Summit at Kemps Creek – 706-752 Mamre Road

SSD-30628110

Civil Infrastructure Report

ISPT Super Property

28/02/2023

21-855

Commercial in Confidence

Document Registration

Document Title	Summit at Kemps Creek – 706-752 Mamre Road Civil Infrastructure Report
Document File Name	REP002-02-21-855 SSDA Civil Infrastructure.docx
Section	Civil
Document Author	Tim Michel

Issue	Description	Date	Author	Checked	Approved
01	Issue for SSDA	17/02/23	Tim Michel	☐	☐
02	Issue for SSDA	28/02/23	Tim Michel	☒	☒
				☐	☐
				☐	☐
				☐	☐

Contents

Figures

Tables

1. Introduction

This Civil Infrastructure Report has been prepared by AT&L on behalf of ISPT in support of a State Significant Development Application (SSD-30628110) for the proposed development of the 'Summit at Kemps Creek' site located at 706-752 Mamre Road, Kemps Creek (the Site).

1.1. Site Description

The extent of the Summit at Kemps Creek site is presented in **Figure 1**.

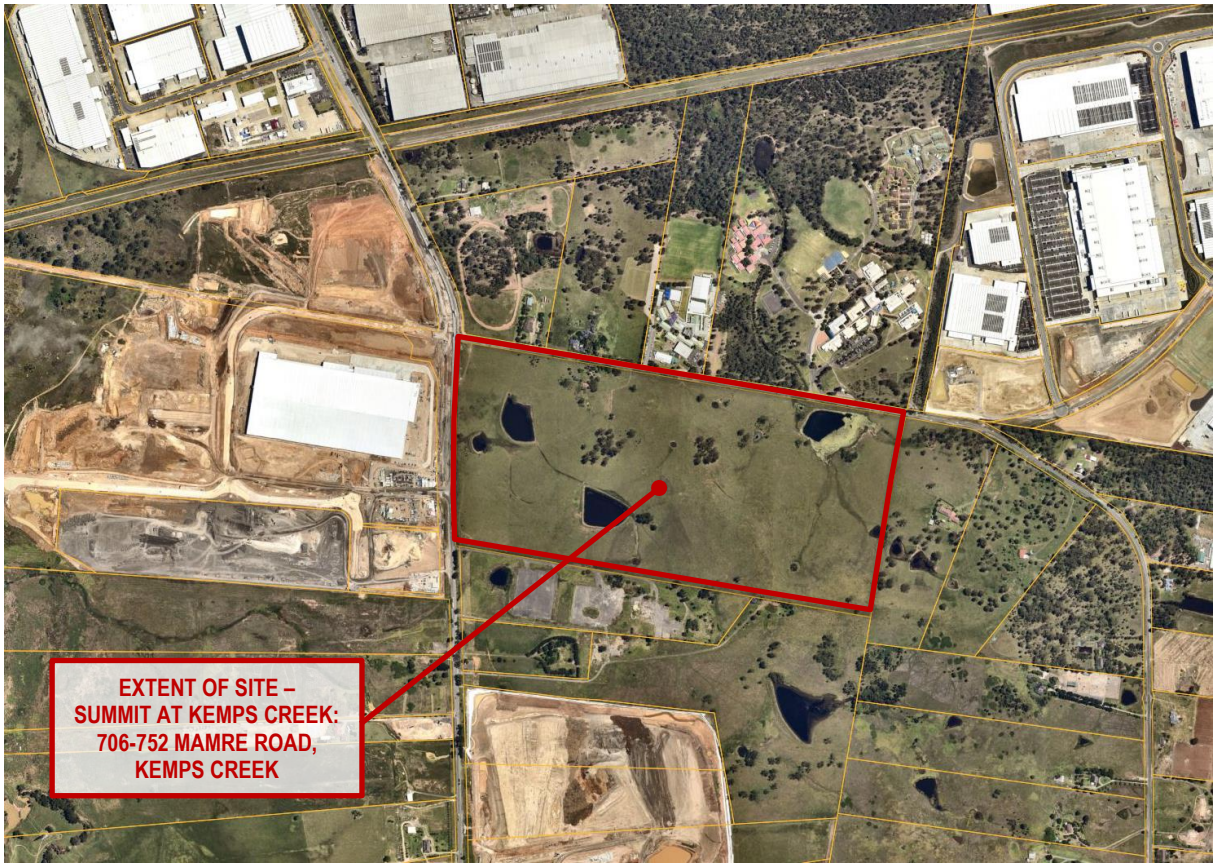

Figure 1: Site Extent (imagery from Nearmap, dated 19 May 2022)

The Site is located in the suburb of Kemps Creek, within the Penrith Local Government Area (LGA) and approximately 13 km south-east of the Penrith CBD and 7 km north-east of the under-construction Western Sydney Airport. The site is made up of a single allotment (Lot 1 DP104958). The total area of the Site is approximately 52 hectares.

The Site is currently characterised as rural land and comprises a single residential dwelling and some farm dams.

In June 2020, the site was rezoned *IN1 – General Industrial* under the *State Environmental Planning Policy (Western Sydney Employment Area) 2009*. The site is also located in the Mamre Road Precinct and is therefore subject to controls outlined in the *Mamre Road Precinct Development Control Plan 2021*.

1.2. Scope of SSDA

SSD-30628110 seeks approval for the following scope of development:

- Concept Masterplan comprising eight (8) industrial allotments with a total gross floor area of approximately 263,010 m^2.
- Stage 1 infrastructure works, including:

- Demolition, vegetation clearing and removal of existing farm dams
- Bulk earthworks and construction of retaining walls
- Construction of two internal roads (Road No. 1 in a north-south direction and Road No. 2 in an east-west direction), including a roundabout at the intersection of the two roads.
- Construction of an interim arrangement of the Southern Link Road, which will provide vehicular access between Mamre Road and the Site.
- Construction of stormwater infrastructure, utility services and landscaping.
- Construction of three (3) warehouse buildings, one each on proposed lots 1, 2 and 3 (east of proposed Road No. 1).
- Implementation of construction-phase erosion and sediment controls, including measures required to satisfy stormwater quantity and flow controls on the remainder of the site west of proposed Road No. 1 (lots 4-8 inclusive).

1.3. Supporting Documentation

This report should be read in conjunction with Civil Drawings (AT&L), 21-855-C1000 (Infrastructure) and the Water and Stormwater Management Plan (AT&L).

2. Compliance with SEARs

This report responds to the NSW Planning Secretary's Environmental Assessment Requirements (SEARs) issued by the NSW Department of Planning, Industry and Environment (DPIE) in November 2021 and subsequently updated in March 2022. **Table 1** below summaries all key civil infrastructure and water management issues raised in the SEARs and how they have been addressed in this report.

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

Key Issue listed in the SEARs	Response
Traffic and Transport *(NB: items listed in the SEARs that are not included in this table have been addressed in the Traffic Assessment prepared by ASON Group)*	
– details of road upgrades, infrastructure works or new roads or access points required for the development. Provide details of consultation with adjoining landowners with regard to road connections on the site boundary	An overview of proposed road upgrades and access points to the site is presented in **Section 6**.
– clearly describe the proposed interim site access arrangement via Bakers Lane and ultimate access via the Southern Link Road. This is to include details on how other landowners and users on Bakers Lane have been consulted on the proposed works and the potential traffic and access impacts	Details of the proposed interim site access arrangement, including connection of an interim Southern Link Road arrangement with Bakers Lane, is described in **Section 6.1**.
– plans demonstrating how all vehicles likely to be generated during construction and operation and awaiting loading, unloading or servicing can be accommodated on the site to avoid queuing in the street network	Refer to ASON Traffic report
– details and plans of any proposed the internal road network, loading dock servicing and provisions, on-site parking provisions, and sufficient pedestrian and cyclist access and facilities, in accordance with the relevant Australian Standards	The proposed internal road layout and site access points is presented on drawings 21-855-C1041 to C1048 inclusive.
– detailed plans of all proposed site access points, justification for their location and an assessment of potential traffic impacts from the proposed access points	The proposed internal road layout and site access points is presented on drawings 21-855-C1041 to C1048 inclusive.
– details of the largest vehicle anticipated to access and move within the site, including swept path analysis	Details of the proposed design vehicle are presented in **Section 6.2**.
– swept path diagrams depicting vehicles entering, exiting and manoeuvring throughout the site.	Swept path diagrams are presented in drawings 21-855-C1105 to C1108 inclusive.
***Soils and Water** – a surface and groundwater assessment that includes:*	
- a topographic assessment and justification the proposed earthworks are site responsive and contextually appropriate	An assessment and justification of the proposed earthworks is discussed in **Section 4.1**.

Key Issue listed in the SEARs	Response
- an assessment of potential surface and groundwater impacts associated with the development, including potential impacts on watercourses, riparian areas, groundwater, and groundwater-dependent communities nearby	Refer to Water and Stormwater Management Plan prepared by AT&L
- a detailed site water balance including a description of the water demands and breakdown of water supplies, and any water licensing requirements	Refer to Water and Stormwater Management Plan prepared by AT&L
- a site-specific integrated water management strategy with details of stormwater/wastewater management system including how it will be designed, operated and maintained, including the capacity of onsite detention system(s)	Refer to Water and Stormwater Management Plan prepared by AT&L
- characterisation of water quality at the point of discharge to surface and/or groundwater against the relevant water quality criteria (including proposed mitigation measures to manage any impacts to receiving waters and monitoring activities and methodologies)	Refer to Water and Stormwater Management Plan prepared by AT&L
- assessment of the impacts of the development on downstream flood behaviour	Refer to Flood Assessment prepared by JWP
- description of the proposed erosion and sediment controls during construction	Refer to **Section** 5
- consideration of salinity and acid sulphate soil impacts.	Refer to Water and Stormwater Management Plan prepared by AT&L
***Infrastructure Requirements** – an infrastructure management plan that includes:*	
– a detailed written and/or graphical description of infrastructure required on the site, including upgrades required	The extent of utility services infrastructure required to service the proposed development of the site is presented on drawings 21-855-C1111 to C1117 inclusive. A description of the proposed services required is presented in **Section 8**.
- details of the existing capacity of the site to service the proposed development and any extension or augmentation, property tenure or staging requirements for the provision of utilities, including arrangements for electrical network requirements, drinking water, wastewater and recycled water	Refer to **Section 8**
- a description of how any upgrades will be co-ordinated, funded and delivered on time and be maintained to facilitate the development	An indicative Infrastructure Staging Plan is included in **Section 9**.
- identification of any existing infrastructure or easements on or off the site which may be impacted by construction or operation of the development and details of measures to be implemented to address any impacts.	Refer to **Section 8**

Since the SEARs were issued on 22 November 2021, additional SEARs have been identified by DPE and are presented in a letter dated 25 March 2022. The additional SEARs addressed in this report are summarised in **Table 2**.

Table 2: Additional Planning Secretary's Environmental Assessment Requirements addressed in this report

Key issues listed in the Additional SEARs	Response
Waterway health	
You are reminded that the Department strongly encourages you to consult with Environment, Energy and Science Group and Sydney Water with regards to waterway health targets and trunk drainage requirements for the precinct and include evidence of this consultation as part of the EIS.	Refer to Water and Stormwater Management Plan prepared by AT&L

3. Agency Consultation

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

A detail consultation report has been prepared as part of the application by others.

Table 3: Summary of agency consultation

Agency	Date
Penrith City Council	30th June 2022 Meeting held with Council to discuss the project and interface with other projects within the Precinct
TfNSW / DPIE	6th July 2022 Meeting held with TfNSW and DPIE to run through the project along with the Northern Access proposal
Bakers Lane Schools	7th June 2022 Meeting with Robert Nastasi and Catherine Hey (Catholic Education), Cathie Graydon and Michael Pruscino (Mamre Anglican School.) Meeting to discuss the proposed Northern Access Arrangements
Sydney Water	Multiple meetings have been held with Sydney over the course of the last 4 months to discuss the proposed Stormwater management strategy.

4. Earthworks and Retaining Walls

4.1. Proposed Earthworks Strategy

The intent of the proposed development of the site is to produce several level pads to facilitate the development of large-scale industrial lots, ranging in the order of 3.4 hectares to 7.5 hectares. The creation of large format industrial lots will require benched earthworks across the site to achieve level pads across each of the proposed lots.

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

- Undulating topography within the Mamre Road Precinct, resulting in the requirement of extensive cut and fill to allow ISPT to facilitate economic development and provide flexibility to cater for a wide range of industrial customer requirements.
- Provision for connectivity to and interfaces with adjoining lands, including the following adjacent sites:
  - 1-51 Aldington Road (SSD-22595032, 'Prepare EIS' status as of 30 June 2022)
  - 754-770 and 784-786 Mamre Road (SSD-10272349, 'Response to Submissions' status as of 30 June 2022)
  - 99-111 Aldington Road (Frasers Property site, at initial stages of planning and design for DA)
- Provision for connectivity to Mamre Road and an interim arrangement for the Southern Link Road.
- Provision for connectivity to the adjacent development sites to the south and east.
- Achieving as close as possible to a balance of cut to fill to minimise the volume of material that needs to be imported or exported, allowing for management of topsoil and over-excavation (desilting) required within existing farm dams.
- Minimising the height and extent of retaining walls fronting the Southern Link Road, Mamre Road and internal estate roads as much as possible.
- Avoiding extensive cut in bedrock sub-surface units.
- Meeting the requirements for the end-use of the site, being that it will cater for *IN1 – General Industrial* end use which requires large flexible allotments.
- Provision of a final design solution that addresses water management requirements, including stormwater quantity and quality management, external catchments, stormwater drainage (major and minor system), flooding and discharges.

It is recommended that the proposed earthworks design contained within the AT&L documentation provides the most contextually and economically appropriate design in consideration of the above requirements.

Refer to drawing 21-855-C1030 for the proposed Cut and Fill Plan. A summary of the estimated cut and fill volumes across the site is presented in Table 3.

Table 4: Summary of proposed cut and fill volumes across the site

Item	Volume (m^3) (approximate only)
Stripping of topsoil	101,300
Excavation of existing farm dams (allowing for 1m deep excavation of accumulated sediment)	34,100
Net cut (excluding topsoil stripping)	1,422,600
Net fill	1,564,400
Balance	**6,400 import**

NB: These volumes exclude allowances for bulking and compaction, excavation of footings and services trenches, select materials (e.g., retaining wall backfill) and engineered fill.

The volumes presented in **Table 4** are based on the current design at the time of SSDA submission, and further detailed design of the infrastructure and on-lot works may alter these volumes. It is assumed that topsoil from the Site will be reused on Site by blending with general fill material.

All imported materials will comply with the requirements of the Import Fill Protocol and geotechnical specifications for the development. Topsoil stripping, blending and placement will be undertaken in accordance with the geotechnical engineering specification for the project.

4.2. Batter Design

Any permanent batters steeper than 1 in 5 will be vegetated in accordance with Penrith City Council requirements. All external batters to the development have been limited to no steeper than 1 in 3.

Any temporary batters constructed during the works will be in accordance with recommended maximum batter slopes as per the geotechnical investigation report and ongoing advice from the Level 1 geotechnical engineer. All temporary batters will be stabilised with appropriate methods and vegetated where required.

4.3. Retaining Walls

Where possible, batter slopes will be provided to accommodate level changes. Where this is not possible, retaining walls will be constructed adjacent to the road reserve, lots and basins based on the current civil and earthworks design. A keystone product or other similar block will be adopted for all retaining walls and will be detailed on the civil drawings. Refer to **Figure 2** to **Figure 4** inclusive for examples of proposed retaining walls. Refer to Drawings 21-855-C1090 and C1091 for proposed retaining wall locations.

Where retaining wall heights exceed 2 metres, a tiered retaining wall such as that shown in **Figure 2** will be adopted, in accordance with Section 4.4 of the Mamre Road Precinct DCP.

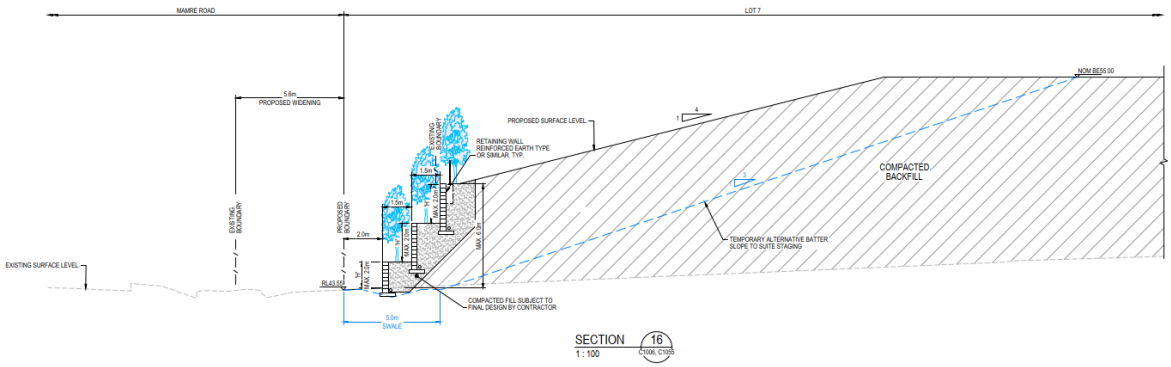

Figure 2: Typical retaining wall section in fill

Figure 3: Example of retaining wall in location of fill adjacent to road reserve

Figure 4: Example of retaining wall in location of cut

Retaining walls will be designed and constructed using standard industry practices, standards and guidelines. All retaining walls will be constructed on a staged basis and as required to suit the development earthworks. Where

walls are not constructed, a batter of 1 in 4 will be maintained for stability purposes. Any batter steeper than 1 in 5 shall be vegetated.

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

Where boundary fill walls are proposed, the construction of the boundary walls may be delayed until such time the adjacent lot is developed. If the boundary walls are delayed, a temporary batter will be constructed as an interim measure.

5. Soil and Water Management

5.1. Construction Phase Erosion and Sediment Control

An Erosion and Sediment Control Plan (ESCP) has been prepared in accordance with the guideline document titled *Managing Urban Stormwater – Soils and Construction* (Landcom, 2004). The key objectives of the ESCP are:

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

5.2. Sources of Pollution

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

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

5.3. Potential Impacts

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

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

5.4. RUSLE Analysis

To inform the design of the ESCP, an analysis using the Revised Universal Soil Loss Equation (RUSLE) has been undertaken in accordance with the "Blue Book". This analysis has been undertaken to predict the long term, average and annual soil loss from sheet and rill flow from the site under specified management conditions.

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

a) Assess the erosion risk at a site.
b) Identify suitable measures to overcome the erosion risk.
c) Estimate the required capacity of sediment retarding basins.
d) Compare the effectiveness of various erosion control measured.

Refer to **Table 5** below for estimates of soil loss on the site.

Table 5: RUSLE Analysis

Parameter	Value
Rainfall Erosivity Factor, R	1,897.10
Soil Erodibility Factor, K (Table C20, Blue Book)	0.05
Slope Length/Gradient Factor, LS	1.19
Erosion Control Practice Factor, P	1.20
Ground Cover and Management Factor, C	1
Computed Soil Loss (tonnes/ha/year), (A = R x K x LS x P x C)	**135.45**
Soil Loss Class	1 (Table 4.2 of the Blue Book)
Erosion Hazard	Very Low (Table 4.2 of the Blue Book)

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

- Rainfall Erosivity Factor (R) = 1,897.1 from (Equation 2, Appendix A2 Blue Book).
- Soil Erodibility Factor (K) = 0.05 (from Appendix C, Table C19 of Blue Book).
- Slope Length (LS): Is assumed to not exceed 80m immediately before forecast rainfall or during shutdown periods and a maximum grade of 5%.
- Erosion Control Factor (P): Is the ratio of soil loss with a nominated surface condition ploughed up and down the slope (from Appendix A5, Blue Book); and
- Cover Factor (C): Is the ratio of soil loss from land under specified crop or mulch conditions to the corresponding loss from continuously tilled, bare soil. With the proposed ESC measures being installed post bulk earthworks, it is assumed that all soil is recently disturbed, thus a C factor of 1 is chosen.

5.5. Design of Erosion and Sediment Control Measures

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

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

- *Protection of the Environment Operations Act*
- Penrith City Council's guidelines and specifications

- *Managing Urban Stormwater: Soils and Construction*, Landcom, (4th Edition) (The "Blue Book") Volume 1 and Volume 2

With the proposed site being larger than 2,500m^2 in disturbed area, sediment basins are required to be incorporated into the ESCP. Refer to drawing 20-748-C1201 'Earth Basin Wet' SD6-4 for details.

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

5.6. Construction Methodology

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

- Diversion of "clean" water away from the disturbed areas and discharge via suitable scour protection.
- Provision of hay bale type flow diverters to catch drainage and divert to "clean" water drains.
- Diversion of sediment-laden water into temporary sediment control basins to capture the design storm volume and undertake flocculation (if required).
- Provision of construction traffic shaker grids and wash-down to prevent vehicles carrying soils beyond the site.
- Provision of catch drains to carry sediment-laden water to sediment basins.
- Provision of silt fences to filter and retain sediments at source.
- Rapid stabilisation of disturbed and exposed ground surfaces with hydro-seeding areas where future construction and building works are not currently proposed.
- All temporary sediment basins will be located clear of the 1% AEP flood extent from catchments upstream of the site.
- The proposed detention basin will be utilised as temporary sediment control basins.

Refer to AT&L Drawings 21-855-C1201 to C1203 inclusive for Erosion and Sediment Control Plans, for all proposed control and protection measures across the site until completion of on lot works.

Suitable temporary erosion and sediment controls shall be designed by a suitably qualified Engineer. Erosion and sediment controls shall be installed and maintained by the Contractor throughout all stages of works. Such controls shall be in accordance with the relevant requirements in the latest version of *Managing Urban Stormwater: Soils and Construction* (Landcom, 2004).

5.7. Site Inspection and Maintenance

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

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

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

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

5.8. Sediment Basin Maintenance

The site contains 'Type F' soils, or soils that contain a significant proportion of fine grained (33% or more of finer than 0.02mm) and require a much longer residence time to settle.

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

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

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

5.9. Summary

The erosion and sediment control measures proposed for the site will comply with the requirements of Penrith City Council Engineering Guidelines and the Department of Planning and Environment (DPE).

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

6. Road Design

6.1. External Road Network

The existing Bakers Lane, which runs adjacent to the northern boundary of the site, is a local road (i.e., owned and maintained by Penrith City Council). Bakers Lane has a 6-8 metre wide sealed pavement with table drains on either side within a 20 metre wide road reserve (refer to **Figure 5** and **Figure 6**).

Figure 5: View of Bakers Lane looking west towards Mamre Road (Google Streetview, March 2021)

Figure 6: View of Bakers Lane looking east towards Aldington Road (Google Streetview, August 2020)

The future Southern Link Road (SLR) will be located parallel to Bakers Lane, and will provide the primary point of access to the site. Ultimately, the SLR will provide an east-west arterial link between Mamre Road and Wallgrove Road. TfNSW has commissioned WSP to undertake concept design of the SLR alignment, however it is understood that funding for delivery of the project has not yet been committed by TfNSW.

AT&L are working with TfNSW to develop the design of an interim arrangement for the provision of part-construction of the SLR adjacent to the Site. The proposed arrangement is presented as **Figure 7**, and would include the following:

- Construction of the southern half of SLR, and configuration to provide four traffic lanes (two in either direction). This portion of the work is shown hatched green in **Figure 7**.
- Construction of an intersection at the SLR and proposed internal Road 01. This intersection would likely be signalised (pending liaison with Penrith City Council and TfNSW).
- Transition works between the interim SLR and Bakers Lane near Mamre Road (shown hatched in blue in **Figure 7**), including a left-in only for eastbound traffic to maintain access for properties on the northern side of Bakers Lane.
- Transition works between the interim SLR and Bakers Lane at the eastern end of the Site (shown hatched in red in **Figure 7**), including connection to the existing alignment of Aldington Road.

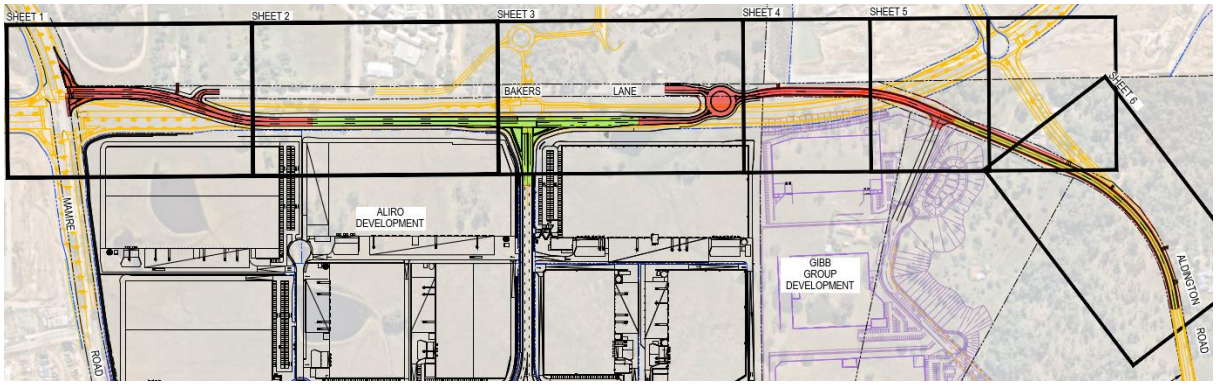

Figure 7: Proposed interim arrangement of Southern Link Road adjacent to the Site

The ultimate internal road network will include connection to the GPT site to the south, and to the Gibb Group and Frasers sites to the east.

No vehicular access to the site off Mamre Road is proposed.

6.2. Internal Road Network

The proposed internal road network has been designed to service the intended land use within the site, being large-format industrial lots. A large proportion of the traffic within the site will be heavy vehicles, including semi-trailers (typically up to 19m long) and A-Doubles (up to 30m long). These vehicles are on average 2.5m wide and when navigating the local road network, can regularly consume all the travel lane and more so around corners where the swept path can extend beyond the average travel lane width.

A summary of the general design criteria adopted for the internal estate roads, which is consistent with the Mamre Road Precinct Development Control Plan, is summarised in **Table 6**.

Table 6: General road design criteria

Road Type	Collector Road (25.6m)	Industrial Road (24.0m)
Roads within the estate	Road No. 1	Road No. 2
Design Speed	60 km/h (signposted 50 km/h)	60 km/h (signposted 50 km/h)
Design Vehicle	30m long Performance Based Standards (PBS) Level 2 Type B vehicle (Type 2B)	30m long Performance Based Standards (PBS) Level 2 Type B vehicle (Type 2B)
Check Vehicle	36.5m long Performance Based Standards (PBS) Level 3 Type A vehicle (Type 3A)	36.5m long Performance Based Standards (PBS) Level 3 Type A vehicle (Type 3A)
Pedestrian and cycle path (within verge width)	Verge 1 – 1.5m Verge 2 – 2.5m	Verge 1 – 1.5m Verge 2 – 2.5m
Through traffic lanes	2 x 3.5m	2 x 3.5m

Road Type	Collector Road (25.6m)	Industrial Road (24.0m)
Kerbside lanes	2 x 4.2m (No Parking)	2 x 4.0m
Median width	Required only at key signalised intersections and locations to separate opposing movements which may cause conflicts	N/A
Road carriageway width (kerb to kerb)	15.4m (mid-block no median)	15.0m
Verge width	Verge 1 – 4.6m Verge 2 – 5.6m	Verge 1 – 4.0m Verge 2 – 5.0m
Road Reserve	25.6m	24.0m

The internal road network will be designed and constructed in accordance with the following documents:

- Western Sydney Planning Partnership, *Western Sydney Engineering Design Manual* (December 2020)
- Penrith City Council, *Engineering Construction Specification for Civil Works* (October 2017)

Cul-de-sacs will also be designed and constructed in accordance with the Council guidelines requiring a 16.5m radius on the turn heads and to accommodate the design vehicle (PBS Type 2B). Swept paths showing the design vehicle manoeuvres at the proposed roundabout and cul-de-sacs are presented on drawings 21-855-C1105 to C1108 inclusive.

6.3. Pavement Design

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

The basis of this design is:

- Design Traffic Loading: N =1x107 ESA (in accordance with Penrith City Council requirements for Heavy Industrial)
- Design subgrade CBR = 2% (based on Section 6.7.1 of the Douglas Partners and Alliance Geotechnical Reports)

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

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

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

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

7. Stormwater Drainage

7.1. Stormwater Drainage Design Criteria

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

- AS 3500.3 – Plumbing and drainage – Stormwater drainage
- Commonwealth of Australia (Geoscience Australia), *Australian Rainfall and Runoff: A guide to flood estimation*, 2019.
- NSW Department of Planning, Industry and Environment (DPIE), *Mamre Road Precinct Development Control Plan 2021*.
- NSW Department of Planning, Industry and Environment (DPIE), *MUSIC Modelling Toolkit – Wianamatta*, 2 August 2021.
- Penrith City Council, *Design Guidelines for Engineering Works for Subdivisions and Developments*, as amended 20 November 2013.
- Penrith City Council, *Water Sensitive Urban Design (WSUD) Policy*, December 2013.
- Penrith City Council, *WSUD Technical Guidelines*, Version 4 – October 2020.

An extract of the prescriptive controls is summarised in **Table 7**.

Table 7: General stormwater drainage design criteria

Stormwater Component	Design Criteria
Hydrology	▪ Time of concentration values 5 minutes (minimum) and 20 minutes (maximum). ▪ Design Storm events: 50% AEP, 20% AEP, 10% AEP, 5% AEP, 2% AEP and 1% AEP.
Minor and Major System	▪ Minor system: 5% AEP conveyed by way of pit and pipe drainage. ▪ Major system: 1% AEP conveyed by way of pit and pipe drainage and overland flow.
Pipes	▪ Minimum pipe diameter size on roads: 375mm ▪ Minimum pipe grade: 1% (desirable), 0.5% (absolute minimum) ▪ Minimum pipe cover: 450mm (grassed area), 600mm (under carriageway) ▪ Where minimum cover cannot be achieved due to physical constraints the pipe class shall be suitably increased. ▪ All pipes in trafficable areas will be Reinforced Concrete Pipes (RCP) or Fibre Reinforced Cement (FRC) equivalent. ▪ Pipes discharging to an overland flow path shall adopt a minimum tailwater level equivalent to respective overland flow level. ▪ A hydraulic grade line HGL design method shall be adopted for all road pipe drainage design.
Pits	▪ Minimum pit freeboard: 150mm from HGL to surface level in the minor event. ▪ Where trapped low points are unavoidable and potential for flooding private property is a concern, an overland flow path capable of carrying the total 1% AEP storm event has been provided. Alternatively, the pipe and inlet system has been upgraded to accommodate the 1% AEP storm event. ▪ Maximum pit spacing: 75 metre intervals. ▪ Blockage factors of 20% and 50% shall be adopted for on-grade and sag pits respectively.

Stormwater Component	Design Criteria
Gutter flow widths	▪ Maximum flow width: 2.5m ▪ Bypass from any pit on grade shall not exceed 15% of the total flow at the pit.
Overland flow paths	▪ Velocity x depth product shall not exceed 0.4 m^2/s for all storms up to and including the 1% AEP event.

7.2. Existing Site Stormwater Drainage

The site is currently zoned as IN1 – *General Industrial* and SP2 – *Infrastructure* in the west with 5 low points subdividing the area into 5 catchments and a large external catchment in the east discharging through the site. These catchments are characterised by pervious areas with sparse vegetation and three large dams. Stormwater runoff traverses the site and enters these dams prior to overflowing to their natural discharge locations. Refer to 21-855-C1081 for a pre-development stormwater catchment plan and Table 8 for discharge locations.

Table 8: Existing site stormwater discharge

Catchment ID	Approximate area (ha)	Discharges to:
CATCHMENT 1	19.5	Northern boundary culvert under Bakers Lane
CATCHMENT 2	2.9	North-western boundary culvert under Mamre Road
CATCHMENT 3	8.4	Western boundary culvert under Mamre Road
CATCHMENT 4	19.5	South-western boundary through Lot 61 DP259135
CATCHMENT 5	0.2	Southern Boundary through Lot 5 DP259135
CATCHMENT EXT-A	17.7	Catchment 1 Northern boundary

7.3. Proposed Site Stormwater Drainage

The proposed drainage network within the estate has been designed to safely convey major and minor flows prior to discharging to neighbouring properties to the north and west. The following criteria have been adopted for the proposed drainage system:

- Major system (pit and pipe network, overland flow paths and channels): 1% AEP
- Minor system (pit and pipe network): minimum 5% AEP and increased where required to address major system design requirements.

The site is divided into three broad catchments with the following Lot configuration:

- Lot 7 is intended to discharge west towards Mamre Road.
- Lot 4 – 6, Lot 8 and the western portion of Road 2 are intended to discharge towards the south-western boundary towards the drainage easement in Lot 61 DP259135.
- Lot 1 – Lot 3, Road 1 and the eastern portion of Road 2 will discharge north towards Bakers Lane.
- Lot 4 – Lot 7 are not intended to be developed as part of this application but will include bulk earthworks for site preparation. As part of the interim solution these areas are to be treated by sediment basins.

The current proposal for Lot 1 – Lot 3, Road 1 and Road 2 will incorporate six detention tanks. Key parameters relating to these proposed tanks are described in **Table 9**. Further specific design criteria relating to stormwater quantity management is presented in the Water and Stormwater Management Plan prepared by AT&L.

Table 9: Key detention tank parameters

Basin ID	Location	Collects stormwater from:	Discharges to:
1A	Lot 1 Northern Boundary	50% of Lot 1	Drainage pipe within Lot 1 easement to Bakers Lane outlet
1B	Lot 1 Eastern Boundary	50% of Lot 1	Drainage pipe within Lot 1 easement to Bakers Lane outlet
2	Lot 2 Northern Boundary	Lot 2	Drainage pipe within Lot 1 easement to Bakers Lane outlet
3A	Lot 3 Northern Boundary	50% of Lot 3	Drainage pipe within Lot 1 easement to Bakers Lane outlet
3B	Lot 3 western boundary	50% of Lot 3	Drainage pipe within Road 1 to Bakers Lane outlet
4	Lot 1 Drainage Easement	Road 1 and Road 2 (East)	Drainage pipe within Lot 1 easement to Bakers Lane outlet

7.4. Trunk Drainage Infrastructure

The *Mamre Road Precinct DCP* includes indicative locations of trunk drainage infrastructure across the precinct, refer to **Figure 8**. The indicative trunk drainage line within the site is located at the northern boundary of proposed Lot 1 and extends towards the east along the northern boundary of 21 Aldington Road within the Gibb Group Development. The nature and extent of trunk stormwater drainage at the interface between the two development sites will be subject to coordination at the detailed design phase.

The geometry of the channel is subject to ongoing coordination between the Gibb Group development and WSP design for the future Southern Link Road.

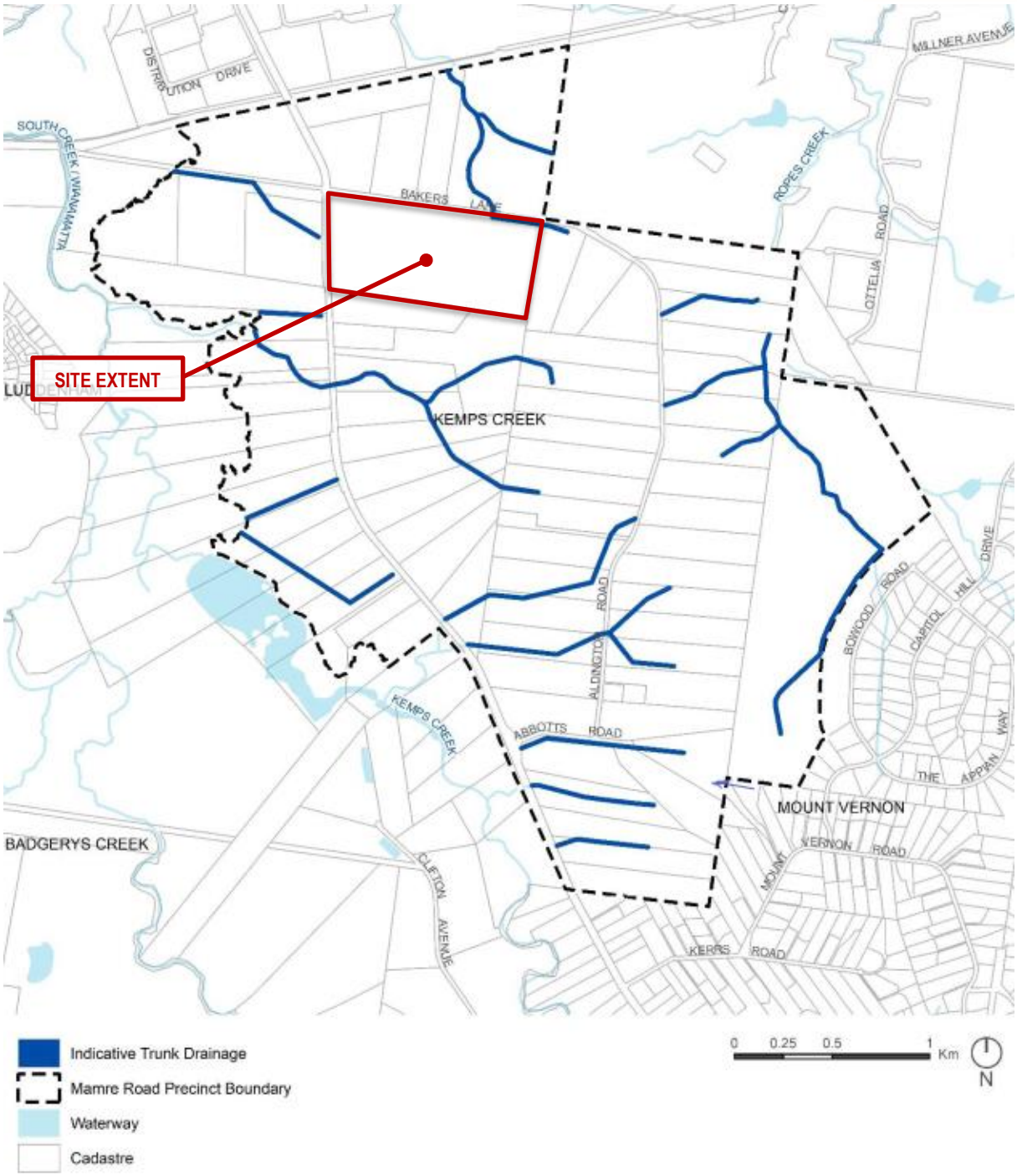

Figure 8: Trunk Drainage Infrastructure identified in the Mamre Road Precinct DCP

Preliminary channel design parameters, peak flows and indicative flow depths from DRAINS model outputs are presented in **Table 10**.

Table 10: Preliminary trunk drainage channel design parameters

	Channel east
Inflow characteristics	Flow from proposed Aldington Road, which will capture and convey the upstream catchment east of the site
Low flow channel	To contain peak flow up to the 50% AEP design event
High flow channel	To contain peak flow up to the 1% AEP design event, with sufficient freeboard (minimum 0.5m) to surrounding development to satisfy development controls
50% AEP peak flow	0.676 m^3/s
1% AEP peak flow	3.16 m^3/s

Further design and coordination with the project landscape designer and ecologist will be undertaken to develop other design parameters for the proposed trunk drainage channel, including:

- Channel planform (including low flow channel sinuosity and meander)
- Depth variability (in the form of pools and riffles)
- Channel bed grade control structures (e.g., rock chutes or ramps)
- Bank stabilisation
- Ecological values (e.g., habitat structures, vegetation types and variety)
- Social values (e.g., amenity, community connection)

8. Utility Services

8.1. Existing utilities in the vicinity of the Site

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

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

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

Investigations of the Site were carried out based on:

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

8.2. Potable Water

8.2.1. Existing Services

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

- 200mm diameter DICL / PVC-U potable watermain on the western side of Mamre Road along the full frontage of Summit at Kemps Creek.
- 300mm diameter PVC-O potable watermain on the northern side of Bakers Lane, approximately 200 metres east of Summit at Kemps Creek. This main runs along Compass Drive within the Oakdale West Estate.
- 100mm diameter DICL main on the eastern side of Aldington Road, which connects to the 300mm main on the northern side of Bakers Lane.

8.2.2. Proposed Services

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

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

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

The internal reticulation will consist of either a DN200 or DN250 main within Summit at Kemps Creek.

8.3. Wastewater

8.3.1. Existing Services

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

8.3.2. Proposed Services

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

Sydney Water met with ISPT in June 2021 to present preliminary design of proposed gravity and pressure sewer mains on the eastern side of Mamre Road and the southern side of Bakers Lane along the frontage of Summit at Kemps Creek.

The delivery date for servicing the western catchment is planned for 2023/24 and will be subject to funding approval. If the site is developed in advanced of Sydney Water's proposed works and sufficient infrastructure is not available, an Interim Operating Procedure (IOP)will need to be developed to allow for wastewater to be constructed to service the site. The IOP will need to be raised and will be subject to approval from Sydney Water.

8.4. Recycled Water

8.4.1. Existing Services

There is no existing recycled (non-potable) water infrastructure within or in the vicinity of the site.

8.4.2. Proposed Services

The *Mamre Road Precinct Flood, Riparian Corridor and Integrated Water Cycle Management Strategy* (2020) documents Sydney Water's commitment to the provision of recycled water to the Mamre Road Precinct from the Upper South Creek AWRC.

In their submission to SSD-9138102 dated 6 August 2021, Sydney Water confirmed that recycled water for non-drinking purposes will be provided in the Mamre Road Precinct. The Integrated Water Servicing Options analysis is currently underway and will determine the extent to which recycled stormwater is integrated with recycled wastewater. Sydney Water is currently preparing a Development Servicing Plan (DSP) for the Mamre Road Precinct. This will include Developer Charges for the provision of recycled water services to the Precinct.

Sydney Water's draft recycled water scheme plan for the Mamre Road Precinct is reproduced below as **Figure 9**. It is subject to change depending on the outcome of the Integrated Water Servicing options analysis. Sydney Water will confirm the requirement for recycled water connections on finalisation of the scheme plan for the Precinct. It is likely that the requirements will be a combination of the following:

- Each lot in the subdivision must have a frontage to a recycled water main that is the right size and can be used for connection of the lot to the recycled water main.
- The proponent must construct a recycled water main extension to serve the lots appropriately. The extension must comply with the standards for Dual Water Reticulation Systems.

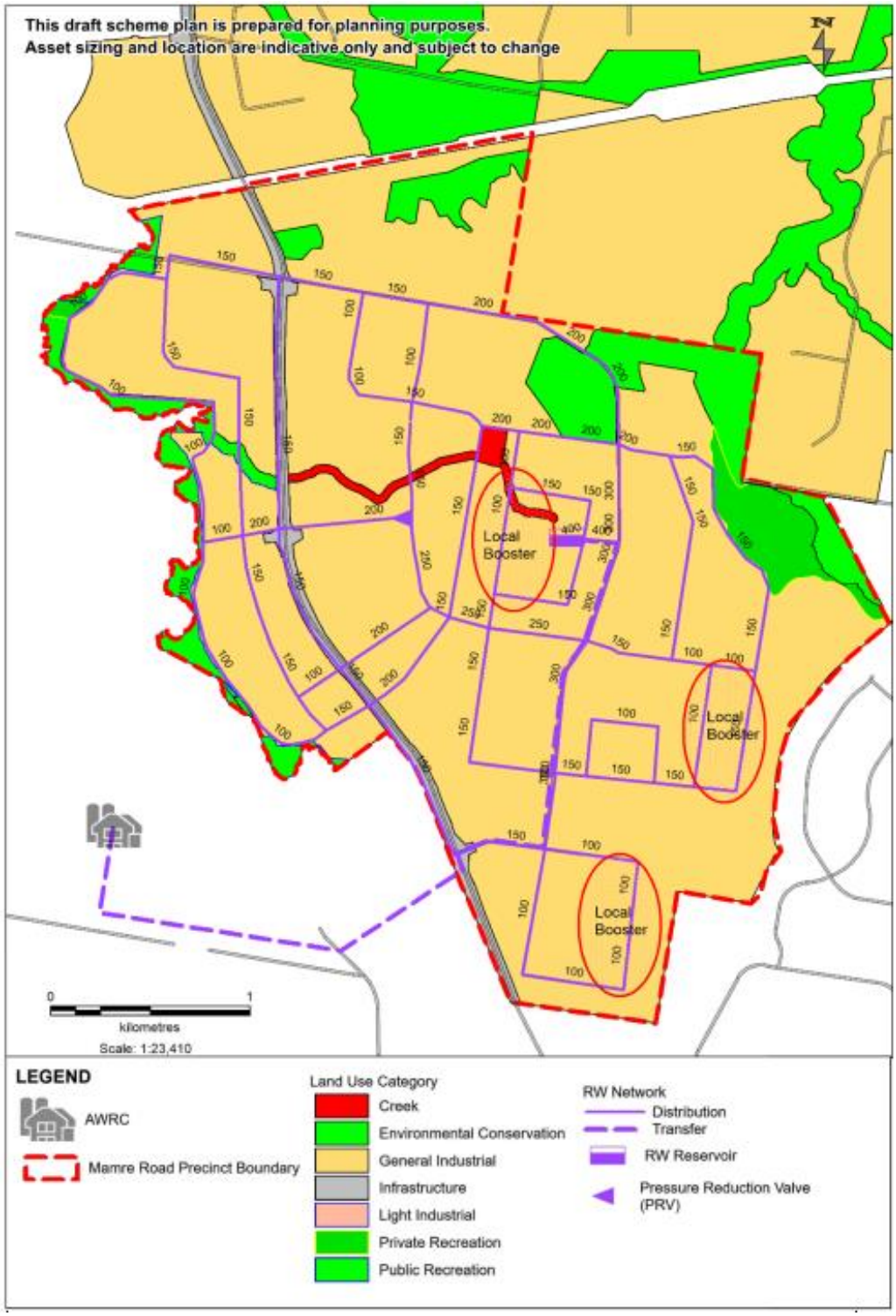

Figure 9: Draft Mamre Road Recycled Water Scheme Plan

8.5. Electrical

8.5.1. Existing Services

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

8.5.2. Proposed Services

Endeavour Energy has noted the following in the Scoping / Request for SEARs Request Report:

The Mamre Road Precinct within the Western Sydney Employment Area is initially being supplied from the existing Mamre Zone Substation located at 8 John Morphett Place, Erskine Park (Lot 9 DP 1097134) which has limited spare capacity but is enabling some development to progress ahead of the timeline for upstream utility and civil infrastructure. The establishment of the proposed South Erskine Park Zone Substation (Lot 99 DP 1266383) within the Oakdale West Estate (currently expected to be available in the fourth quarter of 2022) together with the associated the installation of multiple 22,000 volt 22 kV high voltage feeders will be required to service any significant development along Mamre Road and Aldington Road.

In regard to electricity distribution within the Precinct, the availability of electricity supply to a site is based on a wide range of factors, e.g., the age and design of the network; other development in the locality utilising previously spare capacity within the local network; the progress of nearby / surrounding sites including electricity infrastructure works, e.g., a smaller and isolated development that may not of its own accord require a distribution substation may require a substation to facilitate the development and from which the spare capacity is made available to subsequent nearby development.

8.6. Gas

8.6.1. Existing Services

The nearest gas main to Summit at Kemps Creek is a 110mm main (210 kPa) that runs along the northern side of Bakers Lane across the full frontage of the site.

8.6.2. Future Services

No contact has been made with Jemena to determine if there are plans to service the area in future. Any possible future upgrades would need to be assessed for capacity and commercial viability.

8.7. Telecommunications

8.7.1. Existing Services

Dial Before You Dig (DBYD) indicates that Telstra below-ground conduits are located within the Bakers Lane road reserve parallel to the boundary.

Site inspection has identified there are aboveground assets along the northern side of Bakers Lane.

8.7.2. Proposed Services

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

NBN requires an application for connection to be made with appropriate lead times to ensure the network can be delivered to the site.

9. Infrastructure Delivery and Staging

9.1. Staging

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

- Construction of the interim arrangement of the Southern Link Road to provide access to Summit at Kemps Creek.
- Construction of Road No. 1 and Road No. 2, including roundabout at the intersection of the two roads (part of which will be contained in the adjacent GPT development site) and a temporary cul-de-sac at the eastern end of Road No. 2.
- Earthworks and retaining walls / structures.
- Stormwater drainage systems, including diversion of external catchments through the site.
- Stormwater management measures, including on-site detention and any interim measures that may be required to satisfy the stormwater quality and flow targets for the estate.
- Utility services (water, sewerage, power, communications), including lead-in works as required.

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

9.2. Funding Arrangements

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

- **Interim Southern Link Road and intersection at Road No. 1**: Proposed to be delivered as Works in Kind against State Infrastructure Contribution (SIC), subject to authority approvals.
- **Transition works at Bakers Lane and Interim Southern Link Road**: Proponent funded redundant works, to be superseded by ultimate arrangement of the Southern Link Road.
- **Lead-in services**: Proponent funded with potential reimbursements subject to relevant authority approvals and procurement processes.
- **Internal works**: Proponent funded.

at&l

NORTH SYDNEY
LEVEL 7
153 WALKER STREET
NORTH SYDNEY NSW 2060
02 9439 1777
INFO@ATL.NET.AU

PARRAMATTA
SUITE 4 LEVEL 4
17-21 MACQUARIE STREET
PARRAMATTA NSW 2150
02 9068 8517
INFO@ATL.NET.AU

BRISBANE
SUITE A1 LEVEL 20
127 CREEK STREET
BRISBANE QLD 4000
07 3211 9581
INFO-QLD@ATL.NET.AU

MELBOURNE
LEVEL 24
570 BOURKE STREET
MELBOURNE VIC 3000
INFO-VIC@ATL.NET.AU

atl.net.au