirm that the design follows the endorsed interim option and aligns with the ultimate servicing strategy.

The preferred interim water option is a DN250-DN300 extension of the Erskine Park water supply zone (WSZ). There are two potential interim wastewater options that can be used at the discretion of Altis-Frasers. The first option is a local pressure sewer network connecting to the existing sewer network 2km away. The second option, preferred by both Altis-Frasers and Sydney Water, is an internal gravity network with a temporary pump out facility.

Context

Altis Property Partners (Altis) and Frasers Property Australia (Frasers) are proposing to develop a 118ha warehouse, logistics and industrial facilities hub at 657-769 Mamre Rd, Kemps Creek (Proposed Site) generating an assumed 2,500 jobs.

The Proposed Site is located within the Mamre Road Precinct of the Western Sydney Aerotropolis. Altis-Frasers have submitted a State Significant Development application (SSD-9522) for Stage 1 of the development to DPIE, as shown below, and it is currently under assessment.

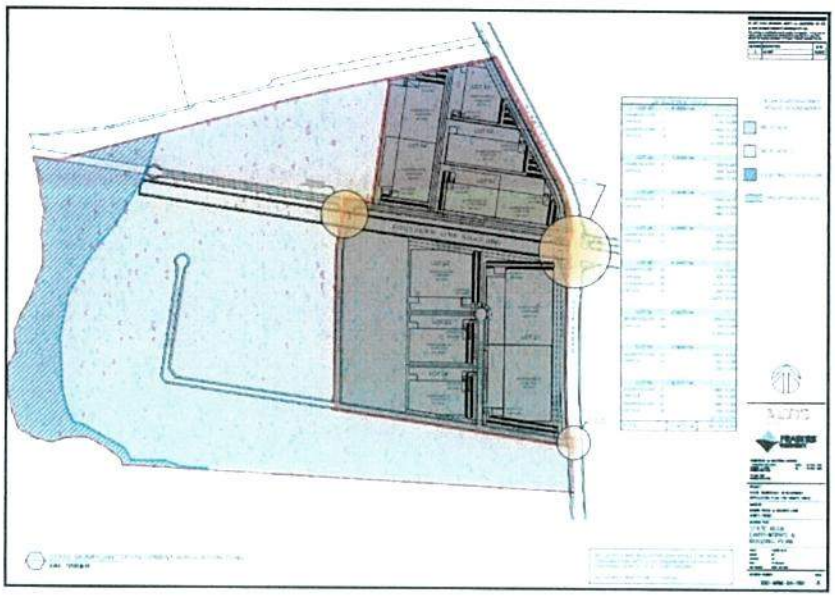


Figure 1: Altis-Frasers proposed Stage 1 development

Concurrently, DPIE has put on exhibition the draft structure plan (Figure 2) for Mamre Rd Precinct, which will ultimately define the boundary of the future industrial zoning for the Proposed Site.

If there are substantial changes to the Altis-Frasers SSDA that impacts water and wastewater servicing, the interim options will need to be revised based on the changes to their plans.

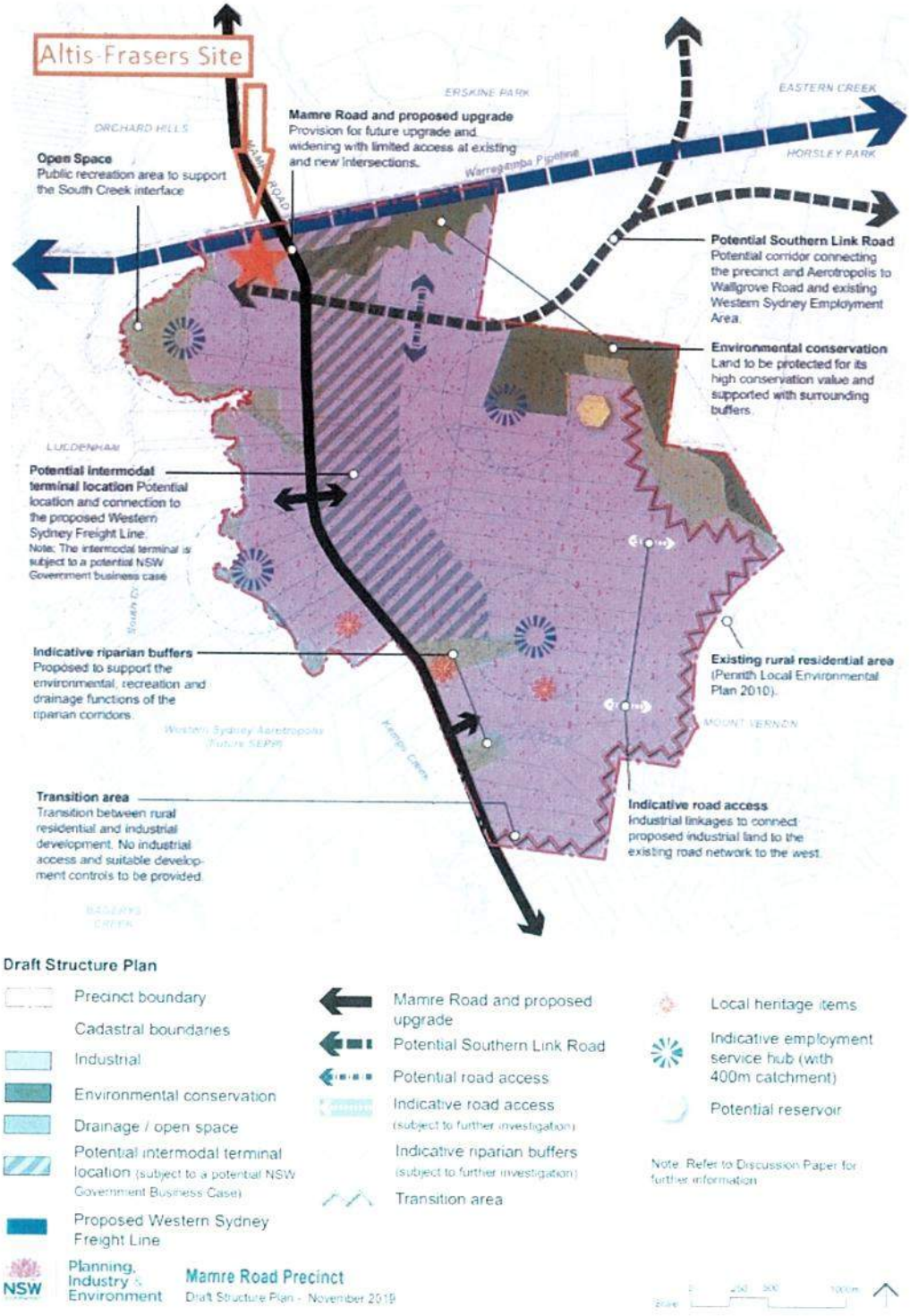


Figure 2: Draft Structure Plan with Altis-Frasers site

Sydney Water Strategic Planning for Mamre Rd Precinct

Sydney Water is currently undertaking strategic planning to determine the servicing strategy for Mamre Rd Precinct. It is expected that the interim and ultimate servicing strategies for water and wastewater will be determined by February 2020.

Options Planning will commence once the servicing strategy is endorsed, a business case has been approved and there is further clarify on the future zoning and land use types, e.g. the final location of the Intermodal.

Sydney Water has also been in discussion with key landowners and large corporate developers, including Altis-Frasers, to understand their ultimate development plans and timing. These plans will provide growth intelligence to inform the servicing strategy and final water and wastewater infrastructure options.

Interim Options

Altis-Frasers have carried out an options assessment (Attachment A) to determine the preferred interim servicing option for water and wastewater servicing their proposed warehouse, logistics and industrial facilities hub at 657-769 Mamre Rd, Kemps Creek. Sydney Water stakeholders from Integrated Systems Planning, Customer Delivery and City Growth & Development have been involved throughout the assessment process.

Water – Preferred Interim Option

The Mamre Rd Precinct is currently within the Cecil Park Water Supply Zone (WSZ). As at the time of the options assessment, there is limited available capacity from the Cecil Park WSZ. Interim supply for Altis-Frasers, and other potential developers in Mamre Rd Precinct, can be temporarily sourced from the Erskine Park Elevated WSZ. The Strategic and Options Planning for Mamre Rd Precinct will determine the ultimate source of water and trunk upgrades required to service forecasted growth in the area.

The shortlisted interim options to provide water to the Altis-Frasers site are shown in Table 1.

Option	Benefits	Risks	Risk rating		Cost Estimate[1]
W1 DN200 lead in main	• Least cost option to supply development only	• Mamre Rd proposed upgrade. May need to realign main • Crossing raw water pipeline needs lengthy approval • Can only cater for limited additional growth • Lower firefighting capacity		Moderate Very Unlikely	$2.0M
W4 DN200-DN300 lead in main	• Larger main to the development and duplication of the existing DN200 main will provide flexibility to serve other developments • Likely reduced impact on Cecil Park WSZ	• Mamre Rd proposed upgrade. May need to realign main • Crossing raw water pipeline needs lengthy approval		Minor Very Unlikely	$3.3M

Table 1: Shortlisted interim water options

The preferred interim option for water for the Altis-Frasers site is option **W4** and shown in Figure 3. It includes:

- 700m of DN250 main
- 1600m of DN300 main

[1] The Cost Estimate is total cost to deliver the interim water infrastructure. A preliminary funding assessment has been completed on page 6 to determine Sydney Water's potential share of costs.

- A Dividing Valve (DV) for potential future rezoning onto Cecil Park WSZ

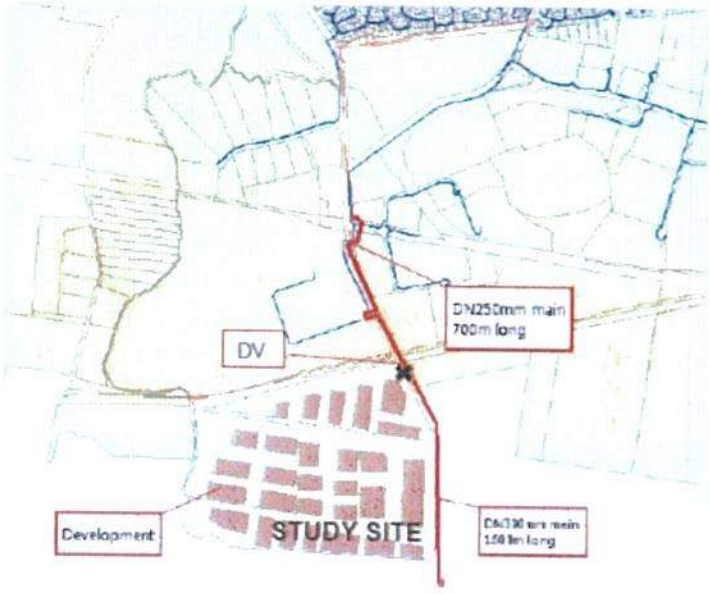


Table 2: Shortlisted interim wastewater options

Wastewater – Interim Options

There are two shortlisted interim options for wastewater that are viable and endorsed by Sydney Water. They are shown in Table 2.

Option	Benefits	Risks	Risk rating		Cost Estimate[2]
WW1 Low pressure sewer	• Developer bears cost and responsibility to maintain the system	• Issues with developer's pressure system could cause local overflow and loss of service. • Crossing raw water pipeline needs lengthy approval • Likely not to align with ultimate servicing strategy		Minor Very Unlikely	$1.9M
WW5 Gravity reticulation with pump out	• Reticulation can likely be used in the ultimate servicing • Developer bears cost and responsibility to maintain the system	• Overflow if tanker operation is not adequately managed • Odour issues at pump out location		Minor Very Unlikely	$2.6M

Table 2: Shortlisted interim wastewater options

Wastewater – Interim Option WW1

Interim Option WW1 is low pressure sewer network with individual collection pots for each building. The pressure sewer will connect to the existing network north of the study site, for treatment at St Marys. If the ultimate strategy is for a gravity system, the pots will be removed, pressure mains decommissioned and internal reticulation put in by Altis-Frasers at their cost. Altis-Frasers will connect the internal reticulation to the ultimate trunk sewer network.

Interim Option WW1 is shown in Figure 4 and requires:

[2] The Cost Estimate is total cost to deliver the interim wastewater infrastructure. A preliminary funding assessment has been completed on page 6 to determine Sydney Water's potential share of costs.

- Collecting pots and pumps for each building
- 2000m of DN140 pressure main
- Barometric loop at DN140 connection into existing manhole

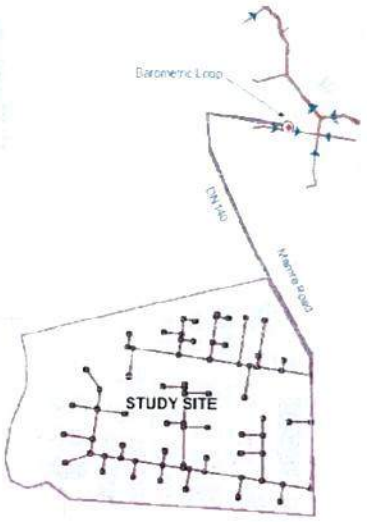


Figure 4: Wastewater Interim Option WW1

Wastewater – Interim Option WW5

Interim Option B is a single tankered pump out facility with reticulation gravity mains within the site. The reticulation gravity mains will be built to Sydney Water standards and can form part of the ultimate solution.

When the ultimate wastewater trunk sewer is ready for connection, Altis-Frasers will be required to decommission all interim pump out infrastructure and connect their reticulation network into the ultimate infrastructure.

Interim Option B is shown in Figure 5 and requires:

- 4500m of DN150 reticulation mains
- Pump out facility with emergency storage (estimated 75m^3)

It is noted that for compliance with the WSAA code, minimum reticulation for industrial and commercial zoning should be DN225, not DN150. This will be reviewed by Sydney Water when the s73 application is submitted.

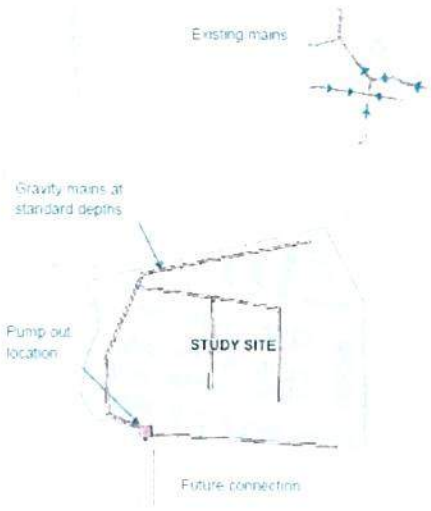


Figure 5: Wastewater Interim Option WW5

Preliminary Funding Assessment

The final determination of Sydney Water funding will be done at the completion of the design and when there is a valid development consent. A preliminary assessment of Sydney Water funding has been completed below based on the current Funding Infrastructure to Service Growth policy and forecasted timing of the Altis-Frasers interim infrastructure to be delivered by end of 2020.

Water

All internal reticulation is to be funded by Altis-Frasers. As the lead in water main provides no benefit to other developers, Sydney Water will only consider funding reimbursement for upsizing of the pipeline from DN150, which is the minimum reticulation size for industrial and commercial property.

Wastewater

All interim wastewater works and the ultimate minimum reticulation is to be funded by Altis-Frasers in accordance with the Sydney Water – Funding Infrastructure to Service Growth policy. The decision not to fund the interim works is based on Altis-Frasers accelerating development ahead of Sydney Water's Growth Servicing Plan, ahead of rezoning and release of land by DPIE and ahead of RMS finalisation of the Mamre Rd upgrade design.

Figure 5 shows the likely future connection to the ultimate trunk sewer. If this connection requires a lead in main to be delivered by Altis-Frasers, it will be subject to funding assessment at that point in time.

Recommendation

It is recommended that Sydney Water endorses the interim options to provide water and wastewater services for Stage 1 of the Altis and Frasers study site at 657-769 Mamre Rd, Kemps Creek.

When Altis-Frasers submit an interim design or s73 application for this development, Sydney Water must confirm that it follows the endorsed interim option and aligns with the ultimate servicing strategy.

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Attachment A – Altis-Frasers Mamre Rd Interim Options Assessment