Moss Vale Plastics Recycling and Reprocessing Facility

Technical Report 6 – Traffic and Transport

Plasrefine Recycling Pty Ltd

27 January 2022

→ The Power of Commitment

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GHD Australia Pty Ltd | ABN 55 120 617 021
133 Castlereagh Street, Level 15
Sydney, New South Wales 2000, Australia
T +61 2 9239 7100 | **F** +61 2 9239 7199 | **E** sydmail@ghd.com | **ghd.com**

Author	Joanne Deng / Elaha Mia
Project manager	Sean Clarke
Client name	Plasrefine Recycling Pty Ltd
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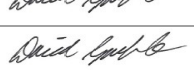
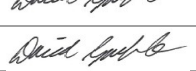
S4	1	J. Deng / E. Mia	D Gamble		D Gamble		23/12/21
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Abbreviations and acronyms

Term	Definition
AS	Australian Standards
BCA	Building Code Australia
BC Act	NSW Biodiversity Conservation Act
COAG	Council of Australian Governments
CTMP	Construction Traffic Management Plan
DCP	Development Control Plan
EIS	Environmental Impact Assessment
GTP	Green Travel Plan
km	kilometre
km/h	kilometres per hour
LoS	Level of Service
m	metre
MVEC	Moss Vale Enterprise Corridor
NCC	National Construction Code
NSW	New South Wales
pc/h	passenger cars per hour
pc/h/lane	passenger cars per hour per lane
TCP	Traffic Control Plan
TGS	Traffic Guidance Scheme
TfNSW	Transport for New South Wales
SEARs	Secretary's Environmental Assessment Requirements
tpa	tonnes per annum
VCR	Volume Capacity Ratio
veh/d	vehicles per day
veh/h	vehicles per hour

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1. Introduction

1.1 Overview

1.1.1 Plasrefine Recycling and the proposal

For many years, recyclable plastics have been recovered from kerbside collections and it has been profitable to export mixed plastics to China and other countries. With the advent of the China National Sword policy (a policy in China which banned the importation of certain types of waste and set strict contamination limits on recyclable materials), as well as issues with contaminated loads of recyclables being sent to China and other countries, opportunities to send mixed plastics overseas for processing have diminished. Recently, the Council of Australian Governments (COAG) decided to ban exports of recyclable waste from Australia from July 2021.

Despite these difficulties, export markets still exist for clean, separated, pelletised plastics and resins. However, there is very little local capacity in NSW and within Australia to sort recovered plastics into different types and convert them into valuable products.

To help address this issue, Plasrefine Recycling Pty Ltd (Plasrefine Recycling) ('the proponent') proposes to construct and operate a plastics recycling and reprocessing facility in Moss Vale ('the proposal').

The proposal would sort the plastics into different types, and convert the various plastics to plastic flakes and pellets (in the first stage) and produce more advanced products (in the second stage). The combined outputs of both stages of the proposal would help fill the gap in local processing capacity for mixed plastics.

The proposal would have an ultimate capacity to receive up to 120,000 tonnes per year of mixed waste plastics.

1.1.2 Approval and assessment requirements

The proposal is State significant development and is subject to approval by the NSW Minister for Planning and Public Spaces under the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act).

This report has been prepared by GHD Pty Ltd (GHD) as part of the environmental impacat statement (EIS) for the proposal. The EIS has been prepared to support the application for approval of the proposal and address the environmental assessment requirements of the Secretary of the NSW Department of Planning, Industry and Environment (SSD-9409987) dated 15 October 2020 (the SEARs).

1.2 The proposal

1.2.1 Location

The proposal would be located about 140 kilometres south west of the Sydney central business district and approximately 2.8 kilometres north west of the Moss Vale town centre within the Wingecarribee local government area.

The proposed plastics recycling and reprocessing facility and ancillary infrastructure would be located on the northern parcel of land in Lot 11 DP 1084421, with a current street address of 74-76 Beaconsfield Road, Moss Vale. This parcel of land is referred to as 'the plastics recycling and reprocessing facility site' for the purpose of the EIS. It has a total site area of about 7.7 hectares. The proposal would occupy a portion of the plastics recycling and reprocessing facility site.

The new access road which would extend from the plastics recycling and reprocessing facility to Lackey Road via:

– the currently unformed Braddon Road
– Lot 1 DP 26490 and Lot 10 DP 1084421 (the 'Braddon Road east extension').

The area that would be occupied by the proposal's permanent operational infrastructure, and/or directly disturbed during construction, is referred to as 'the proposal site' for the purposes of the EIS. The proposal site therefore comprises:

– The plastics recycling and reprocessing facility site (7.7 hectares)
– The new access road corridor (about 1.8 hectares)

It is noted that the areas that would be disturbed for construction of buildings, roads and water management would comprise about six hectares of the total 7.7 hectare plastics recycling and reprocessing facility site. Disturbance of the remaining 1.7 hectares would be limited to plantings as part of riparian vegetation management and landscaping.

The proposal would be located within the Moss Vale Enterprise Corridor (MVEC) catchment. The MVEC is a significant area of land between Moss Vale and New Berrima set aside for employment generating development under the Wingecarribee Shire Local Environmental Plan 2010.

The location of the proposal site is shown in Figure 1.1.

1.2.2 Key features

The proposal is defined as the construction and operation of a plastics recycling and reprocessing facility with capacity to receive up to 120,000 tonnes per year of mixed plastics, comprising:

– Two main buildings for waste receival, recycling and reprocessing and finished product storage
– Wastewater treatment plant
– Ancillary infrastructure including an office building, workshop, truck parking, staff and visitor parking, internal roadways, weighbridges, water management, fire management, landscaping, fencing, signage and utility connection
– A new access road from the plastics recycling and reprocessing facility to Lackey Road via part of Braddon Road (currently unformed) and Lot 1 DP 26490 and Lot 10 DP 1084421 (the Braddon Road east extension).

The proposal would sort the plastics into different types and convert the various plastics to flakes and pellets (in the first stage) and produce more advanced products (in the second stage). The combined outputs of both stages of the proposal would help fill the gap in local processing capacity for mixed plastics.

Further information on the proposal is provided in the EIS.

The proposed site layout is shown Figure 1.2.

1.2.3 Construction overview

An indicative construction strategy has been developed, based on the current design, to be used as a basis for the environmental assessment process. Detailed construction planning, including programming, work methodologies and work sequencing would be undertaken once construction contractor(s) have been engaged and during detailed design.

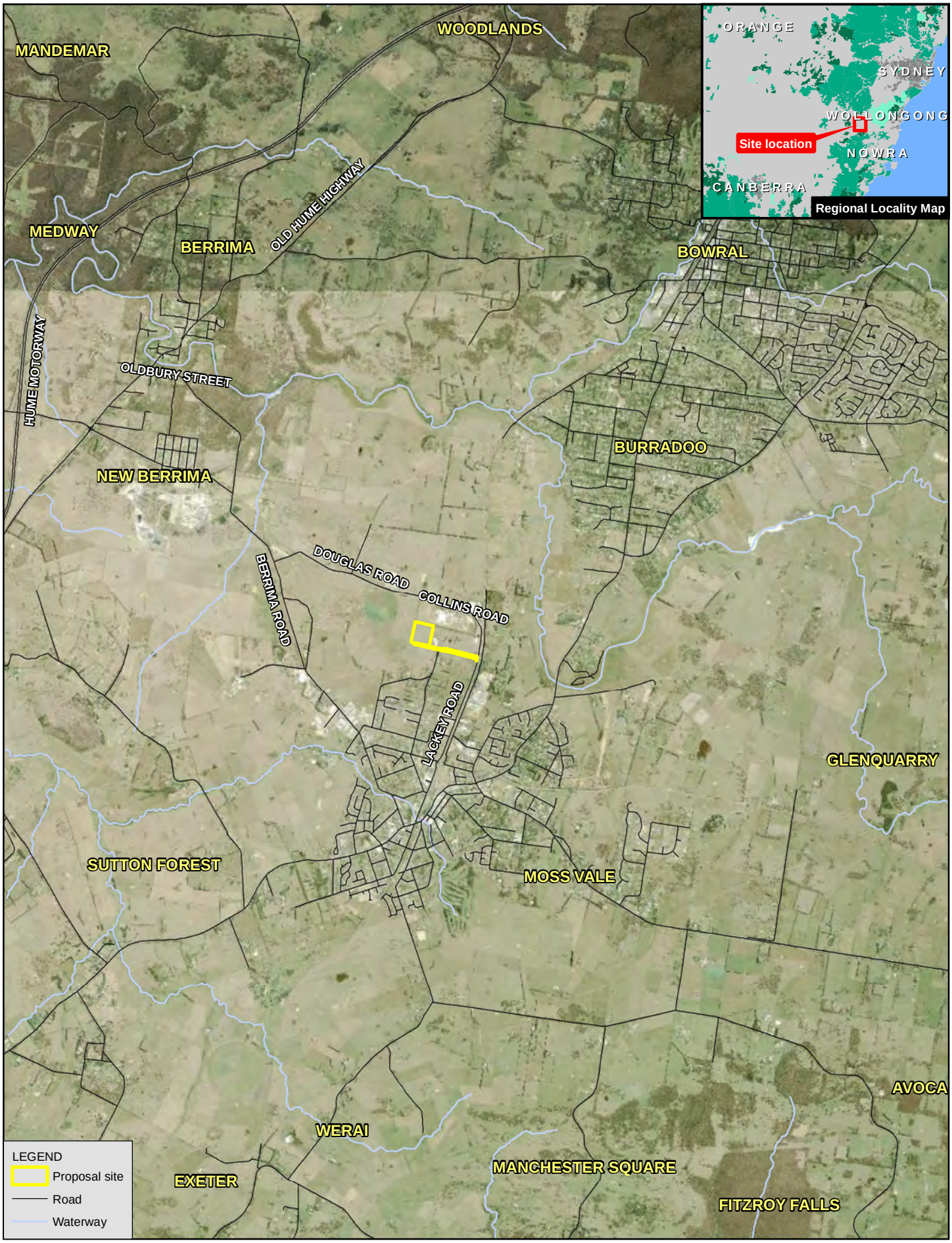
It is estimated that the proposal would take about 15 months to construct and commission and consist of three key stages:

– Early works and site establishment (1 month):
  - Construction of site access road
  - Utilities connection
  - Establishment of construction compound including construction staff amenities
  - Installation of temporary fencing
– Main site works (11 months):
  - Clearance of vegetation within the construction footprint, stripping and stockpiling of topsoil for reuse
  - Bulk earthworks for site shaping and surface water drainage and the bioretention pond
  - Pouring concrete foundation slab, footings, hardstand and slabs for the buildings
  - Construction of pavement areas for the truck and car park, internal roads and the site entrance/egress points
  - Installation of steel truss framework for structures

- Erection of pre-cast concrete panels for external and internal partition walls and metal roof sheets for site buildings
- Installation of processing equipment
- Building finishing works including fit out
- Installation of firewater and other tanks
- Installation of weighbridges
- Installation of permanent fencing and signage
- Restoration works including removal of temporary construction compound, general site clean up and landscaping following construction

– Testing and commissioning (3 months)

Further information on how the proposal would be constructed is provided in the EIS.



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Map Projection: Transverse Mercator
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Grid: GDA 1994 MGA Zone 56

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Plasrefine Recycling Pty Ltd
Moss Vale Plastics Recycling and Reprocessing Facility

Project No. 12524108
Revision No. A
Date 22 Dec 2021

Proposal site location

FIGURE 1.1

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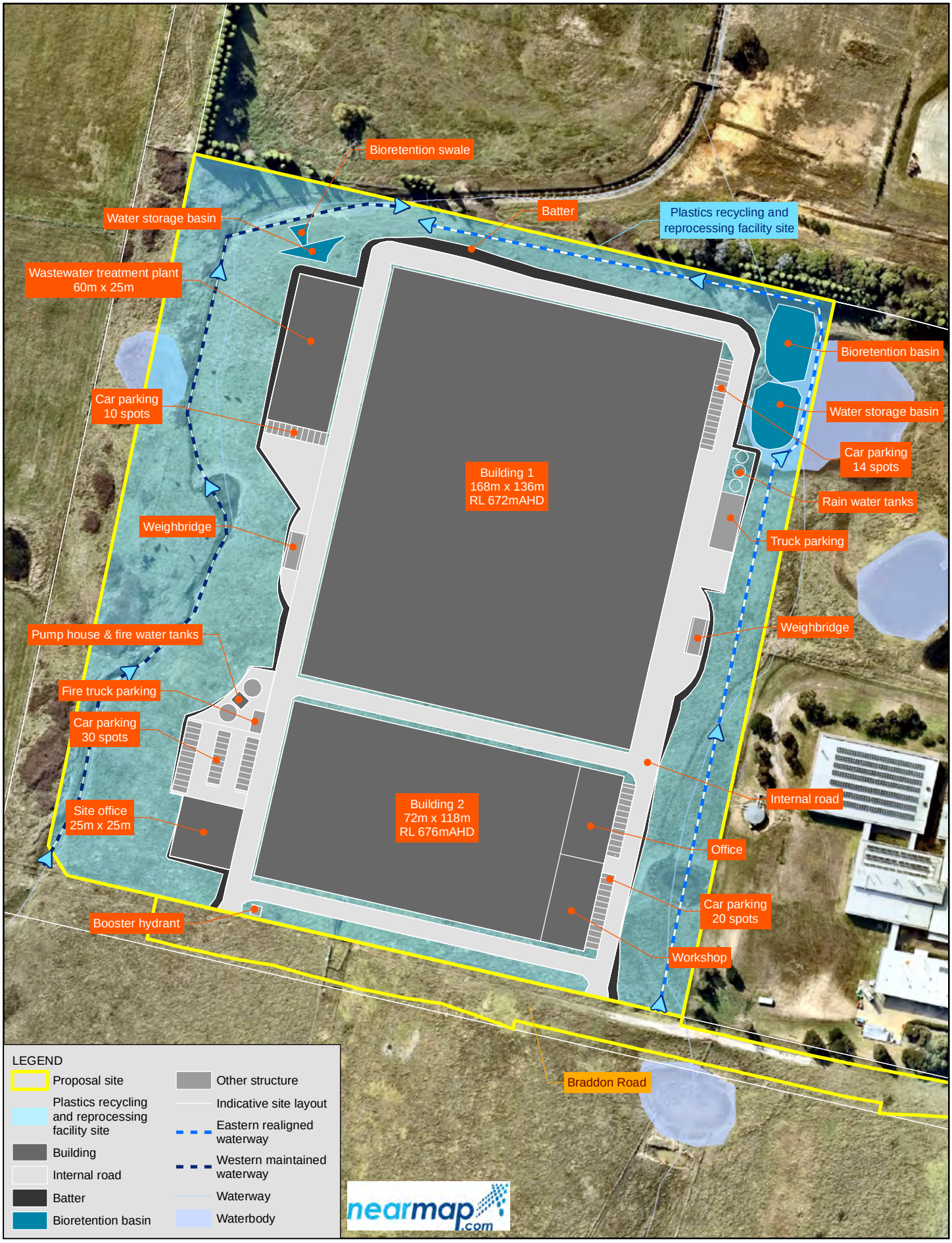

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Grid: GDA 1994 MGA Zone 56

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Plasrefine Recycling Pty Ltd
Moss Vale Plastics Recycling and Reprocessing Facility

Project No. 12524108
Revision No. A
Date 06 Oct 2021

Proposed site layout

FIGURE 1.2

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Data source: Aerial imagery - nearmap 2021 (image date 24/04/2021, image extracted 30/06/2021); General topo - NSW LPI DTDB 2020, 2015. Created by: jrprice

1.3 Secretary's Environmental Assessment Requirements and agency requirements

The specific SEARs and agency requirements relating to traffic and transport addressed in this report are summarised in Table 1.1**Error! Reference source not found.**.

Table 1.1 Secretary's Environmental Assessment Requirements and agency requirements

Requirement - Traffic and Transport	Where addressed in this report
Details of all traffic types and volumes likely to be generated during construction and operation, including a description of key access / haul routes	Refer to Sections 2.2, 4.1, 4.2, and 6.2.
An assessment of the predicted impacts of this traffic on road safety and the capacity of the road network, including consideration of cumulative traffic impacts at key intersections using SIDRA or similar traffic model	Refer to Sections 4.2, 4.3 and 4.4.
Details of the proposed road connection to Lackey Road including timing and an assessment of the impact on Beaconsfield Road should the access to Lackey Road not be provided	Refer to Sections 2.2 and 4.1.
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 Sections 4.2 and 6.2.
Details of on-site parking provisions, and sufficient pedestrian and cyclist facilities, in accordance with the relevant Australian Standards	Refer to Sections 5 and 6.1
Details of the largest vehicle anticipated to access and move within the site, including swept path analysis	Refer to Sections 7 and Appendix B
Swept path diagrams depicting vehicles entering, exiting and manoeuvring throughout the site and - details of road upgrades, infrastructure	Refer to Sections 4.1, 7 and Appendix B

1.4 Purpose and scope of this report

The purpose of this report is to assess the potential traffic and parking impacts of the construction and operation of the proposal on the surrounding road network. The report:

– Addresses the SEARs as listed in Table 1.1**Error! Reference source not found.**.
– Describes the existing condition of roads and intersections within the vicinity of the proposal site.
– Assesses the impacts of construction and operation of the proposal on intersections performance within the vicinity of the proposal site and the surrounding road network.
– Recommendation measures to mitigate and manage the impacts identified.

1.5 Scope and structure of the report

The structure of the report is outlined below.

– Section 1: Introduction – provides background information to the study and proposal.
– Section 2: Existing conditions – a review of the existing road and transport conditions adjacent to the proposal, traffic volumes and crash data.
– Section 3: Future projects – outline of the Moss Vale Enterprise Corridor (MVEC).
– Section 4: Traffic impact assessment – an assessment of the trip generation characteristics of the proposal and the performance of the intersections following the proposal.
– Section 5: Parking provision – an assessment of potential parking demand that will be generated by the development with reference to Wingecarribee Shire Council DCP, Roads and Maritimes Services, *Guide to Traffic Generating Developments*, client information and first-principals approach of potential parking demands.

– Section 6: Access and parking layout – a review of access and parking layout within the site with reference to relevant Australian standards.
– Section 7: Swept turn path assessment – a review of the design vehicle turn path within the site.
– Section 8: Mitigation measures – an introduction to the implementation of a Construction Traffic Management Plan during construction of the proposal to minimise road user disruption and maintain safety and an outline to a Green Travel Plan to provide information to encourage people to consider alternative means to access the development rather than by private motor vehicle.
– Section 9: Summary and conclusion – provides a summary and concluding statements of the findings of the study.

1.6 Assumptions and limitations

The following assumptions were made as part of this study:

– A future state base model was developed for 2030, allowing ten year future growth. The future base traffic model was developed utilising an assumed growth rate of two percent per annum.
– Traffic surveys conducted by Matrix Traffic and Transport Data Pty Ltd at the following intersections on Thursday 3rd December 2020 between 6:30 am to 9:30 am and 3:30 pm to 6:30 pm:
  - Lackey Road and Access Road (to Australian BioResources).
  - Berrima Road and Lytton Road.
– Traffic surveys conducted by Matrix Traffic and Transport Data Pty Ltd at the following mid block locations between Monday 7th December 2020 and Sunday 6th December 2020:
  - Lytton Road (west of Beaconsfield Road; Eastbound and Westbound)
  - Beaconsfield Road (between Roche Close and Stables Place; Northbound and Southbound)
– Traffic distribution assumptions in relation to arrivals and departure vehicle profiles were based on existing traffic movement determined within the traffic intersection surveys undertaken
– The conditions of the surrounding network are based on information either supplied by the traffic surveys and Google Maps / Streetview and on a site visit by GHD staff
– Vehicle trip generation rates were based on a first principles approach of the maximum capacity of the plastic waste collection received as provided by the client.

2. Existing conditions

This section outlines the existing traffic and transport conditions of roads within the vicinity of the proposal. This includes the existing transport and accessibility conditions and the existing road network performance.

2.1 Existing road network characteristics

Roads within NSW are categorised in the following two ways:

– By classification (ownership).
– By the function that they perform.

Road Classification

Roads are classified (as defined by the *Roads Act 1993*) based on their importance to the movement of people and goods within NSW (as a primary means of communication).

The classification of a road allows Transport for NSW (TfNSW) to exercise authority of all or part of the road. Classified roads include Main Roads, State Highways, Tourist Roads, Secondary Roads, Tollways, Freeways and Transitways.

For management purposes, TfNSW has three administrative classes of roads. These are:

– **State Roads –** Major arterial links throughout NSW and within major urban areas. They are the principal traffic carrying roads and fully controlled by TfNSW with maintenance fully funded by TfNSW. State Roads include all Tollways, Freeways and Transitways; and all or part of a Main Road, Tourist Road or State Highway.
– **Regional Roads** – Roads of secondary importance between State Roads and Local Roads which, together with State Roads provide the main connections to and between smaller towns and perform a sub arterial function in major urban areas. Regional roads are the responsibility of councils for maintenance funding, though TfNSW funds some maintenance based on traffic and infrastructure. Traffic management on Regional Roads is controlled under delegation by local government. Regional Roads maybe all or part of a Main Road, Secondary Road, Tourist Road or State Highway; or other roads as determined by TfNSW.
– **Local Roads** – The remainder of roads are council controlled roads. Local Roads are the responsibility of councils for maintenance funding. TfNSW may fund some maintenance and improvements based on specific programs (e.g. urban bus routes, road safety programs). Traffic management on Local Roads is controlled under the delegation by local government.

Functional Hierarchy

Functional road classification involves the relative balance of the mobility and access functions. TfNSW define four levels in a typical functional road hierarchy, ranking from high mobility and low accessibility, to high accessibility and low mobility. These road classes are:

– **Arterial Roads** – generally controlled by TfNSW, typically no limit in flow and designed to carry vehicles long distance between regional centres.
– **Sub-Arterial Roads** – can be managed by either TfNSW or local council. Typically, their operating capacity ranges between 10,000 and 20,000 vehicles per day and their aim is to carry traffic between specific areas in a sub region or provide connectivity from arterial road routes (regional links).
– **Collector Roads** – provide connectivity between local roads and the-arterial road network and typically carry between 2,000 and 10,000 vehicles per day.
– **Local Roads** – provide direct access to properties and the collector road system and typically carry between 500 and 4,000 vehicles per day.

The surrounding road network is shown in Figure 2.1.

Figure 2.1 Surrounding road network

Source: State and Regional Roads (TfNSW, 2021) – Modified by GHD

2.1.1 Berrima Road

Berrima Road is a regional sub-arterial road that runs between Berrima and Moss Vale in generally a north-south direction. Within proximity of the proposal. Berrima Road intersects Douglas Road and Lytton Road with a give-way priority-control at both locations.

Berrima Road has the following key features within proximity of the site as outlined in Table 2.1 and general configuration image in Figure 2.2 north of Brookvale Road.

Table 2.1 Berrima Road key features

Feature	Description
Carriageway	Undivided carriageway, with a single travel lane in each direction. Dedicated turn lanes are provided on Berrima Road to access Douglas Road and to access industrial/commercial area near Bowman Road. There is also a level rail crossing south of Taylor Avenue.
Parking	Unrestricted except in proximity to warehouse access points (e.g., Boex).
Speed Limit	Primarily 80 km/h with 70 km/h on approach to Brookdale industrial/commercial area and 50 km/h south of Lytton Street.
Pedestrian Facilities	No dedicated pedestrian facilities.
Bicycle Facilities	No dedicated bicycle facilities.
Public Transport	There are five bus stops in the southbound and two bus stops in the northbound direction. These service private bus routes 812 (Berrima to Moss Vale) and 816 (Moss Vale Loop; south of Lytton Rd only).

Figure 2.2 Berrima Road viewed north (north of Brookvale Road)

Source: Street View (Google Maps, 2020)

2.1.2 Douglas Road and Collins Road

Douglas Road and Collins Road are both local collector roads that connect Berrima Road and Lackey Road in an east-west direction. There are two level rail crossings, one along Douglas Road and one at the connection between Douglas Road and Collins Road.Douglas Road and Collins Road have the following key features within proximity of the site as outlined in Table 2.2 and a general configuration image in Figure 2.3 at the rail crossing at connection with Douglas Road and Collins Road.

Table 2.2 Douglas Road and Collins Road key features

Feature	Description
Carriageway	Undivided carriageway, with one travel lane in each direction. There is a dedicated left turn lane to access Ingham Enterprises development as well as an overtaking lane.
Parking	Unrestricted.
Speed Limit	80 km/h.
Pedestrian Facilities	No dedicated pedestrian facilities.
Bicycle Facilities	No dedicated bicycle facilities.
Public Transport	No dedicated public transport facilities. The nearest bus stop is located on Berrima Road and services private bus route 812 (Berrima to Moss Vale).

Figure 2.3 Douglas Road and Collins Road rail crossing viewed west

Source: Site Inspection (GHD, 2020)

2.1.3 Lackey Road

Lackey Road is a local collector road that connects Collins Road and the Illawarra Highway in a north-south direction. Lackey Road intersects Lytton Road with give-way priority-control.

Lackey Road has the following key features within proximity of the site as outlined in Table 2.3 and a general configuration image in Figure 2.4 at the intersection with Lytton Road.

Table 2.3 Lackey Road key features

Feature	Description
Carriageway	Undivided carriageway, with one travel lane in each direction. The road alignment follows the Southern Highlands and Southern NSW rail line.
Parking	Unrestricted.
Speed Limit	60 km/h and 50 km/h south of Lytton Road with a 40 km/h school zone at the southernmost end.
Pedestrian Facilities	No dedicated pedestrian facilities.
Bicycle Facilities	No dedicated bicycle facilities.
Public Transport	No dedicated public transport facilities. The nearest bus stop is located on Argyle Street and services private bus route 816.

Figure 2.4 Lackey Road viewed north (near Lytton Road)

Source: Street View (Google Maps, 2020)

2.1.4 Beaconsfield Road

Beaconsfield Road is a no through local road that connects Parkes Road / Garrett Street to residential and local business oriented in a north-south direction. Beaconsfield Road also intersects with Lytton Road (give-way priority-control), Bulwer Road (give-way priority-control) and Parkes Road / Garrett Street (stop-sign priority-control).

Beaconsfield Road has the following key features within proximity of site as outlined in Table 2.4 and a general configuration image Figure 2.5 looking towards the intersection with Lytton Road.

Table 2.4 Beaconsfield Road key features

Feature	Description
Carriageway	Undivided carriageway, with one travel lane in each direction.
Parking	Unrestricted.
Speed Limit	50 km/h.

Feature	Description
Pedestrian Facilities	No dedicated pedestrian facilities.
Bicycle Facilities	No dedicated bicycle facilities.
Public Transport	No dedicated public transport facilities. The nearest bus stop is located on Garrett Street and services private bus routes 812 (Berrima to Moss Vale) and 816 (Moss Vale Loop).

Figure 2.5 Beaconsfield Road viewed north

Source: Street View (Google Maps, 2020)

2.1.5 Bulwer Road

Bulwer Road is a local road that connects Lytton Road and Beaconsfield Road in an north-east direction, with a give-way priority controlled intersection at both these locations.

Bulwer Road has the following key features within proximity of the site as outlined in Table 2.5 and a general configuration image in Figure 2.6.

Table 2.5 Bulwer Road key features

Feature	Description
Carriageway	Undivided carriageway, with one travel lane in each direction.
Parking	Unrestricted.
Speed Limit	No sign-posted speed limit (50 km/h) with 15 km/h advisory speed for the sharp bend north of Jopling Way.
Pedestrian Facilities	No dedicated pedestrian facilities.
Bicycle Facilities	No dedicated bicycle facilities.
Public Transport	No dedicated public transport facilities. The nearest bus stop is located on Lytton Road and services private bus routes 812 (Berrima to Moss Vale) and 816 (Moss Vale Loop).

Figure 2.6 Bulwer Road viewed north

Source: Street View (Google Maps, 2020)

2.1.6 Lytton Road

Lytton Road is a local road that connects Berrima Road / Gibbons Road and Lackey Road in an east-west direction. Lytton Road also intersects with Bulwer Road (give-way priority-control) and Beaconsfield Road (give-way priority-control). Lytton Road has the following key features within proximity of the site as outlined in Table 2.6 and a general configuration image in Figure 2.7.

Table 2.6 Lytton Road key features

Feature	Description
Carriageway	Undivided carriageway, with one travel lane in each direction.
Parking	Unrestricted.
Speed Limit	No sign-posted speed limit (50 km/h) with 25 km/h advisory speed for the sharp bend near Lackey Park.
Pedestrian Facilities	No dedicated pedestrian facilities.
Bicycle Facilities	No dedicated bicycle facilities.
Public Transport	No dedicated public transport facilities. The nearest bus stop is located at the intersection with Berrima Road and services private bus routes 812 (Berrima to Moss Vale) and 816 (Moss Vale Loop).

Figure 2.7 Lytton Road viewed west

Source: Street View (Google Maps, 2020)

2.2 Existing road network performance

This section provides an understanding of current traffic volumes.

2.2.1 Existing peak hour intersection traffic volumes

Intersection turning count survey

GHD engaged Matrix Traffic and Transport Data Pty Ltd to undertake intersection traffic turning counts on Thursday, 3rd December 2020. The surveys were undertaken during the following time periods:

– Weekday AM peak (three hours): 6:30 am to 9:30 am.
– Weekday PM peak (three hours): 3:30 pm to 6:30 pm.

The intersection turning count surveys within the immediate vicinity of the site were performed at the following intersections as illustrated in Figure 2.8:

– Site 1: Lackey Road / Access Road (to Australian BioResources).
– Site 2: Berrima Road / Lytton Road / Gibbons Road.

Details of the traffic survey data are included in Appendix A.

Analysis of the survey data identified the following peak hour periods:

– Weekday AM peak hour at Lackey Road / Access Road (to Australian BioResources): 6:30 am to 7:30 am.
– Weekday AM peak hour at Berrima Road / Lytton Road: 8:15 am to 9:15 am.
– Weekday PM peak hour at both intersections: 3:30 pm to 4:30 pm.

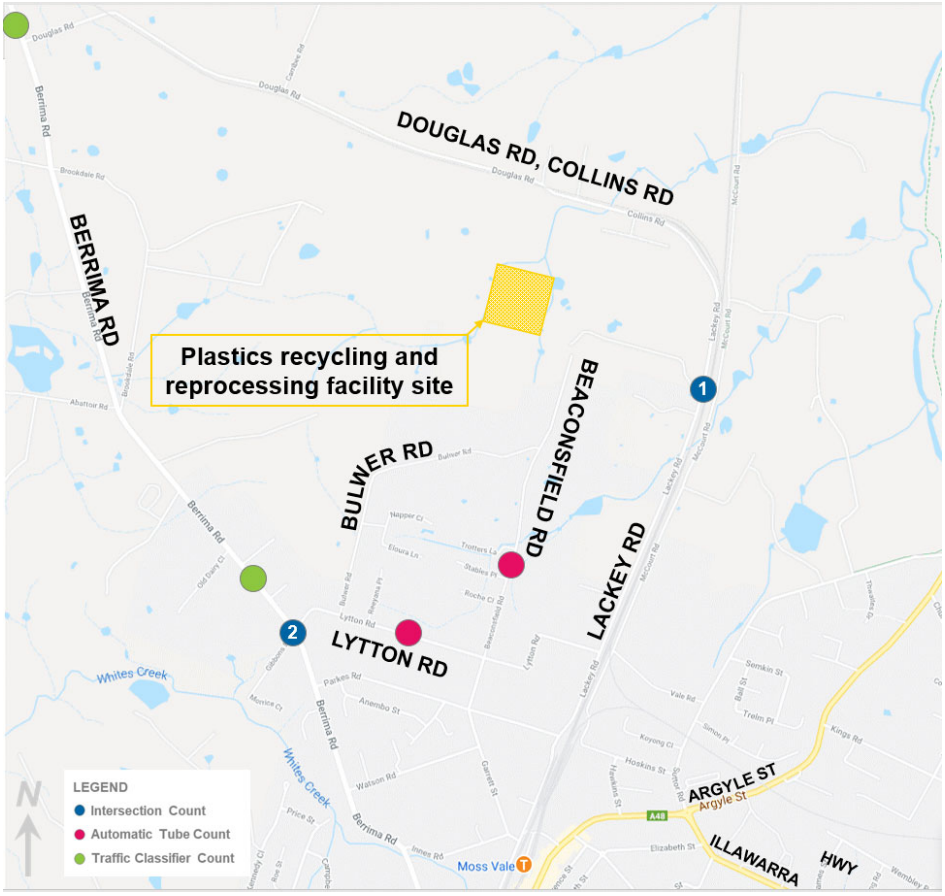


Figure 2.8 Traffic survey locations

Source: Google Maps (2021) – modified by GHD

The traffic movement diagrams for these intersections during the weekday morning and evening peaks are shown in Figure 2.9 to Figure 2.12.

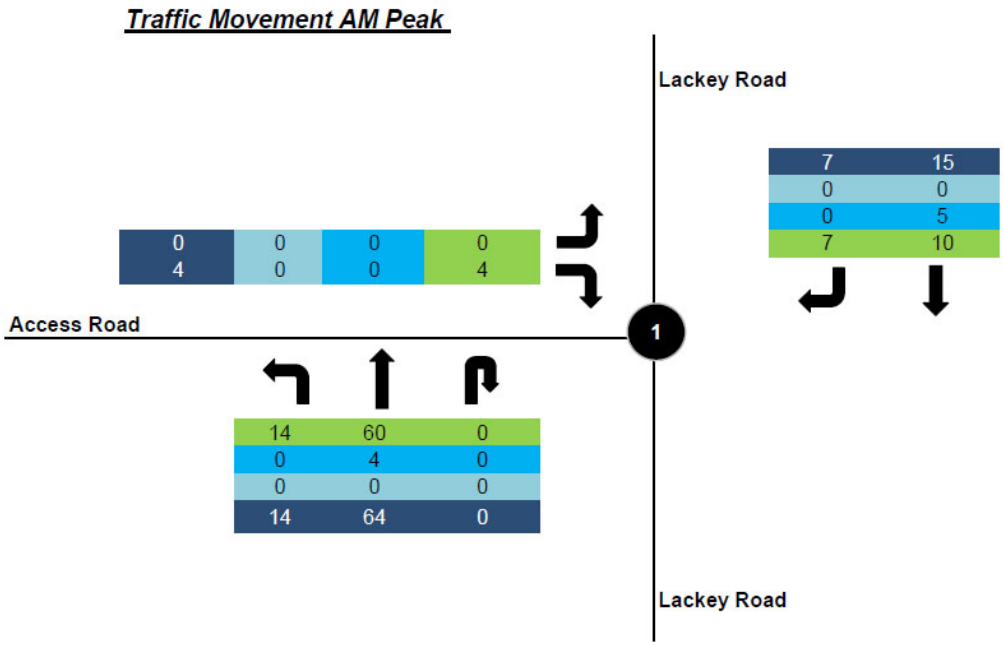


Figure 2.9 Traffic Movement Diagram AM Peak – Lackey Road / Access Road (to Australian BioResources)

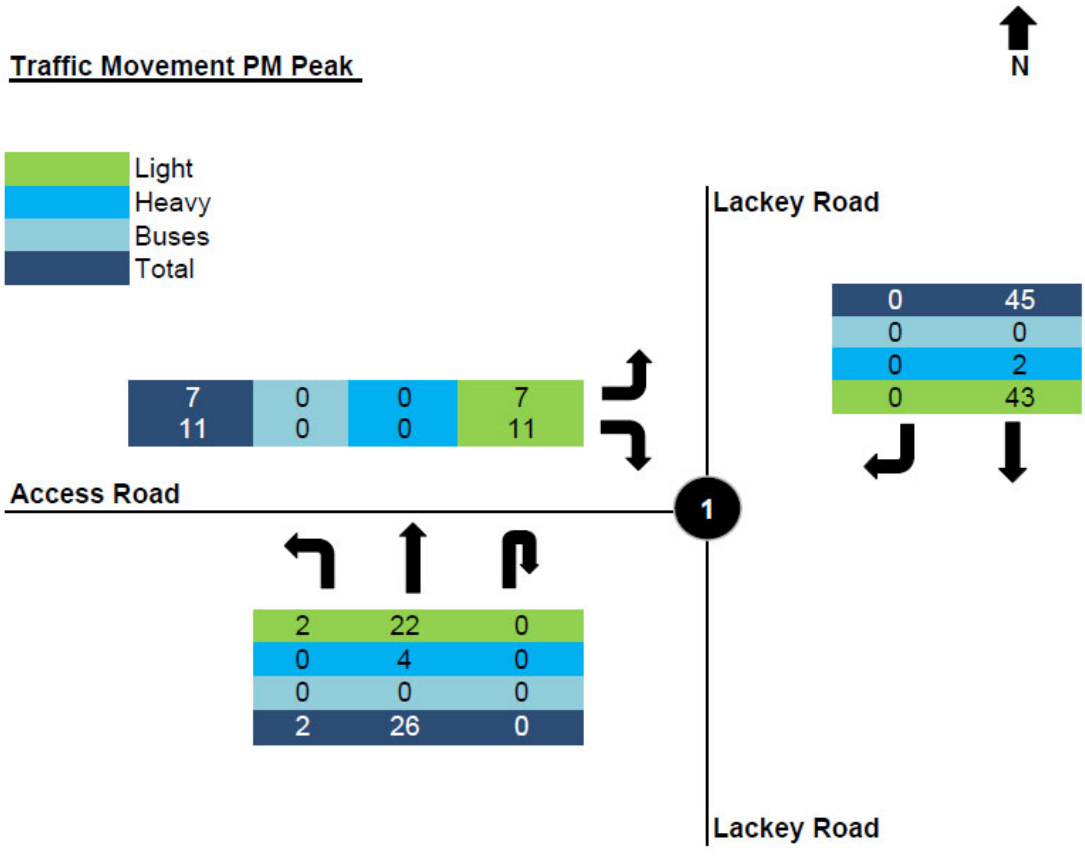


Figure 2.10 Traffic Movement Diagram PM Peak – Lackey Road / Access Road (to Australian BioResources)

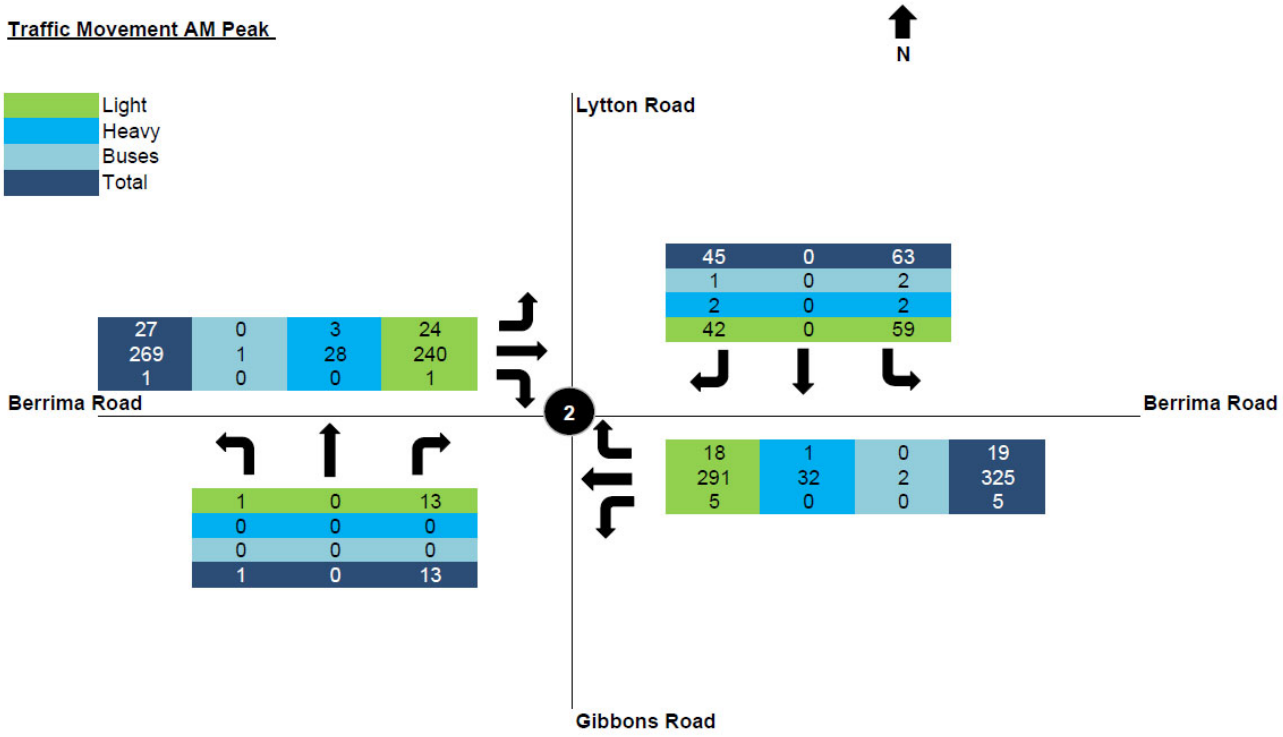


Figure 2.11 Traffic Movement Diagram AM Peak – Lytton Road / Berrima Road

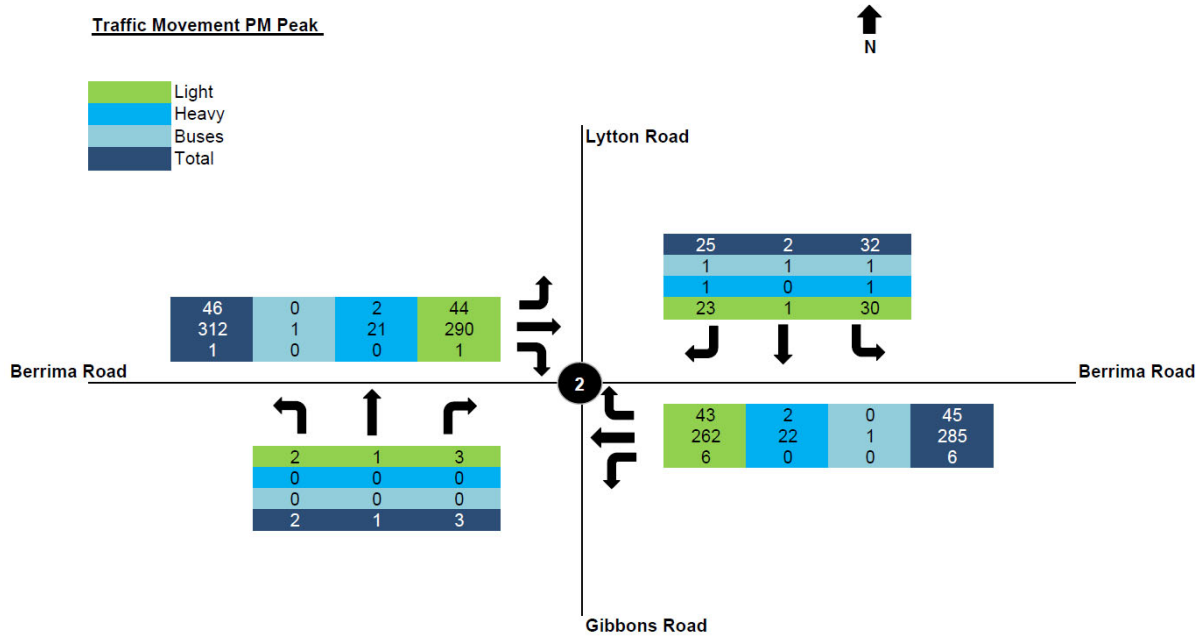


Figure 2.12 Traffic Movement Diagram PM Peak – Lytton Road / Berrima Road

2.2.2 Existing intersection performance

The criteria for evaluating the operational performance of intersections is provided by the *Guide to Traffic Generating Developments* (Roads and Maritime Services, 2002) and reproduced in Table 2.7. The criteria for evaluating the operational performance of intersections is based on a qualitative measure (i.e. Level of Service (LoS), which is applied to each band of average vehicle delay.

Table 2.7 Level of service criteria for intersections

Level of Service	Average Delay per Vehicle (seconds/veh)	Traffic Signals, Roundabouts	Give Way & Stop Signs
A	< 14	Good operation	Good operation
B	15 to 28	Good with acceptable delays & spare capacity	Acceptable delays & spare capacity
C	29 to 42	Satisfactory	Satisfactory, but accident study required
D	43 to 56	Operating near capacity	Near capacity and accident study required
E	57 to 70	At capacity. At signals, incidents will cause excessive delays. Roundabouts require other control modes	At capacity, requires other control mode
F	> 70	Over Capacity, Unstable operation	Over Capacity, Unstable operation

Source: Guide to Traffic Generating Developments (Roads and Maritime Services 2002)

Existing (base 2020) traffic models were developed using the AM and PM weekday and Saturday peak hour surveyed data results. Existing traffic flows at key intersections were analysed using SIDRA 8 to obtain the current operating performance of the key intersections. A summary of the results is outlined in Table 2.8 and detailed in Appendix A.

Table 2.8 Existing intersection operations

Intersection	**Control Type**	AM Peak			PM Peak		
		Average Delay (s)	**LoS**	**Degree of Saturation**	**Average Delay (s)**	**LoS**	**Degree of Saturation**
Site 1: Lackey Road / Access Road (to Australian BioResources)	Give-way	6	LoS A	0.05	6	LoS A	0.03
Site 2: Berrima Road / Lytton Road Access Road / Gibbons Road	Give-way / Stop	14	LoS A	0.19	13	LoS A	0.19

Notes:

- The average delay for priority-controlled intersections is selected from the movement on the approach with the highest average delay.
- The level of service for priority-controlled intersections is based on the highest average delay per vehicle for the most critical movement.
- The degree of saturation is defined as the ratio of the arrival flow (demand) to the capacity of each approach.
- Average delay is given in seconds per vehicle.

Table 2.8 indicates that each of the analysed intersections currently operate with good operation performance with Level of Service A in both the weekday morning and evening peak periods.

Detailed SIDRA results of these intersections are provided in Appendix A.

2.2.3 Existing peak hour midblock analysis

Automatic seven-day tube count survey

In order to identify the existing traffic volumes in proximity to the site, seven-day tube count was undertaken by Matrix Traffic and Transport Data between Monday 7th December 2020 and Sunday 6th December 2020 at the following locations, as shown in Figure 2.8.

– Lytton Road (west of Beaconsfield Road; Eastbound and Westbound).
– Beaconsfield Road (between Roche Close and Stables Place; Northbound and Southbound)

Lytton Road traffic volumes

The surveyed traffic volumes (per day and direction) for Lytton Road are shown in Figure 2.13. Hourly (two-way) traffic volumes recorded for the five-day (weekday) average and peak weekend (Saturday) are shown in Figure 2.14 and a list of the key traffic data summary is outlined in Table 2.9.

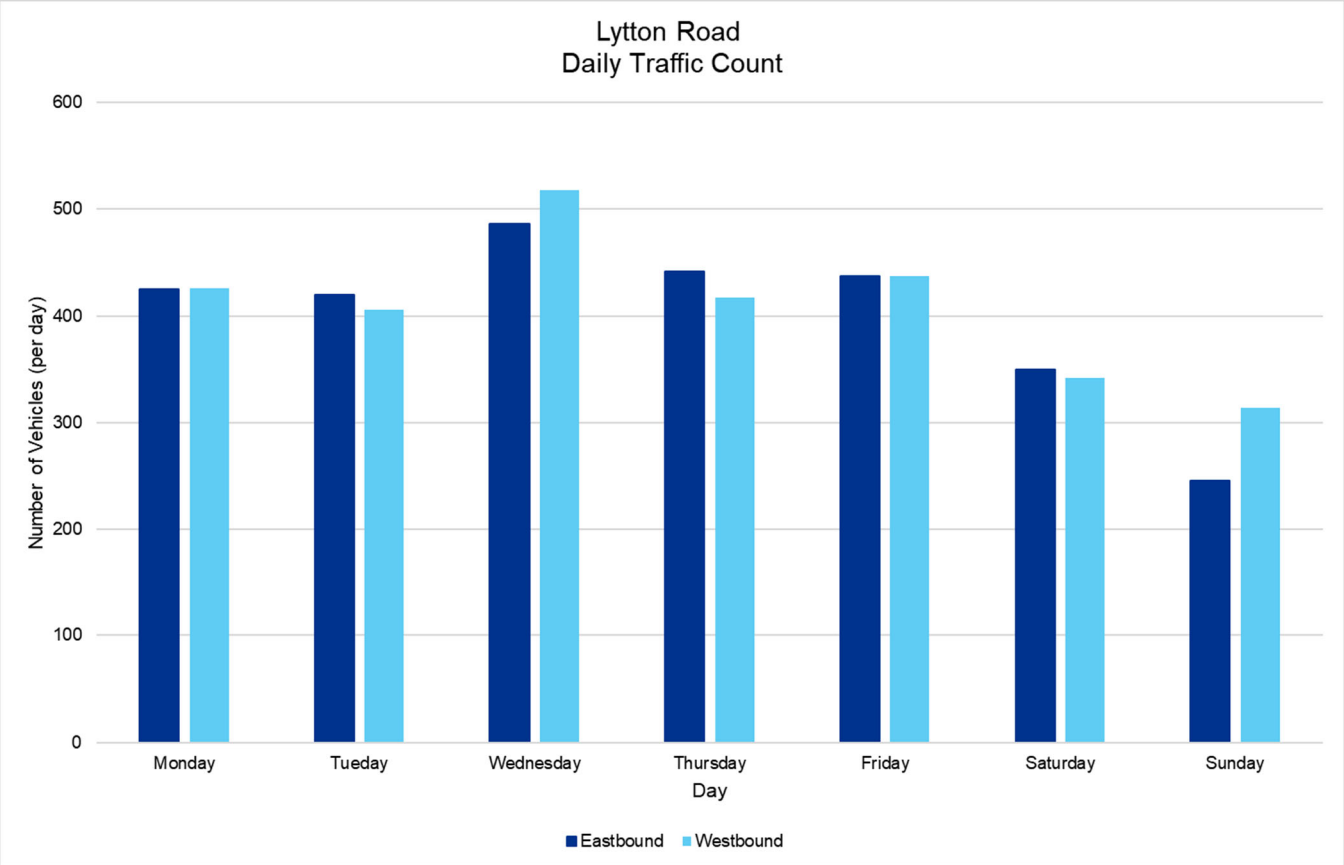


Figure 2.13 Lytton Road: Daily traffic volumes

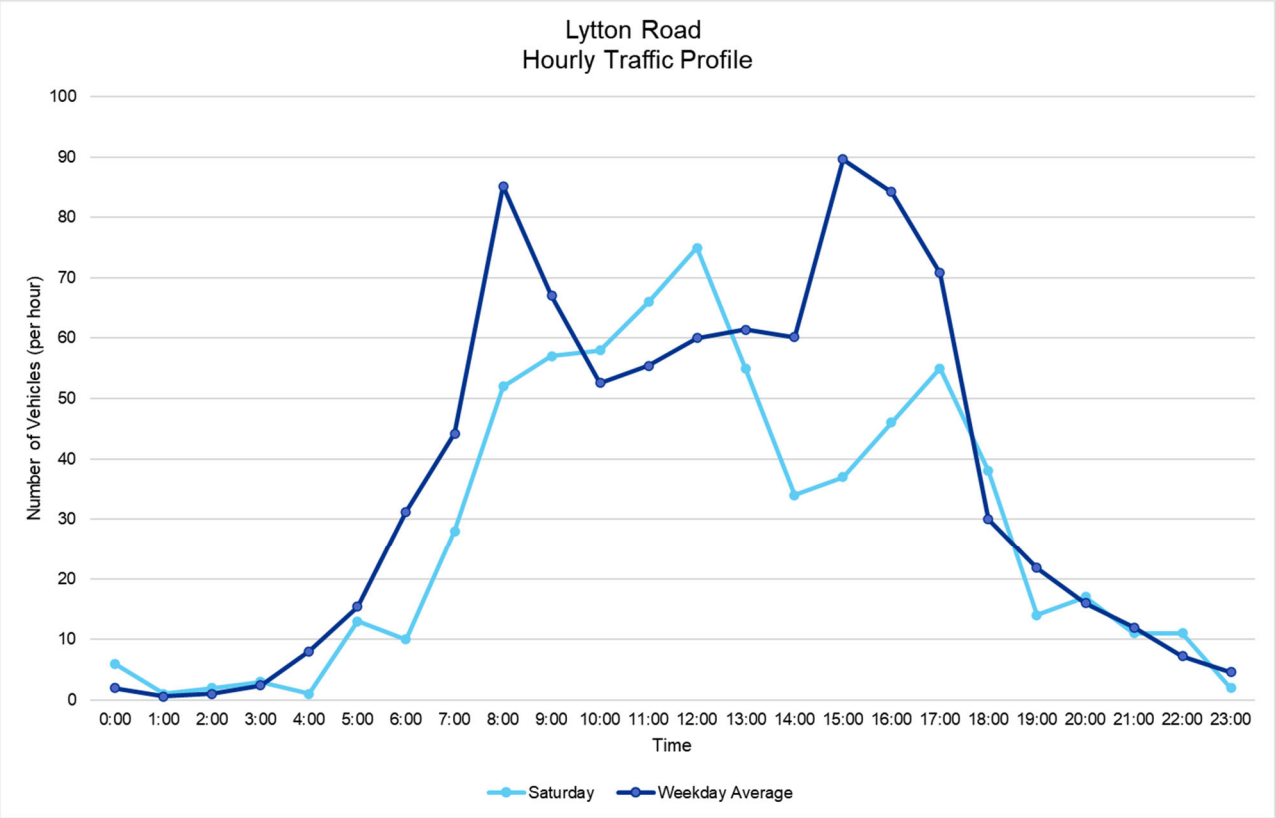


Figure 2.14 Lytton Road: Five-day (weekday) and Saturday hourly traffic profile

Table 2.9 Lytton Road: Key traffic data summary

Key Data Description	Data Summary			
Traffic volume				
		AM Peak Hour (veh/h)*	**PM Peak Hour (veh/h)***	**Saturday Peak Hour (veh/h)***
Peak Hour **	Eastbound	46	57	38
	Westbound	53	54	37
5-Day (Weekday) Average Daily Volume (two-way)	(veh/d)^	883		
Weekend Average Daily Volume (two-way)	(veh/d)^	626		
Vehicle classification				
	5-Day Weekday Average		**Weekend Average**	
Light	89.6%		96.7%	
Medium	8.9%		3.2%	
Heavy	1.5%		0.1%	
Unclassifiable	0%		0%	
Vehicle Speed				
85% Speed (km/h)#	Eastbound	59.7 km/h		
	Westbound	60.4 km/h		

Notes:

(*) veh/h = vehicles per hour

(^) veh/d = vehicles per day)

(#) km/h = kilometres per hour

(**) Maximum peak volume recorded during the survey. Such opposing traffic volume may not necessarily coincide on the same day.

Beaconsfield Road traffic volumes

The surveyed traffic volumes (per day and direction) for Beaconsfield Road are shown in Figure 2.15. Hourly (two-way) traffic volumes recorded for the five-day (weekday) average and peak weekend (Saturday) are shown in Figure 2.16 and a list of the key traffic data summary outlined in Table 2.10.

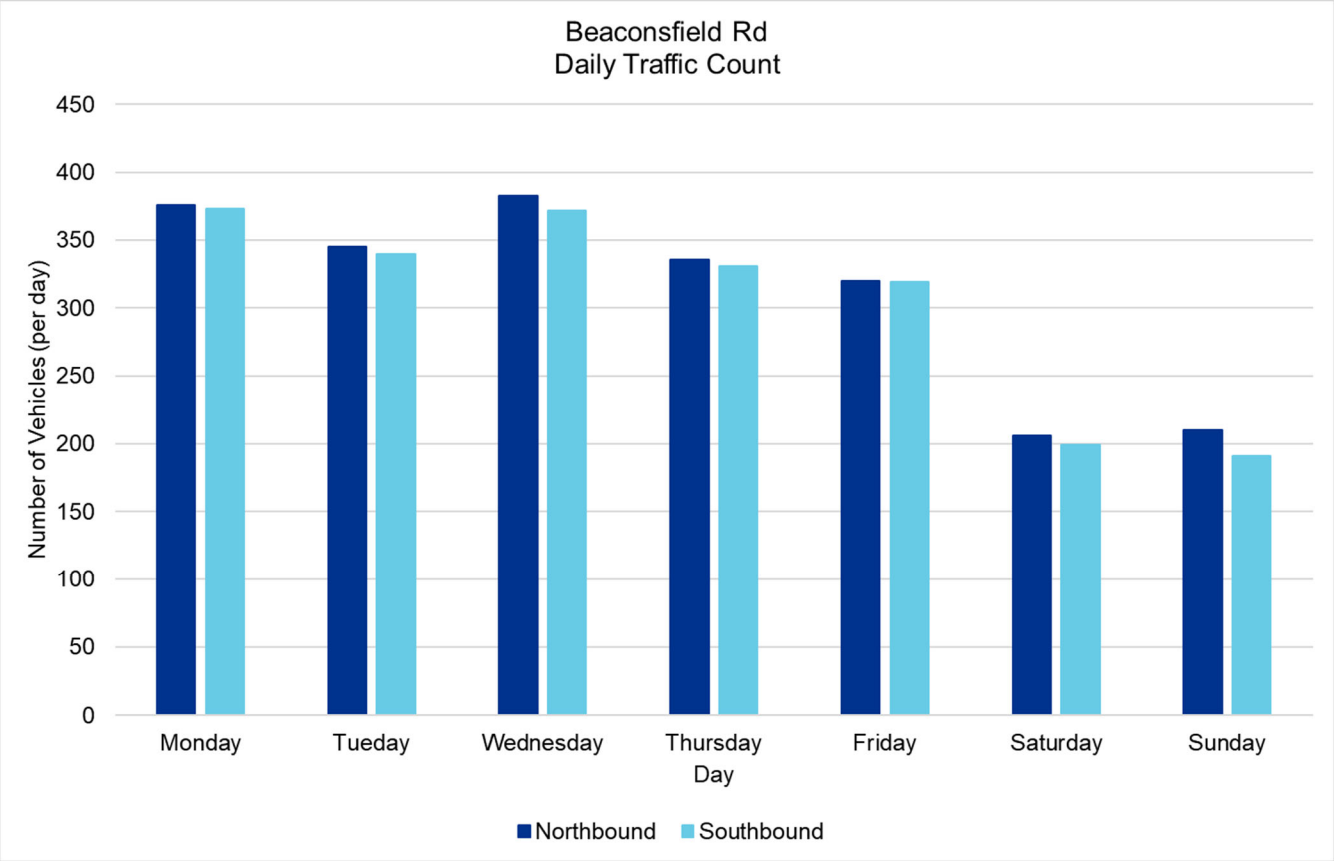


Figure 2.15 Beaconsfield Road: Daily traffic volumes

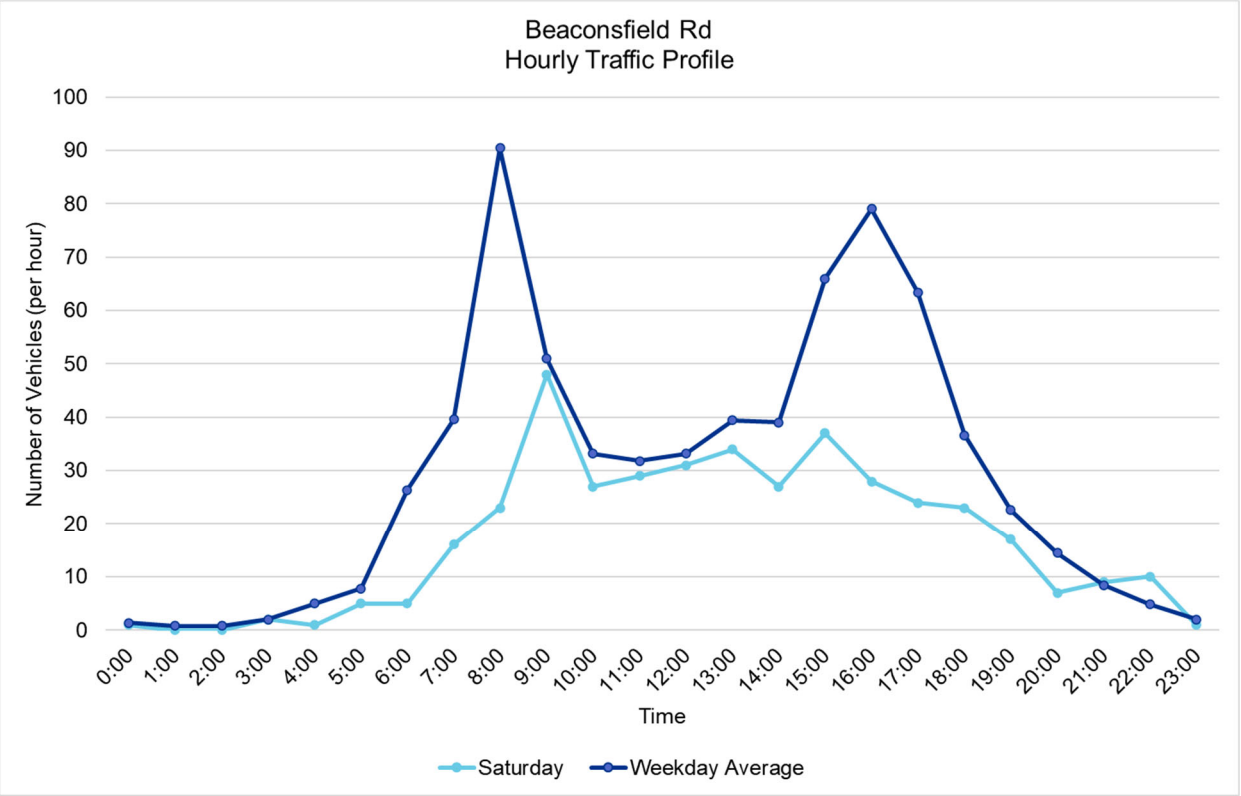


Figure 2.16 Beaconsfield Road: Five-day (weekday) and Saturday hourly traffic profile

Table 2.10 Beaconsfield Road: Key traffic data summary

Key Data Description	Data Summary			
Traffic volume				
		AM Peak Hour (veh/h)*	**PM Peak Hour (veh/h)***	**Saturday Peak Hour (veh/h)***
Peak Hour **	Northbound	47	54	25
	Southbound	52	39	23
5-Day (Weekday) Average Daily Volume (two-way)	(veh/day)^	669		
Weekend Average Daily Volume (two-way)	(veh/day)^	403		
Vehicle classification				
	5-Day Weekday Average			**Weekend Average**
Light	88.4%			90.7%
Medium	11.1%			8.9%
Heavy	0.5%			0.4%
Unclassifiable	0%			0%
Vehicle Speed				
85% Speed (km/h)#	Northbound	58.6 km/h		
	Southbound	58.6 km/h		

Notes:

(*) veh/h = vehicles per hour

(^) veh/d = vehicles per day)

(#) km/h = kilometres per hour

(**) Maximum peak volume recorded during the survey. Such opposing traffic volume may not necessarily coincide on the same day.

Functional classification

The classification of roads within the existing road network can be used as an indication of the functional role each road plays with respect to the volume of traffic they should appropriately carry. Transport for NSW has developed a set of road hierarchy classifications detailed in Table 2.11, which indicate typical nominal average annual daily traffic (AADT) volumes for various classes of roads.

Table 2.11 Functional classification of roads

Location	Traffic Volume (veh/d*)	Peak Hour Volume (veh/h*)
Motorway/Freeway	>15,000	>5,600
Arterial Road	>15,000	1,500 – 5,600
Sub-Arterial Road	5,000 – 20,000	500 – 2,000
Collector Road	2,000 – 10,000	200 – 1,000
Local Road	<2,000	0 – 200

Source: NSW Roads and Maritime Service (now joined with Transport for NSW), Road Design Guide and AMCORD

*Note veh/d = vehicles per day, veh/h = vehicles per hour

Based on the survey results outlined in section 2.2.1, Table 2.9 and Table 2.10, the peak hour traffic volumes generally fall within the criteria provided in Table 2.11 for the relevant classification.

Midblock analysis

According to *Austroads Guide to Traffic Management, Part 3: Traffic Studies and Analysis Methods, Section 6.2.1*, the one-way mid-block capacity of an urban arterial road with interrupted flow varies depending on the type of lane. The typical mid-block capacity for urban roads with interrupted flow is outlined in Table 2.12.

An interrupted flow facility road is one in which traffic flow conditions are subject to the influence of fixed elements such as traffic signals, stop signs, give-way signs, roundabouts or other controls which cause traffic to stop periodically, irrespective of the total amount of traffic; examples include urban streets, unsignalised and signalised intersections.

Table 2.12 Typical mid-block capacity for urban roads with interrupted flow

Type of lane	One-way mid-block capacity (pc/h)
Median or inner lane	
Divided road	1000
Undivided road	900
Middle lane (of a 3 lane carriageway)	
Divided road	900
Undivided road	1000
Kerb lane	
Adjacent to parking lane	900
Occasional parked vehicles	600
Clearway conditions	900

Source: Austroads Guide to Traffic Management Part 3 – Traffic Studies and Analysis Methods - Table 6.1 in Austroads

Austroads Guide to Traffic Management Part 3 – Traffic Studies and Analysis Methods, Section 6.2.1 outlines, however that:

Peak period mid-block traffic volumes may increase to 1200 to 1400 pc/h/lane on any approach road when the following conditions exist or can be implemented:

– adequate flaring at major upstream intersections

– uninterrupted flow from a wider carriageway upstream of an intersection approach and flowing at capacity
– control or absence of crossing or entering traffic at minor intersections by major road priority controls
– control or absence of parking
– control or absence of right turns by banning turning at difficult intersections
high volume flows of traffic from upstream intersections during more than one phase of a signal cycle
– good co-ordination of traffic signals along the route.

For the purposes of this assessment, a conservative approach has been adopted in line with the undivided road mid-block capacity of 900 pc/h/lane to determine the Volume/Capacity Ratio (VCR).

The VCR is a measure of the level of congestion on a road given the traffic volume and road capacity. When the VCR reaches 1, this indicates that the road is operating at theoretical capacity, with 0.9 at practical capacity.

The mid-block analysis results for Lytton Road and Beaconsfield Road are summarised in Table 2.13 and Table 2.14, respectively.

Table 2.13 Lytton Road: Mid-block Volume/Capacity ratio analysis

Day	Time	Direction	Mid-block capacity (pc/h/ln)	Number of lanes	Peak volume (pc/h)	VCR
Weekday	AM	Eastbound	900	1	46	0.051
	AM	Westbound	900	1	53	0.059
	PM	Eastbound	900	1	57	0.063
	PM	Westbound	900	1	54	0.060
Weekend	Saturday	Eastbound	900	1	38	0.042
	Saturday	Westbound	900	1	37	0.041

The table indicates that Lytton Road is currently operating well within capacity in the morning (AM), evening (PM) and weekend peak hour periods.

Table 2.14 Beaconsfield Road: Mid-block Volume/Capacity ratio analysis

Day	Time	Direction	Mid-block capacity (pc/h/ln)	Number of lanes	Peak volume (pc/h)	VCR
Weekday	AM	Eastbound	900	1	47	0.052
	AM	Westbound	900	1	52	0.058
	PM	Eastbound	900	1	54	0.060
	PM	Westbound	900	1	39	0.043
Weekend	Saturday	Eastbound	900	1	25	0.028
	Saturday	Westbound	900	1	23	0.026

The table indicates that Beaconsfield Road is currently operating well within capacity in the morning (AM), evening (PM) and weekend peak hour periods.

2.2.4 Heavy and light vehicle ratio

Based on the traffic survey data, the average heavy vehicle percentage for Lytton Road and Beaconsfield Road in the vicinity of the site is outlined in Table 2.15.

Table 2.15 Peak hour heavy vehicle ratio

Location	% Heavy Vehicles	
	AM	PM
Lytton Road ^	2.1 %	1.1 %
Beaconsfield Road ^	0.7 %	0.9 %
Berrima Road *	11 %	5 %
Lackey Road *	13 %	10 %

Note:

(*) Berrima Road and Lackey based on intersection survey data

(^) Lytton Road and Beaconsfield Road based on automatic tube count survey

The data in Table 2.15 indicates that heavy vehicles constitute a higher percentage of vehicle movement on the local and regional collector road network when compared to the local road network.

2.3 Crash data review

Crash data was obtained from the *Centre for Road Safety website* (Transport for NSW, 2021) for roads within the vicinity of the site. The data has been analysed for the five year period between 2015 and 2019. The location of recorded crashes are shown in Figure 2.17.

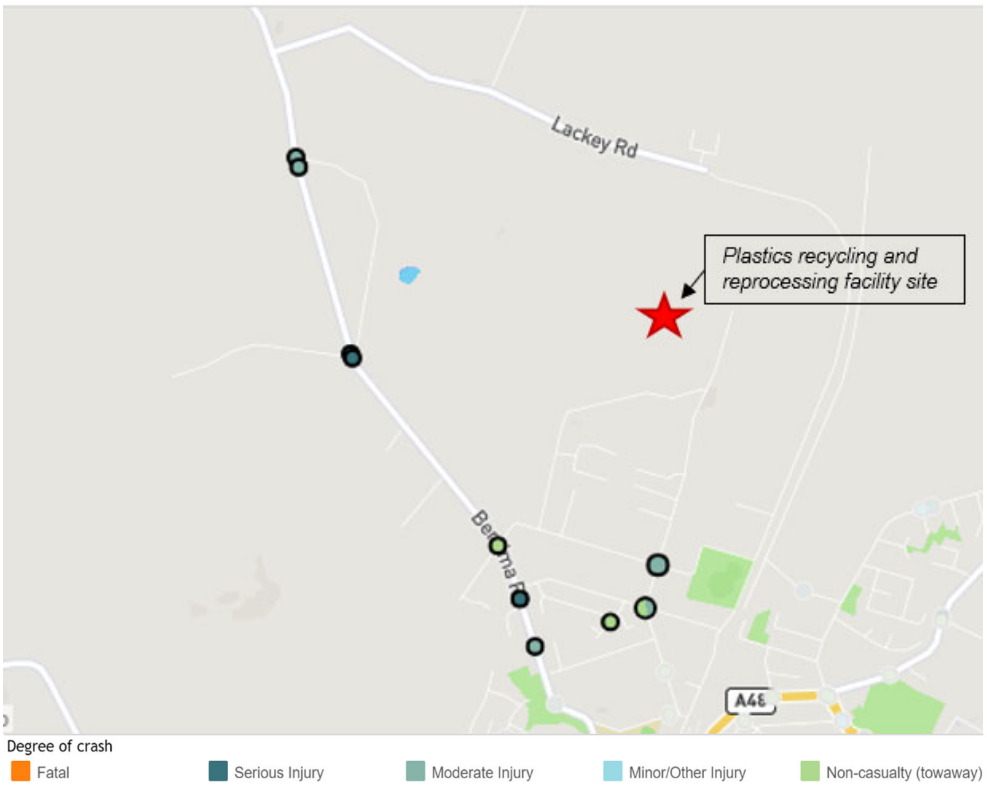


Figure 2.17 Crash locations

Source: Crash Data (TfNSW, 2021) –modified by GHD

There were 12 crashes recorded between 2015 and 2019 in the vicinity of the proposal site. A summary of the five-year crash data is outlined in Table 2.16.

Table 2.16 Crash summary (2015 – 2019)

Location Type	Number of injuries				No injury crashes
	Fatal	Serious	Moderate	Minor	
2-way undivided	0	2	2	1	5
T-junction	0	1	1	1	3
X-intersection	0	0	3	1	4
Predominate Crash Type	**RUM Code**	**Number of Crashes**			
Cross traffic	10	4			
Off road on left, hit object	71	2			
Off road on right, hit object	73	2			
Off right on right turn bend, hit object	83	2			
Off left on right turn bend, hit object	81	1			
Right rear	32	1			
TOTAL		**12**			

2.4 Public and active transport

In reviewing the proposal site and its accessibility to public transport opportunity, reference was made to the *NSW Planning Guidelines for Walking and Cycling* (2004). This document outlines a recommended walkable distance of 400 m to 800 m to public transport and other local amenities or a 1.5 km bicycle riding distance.

Figure 2.18 outlines the key public transport within 800 m of the proposal site, with details of the accessibility to public transport, walking and cycling access provided in the following sections.

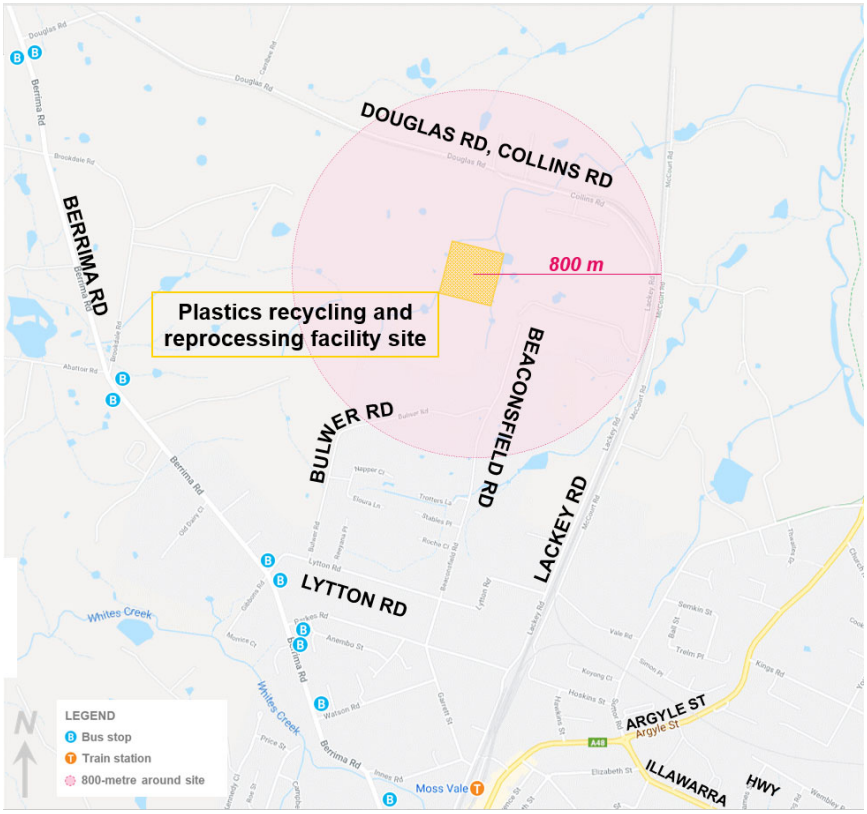


Figure 2.18 Public transport accessibility

Source: Google Maps (2021) – Modified by GHD

2.4.1 Private bus services

Bus stops are located along Berrima Road (approximately 1.7 km south-west of the site), as shown in Figure 2.18. The bus routes frequency are outlined in Table 2.17.

Table 2.17 Private bus services

Route	Frequency	Coverage
812	Weekday: AM Peak: 1-2 services between 7:00 am and 10:00 am PM Peak: 1-2 services between 3:00 pm and 6:00 pm Weekend: 2 services on Saturdays	Berrima and Moss Vale
816	Weekday: AM Peak: 1-2 services between 7:00 am and 10:00 am PM Peak: 3 services between 3:00 pm and 6:00 pm Weekend: 4 services on Saturdays	Moss Vale (loop)

2.4.2 Rail services

The nearest rail station is Moss Vale train station, located approximately 2.4 km south-west of the site, as shown in Figure 2.18. Rail services typically operate between 50-60 minute intervals during the AM and PM peak periods and 120-minute intervals on weekends, providing access to the Sydney CBD (via Campbeltown) and Goulburn on the following train lines:

– Southern Highlands (Intercity Trains).
– Southern NSW (Regional Trains).

Moss Vale train station is also a stop along the route between Central (Sydney) to Melbourne and Sydney (Central) to Canberra.

2.4.3 Existing pedestrian facilities

There are currently no dedicated pedestrian facilities in the study area proximal to the site.

2.4.4 Existing cycling network

Figure 2.19 illustrates the current cycle path network facilities in proximity to the subject site as outlined in *Cycleway Finder website* (TfNSW, 2021). The area proximal to the proposal does not currently provide bicycle parking facilities (e.g. parking). However, an off-road cycle route on part of Berrima Road is identified in both directions to provide a connection to Cosgrove Park and – to an extent – Cecil Hoskins Nature Reserve.

Figure 2.19 Existing cycle network

Source: Cycleway Finder website (TfNSW, 2021) – Modified by GHD

3. Moss Vale Enterprise Corridor

This section of the report outlines the objectives of the Moss Vale Enterprise Corridor (MVEC) as outlined in the Moss Vale Enterprise Corridor Development Control Plan, 2008, and associated projects.

The MVEC is a sustainable employment area proposed to be developed in accordance with the Development Concept Plan. The MVEC is expected to accommodate business park commercial development and larger scale freight storage and distribution operations associated with existing rail infrastructure and a possible intermodal freight terminal. The proposal site is located within the MVEC catchment.

3.1 Projects

The development of the MVEC for employment uses will require transport infrastructure to accommodate future development. The infrastructure includes upgrading of the following roads:

– Moss Vale Bypass in three stages which are:
  - Stage 1: Construction of the Main Southern Rail overpass bridge linking Suttor Road to Lackey and Beaconsfield Roads (west of rail line).
  - Stage 2: Bypass of Suttor Road connection the over-bridge to Moss Vale Road with a roundabout.
  - Stage 3: Includes linking Stage 1 to Berrima Road, including intersections (roundabouts) to connecting roads.
– New Berrima Bypass in two stages that include:
  - Stage 1: Realigns Taylor Avenue to cater for the future construction of the Berrima Road Blue Circle Railway overpass.
  - Stage 2: Berrima Road Blue Circle Railway Overpass is a new road to the south of Taylor Avenue.
– New Road (Enterprise Zone Road): This road will link the MVEC to Lackey Road to the east with Berrima Road to the West.
– Rail overbridge: Connecting Douglas Road to New Road (Enterprise Zone Road). This link will ensure central connectivity through the MVEC north and south of the rail extension.
– Douglas Road Upgrade: The road will be upgraded in the early stages of MVEC development. Until the rail crossing to its east and west are closed and replaced with a single overbridge, it will be the main northern collector road.
– Berrima Road Upgrade: The road will be upgraded in stages and will be one of the main north-south link between Taylor Avenue and the Freeway to the north.

Proposed developments will not be permitted direct access to these roads. Internal access roads will be developed as part of future developments to reduce traffic delays and conflict between merging and through traffic. The future transport infrastructure and road upgrades as part of MVEC are shown in Figure 3.1 and Figure 3.2.

3.2 Pedestrian and cyclist movement

Potential pedestrian and cyclist links have been considered as part of the road concept planning for the MVEC. Footways will be provided on all roadways throughout the MVEC. An important pedestrian link has been identified to connect Berrima Road to Douglas Road via the existing Douglas Road level crossing.

This pedestrian link would be kept separate from the new road link for safety reasons due to the high volumes of traffic expected at the intersection with the bridge crossing. This would require the establishment of a pedestrian overpass or underpass at the spur line crossing.

3.3 Buses

An indicative bus route and possible locations of bus stops that will provide users with ease of access to their workplaces has been formulated as part of the MVEC, as shown in Figure 3.1.

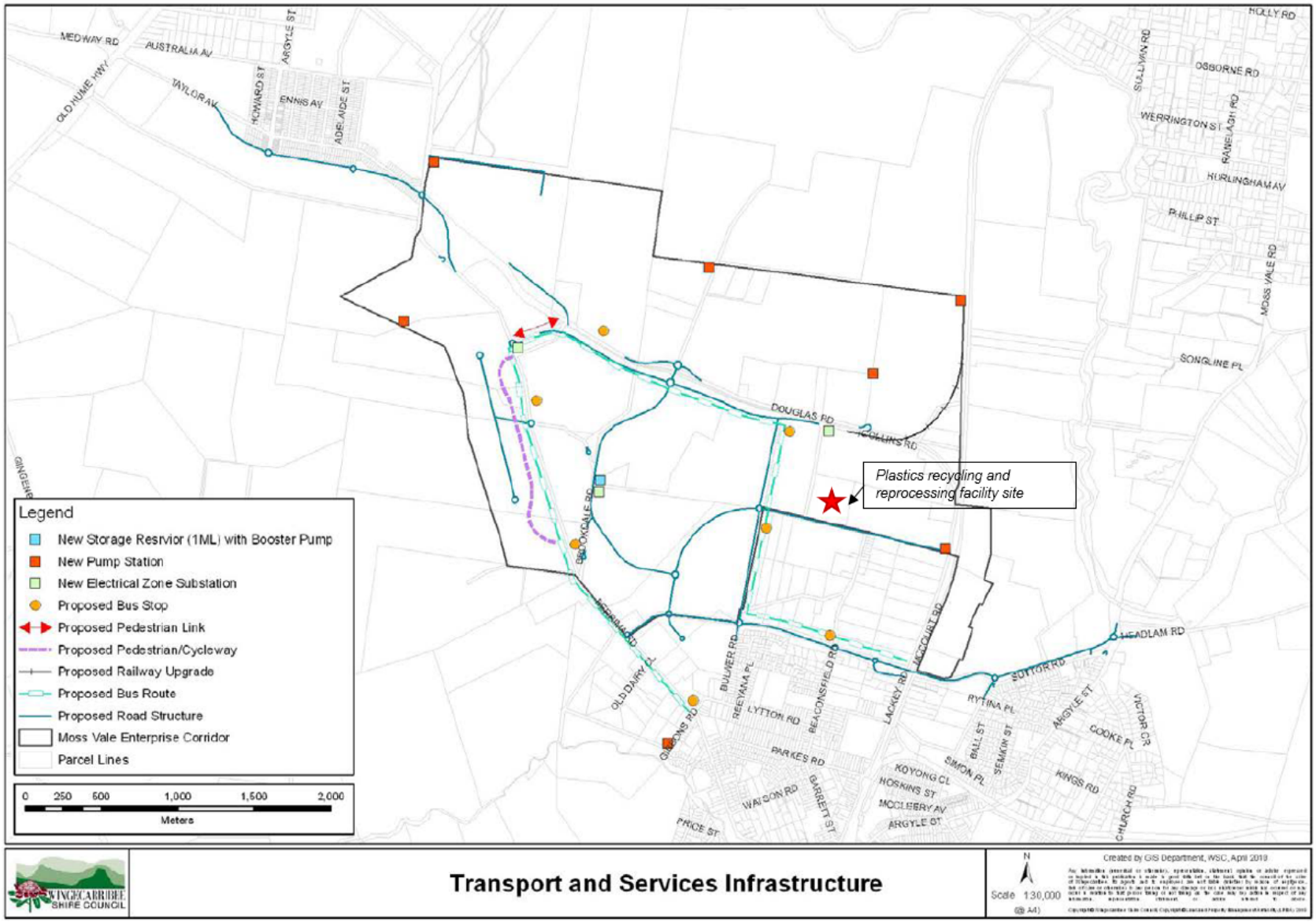


Figure 3.1 Moss Vale Enterprise Corridor: Transport and services infrastructure

Source: Wingecarribee Shire Council: Moss Vale Enterprise Corridor Development Control Plan, 2008, Modified by GHD

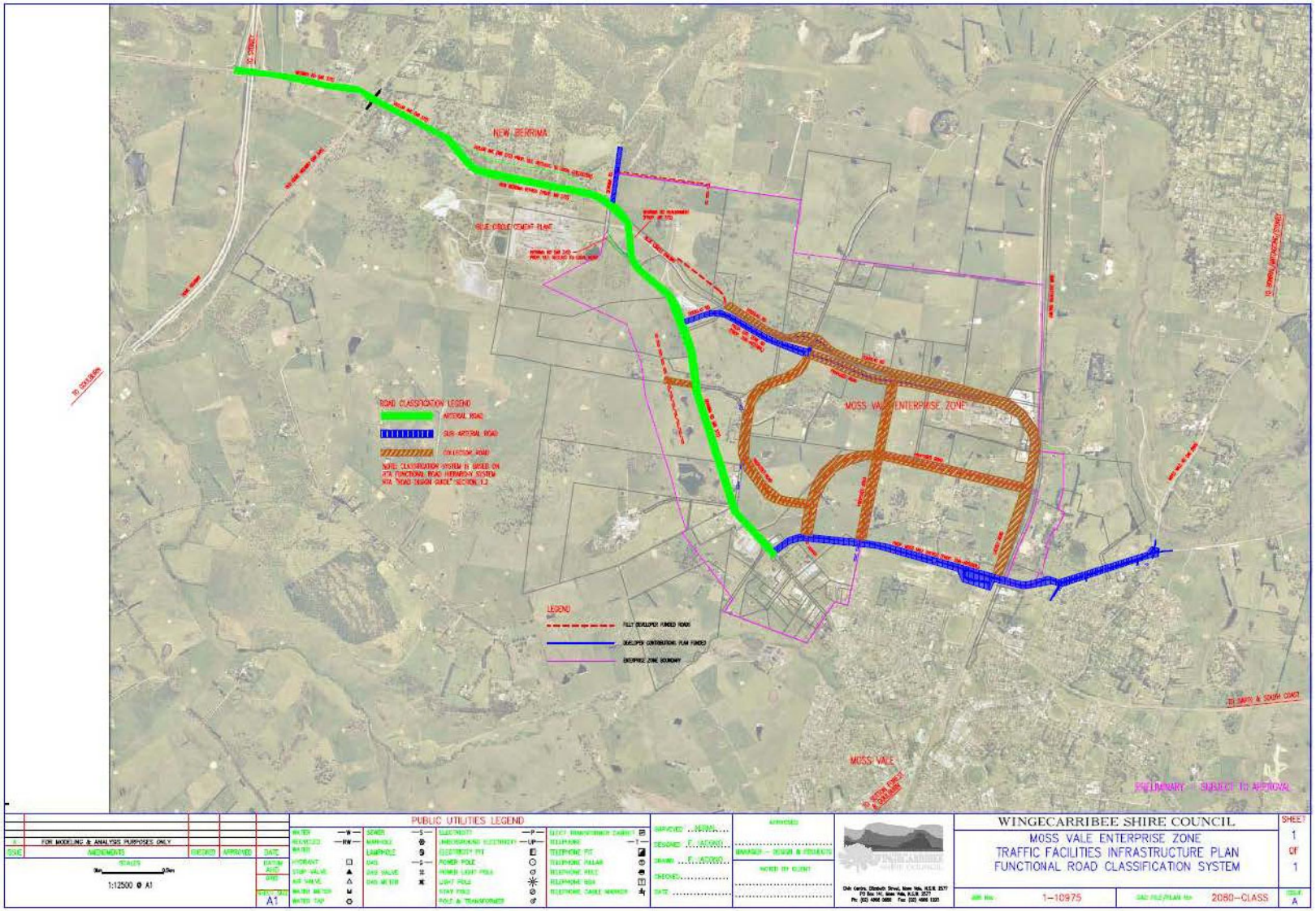


Figure 3.2 Traffic facilities infrastructure

Source: Wingecarribee Shire Council: Moss Vale Enterprise Corridor Development Control Plan, 2008

4. Traffic impact assessment

4.1 Proposed access options

Three key road access options were considered and assessed during development of the proposal. These included:

– Option 1: Beaconsfield Road to Braddon Road (utilising the existing access and “paper road”).
– Option 2: New east-west road along the southern boundary of the ABR site connecting the “paper road” (Braddon Road) with Lackey Road.
– Option 3: New north-south road originating along the western boundary of the site and connecting with Douglas Road in the north.

The three road access options were discussed with Council during a consultation meeting on 18 June 2021, at which analysis of each of the three options from a traffic, environmental, safety and strategic perspective was presented.

4.1.1 Option 1: Beaconsfield Road to Braddon Road (existing access)

Option 1 includes access to and from the south of the site via Berrima Road, Lytton Road, Beaconsfield Road and a new constructed road to the west (currently a “paper road” – Braddon Road). This option was preferred by the proponent, as it utilises the existing access to 74-76 Beaconsfield Road. Upgrades to Beaconsfield Road would be required for access to the plastics recycling and reprocessing facility site, as shown in Figure 4.1.

At a site visit and preliminary traffic and road traffic noise studies confirmed that this road access option would be suitable for use subject to an initial reduction in plant capacity (up to 60,000 tonnes per year depending on truck capabilities), including three heavy vehicles per hour and 30 light vehicles per staff shift (including crossover).

4.1.2 Option 2: New east-west connection with Lackey Road

Option 2 includes access from the south of the site heading east to Lackey Road. This would comprise a new constructed road along the existing “paper road” west of Beaconsfield Road and an extension of this public road along the southern boundary of the Australian BioResources site (Braddon Road east extension), as shown in Figure 4.2 (Option 2a) and Figure 4.3 (Option 2b).

Both sub-options align with the future east-west road corridor proposed by Council as part of the MVEC. They are only preliminary designs and detailed design, following project approval and consultation with Council would be required to determine the final alignment.

As the land on which the paper road is shown is currently privately owned, the acquisition (or lease agreement) of a portion of the following parcel of land would be required for the construction of this road using the Option 2a alignment as shown in Figure 4.2:

– Lot 10 DP 1084421 (9-11 Lackey Road, Moss Vale) – the Australian BioResources site

The road can be constructed and operated safely with this option, but if a decision is made during detail design to provide a straighter alignment (closer to that shown in Figure 4.3), the following parcel of land would also be affected:

– Lot 1 DP 26490 (77 Beaconsfield Road, Moss Vale)

The purchase of land required for the roadway would need to be arranged by either Plasrefine Recycling or via compulsory acquisition by Council. Council has indicated that Plasrefine Recycling needs to negotiate with the existing owner (or owners) to purchase the land. Option 2b has been assessed in the EIS, as it impacts on more land owners and has a higher environmental impact than Option 2a.

Option 2b has been assessed having slightly greater biodiversity impacts than Option 2a, because it would require the removal of a small number of planted trees along the alignment near Beaconsfield Road. Option 2a avoids impacting these trees, but has a slight road curve alignment at the mid-section. It should be noted that neither option provides a straight road alignment because of misalignment between the Braddon Road (paper road) corridor, and existing property boundaries east of Beaconsfield Road.

A separate preliminary environment impact assessment was undertaken for these options. This is discussed in the specialist report and EIS.

4.1.3 Option 3 North-south connection with Douglas Road

Option 3 includes access to / from the north of the plastics recycling and reprocessing facility site via Berrima Road, Douglas Road, Collins Road and a new constructed north-south road. This would require constructing a road in the existing road easement and expanding the existing level crossing area, to accommodate vehicles turning left out of the new road onto Douglas Road as shown in Figure 4.4.

During consultation with Council, this option was found to be the least preferred due to the need for heavy vehicles to carry out a hook turn across a level rail crossing associated with the Berrima Branch Line. Reference was made to *Level crossing safety - Transport for NSW and National Railway Level Crossing Safety Strategy 2010-2020* specifically, that level crossing collisions between trains and vehicles are a major road safety risk. This is of concern given the projected growth in Australian freight over the next few decades: between 2010- 2030, truck traffic is predicted to increase by 50 per cent and rail freight is expected to increase by 90 per cent. In addition, the Berrima Rail Project proposed by Hume Coal (SSD 7171) would, if approved, significantly increase the use of the Berrima Branch Line. This would increase the risk of accidents between heavy vehicles and trains at this level crossing.

In addition, road access Option 3 would result in impacts to nine *Eucalyptus macarthurii* which is an endangered species under the NSW *Biodiversity Conservation Act 2016* and Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*. The occurrence of this species is also associated with the endangered ecological community Southern Highlands Shale Woodlands of the Sydney Basin Bioregion listed under the *Biodiversity Conservation Act 2016*.

4.1.4 Road access option summary

A summary of potential positive and negative attributes with each of the above access options are summarised in Table 4.1.

Table 4.1 Summary of access options

Access Options	Positive attribute	Negative attribute
Option 1 - Beaconsfield Road to Braddon Road (utilising the existing access and “paper road”)	✓ Utilises existing access road and existing designated “paper roads” ✓ Only option that minimises existing road access ✓ Does not require any acquisition of land ✓ Negligible impact on native vegetation	× Plant throughput reduced below 120,000 tpa capacity to comply with traffic noise criteria on Beconsfield Road × Road upgrades to Beaconsfield Road would be required × Increased heavy vehicle traffic movements along Beaconsfield Road which Council has indicated it does not support
Option 2: New east-west connection with Lackey Road (along the southern boundary of the plastics recycling and reprocessing facility site) – Braddon Road east extension	✓ Minimal impact on native vegetation ✓ Maintain access to existing landowners ✓ New road corridor aligns with the MVEC future road network	× New road construction × Land acquisition or agreement required with landowners for the lease of the adjoining site (Australian BioResources). × Moderate terrain

Access Options	Positive attribute	Negative attribute
Option 3 – New north-south connection with Douglas Road (along the western boundary of the plastics recycling and reprocessing facility site)	✓ Generally level terrain	× Impacts to vegetation including *Eucalyptus macarthurii* which are endangered species × Need for heavy vehicles to carry out a hook turn across a level rail crossing × Major road safety risk (collision between trains and vehicles) × New road construction including crossing a watercourse

4.1.5 Access option conclusion and next steps

The three road access options were discussed with Council staff at meetings on 18 June 2021 and 30 August 2021. At the 18 June meeting, Council advised that it would not support the use of Beaconsfield Road for heavy vehicles associated with the operation of the project although this was the only current access. It is noted that Beaconsfield Road is not restricted to residential use.

A subsequent meeting was held with Council staff on 30 August 2021, at which Council advised that Plasrefine Recycling needed to negotiate directly with existing landowners to acquire the necessary land for the proposed extension of the unformed Braddon Road eastwards from Beaconsfield Road to Lackey Road. Council indicated that it would agree to the proposed new road being designated as a public road, and that the road had to meet Council's design and construction requirements.

Since the east-west road (Option 2) is shown in the current Section 94 plan for the Moss Vale Enterprise Corridor (MVEC), Plasrefine Recycling proposes that the costs associated with purchasing land and building the road be considered as works in kind and offset against potential Section 94 contributions associated with the project. A Voluntary Planning Agreement would be put in place between all parties to transfer the constructed road to Council for future use as a public road.

Figure 4.1 Option 1: Beaconsfield Road – Road upgrade

Source: GHD 2021

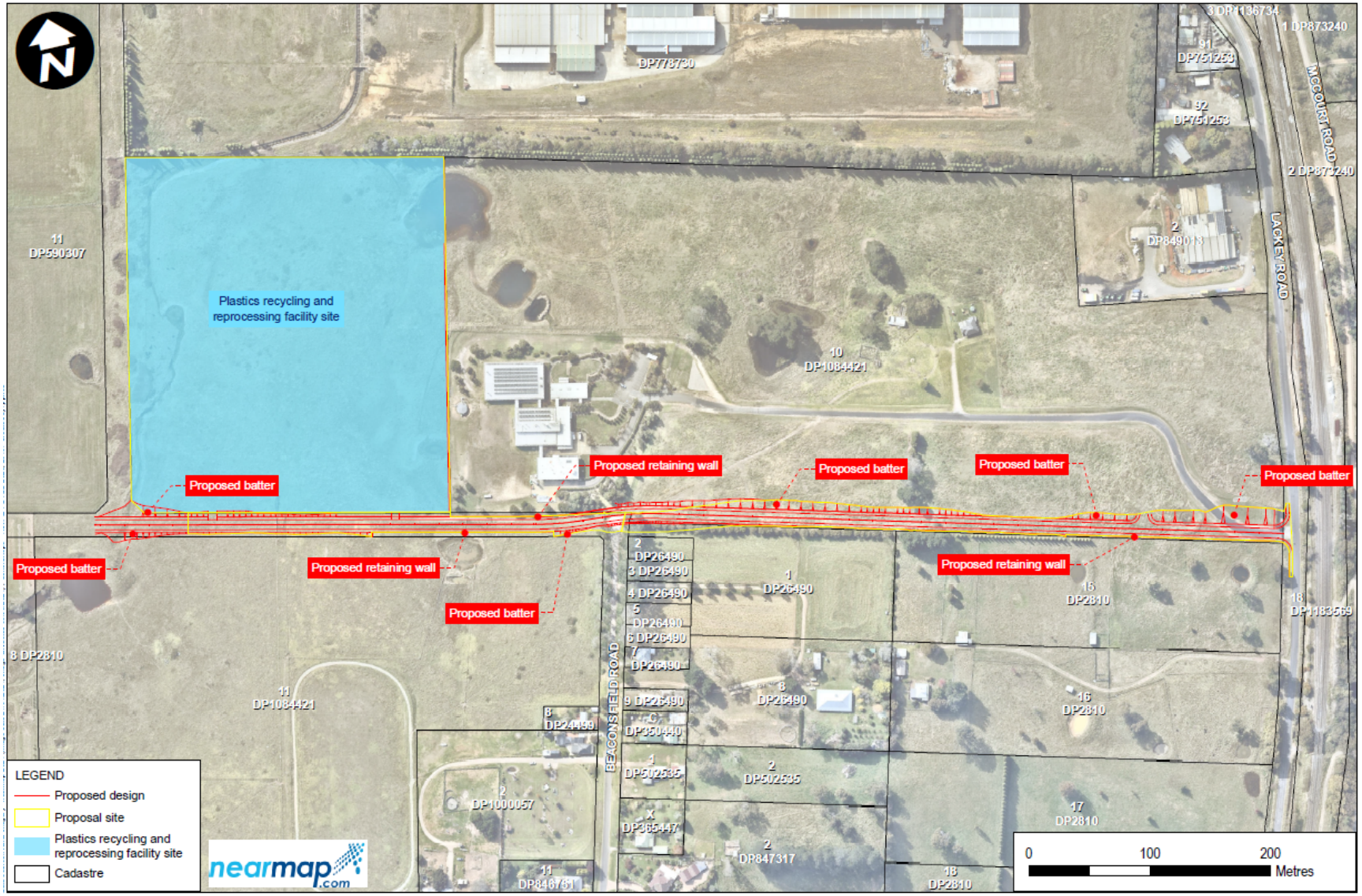


Figure 4.2 Option 2a: New access road – Connecting Lackey Road with the plastics recycling and reprocessing facility site

Source: GHD 2021

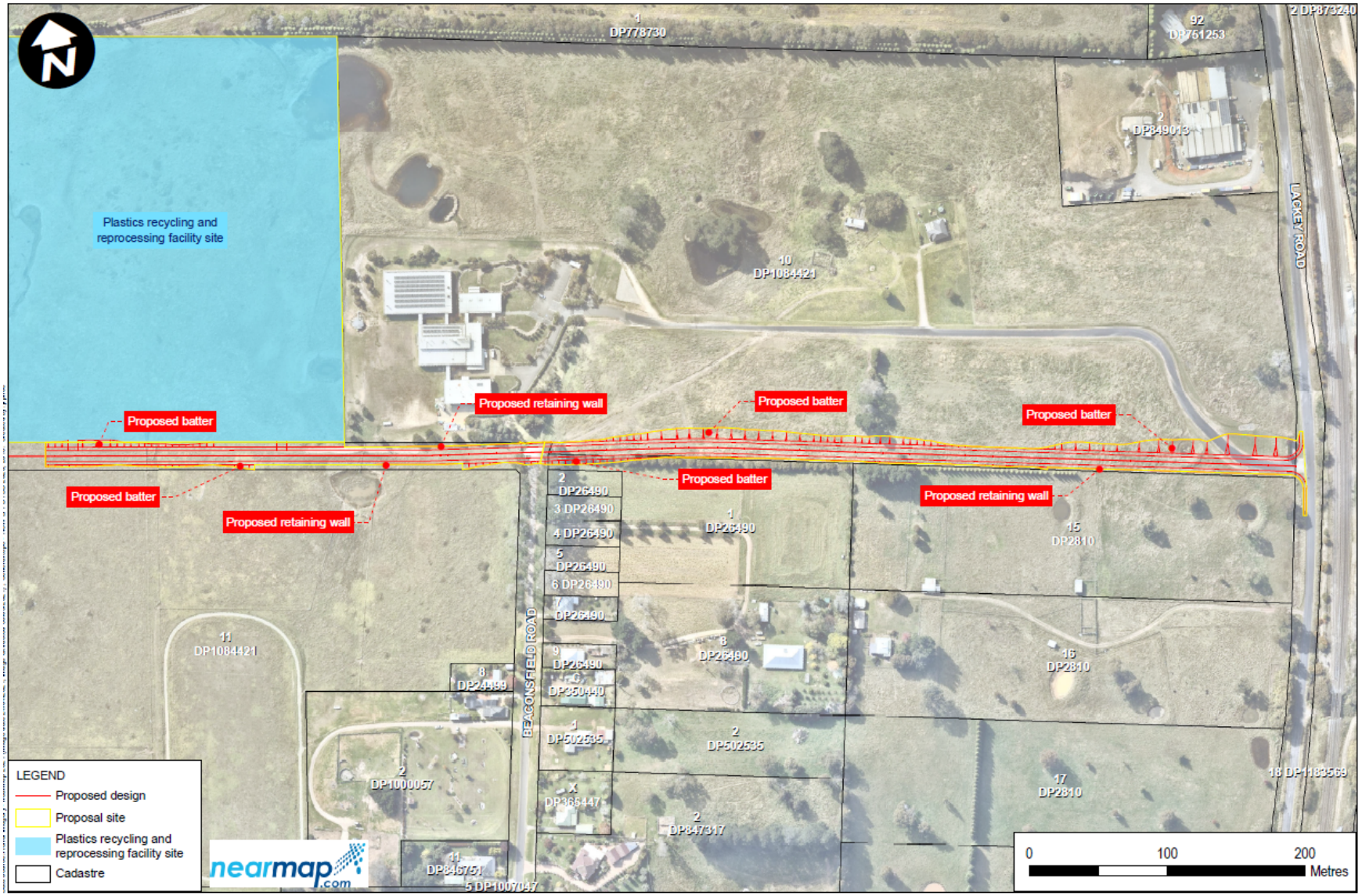


Figure 4.3 Option 2b: New access road – Connecting Lackey Road with the plastics recycling and reprocessing facility site (alternative alignment)

Source: GHD 2021

Figure 4.4 Option 3: New access road – North-south connection with Douglas Road

Source: GHD 2021

4.2 Projected traffic generation

This section summarises the traffic generation during the construction and operation of the facility.

4.2.1 Construction traffic activity

Construction would occur from Monday to Friday between 7:00 am and 6:00 pm and 8:00 am to 1:00 pm on Saturdays. Peak construction workforce is a maximum of 30 people. The anticipate peak vehicle movement during construction is summarised in Table 4.2.

Although construction workers arrival and departure from the site is likely to occur outside the road network peak, for assessment purposes and for the worst-case scenario, a maximum of 30 light vehicles (equivalent to peak workforce) and was assumed to enter the site during AM peak with two entering and two exiting heavy vehicles (equivalent to ten percent of peak daily heavy vehicle traffic) occurring concurrently.

Conversely in the PM peak a maximum of 30 light vehicles was assumed to exit the site with two heavy vehicles entering and two exiting heavy vehicles.

Table 4.2 Vehicle movement during construction

Vehicle type	Estimated average daily vehicle movements	Estimated peak daily vehicle movements	Estimated AM Peak vehicle movement		Estimated PM Peak vehicle movement	
			In	Out	In	Out
Light vehicles	40	60	30	0	0	30
Heavy vehicles	15	40	2	2	2	2

4.2.2 Operation traffic activity

During operation at full capacity (not expected to be reached for many years), the daily number of heavy vehicles associated with the proposal would be approximately:

– 40 to 50 trucks per day delivering and exporting plastics.

– Waste acceptance would only occur Monday to Friday between 7:00 am and 6:00 pm.

Staff including up to 140 Full Time Equivalent (FTE) would include:

– 40 staff per shift (three shifts per day).

– 20 staff for maintenance, administration, engineering, technical support and management.

For assessment purposes and for a worst-case scenario, it was assumed that a total of 60 light vehicles (equivalent to the number of shift and maintenance staff) would enter the site during AM Peak with the corresponding exiting. In practice however, there is likely to be a reduced number of staff exiting the site in the AM period, with night shift staff being less and administration, technical support and management not operating during the night shift period.

During PM peak, it was assumed that a total of 60 light vehicles (equivalent to the number of shift and maintenance staff) would enter the site with the corresponding exiting. In practice, however, there is likely to be a reduced number of staff entering the site in the PM period, with night shift staff being less and administration, technical support and management not operating during the night shift.

Further to the above, it has been assumed that staff would arrive and depart the site by individual private transport, with no reduction factor applied in relation to carpooling, which would reduce the trip generation adopted.

It was assumed ten percent of heavy vehicles (five heavy vehicles) would enter the site during AM delivering plastics and five heavy vehicles will exit the site. This is equivalent to approximately the average distribution of daily traffic over the operational period (11 hours).

This is summarised in Table 4.3.

Table 4.3 Vehicle movement during operation

Vehicle type	Estimated number of daily vehicle movements	Estimated AM Peak vehicle movement		Estimated PM Peak vehicle movement	
		In	Out	In	Out
Light vehicles	280 *	60	60	60	60
Heavy vehicles	100	10	10	10	10

Note (*) Assumes all FTE staff inbound and outbound daily

4.2.3 Trip generation distribution

Trip distribution of construction and operation traffic was based on the existing 2020 survey date turn movement to and from the access road onto Lackey Road. For assessment purposes vehicle trips were distributed with 60 percent arrival and departure from the south and 40 percent arrival and departures from the north.

4.3 Construction road network performance

Prior to onsite construction activity, the new access road would be constructed. This construction activity may partly utilise the existing road network of Beaconsfield and Lytton Roads. As outlined in section 2.2.3, such road network has sufficient mid-block capacity, and would be able to cater for traffic flow associated with potential construction, with negligible impact to road operation.

Following the construction of the new access road, site construction access would utilise the Lackey Road and newly constructed access road.

The criteria for evaluating the operational performance of intersections is provided by the Guide to Traffic Generating Developments (Roads and Maritime Services, 2002) and reproduced in Table 2.7. The criteria for evaluating the operational performance of intersections is based on a qualitative measure (i.e. Level of Service), which is applied to each band of average vehicle delay.

The construction traffic volumes, incorporating the 2020 base survey volumes, were assessed under the proposed intersection arrangement diagrammatical shown in Figure 4.5. The intersection was analysed using SIDRA 9 to obtain the proposed operational performance as summarised in Table 4.4.

Table 4.4 Intersection performance – Construction

Intersection	**Control Type**	AM Peak			PM Peak		
		Average Delay (s)	**LoS**	**Degree of Saturation**	**Average Delay (s)**	**LoS**	**Degree of Saturation**
Site 1: Lackey Road / Access Road (Braddon Road east extension)	Giveway – T intersection	6	LoS A	0.06	6	LoS A	0.05

Notes:

- The average delay for priority-controlled intersections is selected from the movement on the approach with the highest average delay.
- The level of service for priority-controlled intersections is based on the highest average delay per vehicle for the most critical movement.
- The degree of saturation is defined as the ratio of the arrival flow (demand) to the capacity of each approach.
- Average delay is given in seconds per vehicle.

4.4 Post development intersection performance

The criteria for evaluating the operational performance of intersections is provided by the Guide to Traffic Generating Developments (Roads and Maritime Services, 2002) and reproduced in Table 2.7. The criteria for evaluating the operational performance of intersections is based on a qualitative measure (i.e. Level of Service), which is applied to each band of average vehicle delay.

The number of traffic generation during operation the SIDRA modelling was undertaken for the worst-case scenario, as outlined in section 4.2.2 and 4.2.3 above for 2020 and 2030 post development scenarios.

4.4.1 2020 post development scenario

The post development traffic volumes incorporating base 2020 traffic volumes and post development operational traffic flows at the intersection to the proposal site under the proposed intersection arrangement diagrammatical shown in Figure 4.5, was analysed using SIDRA 9 to obtain the proposed operational performance as summarised in Table 4.4.

Table 4.5 Operational Intersection performance (2020) – post development

Intersection	Control Type	AM Peak			PM Peak		
		Average Delay (s)	LoS	Degree of Saturation	Average Delay (s)	LoS	Degree of Saturation
Site 1: Lackey Road / Access Road (Braddon Road east extension)	Giveway – T intersection	6	LoS A	0.07	6	LoS A	0.08

Table 4.4 indicates that the analysed intersection will have an acceptable Level of Service (i.e. better than Level of Service E) with spare capacity in both the weekday morning, evening weekday and weekend peak periods in the future 2020 case post development. Detailed SIDRA results of these intersections are provided in Appendix A.

4.4.2 2030 post development scenario

The post development operational traffic volumes, incorporating the 2030 background traffic growth volumes (assumed to be two percent per annum) and operational trip generation, were assessed under the proposed intersection arrangement diagrammatical shown in Figure 4.5. The intersection was analysed using SIDRA 9 to obtain the proposed operational performance as summarised in Table 4.6.

Table 4.6 Operational Intersection performance (2030) – post development

Intersection	Control Type	AM Peak			PM Peak		
		Average Delay (s)	LoS	Degree of Saturation	Average Delay (s)	LoS	Degree of Saturation
Site 1: Lackey Road / Access Road (Braddon Road east extension)	Giveway – T intersection	6	LoS A	0.08	6	LoS A	0.09

Table 4.6 indicates that the analysed intersection will have an acceptable Level of Service (i.e. better than Level of Service E) with spare capacity in both the weekday morning, evening weekday and weekend peak periods in the future 2030 case post development. Detailed SIDRA results of these intersections are provided in Appendix A.

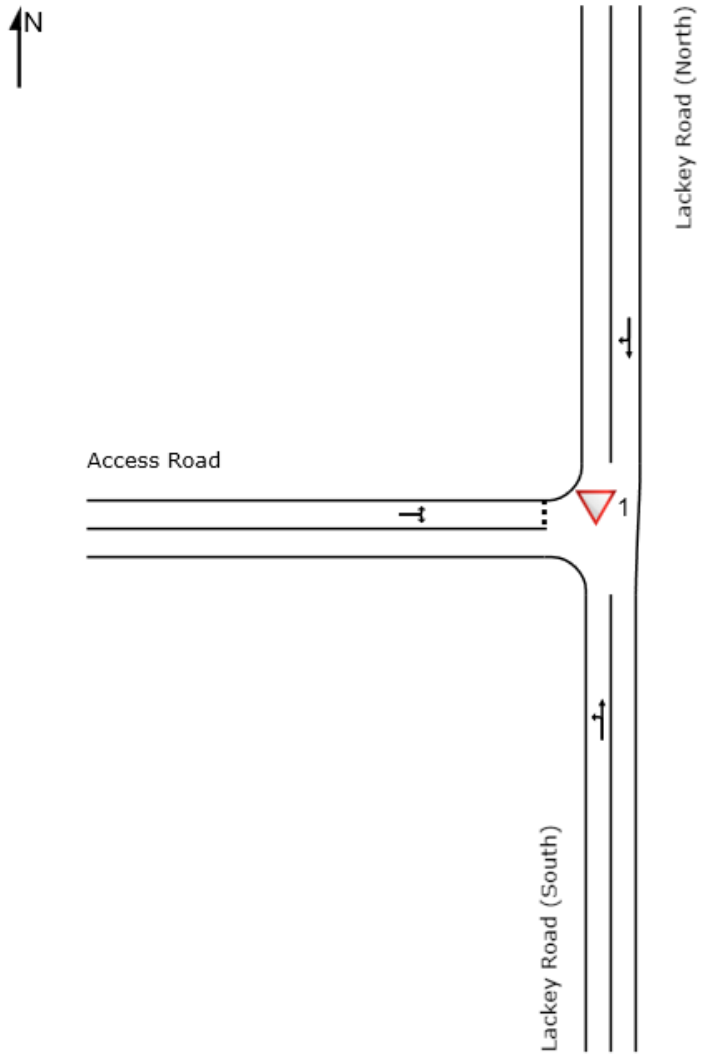


Figure 4.5 SIDRA geometrical layout – Lackey Road / Access Road

5. Parking provision

5.1 Car parking

As detailed in section 4.2.2, the traffic generation during the operation of the proposal (at full capacity) would be as follows:

– 40 to 50 trucks per day delivering mixed plastics and exporting end products
– 40 staff per shift (three shifts per day)
– 20 staff for maintenance, administration, engineering, technical support and management.

It is proposed to provide a total of 70 parking spaces for the facility that will accommodate the peak 60 staff and maintenance personnel and an allowance of an additional 10 spaces to assist staff change over periods, assuming all personnel travel by individual private transport (e.g. cars). Refer to Figure 5.1 for the proposed parking locations within the site.

However, it is recommended, to assist in reduction of parking demand (and associated traffic movements), staff be encouraged to carpool as an alternate transport option. Due to the location, initially there is limited public transport available in the vicinity of the site, until such time a public bus network is incorporated in the MVEC (as outline in section 3.3). Following implementation of such services, such will support the opportunity for another alternate transport option to the site.

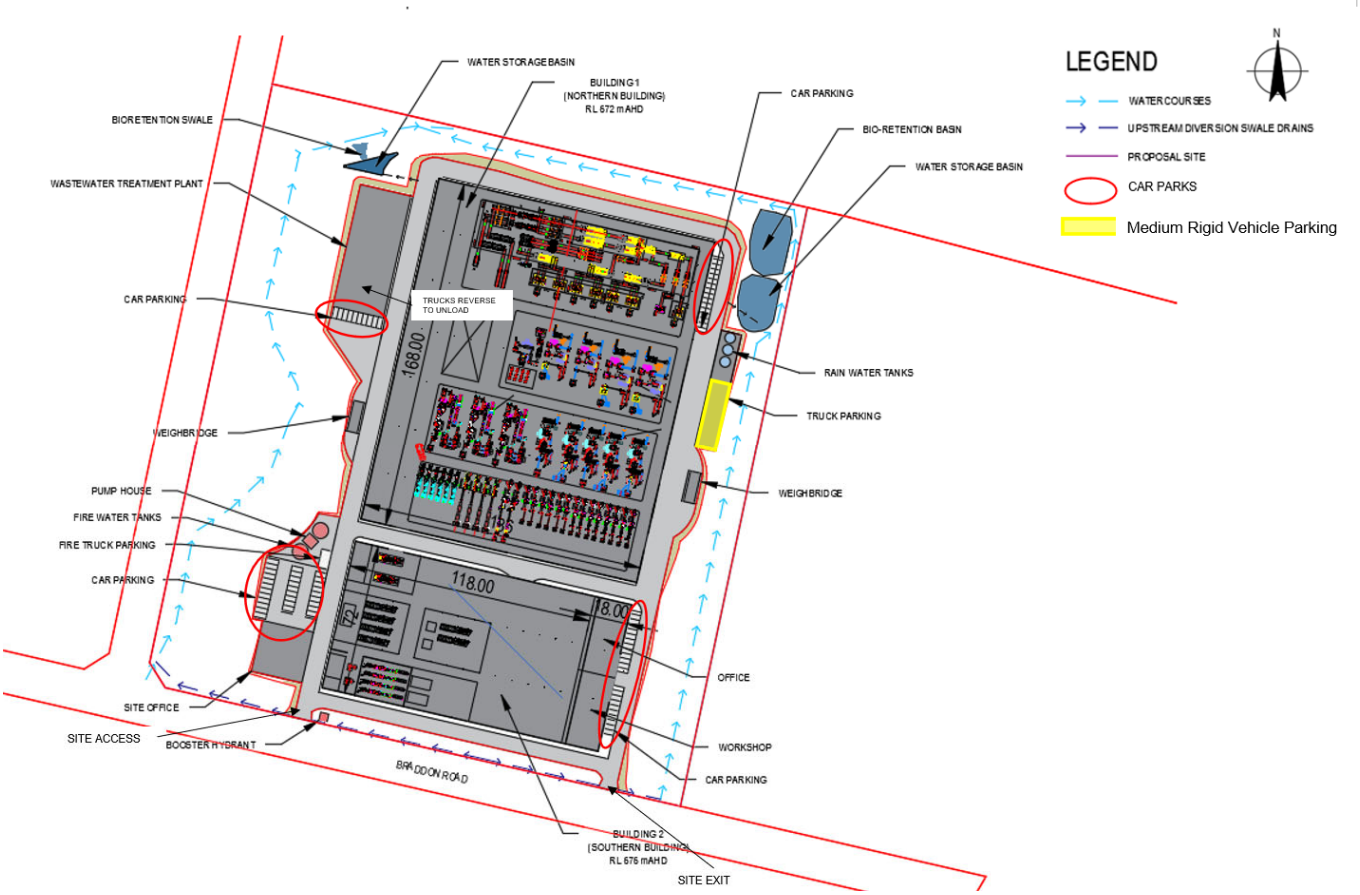


Figure 5.1 Carpark location

Source: GHD 2021

5.2 Accessible parking

As outlined In Table D3.5 of the National Construction Code (NCC) Building Code of Australia (Vol 1) 2019, it is recommended to have one accessible car park space for every 100 carparking spaces for Class 8 land use type. Therefore, the proposal is required to have a minimum of one accessible car space. Accessible parking should be positioned in close proximity to the building entrance and minimise crossing distance along the road networks within the plastics recycling and reprocessing facility site.

5.3 Bicycle parking

To encourage alternative and sustainable transport opportunities, Austroads Bicycle Parking Facilities: Updating the Austroads Guide to Traffic Management 2016 in section 5.5.3 outlines rates for the provision of bicycle parking for various land uses. The guideline outlines that a ten percent bicycle mode share is considered a reasonable starting point to accommodate the likely demand generated by land uses.

Although land uses could comprise a mix of staff and visitors, the proposal is industrial in nature and would be predominately accessed by staff. Based on the proposed peak concurrent staff numbers of 60 staff, the provision of six bicycle parking spaces should be provided. This provision could be monitored and expanded if demand is regularly reached.

To further encourage bicycle and other active transport options, consideration should be given to end-of-trip facilities within the proposal. These could include showers and lockers to store belongings for the use of the staff.

Such bicycle facilities will align with Moss Vale Enterprise Corridor Development which proposes to provide bicycle paths within the vicinity of the site. The provision of proposed bicycle facilities will encourage employees who live closer to the site to use alternative sustainable transport opportunities, reducing car dependency and vehicle trip generation.

5.4 Motorcycle parking

There is no requirement for the provision of motorcycle parking in Moss Vale DCP. However, it is recommended that a small area of carpark be allocated for motorcycle parking to encourage alternative transport to the the plastics recycling and reprocessing facility site.

5.5 Service vehicle parking

As shown in Figure 5.1 and Appendix A, a loading dock area would be provided on the western side of Building 1 to accommodate up to three semi-trailers (19 m in length). Based on the anticipated peak of ten heavy vehicles over an hour period and the unloading activity is up to ten minutes in duration, it is expected the loading dock will be adequate to service the anticipated service vehicle parking demands.

In addition to the designated loading dock within the building, an area along the eastern boundary is available to store up eight medium rigid vehicles (8.8 m in length).

6. Access and parking layout

6.1 Carpark arrangement

6.1.1 General layout

A general high-level overview of the car parking has been undertaken using *AS2890.1 – Parking Facilities: Off-street car parking.* Table 1.1 of AS2890.1 which presents a number of car park classifications applicable to different land-uses. According to the table, the car park will comprise a Class 1 facility suitable for employee use. The parking space dimensions and associated aisle widths for each facility classification are presented in AS2890.1: Figure 2.2 include:

Class 1 facility:

– Spaces: 2.4 m x 5.4 m; and
– Aisle Width: 6.2 m

The general review of the parking layout has been completed within the proposal with parking spaces having proposed dimensions of 2.4 m x 5.4 m and aisle widths of minimum 6.2 m, meeting the minimum requirement for employee use outlined AS2890.1.

6.1.2 Accessible parking

Within the proposed layout there is provision for accessible car spaces. Section 2.2 of *AS2890.6 – Parking Facilities: Off-street parking for people with disabilities* requires parking space dimensions 2.4 m x 5.4 m with an access aisle width of 5.8 m and a shared area of 2.4 m x 5.4 m between spaces.

The proposed car park has been designed to provide compliant parking space with minimum dimensions of 2.5 m by 5.4 m, minimum aisle width of 5.8 m and a shared space of 5.4 m by 2.4 m, which exceeds the minimum requirement.

6.2 Haulage route and internal circulation

6.2.1 Internal circulation

Vehicles are expected to access the plastics recycling and reprocessing facility site via Lackey Road (primarily via either Douglas Road/ Collins Road (from the north) or as a secondary alternative, via Berrima Road (from the south) and a new access road, as described in section 6.2.2.

Upon entry to the plastics recycling and reprocessing facility site in the southwest corner, vehicles would circulate in a one-way clockwise direction with trucks unloading within Building 1 following access via the weighbridge. Vehicles would then exit the site via the weighbridge at the eastern side of the facility before turning left and returning to Lackey Road via the new access road (refer to). Vehicles will use the one-way middle lane to access Building 1. Vehicles can either enter in a forward direction or reverse to enter into Building 1. Upon leaving either buildings, vehicles will continue in a clockwise direction around the site, prior to exiting in the south east corner of the site. Vehicles would enter and exit the site in a forward direction.

The driveway crossover will need to be designed in accordance with AS 2890.2 – Parking Facilities: Off-street commercial facilities suitable for the designated design vehicle.

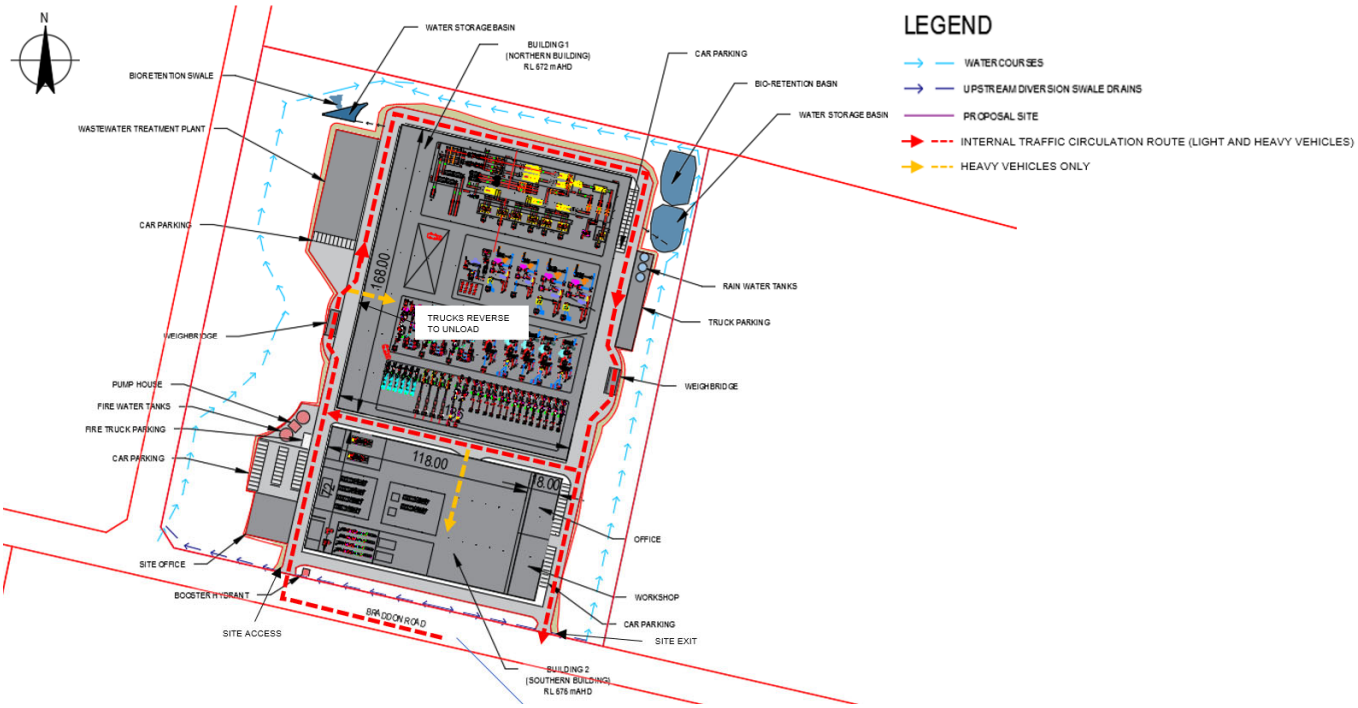


Figure 6.1 Internal circulation of light and heavy vehicles

6.2.2 Haulage routes

The proposed haulage routes have been based in relation to the existing approved heavy vehicle use road network as outlined in TfNSW Restricted Access Vehicle (RAV) access map. The RAV maps provide information on the enforceable network for all RAV operating at General Mass Limits (GML) and Concessional Mass Limits (CML) in NSW.

Additionally, the RAV maps show the Higher Mass Limit (HML) routes. HML routes are approved routes for vehicles enrolled under the Intelligent Access Program (IAP). The IAP is a national program developed in partnership with all Australian road agencies. It allows participating operators access, or improved access, to the road network in return for IAP monitoring and compliance with access conditions imposed by road authorities or road managers. Heavy vehicles are monitored using telematics services with an in-vehicle unit (IVU). IVUs use satellite tracking and wireless communication technology to remotely monitor where, when and how heavy vehicles are being operated on the road network.

Figure 6.1 shows the permitted routes for 19 m GML and CML vehicles west of the Proposal, Figure 6.3 shows the permitted routes for 19 m GML and CML vehicles east of the Proposal, while Figure 6.4 shows the permitted routes for short combination HML vehicles east of the Proposal, if enrolled in the IAP. Vehicles east of the Proposal (i.e. to and from Wollongong), must be enrolled in the IAP program, with the alternate permitted route for all GML and CML, as shown in Figure 6.5.

A review of the travel distance and journey time (based on google maps) of the haulage route options to and from the east of the Proposal (i.e. Wollongong) indicates that while the travel distance is greater, typical travel times are generally equivalent, additionally, the terrain along this route is less steep than the shorter route, which would result in less ware and tear on vehicles and reduced driver fatigue.

When considering the haulage route options available and assuming that the general heavy vehicles being used may not necessarily participate in the IAP, it is assumed most vehicles associated with operation of the Proposal will access and egress from the west (ie for all key nodes of Sydney, Canberra and Wollongong) along the Hume Highway (Old Hume Highway), Medway Road, Taylors Avenue Douglas Road/ Colins Road and Lackey Road (refer to Figure 6.6). A secondary route is also available along Berrima Road (from the south) via Innes and Lackey Roads, but is unlikely to be used because of the shorter distance along the primary route.

Furthermore, routes from the west minimise the need for heavy vehicles to travel in the southern portion of the Moss Vale township.

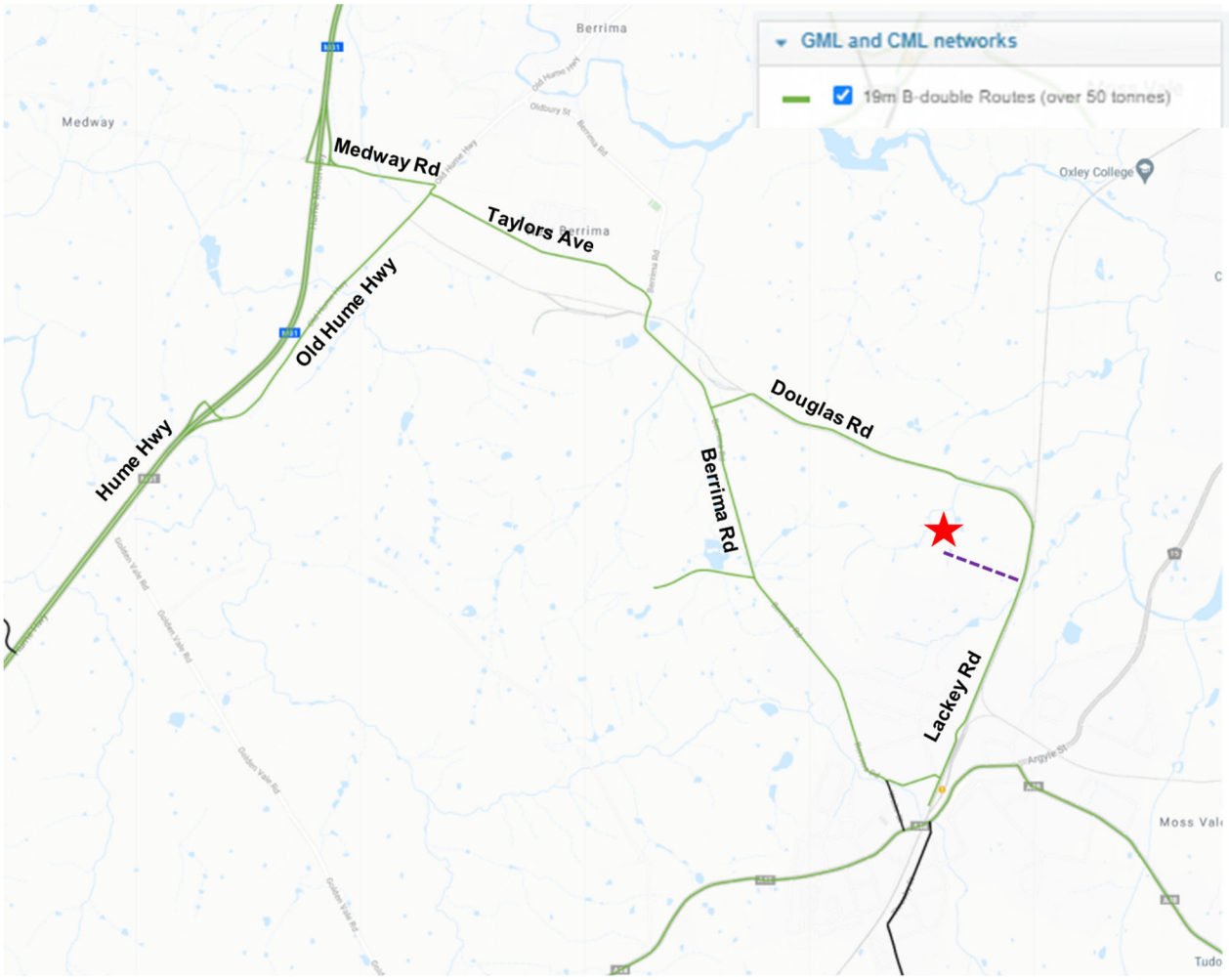


Figure 6.2 TfNSW RAV map – 19m GML and CML road network west of site

Source: TfNSW RAV map – modified by GHD

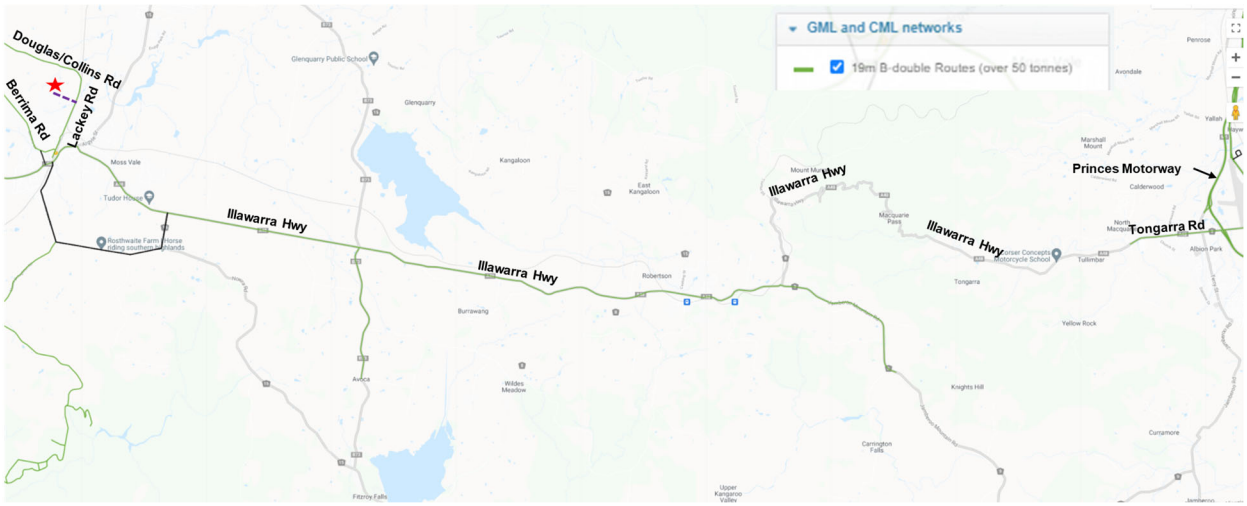


Figure 6.3 TfNSW RAV map – 19m GML and CML road network east of site

Source: TfNSW RAV map – modified by GHD

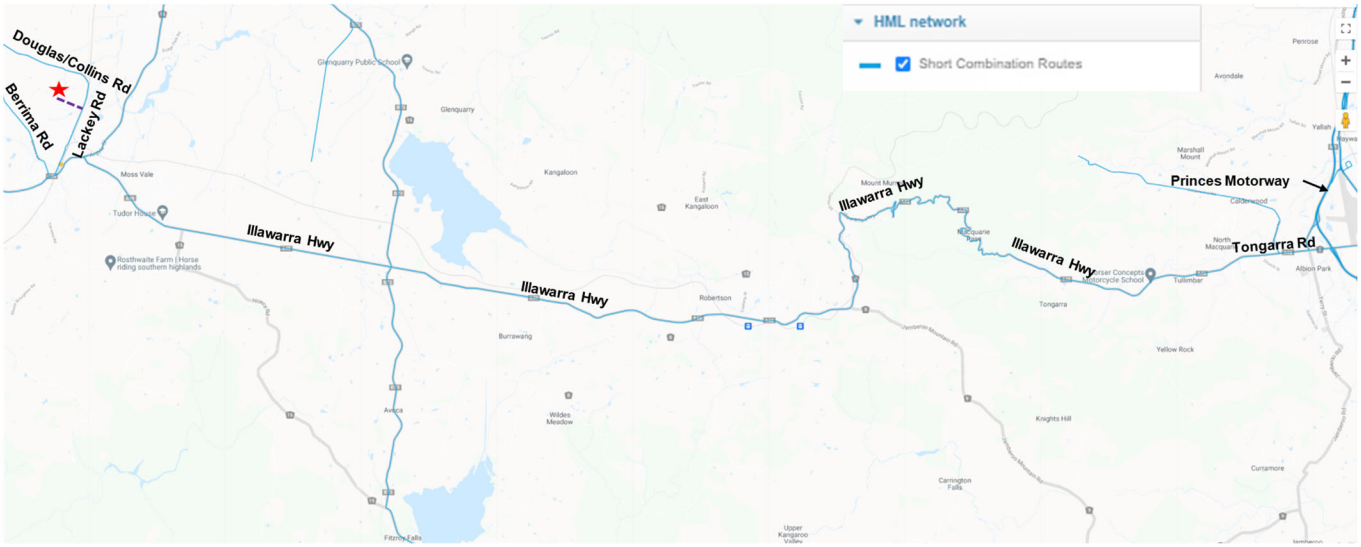


Figure 6.4 TfNSW RAV map – Short combination HML road network east of site

Source: TfNSW RAV map – modified by GHD

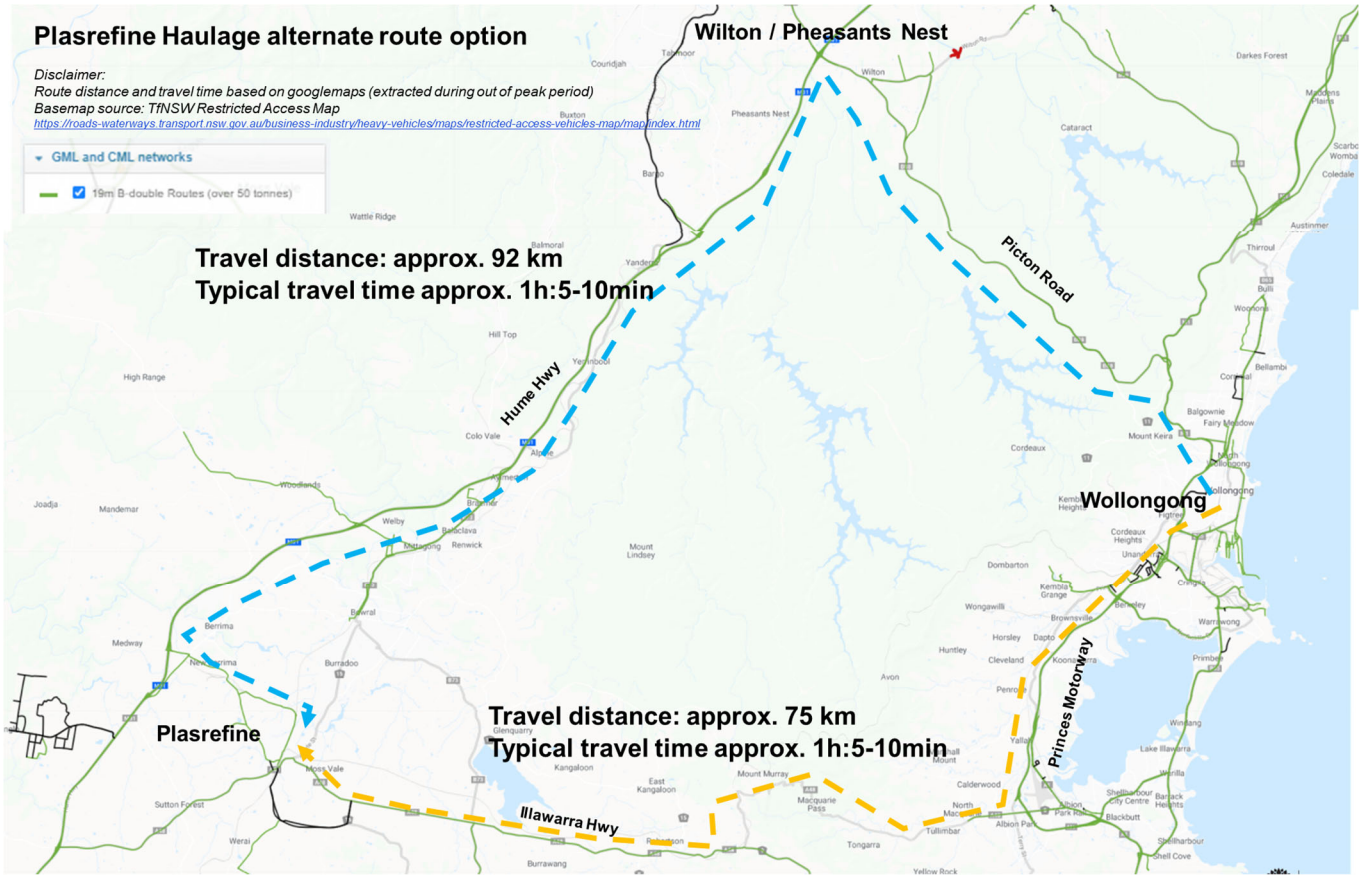


Figure 6.5 Alternative Haulage routes to and from the of the site (19 m GML and CML vehicles)

Source: TfNSW RAV map and Googlemaps– modified by GHD

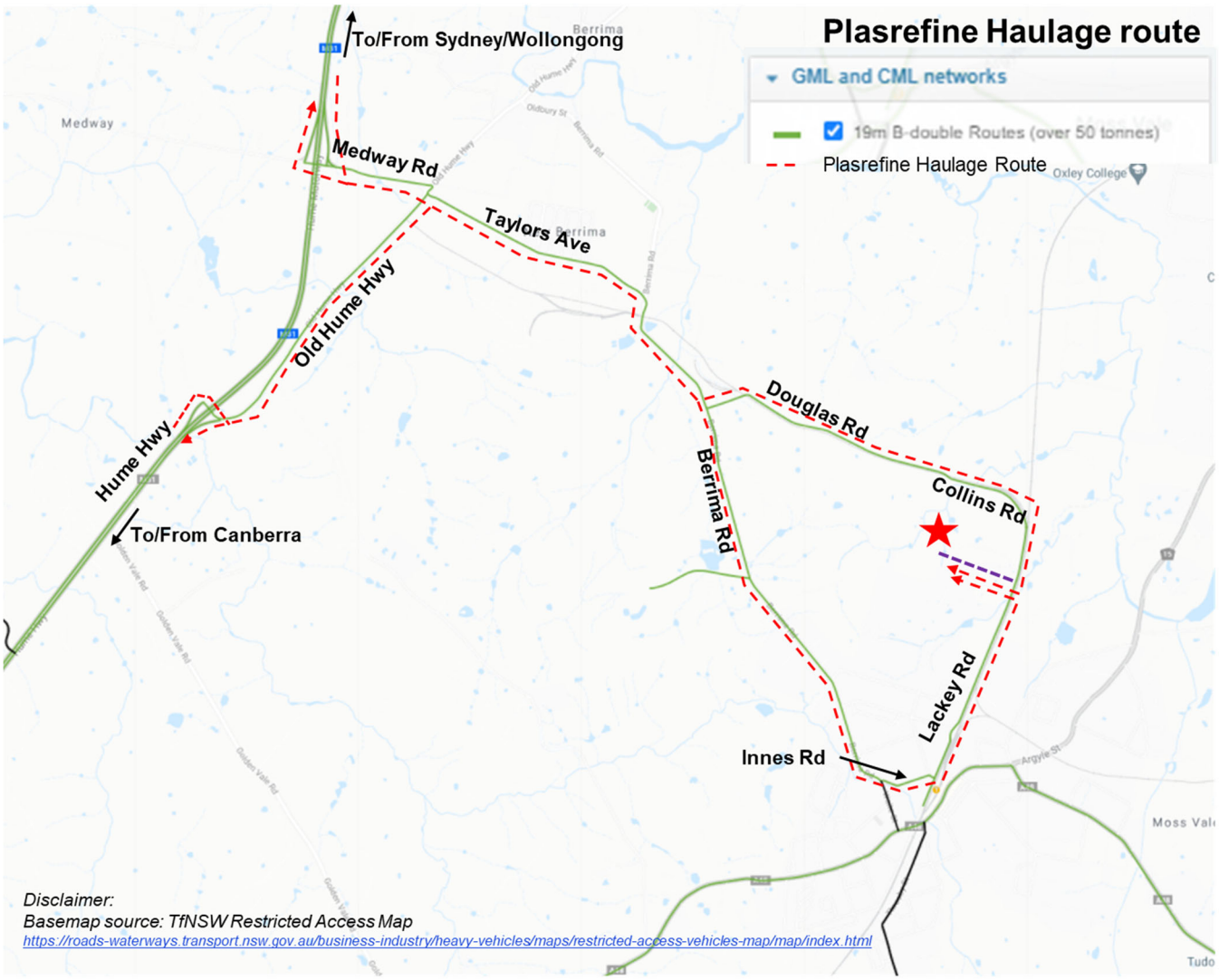


Figure 6.6 Proposed Haulage routes to and from the of the site (19m GML and CML vehicles)

Source: TfNSW RAV map – modified by GHD

6.3 Site access review

The sight distance requirements are described in Section 3.2 of AS2890.1 and are prescribed on the basis of the signposted speed limit or 85th percentile vehicle speeds along the frontage road.

Egress from the proposal site would be through Lackey Road, with a posted speed limit of 60 km/h. Assuming the access road, retains the posted speed limit of 60 km/h and the approach speed of 60 km/h to the site driveway, the desirable visibility distance is 84 m.

The proposed driveway would be located on the straight sections of the road alignment. A detailed review will need to be undertaken within the design of the new east-west road to ensure a suitable sight distance is available from the proposed egress driveway. It is recommended that no permanent obstructions within the above visibility zone are erected to affect the visibility from the driver when exiting.

7. Swept turn path assessment

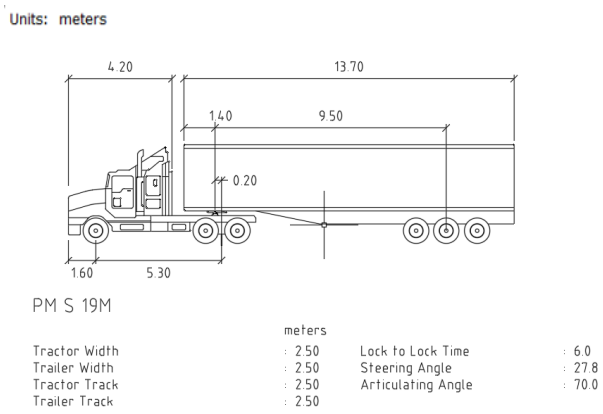
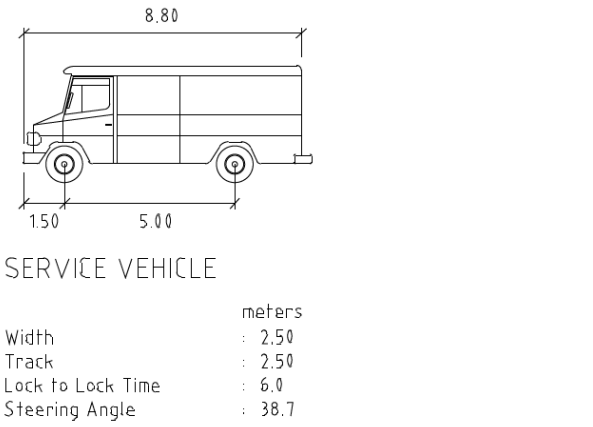
GHD conducted swept path assessments using AutoTURN 11 to confirm that the proposed site layout would allow vehicles to safely enter / exit the site using the design vehicle shown in Table 7.1. It is expected that a semi-trailer, 19 m in length will be the maximum size vehicle to be utilised to deliver plastic waste to site.

The swept path simulations were undertaken using vehicle speeds of five kilometres per hour, with the assessment based on the proposed site plan. The result of turn path assessment as shown in Appendix B indicates that the design vehicle is expected to generally manoeuvre with appropriate clearances within the site.

The driveway crossover will need to be designed in accordance with AS 2890.2 – Parking Facilities: Off-street commercial facilities suitable for the designated design vehicle.

Table 7.1 outlines the design vehicle and swept path elements utilised in the turn path assessment as outlined in Appendix B.

Table 7.1 Swept path design vehicles

AutoTURN Design Vehicle	Design Vehicle Dimensions
Semi-trailer 19 m length, Austroads 2013	
Service Vehicle 8.8 m in length, Austroads 2013	
Swept Path Elements	Vehicle Clearance (300 mm clearance) Vehicle Body Vehicle Wheels

8. Mitigation measures

This section outlines recommended mitigations measures to minimise traffic impact during construction and operation of the proposal.

8.1 Construction Traffic Management Plan

8.1.1 Construction traffic management objective

A Construction Traffic Management Plan (CTMP) should be prepared prior to the commencement of works with site induction for construction personnel being undertaken to outline the requirements of the CTMP. The aim of the CTMP is to maintain the safety of all workers and road users within the vicinity site and the following are the primary objectives:

- To minimise the impact of the construction vehicle traffic on the overall operation of the road network.
- To provide continuous, safe and efficient movement of traffic for both the general public and construction workers.
- Installation of appropriate advance warning signs to inform users of the changed traffic condition.
- To provide a description of the construction vehicles and the volume of these construction vehicles accessing the construction site.
- To provide information regarding the changed access arrangement and also a description of the proposed external routes for vehicles, including the construction vehicles accessing the site.
- Establishment of a safe pedestrian environment in the vicinity of the site.

8.1.2 Construction vehicle types

The construction of the proposal is expected to involve the use of a number of different vehicle types. The proposal involves the construction of an industrial development which will require the removal and delivery of various materials, including spoil/waste, steel reinforcement, concrete and fit-out equipment. This will require the delivery of building materials that would typically involve medium rigid vehicles (i.e. concrete trucks), heavy rigid vehicles (i.e. spoil removal vehicles) and the use of up to an ‘Articulated Vehicle” (19 m in length) for such activities as large building panels and equipment. Additionally, there is the construction of the new east-west road.

8.1.3 Construction vehicle routes and access

Details of the site access and construction routes have not been finalised at this stage of the proposal, however, it is anticipated that access would be via Beaconsfield Road for the initial construction of the new east-west road. Following the construction of the east-west road, construction movements can be accommodated on the newly constructed east-west road, in lieu of Beaconsfield Road.

8.1.4 Traffic management

Public access of through vehicles is to be maintained along Beaconsfield Road and Lackey Street. Vehicles should be permitted to travel past the worksite with traffic signage in accordance with a Traffic Control Plan (TCP) (also known as a Traffic Guidance Scheme (TGS)) to be developed in accordance with *Transport for NSW Traffic Control at Works Sites Technical Manual and AS1742.3 – Traffic Control for Works on Roads*.

Should partial road closures be required as part of the works, the contractors are to be required to ensure that both Transport for NSW and Council approvals are obtained prior to implementation and appropriate TCP/TGSs are developed and are implemented as part of the works.

Any TCP/TGS should be developed as part of the detailed CTMP prior to the commencement of construction activity.

8.1.5 Traffic activity and parking provisions

Access and egress would primarily be prior to both the AM and PM peak hour periods as construction activity generally would commence at 7:00 am and finish by 4:00 pm on weekdays. Workers should be made aware of the various risk areas with the proximity of the proposal site, particularly in areas, which will have increased pedestrian and vehicle activity.

A parking area should be provided on-site, minimising the impact on the adjoining road network. Workers should be encouraged to carpool to decrease traffic activity and parking demand (subject to COVID-19 government regulations that may be in place).

The CTMP should include the provisions for contractors to discourage the use of on-street parking and encourage the use of alternate travel arrangements to decrease traffic movements and parking demand associated with construction workers.

8.1.6 Pedestrian and cycle management

Site access is to be restricted to authorised personnel only. Pedestrian and cycle movement surrounding the proposal site is anticipated to be low, however workers should be made aware of the potential hazards and associated mitigation measures in place as outlined in the CTMP.

The pedestrian travel paths are to be maintained and be free from trip hazards.

8.2 Green Travel Plan

To encourage and promote alternate transport opportunities to the development, consideration should be given to the development of a Green Travel Plan (GTP) specific to the proposal. The GTP summarises alternate transport options to access the development, outlining where and how these services can be accessed and the frequency of the service. This could include but not limited to:

– Public transport locations (bus connection in line with the MVEC).
– Active transport (cycle/walking) opportunities (in line with the MVEC).
– Bicycle infrastructure facilities.

Sound planning for the provision of high quality facilities for pedestrians and cyclists constitute a crucial element of the transport strategy for a development. The proposed development should be developed on the basis that there will be safe, amenable and attractive pedestrian environment linking the site to nearby facilities Moss Vale business area and public transport nodes outline in the MVEC.

Staff should be encouraged to utilise such facilities, with the GTP provided to staff as part of staff inductions for new employees and raised at regular team meetings and internal messaging systems (i.e. email or text).

A separate Green Travel Plan document is recommended to be developed during the further design stages.

9. Summary and conclusion

This Traffic and Parking Impact Assessment provides an assessment of the traffic and transport impacts associated with the construction and operation of the proposed Moss Vale Plastics Recycling and Reprocessing Facility.

9.1 Road network performance

Existing traffic performance

– Intersection modelling was undertaken to assess the existing 2020 intersection performance for the following intersections:
  - Lackey Road / Access Road (Giveway – T intersection)
  - Berrima Road / Lytton Road (priority controlled 'Give Way'/ Stop sign)
– The SIDRA results indicate that under the existing conditions both intersections perform at an acceptable Level of Service (i.e. better than Level of Service E) with spare capacity in both the weekday morning, evening weekday.
– Midblock assessment of Beaconsfields Road and Lytton Road indicated the road network operates at a good level of service with additional road network capacity.

Construction and operational performance

– Traffic modelling was undertaken to determine the worst-case between construction and operational performance level of new east west road and Lackey Road intersection:
  - 2020 post development scenario
  - 2030 post development scenario
– The SIDRA modelling results indicate that the analysed intersections have an acceptable Level of Service (i.e. better than Level of Service E) with spare capacity in both the weekday morning, evening weekday and in 2020 and future 2030 post development scenarios.
– The construction of the proposal is therefore expected to have minimal impacts to the surrounding road network from a traffic operation perspective.

9.2 Vehicle access arrangement and circulation

– Access to the plastics recycling and reprocessing facility site would be via a new access road from Lackey Road primarily from Collins/Douglas Roads (from the north) or secondary access along Berrima Road (from the south) via Innes and Lackey Roads. Access within the plastics recycling and reprocessing facility site would be in a one way clockwise direction via and internal weighbridge. Vehicles would enter and exit the proposal site in a forward direction.
– A swept path has been undertaken to assess the turning movement of a 19 m semi-trailer vehicle to access the parking entry / exit and circulation movements. Generally, there is sufficient access for the design vehicle.

9.3 Parking provision

– Based on a first principle approach on the anticipated staff numbers, it is estimated that a parking provision of 70 car spaces will be sufficient to cater for the anticipated parking demands, with the implementation of one accessible car space within proximity of the building access
– It is recommended to provide parking for bicycles (and associated end-of-trip facilities) and motorcycles provision to support alternate transport options to the site.
– Service vehicle loading dock area is design to accommodate up three heavy vehicles (up to 19 m in length) suitable to support the unloading waste for the facility. Additionally, an area along the eastern boundary is available to store up eight medium rigid vehicles (8.8 m in length).

– Staff should be encouraged to utilise alternate transport options, including carpooling, active transport (bicycle and walking) and public transport (in association with the future MVEC bus network)

9.4 Mitigation measures

– A Construction Traffic Management Plan (CTMP) should be prepared prior to the commencement of works with site induction for construction personnel being undertaken to outline the requirements of the CTMP. The aim of the CTMP is to maintain the safety of all workers and road users within the vicinity site
– To encourage and promote alternate transport opportunities to the development, consideration should be given to the development of a Green Travel Plan (GTP) specific to the proposal. The GTP summarises alternate transport options to access the development, outlining where and how these services can be accessed and the frequency of the service.

9.5 Conclusion

Based on the assumptions and investigations undertaken by GHD and the conclusions drawn in this report, it is considered that the proposal would have negligible impact on surrounding road networking in the vicinity of the proposal site, subject to the recommendations outlined.

Appendix A

SIDRA modelling results

MOVEMENT SUMMARY

Site: 1 [2020_AM Peak_Base_Lackey Road and Access Road (Site Folder: General)]

2020_AM Peak_Base_Lackey Road and Access Road
Site Category: AM Peak
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Lackey Road (South)														
1	L2	14	0	15	0.0	0.045	5.6	LOS A	0.0	0.0	0.00	0.11	0.00	57.4
2	T1	64	4	67	6.3	0.045	0.0	LOS A	0.0	0.0	0.00	0.11	0.00	59.0
Approach		78	4	82	5.1	0.045	1.0	NA	0.0	0.0	0.00	0.11	0.00	58.7
North: Lackey Road (North)														
8	T1	15	5	16	33.3	0.014	0.1	LOS A	0.0	0.3	0.11	0.19	0.11	57.4
9	R2	7	0	7	0.0	0.014	5.7	LOS A	0.0	0.3	0.11	0.19	0.11	46.2
Approach		22	5	23	22.7	0.014	1.9	NA	0.0	0.3	0.11	0.19	0.11	53.3
West: Access Road														
10	L2	1	0	1	0.0	0.005	3.6	LOS A	0.0	0.1	0.19	0.47	0.19	44.4
12	R2	4	0	4	0.0	0.005	4.1	LOS A	0.0	0.1	0.19	0.47	0.19	44.1
Approach		5	0	5	0.0	0.005	4.0	LOS A	0.0	0.1	0.19	0.47	0.19	44.1
All Vehicles		105	9	111	8.6	0.045	1.3	NA	0.0	0.3	0.03	0.14	0.03	56.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 1 [2020_PM Peak_Base_Lackey Road and Access Road (Site Folder: General)]

2020_PM Peak_Base_Lackey Road and Access Road
Site Category: PM Peak
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Lackey Road (South)														
1	L2	2	0	2	0.0	0.017	5.5	LOS A	0.0	0.0	0.00	0.04	0.00	57.9
2	T1	26	4	27	15.4	0.017	0.0	LOS A	0.0	0.0	0.00	0.04	0.00	59.5
Approach		28	4	29	14.3	0.017	0.4	NA	0.0	0.0	0.00	0.04	0.00	59.4
North: Lackey Road (North)														
8	T1	45	2	47	4.4	0.025	0.0	LOS A	0.0	0.0	0.01	0.01	0.01	59.9
9	R2	1	0	1	0.0	0.025	5.5	LOS A	0.0	0.0	0.01	0.01	0.01	47.8
Approach		46	2	48	4.3	0.025	0.1	NA	0.0	0.0	0.01	0.01	0.01	59.5
West: Access Road														
10	L2	7	0	7	0.0	0.018	3.5	LOS A	0.1	0.4	0.12	0.46	0.12	44.6
12	R2	11	0	12	0.0	0.018	4.0	LOS A	0.1	0.4	0.12	0.46	0.12	44.2
Approach		18	0	19	0.0	0.018	3.8	LOS A	0.1	0.4	0.12	0.46	0.12	44.3
All Vehicles		92	6	97	6.5	0.025	0.9	NA	0.1	0.4	0.03	0.11	0.03	55.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 2 [2020_AM Peak_Base_Berrima Road and Lytton Road (Site Folder: General)]

2020_AM Peak_Base_Berrima Road and Lytton Road
Site Category: AM Peak
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Gibbons Road (South)														
10	L2	1	0	1	0.0	0.038	9.0	LOS A	0.1	0.8	0.60	0.96	0.60	46.6
11	T1	1	0	1	0.0	0.038	12.5	LOS A	0.1	0.8	0.60	0.96	0.60	41.3
12	R2	13	0	14	0.0	0.038	13.7	LOS A	0.1	0.8	0.60	0.96	0.60	41.0
Approach		15	0	16	0.0	0.038	13.3	LOS A	0.1	0.8	0.60	0.96	0.60	41.3
East: Berrima Road (East)														
1	L2	5	0	5	0.0	0.192	5.9	LOS A	0.2	1.7	0.07	0.04	0.07	48.9
2	T1	325	34	342	10.5	0.192	0.1	LOS A	0.2	1.7	0.07	0.04	0.07	57.4
3	R2	19	1	20	5.3	0.192	6.1	LOS A	0.2	1.7	0.07	0.04	0.07	48.7
Approach		349	35	367	10.0	0.192	0.5	NA	0.2	1.7	0.07	0.04	0.07	56.7
North: Lytton Road (North)														
4	L2	63	4	66	6.3	0.187	6.1	LOS A	0.7	5.0	0.50	0.69	0.50	44.3
5	T1	1	0	1	0.0	0.187	9.2	LOS A	0.7	5.0	0.50	0.69	0.50	43.7
6	R2	45	3	47	6.7	0.187	12.1	LOS A	0.7	5.0	0.50	0.69	0.50	49.2
Approach		109	7	115	6.4	0.187	8.6	LOS A	0.7	5.0	0.50	0.69	0.50	46.2
West: Berrima Road (West)														
7	L2	27	24	28	88.9	0.167	5.4	LOS A	0.0	0.1	0.01	0.05	0.01	48.0
8	T1	269	29	283	10.8	0.167	0.0	LOS A	0.0	0.1	0.01	0.05	0.01	49.9
9	R2	1	0	1	0.0	0.167	6.1	LOS A	0.0	0.1	0.01	0.05	0.01	49.2
Approach		297	53	313	17.8	0.167	0.5	NA	0.0	0.1	0.01	0.05	0.01	49.8
All Vehicles		770	95	811	12.3	0.192	1.9	NA	0.7	5.0	0.12	0.15	0.12	51.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 2 [2020_PM Peak_Base_Berrima Road and Lytton Road (Site Folder: General)]

2020_PM Peak_Base_Berrima Road and Lytton Road
Site Category: PM Peak
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Gibbons Road (South)														
10	L2	2	0	2	0.0	0.012	8.7	LOS A	0.0	0.3	0.51	0.88	0.51	47.7
11	T1	1	0	1	0.0	0.012	12.7	LOS A	0.0	0.3	0.51	0.88	0.51	42.1
12	R2	3	0	3	0.0	0.012	13.3	LOS A	0.0	0.3	0.51	0.88	0.51	41.8
Approach		6	0	6	0.0	0.012	11.7	LOS A	0.0	0.3	0.51	0.88	0.51	43.7
East: Berrima Road (East)														
1	L2	6	0	6	0.0	0.193	6.3	LOS A	0.5	3.7	0.18	0.09	0.18	48.3
2	T1	285	23	300	8.1	0.193	0.4	LOS A	0.5	3.7	0.18	0.09	0.18	56.7
3	R2	45	2	47	4.4	0.193	6.4	LOS A	0.5	3.7	0.18	0.09	0.18	48.2
Approach		336	25	354	7.4	0.193	1.3	NA	0.5	3.7	0.18	0.09	0.18	55.2
North: Lytton Road (North)														
4	L2	32	2	34	6.3	0.107	6.3	LOS A	0.4	2.7	0.51	0.70	0.51	44.2
5	T1	1	0	1	0.0	0.107	9.1	LOS A	0.4	2.7	0.51	0.70	0.51	43.6
6	R2	25	2	26	8.0	0.107	12.2	LOS A	0.4	2.7	0.51	0.70	0.51	49.0
Approach		58	4	61	6.9	0.107	8.9	LOS A	0.4	2.7	0.51	0.70	0.51	46.1
West: Berrima Road (West)														
7	L2	46	2	48	4.3	0.187	4.6	LOS A	0.0	0.1	0.00	0.07	0.00	49.0
8	T1	312	22	328	7.1	0.187	0.0	LOS A	0.0	0.1	0.00	0.07	0.00	49.6
9	R2	1	0	1	0.0	0.187	5.9	LOS A	0.0	0.1	0.00	0.07	0.00	48.8
Approach		359	24	378	6.7	0.187	0.6	NA	0.0	0.1	0.00	0.07	0.00	49.5
All Vehicles		759	53	799	7.0	0.193	1.6	NA	0.5	3.7	0.12	0.13	0.12	51.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 1 [2020_AM Peak_Construction_Lackey Road and Access Road (Site Folder: General)]

2020_AM Peak_Construction_Lackey Road and Access Road
Site Category: AM Peak
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Lackey Road (South)														
1	L2	33	1	35	3.0	0.056	5.6	LOS A	0.0	0.0	0.00	0.20	0.00	56.5
2	T1	64	4	67	6.3	0.056	0.0	LOS A	0.0	0.0	0.00	0.20	0.00	58.1
Approach		97	5	102	5.2	0.056	1.9	NA	0.0	0.0	0.00	0.20	0.00	57.5
North: Lackey Road (North)														
8	T1	15	5	16	33.3	0.022	0.2	LOS A	0.1	0.8	0.19	0.33	0.19	56.0
9	R2	20	1	21	5.0	0.022	5.8	LOS A	0.1	0.8	0.19	0.33	0.19	45.3
Approach		35	6	37	17.1	0.022	3.4	NA	0.1	0.8	0.19	0.33	0.19	49.3
West: Access Road														
10	L2	1	1	1	100.0	0.008	4.5	LOS A	0.0	0.2	0.23	0.48	0.23	41.5
12	R2	5	1	5	20.0	0.008	4.5	LOS A	0.0	0.2	0.23	0.48	0.23	43.3
Approach		6	2	6	33.3	0.008	4.5	LOS A	0.0	0.2	0.23	0.48	0.23	43.0
All Vehicles		138	13	145	9.4	0.056	2.4	NA	0.1	0.8	0.06	0.25	0.06	54.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 1 [2020_PM Peak_Construction_Lackey Road and Access Road (Site Folder: General)]

2020_PM Peak_Construction_Lackey Road and Access Road
Site Category: PM Peak
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Lackey Road (South)														
1	L2	3	1	3	33.3	0.018	5.9	LOS A	0.0	0.0	0.00	0.06	0.00	56.3
2	T1	26	4	27	15.4	0.018	0.0	LOS A	0.0	0.0	0.00	0.06	0.00	59.5
Approach		29	5	31	17.2	0.018	0.6	NA	0.0	0.0	0.00	0.06	0.00	59.2
North: Lackey Road (North)														
8	T1	45	2	47	4.4	0.025	0.0	LOS A	0.0	0.0	0.01	0.01	0.01	59.9
9	R2	1	0	1	0.0	0.025	5.5	LOS A	0.0	0.0	0.01	0.01	0.01	47.8
Approach		46	2	48	4.3	0.025	0.1	NA	0.0	0.0	0.01	0.01	0.01	59.5
West: Access Road														
10	L2	20	1	21	5.0	0.049	3.5	LOS A	0.2	1.3	0.12	0.47	0.12	44.4
12	R2	30	1	32	3.3	0.049	4.0	LOS A	0.2	1.3	0.12	0.47	0.12	44.1
Approach		50	2	53	4.0	0.049	3.8	LOS A	0.2	1.3	0.12	0.47	0.12	44.2
All Vehicles		125	9	132	7.2	0.049	1.7	NA	0.2	1.3	0.05	0.21	0.05	52.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 1 [2020_AM Peak_Operation_Lackey Road and Access Road (Site Folder: General)]

2031_AM Peak_Operation_Lackey Road and Access Road
Site Category: AM Peak
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Lackey Road (South)														
1	L2	50	0	53	0.0	0.065	5.6	LOS A	0.0	0.0	0.00	0.26	0.00	56.1
2	T1	64	4	67	6.3	0.065	0.0	LOS A	0.0	0.0	0.00	0.26	0.00	57.6
Approach		114	4	120	3.5	0.065	2.4	NA	0.0	0.0	0.00	0.26	0.00	56.9
North: Lackey Road (North)														
8	T1	15	5	16	33.3	0.035	0.4	LOS A	0.2	1.3	0.23	0.40	0.23	55.4
9	R2	36	5	38	13.9	0.035	6.0	LOS A	0.2	1.3	0.23	0.40	0.23	44.8
Approach		51	10	54	19.6	0.035	4.4	NA	0.2	1.3	0.23	0.40	0.23	47.5
West: Access Road														
10	L2	29	5	31	17.2	0.073	3.8	LOS A	0.3	2.0	0.20	0.48	0.20	43.9
12	R2	40	0	42	0.0	0.073	4.5	LOS A	0.3	2.0	0.20	0.48	0.20	44.0
Approach		69	5	73	7.2	0.073	4.2	LOS A	0.3	2.0	0.20	0.48	0.20	44.0
All Vehicles		234	19	246	8.1	0.073	3.4	NA	0.3	2.0	0.11	0.36	0.11	50.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 1 [2020_PM Peak_Operation_Lackey Road and Access Road (Site Folder: General)]

2031_PM Peak_Operation_Lackey Road and Access Road
Site Category: PM Peak
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Lackey Road (South)														
1	L2	38	0	40	0.0	0.038	5.5	LOS A	0.0	0.0	0.00	0.35	0.00	55.3
2	T1	26	4	27	15.4	0.038	0.0	LOS A	0.0	0.0	0.00	0.35	0.00	56.7
Approach		64	4	67	6.3	0.038	3.3	NA	0.0	0.0	0.00	0.35	0.00	55.8
North: Lackey Road (North)														
8	T1	45	2	47	4.4	0.046	0.1	LOS A	0.2	1.3	0.13	0.22	0.13	57.6
9	R2	29	5	31	17.2	0.046	5.9	LOS A	0.2	1.3	0.13	0.22	0.13	46.2
Approach		74	7	78	9.5	0.046	2.4	NA	0.2	1.3	0.13	0.22	0.13	52.6
West: Access Road														
10	L2	36	5	38	13.9	0.084	3.6	LOS A	0.3	2.3	0.12	0.47	0.12	44.1
12	R2	47	0	49	0.0	0.084	4.3	LOS A	0.3	2.3	0.12	0.47	0.12	44.2
Approach		83	5	87	6.0	0.084	4.0	LOS A	0.3	2.3	0.12	0.47	0.12	44.2
All Vehicles		221	16	233	7.2	0.084	3.3	NA	0.3	2.3	0.09	0.35	0.09	49.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 1 [2030_AM Peak_Operation_Lackey Road and Access Road (Site Folder: General)]

2031_AM Peak_Operation_Lackey Road and Access Road
Site Category: AM Peak
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Lackey Road (South)														
1	L2	53	0	56	0.0	0.075	5.6	LOS A	0.0	0.0	0.00	0.24	0.00	56.2
2	T1	78	5	82	6.4	0.075	0.0	LOS A	0.0	0.0	0.00	0.24	0.00	57.8
Approach		131	5	138	3.8	0.075	2.3	NA	0.0	0.0	0.00	0.24	0.00	57.1
North: Lackey Road (North)														
8	T1	18	6	19	33.3	0.038	0.4	LOS A	0.2	1.4	0.25	0.39	0.25	55.5
9	R2	38	5	40	13.2	0.038	6.1	LOS A	0.2	1.4	0.25	0.39	0.25	44.9
Approach		56	11	59	19.6	0.038	4.3	NA	0.2	1.4	0.25	0.39	0.25	47.8
West: Access Road														
10	L2	29	5	31	17.2	0.076	3.9	LOS A	0.3	2.1	0.23	0.49	0.23	43.9
12	R2	41	0	43	0.0	0.076	4.6	LOS A	0.3	2.1	0.23	0.49	0.23	44.0
Approach		70	5	74	7.1	0.076	4.3	LOS A	0.3	2.1	0.23	0.49	0.23	43.9
All Vehicles		257	21	271	8.2	0.076	3.3	NA	0.3	2.1	0.12	0.34	0.12	50.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 1 [2030_PM Peak_Operation_Lackey Road and Access Road (Site Folder: General)]

2031_PM Peak_Operation_Lackey Road and Access Road
Site Category: PM Peak
Give-Way (Two-Way)

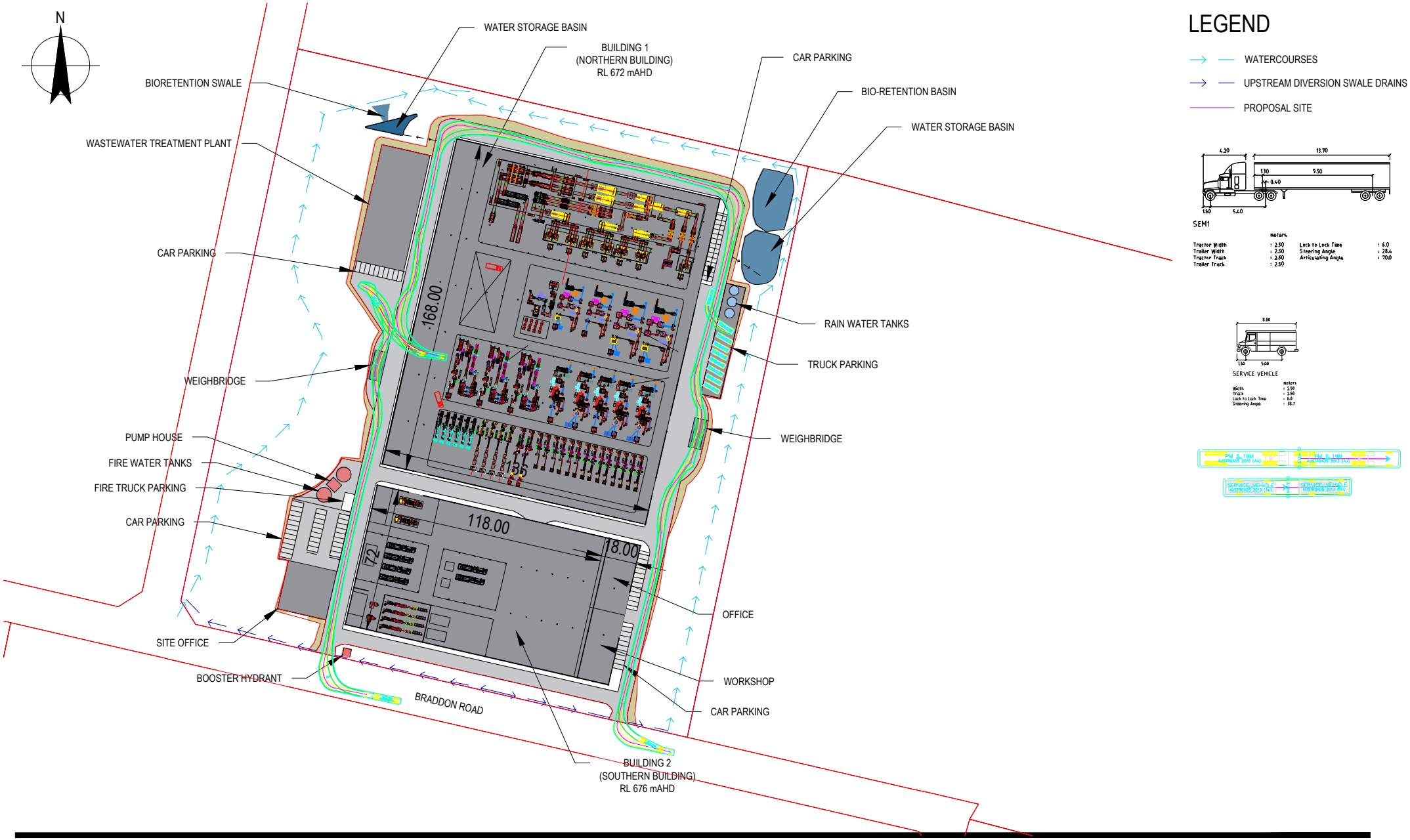
Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Lackey Road (South)														
1	L2	38	0	40	0.0	0.066	5.6	LOS A	0.0	0.0	0.00	0.19	0.00	56.6
2	T1	78	5	82	6.4	0.066	0.0	LOS A	0.0	0.0	0.00	0.19	0.00	58.2
Approach		116	5	122	4.3	0.066	1.8	NA	0.0	0.0	0.00	0.19	0.00	57.6
North: Lackey Road (North)														
8	T1	54	2	57	3.7	0.052	0.2	LOS A	0.2	1.4	0.17	0.20	0.17	57.7
9	R2	29	5	31	17.2	0.052	6.1	LOS A	0.2	1.4	0.17	0.20	0.17	46.3
Approach		83	7	87	8.4	0.052	2.3	NA	0.2	1.4	0.17	0.20	0.17	53.1
West: Access Road														
10	L2	38	5	40	13.2	0.094	3.9	LOS A	0.3	2.6	0.23	0.50	0.23	44.0
12	R2	49	0	52	0.0	0.094	4.8	LOS A	0.3	2.6	0.23	0.50	0.23	44.0
Approach		87	5	92	5.7	0.094	4.4	LOS A	0.3	2.6	0.23	0.50	0.23	44.0
All Vehicles		286	17	301	5.9	0.094	2.7	NA	0.3	2.6	0.12	0.29	0.12	51.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Appendix B

Swept turn path assessment



LEGEND

- WATERCOURSES
- UPSTREAM DIVERSION SWALE DRAINS
- PROPOSAL SITE

0 25 50 75 100 125m

SCALE 1:2500 AT ORIGINAL SIZE

Paper Size ISO A4
Scale 1:2,500m

PLASREFINE RECYCLING PTY LTD
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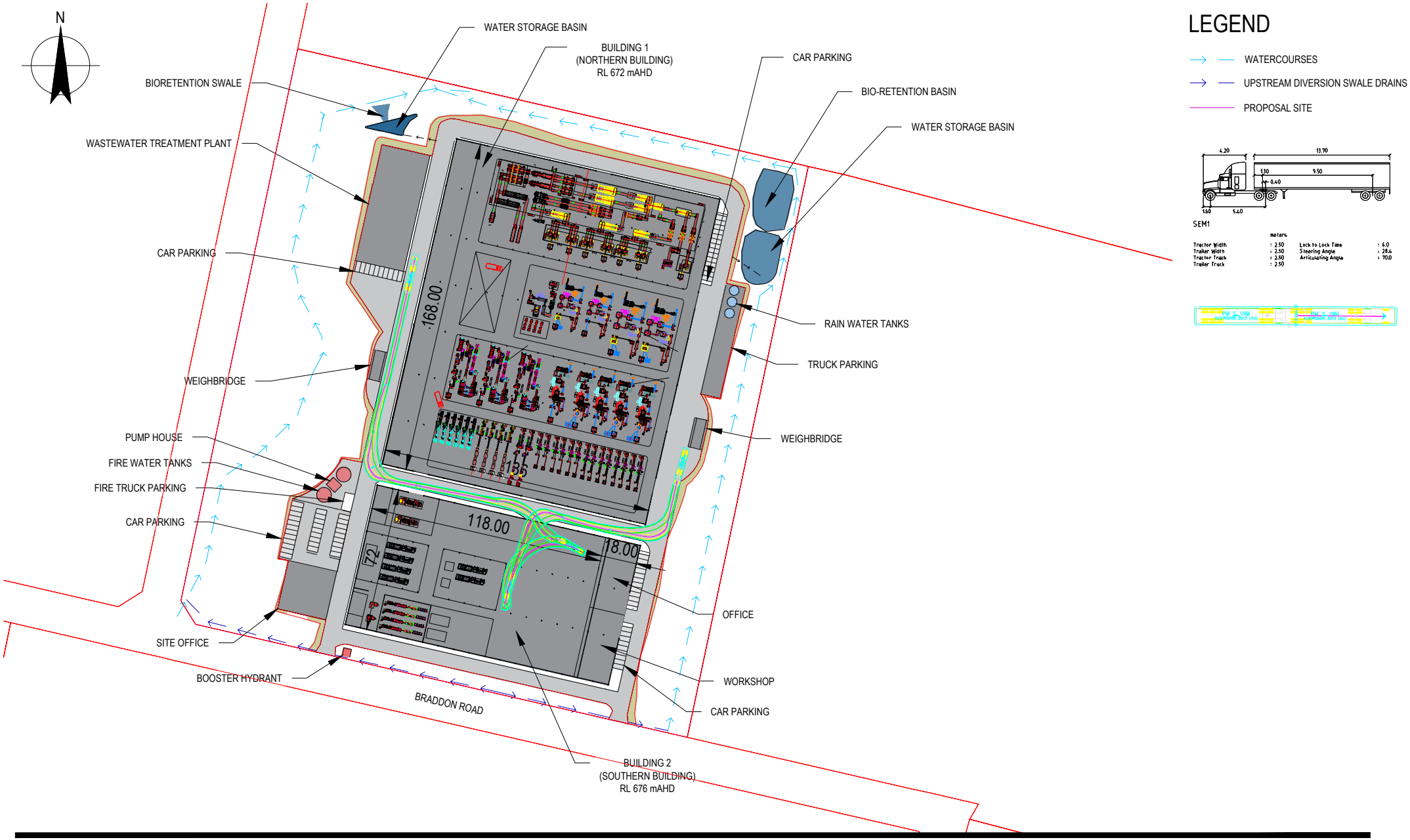
GENERAL ARRANGEMENT
Swept Turn Paths

Job Number 12524108
Revision A
Date December 2021

Figure SK003

Plot Date: 17 December 2021 - 11:53 AM Plotted by: Elaha Mia

Cad File No: \\ghdnet\ghd\AU\Sydney\Projects\21\12524108\Tech\Traffic\Swept Turn Paths\Option 1 Dec 2021\12524108-SK003_14 Dec - Part A V2.dwg



LEGEND

- WATERCOURSES
- UPSTREAM DIVERSION SWALE DRAINS
- PROPOSAL SITE

SEM1

meters

Tractor Width	: 2.50	Lock to Lock Time	: 6.0
Trailer Width	: 2.50	Steering Angle	: 28.4
Tractor Track	: 2.50	Articulating Angle	: 70.0
Trailer Track	: 2.50		

0 25 50 75 100 125m

SCALE 1:2500 AT ORIGINAL SIZE

Paper Size ISO A4
Scale 1:2,500m

PLASREFINE RECYCLING PTY LTD
MOSS VALE PLASTICS RECYCLING
AND REPROCESSING FACILITY

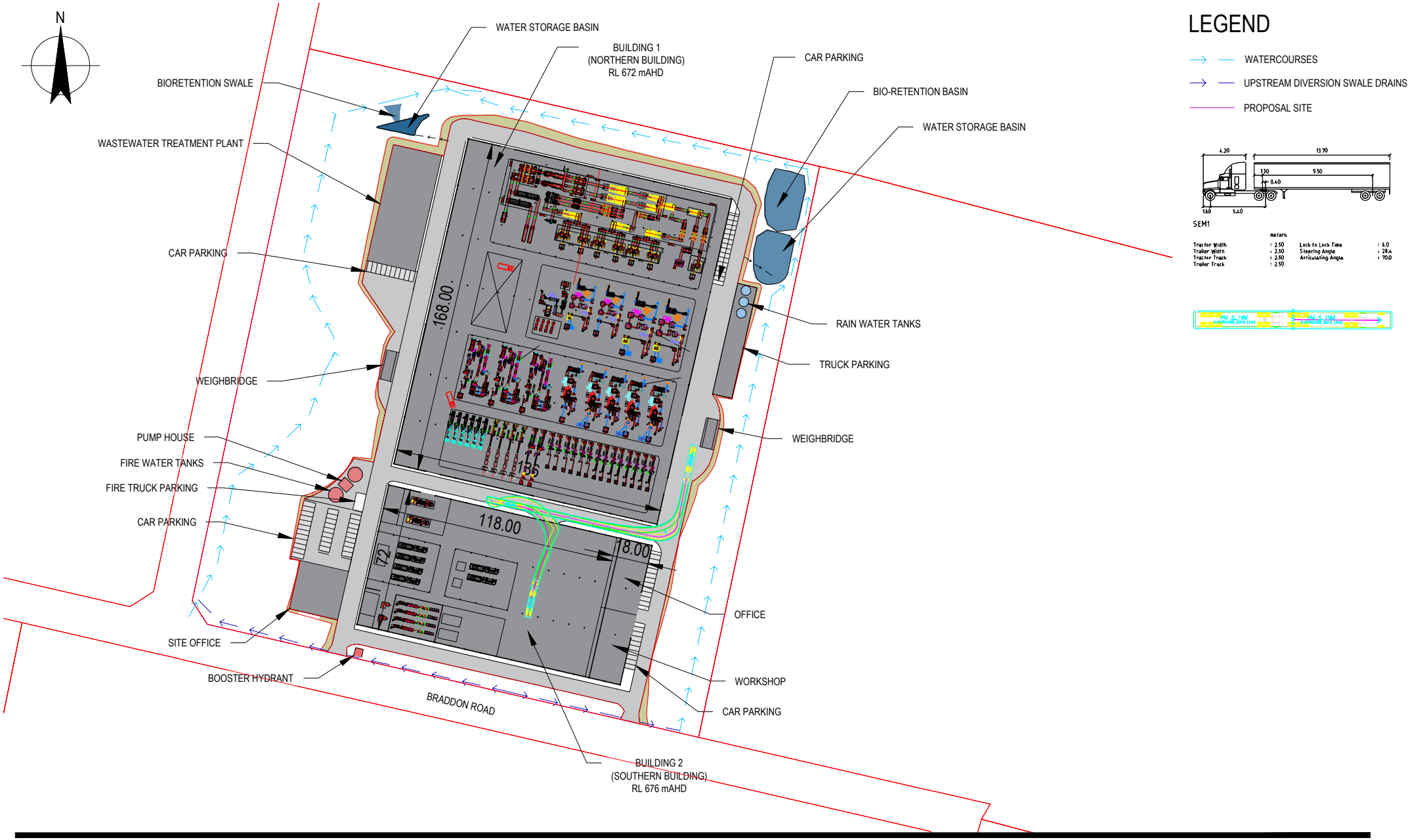
GENERAL ARRANGEMENT
Swept Turn Paths

Job Number 12524108
Revision A
Date December 2021

Figure SK003

Plot Date: 17 December 2021 - 1:20 PM Plotted by: Elaha Mia

Cad File No: \\ghdnet\ghd\AU\Sydney\Projects\21\12524108\Tech\Traffic\Swept Turn Paths\Option 1 Dec 2021\12524108-SK003_14 Dec - Part B.dwg



LEGEND

- WATERCOURSES
- UPSTREAM DIVERSION SWALE DRAINS
- PROPOSAL SITE

SEM1

meters

Tractor Width	: 2.50	Lock to Lock Time	: 6.0
Trailer Width	: 2.50	Steering Angle	: 28.4
Tractor Track	: 2.50	Articulating Angle	: 70.0
Trailer Track	: 2.50		

0 25 50 75 100 125m

SCALE 1:2500 AT ORIGINAL SIZE

Paper Size ISO A4
Scale 1:2,500m

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GENERAL ARRANGEMENT
Swept Turn Paths

Job Number 12524108
Revision A
Date December 2021

Figure SK003

Plot Date: 17 December 2021 - 2:37 PM Plotted by: Elaha Mia

Cad File No: \\ghdnet\ghd\AU\Sydney\Projects\21\12524108\Tech\Traffic\Swept Turn Paths\Option 1 Dec 2021\12524108-SK004_14 Dec - Part C final.dwg

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