SUSTAINABLE
PROJECT MANAGEMENT

DEVELOPMENT LICENCE APPLICATION APP010981

FULTON HOGAN ASPHALT BATCH PLANT WARRNAMBOOL, VIC

FEBRUARY 2022

Document Information

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Executive Summary

Fulton Hogan propose establishing an asphalt batch plant at Lot 58 Mason Street, Warrnambool to produce up to 50,000 to 100,000 tonnes per annum of asphalt for use in road construction and surfacing projects for local and state government, private premises and for direct sales to customers. The proposed facility will also include the import and processing of reclaimed asphalt pavement (RAP) and waste glass. These materials will be used to supplement virgin aggregate and sand in the batching process and improve sustainability of the operation and contribute to the circular economy in the south-west Victoria region.

The proposal would effectively consolidate three existing owned and operated Fulton Hogan facilities in the Warrnambool area (that is, an existing asphalt batch plant, depot and glass crushing plant).

Sustainable Project Management Pty Ltd (SPM) act on behalf of Fulton Hogan (the applicant) for this development licence application (DLA) to the Environment Protection Authority Victoria (EPA) to undertake a prescribed permission activity under the *Environment Protection Act 2017* (EP Act 2017). This DLA is being submitted to EPA in parallel with a planning permit application to Warrnambool City Council.

Fulton Hogan intend to undertake the following activities at the site:

- Importing and stockpiling / storage of materials for use in asphalt batching and road construction including:
    - bitumen and bitumen emulsions,
    - aggregates and sand,
    - unprocessed RAP, and
    - waste glass (as a substitute for sand).
- Asphalt production using a modular asphalt batch plant such as the 'ASTEC BG 1800' (see Figure 6-1 for photo; Figure 6-2 shows plan and elevation of main components of proposed batch plant) to produce hot and warm mix asphalt that incorporates recycled material including RAP and glass.
- Glass crushing and screening using a crusher within a dedicated three-sided shed (which will also be used for stockpiling of unprocessed waste glass). The glass crusher will also be used to crush and screen RAP.
- Storage of materials including aggregates, filler material and processed RAP and glass in covered storage bays.
- Storage of the following bitumen products in bunded tanks:
    - bitumen (and modified bitumen) for use on site in asphalt batching (in 3 x 50,000 to 60,000L tanks) and
    - bitumen and bitumen emulsions for direct use (e.g., in road work projects) in 3 tanks ranging from 10,000L to 30,000L capacity.
- Diesel tank (self-bunded) for refueling of mobile plant (mainly front-end loaders).
- A bunded truck wash bay.
- A bunded (via rollover bunds) tanker / truck parking area adjacent the tank farm will serve as a loading / unloading area for the bitumen and emulsion etc.
- Parking for equipment, trucks and machinery related to road manufacture operations.
- Office and workshop buildings including:
    - amenities,
    - office space,
    - workshop bays,
    - car parking.

Under Schedule 1 of the *Environment Protection Regulations* 2021 (EP Regs 2021), the proposed activities at the site are considered to align with the following prescribed permission activities:

- H02 Bitumen or asphalt batching (a prescribed development activity)
- H05(c) Glass works - small reprocessing (a prescribed registration activity).
- A13(c) Waste and resource recovery - small (a prescribed registration activity.)

Fulton Hogan's environmental track record in operating similar operations to that proposed at Warrnambool has been excellent. Fulton Hogan currently own and operate multiple asphalt production facilities in Victoria (and multiple plants in other Australian states and territories). Fulton Hogan also operate multiple RAP processing facilities in Victoria. Fulton Hogan have not received any EPA infringements associated with these facilities.

This development licence application has been developed in accordance with and with reference to relevant legislation and guidelines, including the EP Act 2017 and the EP Regs 2021. The General Environmental Duty (GED) has also been considered throughout this application and the proposal is assessed against the areas of risk control defined in the GED. Relevant sections of the Environmental reference Standard (ERS) have been considered throughout this DLA and relevant EPA publications have been considered also.

Potential impacts from the proposal associated with air emissions (including odour and dust), stormwater run-off, noise and waste have been assessed and it has been determined that these risks can be managed to acceptable levels with the adoption of safeguards and management measures described in this DLA.

Stakeholder and community consultation has commenced, and this DLA describes the proposed approach to consultation going forward. A best available techniques and technology (BATT) assessment of the proposal is provided, and an initial decommissioning plan is also provided in this DLA.

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1. PRIMARY INFORMATION

1.1. Introduction

Fulton Hogan Industries Pty Ltd (Fulton Hogan) is a leading producer and contractor of asphalt products and services in Australia. The company supplies products and services from approximately forty locations around Australia.

Fulton Hogan propose establishing an asphalt batch plant at Lot 58 Mason Street, Warrnambool to produce up to 50,000 to 100,000 tonnes per annum of asphalt for use in road construction and surfacing projects for local and state government, private premises and for direct sales to customers. The proposed facility will also include the import and processing of reclaimed asphalt pavement (RAP) and waste glass. These materials will be used to supplement virgin aggregate and sand in the asphalt batching process and thereby improve sustainability of the operation and contribute to the circular economy in the south-west Victoria region.

The proposal would effectively consolidate three existing operated Fulton Hogan facilities in the Warrnambool area; namely, an existing asphalt batch plant, works depot and glass crushing plant.

1.2. Need for Development Licence

Sustainable Project Management Pty Ltd (SPM) act on behalf of Fulton Hogan (the applicant) for this development licence application (DLA). This document supports a development licence application to the Environment Protection Authority Victoria (EPA) to undertake a prescribed permission activity under the Environment Protection Act 2017 (EP Act 2017).

The three-tiered permissions framework of the EP Act 2017 allows for proportionate controls to be applied based on the nature of the risk. Under Schedule 1 of the Environment Protection Regulations 2021 (EP Regs 2021), the proposed activities at the batch plant are considered to align with the following prescribed permission activities:

H02 Bitumen or asphalt batching

Bitumen or asphalt batching at a designed throughput of at least 100 tonnes per week.

This activity type is a prescribed development activity

H05c Glass works - small reprocessing

Reprocessing glass waste at a design capacity of less than or equal to 10 000 tonnes per year.

This activity type is a prescribed registration activity.

A13c Waste and resource recovery - small

Receiving, storing, or processing waste generated at another site, including specified combustible recyclable and waste material but excluding reportable priority waste (transport), for the purpose of resource recovery or off-site transfer or disposal, if between 5 m ^{3} and 5000 m ^{3} of any waste is stored on the site at any time

This activity type is a prescribed registration activity.

The following definition for 'specified combustible recyclable and waste material' from the EP Regs 2021 is noted:

"specified combustible recyclable and waste material means paper, cardboard, wood, plastic, rubber, tyres, tyre-derived waste, textiles, e-waste, metal and other materials with combustible contaminants, combustible by-products of metal processing activities and refuse-derived fuel;"

Glass waste to be imported to site may contain contaminants (including paper, wood, plastic and organic material) that are within the above definition for 'specified combustible recyclable and waste material'. Volumes of glass waste to be imported will be within the maximum volume criteria for A13c. That is, volumes of potentially combustible contaminants stored on the site at any time will be less than 5000 m^3.

1.3. Location of Premises

The subject site is located within the City of Warrnambool, approximately 5 kilometres east of the Warrnambool CBD. The site is part of an 8-lot subdivision of 86 Rodgers Road, Warrnambool which was approved by Planning Permit PP2021-0176 on 2 November, 2021. Lot 58 on Masons Road is freehold land and will be leased by Fulton Hogan to allow for the asphalt batch plant operation to proceed.

1.4. Works Details

Project/Works Name	Fulton Hogan – Asphalt Batch Plant – Warrnambool
Cost of Works estimate	$6,000,000 – cost estimate for works specific to the prescribed development activity being assessed under this DLA (i.e., bitumen processing)

1.5. Applicant Details

Fulton Hogan is a large infrastructure construction, roadworks and aggregate supplier company that operates throughout Australasia. Fulton Hogan is an unlisted public company that was founded in 1933 in New Zealand.

Company Name	Fulton Hogan Industries Pty Ltd
can	000 538 689
ABN	54 000 538 689
Registered Address	Botanica Corporate Park, Building 7, Level 1,572 Swan Street, Richmond, VIC, 3121

1.5.1. CEO Contact Details

Name Matt McMahon

Phone +61418816935

Email Matthew.MacMahon@fultonhogan.com.au

1.6. Track Record

Fulton Hogan employ over 7,800 staff over 100 locations in three countries and have operated for over 88 years. Fulton Hogan is a family-owned business, committed to ensuring the work they do today will make a real difference to the lives of their people and customers, the communities they call home, and the world we live in, tomorrow. Fulton Hogan are proud to play a part in making communities better and feel privileged when allowed to do so. Fulton Hogan invest heavily to encourage wellbeing, diversity, environment, education and innovation.

Fulton Hogan's Environmental Policy (Appendix A) provides an overview of the overarching commitments that Fulton Hogan have made to protection of the environment. Fulton Hogan also operate under a Sustainability Policy and a Community & Stakeholder Relations Policy (Appendix A). The Sustainability

Policy provides an overview of Fulton Hogan's commitments to the ecological, social and economic environments in which they operate. The Community & Stakeholder Relations Policy acknowledges that community and stakeholder engagement is fundamental to Fulton Hogan's business success and commits to identifying and managing impacts and engaging with communities and stakeholders.

Fulton Hogan's environmental track record with similar operations to that proposed at Warrnambool has been excellent.

Fulton Hogan currently own and operate the following asphalt production facilities in Victoria (and multiple plants in other Australian states and territories):

- Dandenong – 10-30 Dana Court, Dandenong, VIC 3175 – in operation since 1976 (complete plant upgrade in 2006)
- Lara – 200 Heales Road, Lara, VIC 32–2 - in operation since 2008
- Warrnambool – Koroit Street, VIC 32–0 - in operation since 1994
- Mildu–a - 768 Twentieth St, Koorlong, VIC, 35–1 - in operation since 1994

Fulton Hogan also currently operates the following three RAP processing facilities:

- Brooklyn – Jones Road, Brooklyn VIC 3012 – in operation since ca.2001
- Dandenong – Thomas Murrell Crescent, Dandenong South VIC 31–5 - in operation since ca.2011
- North Shore – Abery Road, North Shore VIC 3214 – in operation since ca. 2009

Activities at the above sites include the production of asphalt (both batching and continuous drum plants), the import of feed materials (including bitumen, aggregates, fillers and recycled materials including RAP and glass), the stockpiling of raw and processed materials and loading and unloading of materials. That is, Fulton Hogan undertake activities proposed for the Warrnambool site at a number of other sites throughout Victoria (and Australia).

Fulton Hogan's track record across its Australian operations includes some notices and infringements involving breaches of environmental legislation. Fulton Hogan takes these breaches seriously and tracks all infringements to allow for opportunities to assess performance over time and address breaches via corrective actions and communicating lessons learnt across company staff. Appendix B provides an excerpt from the Fulton Hogan Industries Environmental Infringements Register and shows infringements associated with high-risk incidents from approximately the last 5 years. The 2 infringements listed in Appendix B represent many thousands of hours of operations across each of dozens of working locations in Australia. In the context of the large number of sites and operational hours, Fulton Hogan has maintained a high standard of environmental performance over this period. Similarly, infringements preceding this period have generally been associated with incidents of a low-risk nature and, in the context of the number of Fulton Hogan sites and operating hours, indicate a very infrequent infringement rate and an associated high standard of environmental performance by Fulton Hogan.

A completed Prohibited person questionnaire (publication F1018) and a completed Fit and proper person questionnaire (publication F1017) will be uploaded to the EPA portal as part of the online Development Licence Application process. These proformas have been completed by the General Manager of Fulton Hogan Infrastructure Services and demonstrate to the community, government, and businesses that the Fulton Hogan General Manager is suitable to perform a prescribed activity.

1.7. Application Fee

The application fee is prescribed in REG 172 of the Environment Protection Regulations 2021, being the greater of:

- 1 per cent of the estimated cost of the prescribed development activity; or
- 81.83 fee units (fee unit is $14.81).

The estimated cost of works specific to the prescribed development activity being assessed under this DLA (i.e., bitumen processing) is AUD$6,000,000; hence the applicable fee is AUD$60,000.

2. STAKEHOLDER AND COMMUNITY ENGAGEMENT

Fulton Hogan's primary objective is to maintain a positive and open relationship with all stakeholders including residents and business occupants in the vicinity of the proposed Warrnambool Asphalt Batch Plant.

Table 2-1 presents the key stakeholders for the proposal and key considerations regarding ongoing communications.

Table 2-1 Key stakeholders

Category	Type	Description	Key Considerations
Community	Residents	Nearby residential dwellings	• Potential for increased dust, noise, odour and traffic movements • Provide information and updates about the site
	Business	Adjacent and nearby industrial tenants	• Potential for increased dust, noise, odour and traffic movements
Government	Regulators	EPA	Review / approval of Development Licence Application
		Warrnambool City Council	Issue planning permit
	Other	Barwon South West Waste & Resource Recovery Group (BSWWRRG)	General interest in site development with reference to the Barwon South West Waste Resource Recovery Implementation Plan
Business	Peak Bodies	Victorian Waste Management Association (VWMA)	General interest in site development
	Waste producers	Moyne Shire Council Cleanaway Waste Management Ltd	Agreements in place for the receival of waste glass from kerbside recycling programs.
		Glenelg Shire Council Corangamite Shire Council	Discussions underway regarding potential agreements for the receival of waste glass from kerbside recycling programs.

2.1. EPA Consultation

In development of this Development Licence application, Fulton Hogan have engaged with the EPA (particularly the Development Assessment division). It is recognised that with the recent (July 1, 2021)

introduction of the EP Regs 2021, there have been considerable changes in the approach to environmental regulation, not least of which is the introduction of the General Environmental Duty and the requirement for this (and other) principles to be reflected in Development Licence Applications. The new Victorian Waste Framework also introduces significant changes to waste management and classification requirements and mechanisms.

Fulton Hogan have consulted with the EPA to ensure that these changes are reflected in the planning for the proposed development and in turn in the Development Licence Application. Acknowledging that such significant changes in legislation may result in some initial gaps in understanding, Fulton Hogan are committed to continuing open and transparent consultation with EPA to ensure that Fulton Hogan's development of the proposed Warrnambool Asphalt Batch Plant complies with all relevant duties under the new legislation.

2.2. Warrnambool City Council

Fulton Hogan has maintained open and transparent communication with the Warrnambool City Council. A planning permit application is being submitted in parallel with this development licence application.

A planning permit application (PPA) has been submitted to Warrnambool City Council for the use and development of the Warrnambool Asphalt Batch Plant at Lot 58 Mason Street, Warrnambool in parallel with this development licence application. A pre-application meeting was held with James Phillips, Keith Watson and Paul Cugley from Warrnambool City Council on 15 October 2021.

It would be preferable if the referral to Council is directed to James Phillips, Keith Watson and Paul Cugley who are dealing with the PPA and therefore have a background on the application.

2.3. Public Consultation

Fulton Hogan has engaged with residents and industry operators up to 1 km from the site via letter drop during the week commencing 20/12/2021. The letter (Appendix C) advises recipients of Fulton Hogan's intention to establish an asphalt batch plant on the site. The letter gives an overview of the proposal as well as the potential environmental risks from the plant. An overview of management measures and safeguards proposed to manage potential risks was also provided. The letter provides contact details and requests the recipient make contact if they have queries or interest regarding the proposal.

At the time of writing Fulton Hogan had not received feedback from the community. If feedback is received then Fulton Hogan will consult further to understand the nature and details of any issues raised and provide further information to assist the respondent. Fulton Hogan are committed to developing trusting and honest relationships with the local community and to engaging with them, listening to what they say, and being open to alternative solutions and ways of doing things.

3. LEGAL AND POLICY FRAMEWORK

This development licence application has been developed in accordance with and with reference to relevant legislation and guidelines, including:

3.1. Victorian Legislation

- Environment Protection Act 2017 (EP Act)
- Environment Protection Regulations 2021
- Planning and Environment Act 1987
- Climate Change Act 2017

As per the EPA Publication Using SEPPs and WMPs in the new environment protection framework guide (publication 1994) much of the content of SEPPs and WMPS has been replaced by the EP Act, its Regulations and the Environment Reference Standard (ERS), or through new guidance published by EPA. However, some content is not directly replaced under the new legislative framework, or EPA is yet to published new guidance. The information in those clauses of SEPPs and WMPs continue to provide a useful source of information and contribute to the State of Knowledge, and therefore the following SEPPs (in conjunction with consideration of the ERS) are considered in this Development Licence Application:

- State Environment Protection Policy (Air Quality Management)
- State Environment Protection Policy (Ambient Air Quality)
- State Environment Protection Policy (Prevention and Management of Contamination of Land)
- State Environment Protection Policy (Control of Noise from Commerce, Industry and Trade No. N1)
- State Environment Protection Policy (Waters)

WMP's considered:

- Waste Management Policy (Combustible Recyclable and Waste Materials) as described in EPA Publication 1667.3: Management and storage of combustible recyclable and waste materials

3.2. General Environmental Duty

Under the EP Act 2017, the General Environmental Duty (GED) requires people and businesses to undertake reasonably practicable steps to eliminate, or otherwise reduce risks of harm to human health and the environment from pollution and waste. The GED framework requires that hazards from waste are reduced, while the reuse, recovery and resource efficiency of waste material is supported.

The GED specifies five broad areas of risk control. These are listed in Table 3-1 and a description of how Fulton Hogan intend to manage each area of risk is provided also.

Table 3-1 General Environmental Duty – areas of risk control

GED (section 25(4) of the EP Act) area of risk control	How these will be addressed at the Warrnambool Plant
Use of plant, equipment, processes and systems to minimise risk	Fulton Hogan will replicate plant, equipment, processes and systems employed at their existing and successfully operating asphalt batch plants (and RAP plants) across Victoria. Various safeguards and management measures applied to their other sites will be implemented to reduce risks to the environment and human health including those associated with air, odour, noise, water (surface and groundwater) and waste. These risks and the safeguards and management measures are described in the relevant subsections of this Development Licence Application.
Ongoing and systematic identification and evaluation of risks to identify further risk control measures	Fulton Hogan maintains an Environmental Management System (EMS) which will be applied to the Warrnambool Asphalt Batch Plant. This system includes an Environment Management Plan (EMP) for each site and a risk register. A draft EMP for the proposed site is at Appendix D. Management measures and controls described in these documents are updated across associated sites when a new risk has been introduced to the site or an existing risk has changed, identified for example during site inspections, environmental audits or as a result of complaints. Regular staff training / communication allows updates to be communicated to all staff.
Incident Response Systems	Incident and emergency planning and response shall be managed in accordance with relevant Fulton Hogan procedures; namely: • 'Conduct Incident & Emergency Response Planning - Process – Au' and • 'Manage Incident Response, Notification & Investigation - Process – Au'. These procedures detail how to: • Plan for incidents and emergencies by preparing a site-specific Emergency Response Plan. This contains site specific procedures to follow in the event of emergency scenarios • Notify required persons • Report, and • Undertake incident investigation. In accordance with the requirements of these processes, an Incident and Emergency Response Plan will be developed for the Warrnambool Asphalt Batch Plant.
Substance handling, management and transport	Various safeguards and management measures will be implemented to reduce risks to the environment and human health from the handling, processing and stockpiling of substances and materials including waste materials. These risks and the safeguards and management measures are described in the relevant subsections of this Development Licence Application.
Provision of information, instruction, supervision and training to any person engaging in the activity to enable those persons to comply with the GED.	The relevant safeguards and management measures within this Development Licence Application will be included in the site-specific Environmental Management Plan (EMP) and a site-specific Environmental Control Plan (ECP). Training and communication materials (e.g., notices and signage) will be used to communicate these management controls and ensure that all persons working on the site understand the risks to human health and the measures that are to be implemented to manage these risks. The draft EMP for the site (Appendix D) includes descriptions of how training and communication will be implemented for the proposed site.

3.3. The Environmental Reference Standard

The Environment Reference Standard (ERS) is a new tool made under the EP Act 2017. The ERS:

- identifies environmental values that the Victorian community want to achieve and maintain
- provides a way to assess those environmental values in locations across Victoria.

The ERS can be applied to assess the impacts on human health and the environment that may result from a proposal or activity, or from existing environmental conditions on a site.

The ERS does not provide compliance standards and it does not set thresholds up to which one can pollute. Nevertheless, it is still necessary under a preventative framework to understand potential impacts on human health and the environment that may arise from an existing or proposed activity or site. The ERS provides a valuable reference for considering impacts and subsequent measures to minimise risks that have the potential to harm human health and the environment.

Relevant sections of the ERS have been considered throughout this Development Licence Application.

3.4. Relevant Guidelines

- EPA Publication 824 (2002) The Protocol for Environmental Management: Greenhouse Gas Emissions and Energy Efficiency in Industry
- EPA Publication 1518 (2013) Recommended Separation Distances for Industrial Residual Air Emissions.
- EPA Publication 1517.1 (2017) Demonstrating Best Practice Guideline
- EPA Publication 1677.3 (2018) Management and Storage of Combustible Recyclable and Waste materials – Guideline
- EPA Publication 978 - Reducing Stormwater Pollution – A guide for Industry
- EPA Publication 1730 - Solid storage and handling guidelines
- EPA Publication 1698 - Liquid storage and handling guidelines
- EPA Publication 2003 - Calculation of financial assurance for landfills, reportable priority waste management and waste and resource recovery facilities
- EPA Publication 1826 Noise limit and assessment protocol (publication 1826)
- Guideline for assessing and minimising air pollution in Victoria (draft EPA Air Quality Guidelines 2021)
- EPA Publication 1820.1 (2021) - Construction - guide to preventing harm to people and the environment
- EPA Publication 1968.1 (2021) - Guide to classifying industrial waste
- EPA Publication 1827.2 (2021) - Waste classification assessment protocol
- EPA Publication 1828.2 (2021) - Waste disposal categories – characteristics and thresholds
- EPA Publication 1895: (2020) - Managing stockpiles

4. ASPHALT IN ROAD MAKING

Australia has 800,000 kilometres of roads with about 310,000 kilometres surfaced and more than 90 percent of the surfaced roads are sprayed seal roads. Annual production of asphalt is about 10 million metric tonnes per annum (tpa). There are around 120 asphalt plants across Australia ranging from small plants of 30 to 40 tonnes per hour (tph) capacity to new large 300 to 400 tph plants.

Semi continuous batch plant and continuous drum mix are the preferred asphalt production methods (the proposed plant at Warrnambool is a semi continuous batch plant). The percentage of imported binders is expected to grow to as much as 100 percent within the next few years. Bitumen is produced to a viscosity specification specific to Australia – AS 2008.

Annual use of bitumen in Australia is just over 800,000 metric tons. The industry employs an estimated 4,000 people in Australia with about double that indirectly involved in road surfacing through state road authorities and local government authorities.

Over time, the benefits of deep lift asphalt (a paving technique whereby the asphalt base course is placed in one or more lifts of four or more inches compacted thickness) in terms of “whole of life costs”, has been recognized across all market sectors and is underlined by the growth in the footprint of asphalt pavements and by its dominance as the pavement of choice for most new infrastructure projects.

Like many modern economies, Australian road authorities and contractors are actively looking for opportunities to minimize the impacts of their operations on the environment. As a consequence, particular focus is being paid to increased utilisation of recyclable materials (RAP, recycled glass etc) and production methods which reduce carbon footprint e.g., low temperature asphalt.

4.1. Recycled products in pavement construction

The use of recycled products in pavement construction introduces an opportunity to better manage the future economic and environmental cost of pavement construction and maintenance. Recycled crushed concrete, crushed brick, glass fines, reclaimed asphalt pavement and crumbed rubber now supplement traditional virgin aggregate and sand extracted from quarries, competing on criteria of quality, price and availability. Recycled products also offer many long-term environmental benefits. Each Victorian requires on average 8 tonnes per year of quarry material to support the building of roads, houses and other infrastructure to service their needs. However, viable locations for future quarries are becoming increasingly limited as urban development and environmental constraints exclude some known virgin resources. Continued demand for pavement construction materials will over a 10 – 40 year period exhaust the supply from some existing quarries, forcing the supply of Victorian quarry resources to move progressively further away from demand. The use of recycled products offers a range of long-term benefits including (Sustainability Victoria 2015):

- reduced impact on the environment through efficient use of extractive industries (natural resources)
- reduced waste to landfill (and increased life of local landfill facilities)
- reduced energy required to produce pavement construction materials. Recycled products are less energy intensive to produce than quarry materials
- some alleviation of conflict over use of land in regional growth planning

Barwon South West Waste and Resource Recovery Implementation Plan for 2017 – 2026 states that:

‘There is opportunity to grow the reprocessing capacity within the region, and that there are opportunities to grow the reprocessing capacity in the region through improving separation of waste streams such as asphalt and establishing mobile crushing infrastructure to deliver services on site’.

The proposed Warrnambool Asphalt Batch Plant is aligned with the Statewide Waste and Resource Recovery Infrastructure Plan (Sustainability Victoria, 2015) (the SWRRIP). The proposal is contributing to the vision of the SWRRIP to develop an integrated state-wide waste and resource recovery system. Six strategic directions underpin the SWRRIP, of which Strategic Direction 3 relates to aggregate materials. The proposal will integrate the processing and use of recovered materials in the production of materials for the road making industry.

4.1.1. Reclaimed Asphalt Pavement

Reclaimed Asphalt Pavement (RAP) is asphalt removed from an existing road pavement and re-processed by crushing and/or screening for use into new asphalt or other approved materials, such as some crushed rock mixes. The use of RAP has become relatively common practice in most countries, as it is both an environmentally and economically attractive proposition. The use of RAP is well established in Victoria, having been introduced into roadwork specifications in the early 2000’s (Vic Roads 2019). The amount of RAP that can be incorporated into asphalt mixes is dependent on the mix type and capability of the plant.

4.1.2. Recycled Glass

According to Austroads (2018), approximately 850,000 tonne of glass is consumed in Australia each year, with 350,000 tonne recovered for recycling. That is equivalent to about 1.4 billion bottles being diverted away from landfill. Glass cullet is recycled container glass (previously used for bottles, jars and other glass vessels) prior to processing. The material is typically collected via bottle banks, kerbside collection schemes and from premises handling large quantities of containers. The primary aim of processing recycling glass is to return it to the glass-making process to manufacture glass containers or other products. However, it can also be used crushed into a granular material and used as a sand replacement in road construction. In terms of its physical and mechanical properties, crushed glass cullet behaves in a very similar manner to sand, having a similar particle density.

5. THE SITE

The subject site is located at Lot 58 Mason Street, within the City of Warrnambool, approximately 5 km east of the Warrnambool CBD. The site is rectangular in shape with a total area of approximately 2.17 ha as shown in Figure 5-1 and Figure 5-2. The site contains no structures, buildings, or service connections. The subject site is located entirely within the Industrial 3 Zone (Warrnambool Planning Scheme).

Figure 5-1 Site of proposed Asphalt Plant – Lot 58 Mason Street

Figure 5-2 Subject Site – View from Mason Street

5.1. Choice of location

The proposed site has been selected based on the following merits:

- The site minimises inter-industry conflict by being of sufficient size to allow co-location of asphalt batch plant, depot facilities (workshop and offices etc) and glass crushing plant at the one site.
- The site is in a newly established industrial area set aside for industrial uses and therefore minimises any additional opportunity for noise or air quality impacts to sensitive receptors
- The proposal is compatible with current and future land use. The site is located within the Industrial 3 Zone.
- The site is centrally located for accepting materials from a range of producers in the southwest Victoria region, and
- It is proximate to transport corridors, including the Princes Freeway.

5.2. Surrounding Land Use and Sensitive Receptors

Figure 5-4 to Figure 5-7 illustrate the land uses surrounding the subject site. The site has a frontage to and access from Mason Street to the north. Dales road reserve runs east-west at the rear of the site beyond the rear easement. Both Mason Street and Dales Road were unconstructed at the time of the site inspection undertaken as part of the DLA, in November 2021.

The site is directly abutting undeveloped land. The land to the north of Mason street, east of the subject site, and south of Dales Road is used for grazing purposes. Beyond the vacant lot to the west of the site is a truck and container storage yard, vacant warehouse/ sheds for lease (at time of November 2021 inspection), and a caravan repair business on the corner of Horne Road and Mason Street. Several newly established industrial / warehouse properties are located to the north-east of the site, and Dales Road water storage is located on the north-west corner of Horne and Dales roads.

Figure 5-8 illustrates the position of the proposed site in relation to the nearest sensitive receptors. Distances are provided in Table 5-1.

Figure 5-3 Land use surrounding the subject site

Figure 5-4 Unconstructed Mason Street and industrial warehouse properties in the background

Figure 5-5 Land used for grazing to the north of the site

Figure 5-6 Caravan repair business on Mason Street

Figure 5-7 - View west along Mason Street towards the subject site

Figure 5-8 Dwellings surrounding the subject site

Table 5-1 Approximate distance from the boundary of site to the nearest dwellings

Sensitive land use	Approx. distance from site boundary
Residence – R1	798m
Residence – R2	840m
Residence – R3	823m
Residence – R4	947m
Residence – R5	1000m
Residence – R6	1018m
Residence – R7	922m
Residence – R8	767m
Residence – R9	751m
Residence – R10	861m
Residence – R11	856m
Residence – R12	932m
Residence – R13 Country Life Rental Accommodation Units	813m
Residence – R14	867m
Residence – R15	867m
Residence – R16	877m
Residence – R17	907m
Residence – R18	1240m
Residence – R19	647m
Residence – R20	768m
Residence – R21	795m
Residence – R22	1085m

5.3. Topography

The subject site is predominantly flat. Neighbouring land is also predominantly flat.

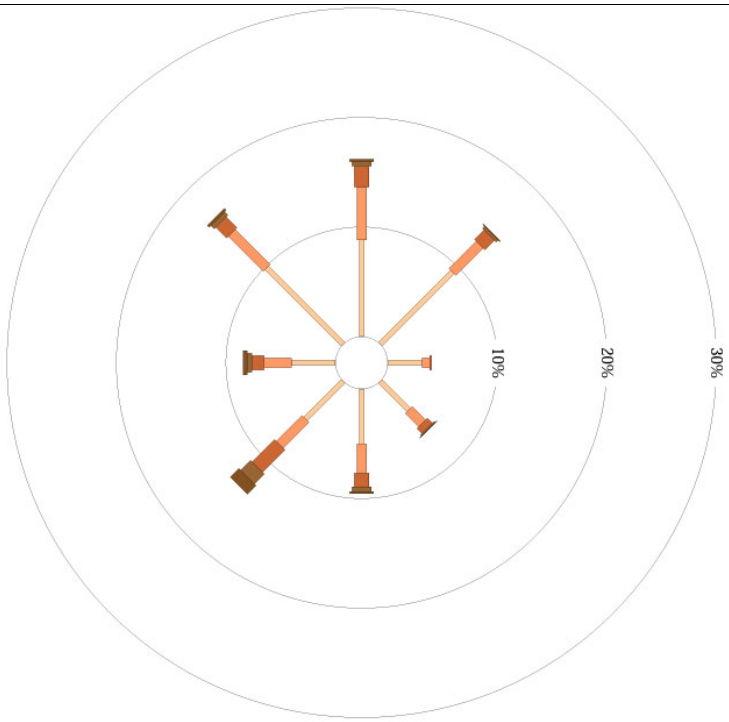
5.4. Site Geology

Review of the regional geology maps of Victoria (Seamless Geology Victoria, Geoscience Victoria 2014) indicates that the site is located within the Newer Volcanic Group – basalt flows.

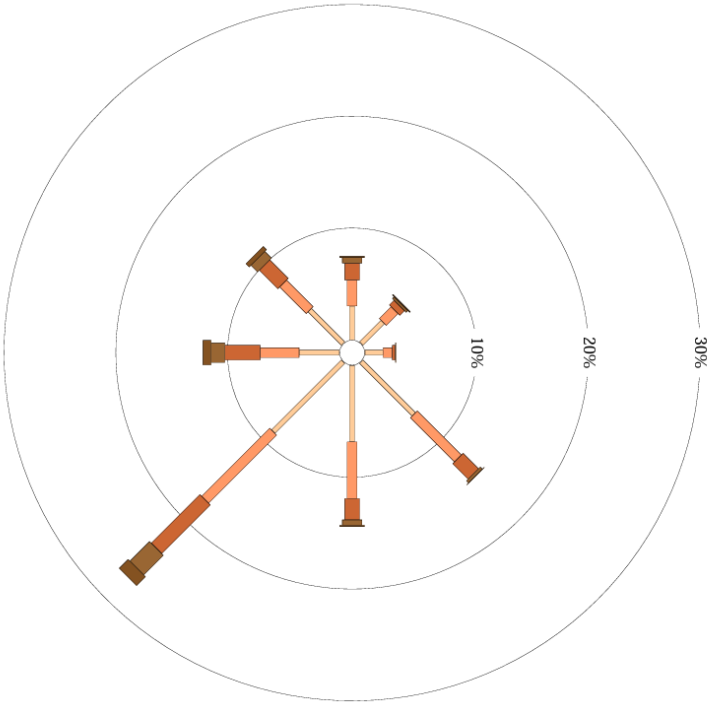
5.5. Climate Data

Data from the Warrnambool Post Office weather station # 090172 (BOM Climate Data Online 2021) (approx. 6km from the subject site) shows the mean annual rainfall is 743.1 mm. The highest rainfall is received the during the winter and spring months.

Figure 5-9 provides average annual wind roses for Warrnambool Post Office weather station at 9am and 3 pm. Wind direction over the year is variable depending on season and time of day. Prevailing winds at 9 am are variable and at 3pm winds are southerly, particularly south-westerly.



9am Warrnambool Post Office (average annual wind speed and direction for years1957to 1983)



3pm Warrnambool Post Office (average annual wind speed and direction for years1957to 1983)

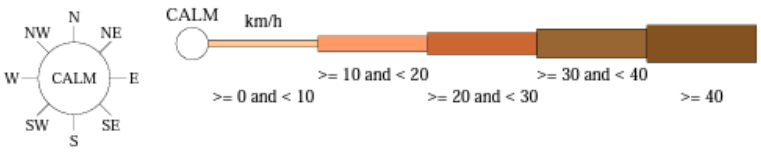


Figure 5-9 Wind Roses – BoM station Warrnambool Post Office (No. 090082)

5.6. Local Waterways

The subject site is approximately 750 m south of Russel Creek which flows in a westerly direction, through the city of Warrnambool before meeting the Merri River. According to the ERS, surface waters in the vicinity of the site are categorised within the *Murray and Western Plains* segment.

5.7. Groundwater

Based on a search using Visualising Victoria's Groundwater website (www.vvg.org.au), the following groundwater bores are within 600 m of the site:

- 99872
- 99954
- 99955

Ownership of the bores in unknown and they are not monitored. Modelled groundwater information from Visualising Victoria's Groundwater (VVG) for the site indicates depth to water table of 5 – 10 m and salinity of 500 to 1000 mg/L.

Schedule 1 of SEPP (Waters) prescribes the segments for groundwater by reference to Total Dissolved Solids (TDS), which is a measure of salinity. Each segment has a defined list of beneficial uses that afford protection based on the salinity of groundwater within an aquifer. Groundwater with a TDS of 1001-3500 m/L is classified as Segment B in accordance with SEPP (Waters). Groundwater segment classification under the Environmental Reference Standard differs from the SEPP (Waters) and the TDS range indicated in the VVG for groundwater at the site ranges across Segments A1 and A2.

The protection of the following beneficial uses is afforded to these segments:

- Water dependent ecosystems and species
- Potable water supply (desirable / acceptable)
- Potable mineral water supply
- Agriculture and irrigation (irrigation)
- Agriculture and irrigation (stock watering)
- Industrial and commercial
- Primary contact recreation
- Traditional owner cultural values
- Geothermal properties; and
- Buildings and structures.

5.8. Flooding

The site is not within the 1% AEP flood extent for the Warrnambool region. While localised flooding in the area may occur, given the site is to be raised to allow for drainage and the nature of the development, significant risk associated with flooding of the site is not likely. Risks associated with flooding of the site have therefore not been considered further in this document.

5.9. Planning and Other Approvals

An application for a planning permit for the proposed facility will be made to Warrnambool City Council in early 2022. A pre-application meeting regarding a planning permit was held with Warrnambool City Council's statutory planning department on 15 October 2021.

This site is part of an 8-lot subdivision of 86 Rodgers Road, Warrnambool which was approved by Planning Permit PP2021-0176 on 2 November, 2021.

6. PROPOSED ACTIVITY AND PROCESS DESCRIPTION

6.1. Development Overview

Fulton Hogan propose establishing an asphalt batch plant at Lot 58 Mason Street, Warrnambool to produce up to 50,000 to 100,000 tonnes per annum of asphalt for use in road construction and surfacing projects for local and state government, private premises and for direct sales to customers. The proposed facility will also include the import and processing of reclaimed asphalt pavement (RAP) and waste glass. These materials will be used to supplement virgin aggregate and sand in the asphalt batching process at the site and will improve sustainability of the operation and contribute to the circular economy in the south-west Victoria region.

The proposed plant will also have facility for storing of bitumen products (e.g. bitumen and bitumen emulsions) for direct use in road making activities including spray sealing and asphalting operations.

The proposal would effectively consolidate three existing owned and operated Fulton Hogan facilities in the Warrnambool area, those being:

- The Fulton Hogan asphalt batch plant at Koroit Street, Warrnambool. This site currently produces approximately 50,000 tonnes per annum of asphalt
- The Fulton Hogan depot at 20 Strong Street in Warrnambool. This site currently provides workshop facilities and storage, laydown and parking areas for Fulton Hogan plant and equipment
- The Fulton Hogan glass crushing operation at a quarry on Quarry Road, Koroit. The glass crusher at this quarry is currently operated on an ‘as needs’ basis, on average one day per week.

The various processes at the proposed plant are described in the following sections.

6.2. Overview of Plant and Activities

Site plans are provided at Appendix E. Fulton Hogan intend to undertake the following activities at the site:

- Importing and stockpiling / storage of materials for use in asphalt batching and road construction including:
    - bitumen and bitumen emulsions,
    - aggregates and sand,
    - unprocessed RAP, and
    - waste glass (as a substitute for sand).
- Asphalt production using a modular asphalt batch plant such as the ‘ASTEC BG 1800’ (see Figure 6-1 for photo; Figure 6-2 shows plan and elevation of main components of proposed batch plant) to produce hot and warm mix asphalt that incorporates recycled material including RAP and glass.

- Glass crushing and screening using a crusher within a dedicated three-sided shed (which will also be used for stockpiling of unprocessed waste glass). The glass crusher will also be used to crush and screen RAP.
- Storage of materials including aggregates, filler material and processed RAP and glass in covered storage bays.
- Storage of the following bitumen products in bunded tanks:
    - bitumen (and modified bitumen) for use on site in asphalt batching (in 3 x 50,000 to 60,000L tanks) and
    - bitumen and bitumen emulsions for direct use (e.g., in road work projects) in 3 tanks ranging from 10,000L to 30,000L capacity.
    - Allowance has been made for an additional two tanks within the bunded 'tank farm' area for future storage of bitumen / emulsion for direct use in road making projects. These two tanks will be approximately 60,000 L capacity and may be constructed and commissioned in future if needed..
- Diesel tank (self-bunded) for refueling of mobile plant (mainly front-end loaders).
- A bunded truck wash bay.
- A bunded (via rollover bunds) tanker / truck parking area adjacent the tank farm will serve as a loading / unloading area for the bitumen and emulsion etc.
- Parking for equipment, trucks and machinery related to road manufacture operations.
- Office and workshop buildings including:
    - amenities,
    - office space,
    - workshop bays,
    - car parking.

The entire site will be on sealed asphalt pavement with the exception of the open stockpiling area (for unprocessed RAP) in the southeast corner of the site which will be unsealed (refer site plans in Appendix E).

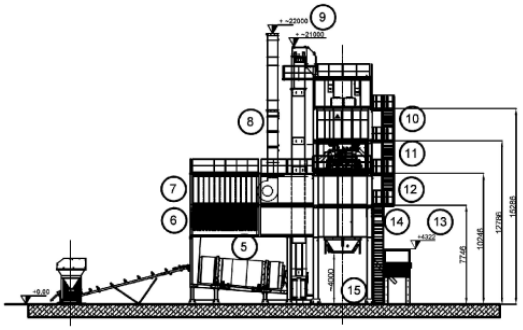
Runoff from the site will be captured and passed through a stormwater treatment system (e.g., triple interceptor) before being discharged to the subdivision drainage system which will include a retarding basin.

Roofed storage bay areas will feed rainwater storage tanks with collected rainwater to be used in dust suppression and landscape watering.

Figure 6-1 Example of modular asphalt batch plant

NOTE:

1. PLANT CONFIGURATION SUBJECT TO CHANGES AS PER MANUFACTURER'S REQUIREMENTS
2. SIDE ELEVATION VIEW AS PER MANUFACTURER'S STANDARD DRAWING. SIDE ELEVATION VIEW SUBJECT TO CHANGES AS PER MANUFACTURER'S REQUIREMENTS



ITEM	DESCRIPTION
1	COLD FEEDER
2	COLLECTING CONVEYOR
3	GRIZZLY FEEDER
4	CHARGING CONVEYOR
5	DRYER DRUM UNIT
6	HOPPER UNDER FILTER
7	BAG FILTER
8	CHIMNEY
9	HOT ELEVATOR
10	VIBRATING SCREEN
11	HOT MINERAL BIN
12	MIXING UNIT
13	ACCESS & PLATFORM
14	IN-LINE SILO
15	STEEL BASES
16	FILLER SILO
17	BITUMEN TANK FARM
18	CONTROL ROOM

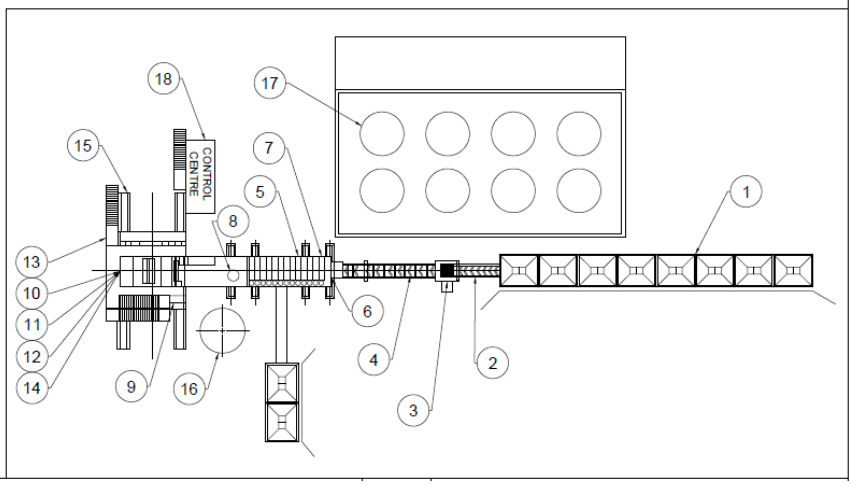


Figure 6-2 Plan and elevation view of the proposed asphalt batch plant

6.3. Materials to be Imported to Site

Table 6-1 provides an overview of the materials to be imported to the site. The site will be able to receive materials on a 24 hour per day / 7 day a week basis, although deliveries will occur predominantly during the daytime (refer to Section 6.5.2 for further information regarding hours of operation).

Table 6-1 Materials to be imported to site

Material	Estimated mount per year (tonnes)	Source	Description	Purpose
Bitumen (and modified bitumen)	3,000	Viva Geelong or Fulton Hogan Laverton	Bitumen is a binding agent produced from petroleum. It can be modified through the addition of elastomers and other products to enhance performance properties.	Used in the manufacture of asphalt as a liquid binder.
Bitumen (for spray seal operations)	500	Viva Geelong or Fulton Hogan Laverton		For direct application in road surfacing (spray seal surfacing)
Bitumen emulsions (for use in spray seal and asphalt operations)	500	Fulton Hogan, Bacchus Marsh	Bitumen emulsions are dispersions of fine droplets of bitumen in water.	
Aggregates, sand and fillers	40,000	Various	Aggregates will include gravel, crushed rock and sand of various sizes. Fillers will comprise hydrated lime.	Used in the manufacture of asphalt.
Reclaimed Asphalt Pavement (RAP) and Crushed Rock	30,000	Mostly from Fulton Hogan / South Western Alliance road works in Warrnambool / South-west Victoria region. Also: • Plant start-up and shutdown waste • Returned asphalt (overorders)	Unprocessed material comprising asphalt from road resurfacing works etc. Can also comprise significant amounts of crushed rock. Expected to contain very low contamination levels (e.g., plastics, metal or wood).	To be crushed / screened on site for use on site in asphalt batching.
Waste Glass	5,000	Local council kerbside recycling programs (i.e., collection of glass packaging from households and businesses).	Unprocessed container glass cullet (from bottles, jars etc). Expected to contain significant amounts of contamination (up to 5%), e.g., metal bottle lids and paper labels.	Most to be processed to glass fines on site for subsequent onsite use in asphalt batching. Remainder to be sold e.g. for pipe bedding material or blended with crushed rock

6.3.1. Bitumen products

Bitumen and bitumen emulsion will be sourced from Viva Energy's Geelong refinery and Fulton Hogan's Laverton and Bacchus Marsh plants and delivered in semi-trailer or B-Double configuration trucks. Bitumen (and bitumen emulsion) will be pumped from trucks (parked in the bunded loading area adjacent the tank farm) into storage tanks.

6.3.2. Aggregates and Fillers

Raw aggregate, sand and hydrated lime loads will be delivered to site via a combination of truck and trailer, semi trailer and B-Double trucks. These materials will be unloaded directly into the roofed storage bunkers and a front end loader used, as required to manage the material in the storage bays (refer plans at Appendix E).

6.3.3. Reclaimed asphalt pavement (RAP) and Crushed Rock

There are three sources of RAP:

- Road resurfacing: RAP generated during road resurfacing activities where layers of existing pavement are removed by a milling machine or during road reconstruction or deep patching where the surfacing together with the underlying pavement materials are removed; volumes of crushed rock are usually extracted during this process.
- Asphalt Plant Waste: Asphalt plant waste is the aggregate based raw material containing binder, which is processed through an asphalt plant, but re-directed to waste. Resulting asphalt products that have not met required specifications may also be classed as asphalt plant waste.
- Asphalt Returns – Asphalt produced but not used due to over ordering or rain-affected works.

During road reclamation, crushed rock combined with asphalt pavement is also generated. These materials will be trucked to the subject site and visually inspected for evidence of contamination before stockpiling in the open stockpiling areas. Loads will be inspected for the presence of contaminants including plastics, wood, and metal. These contaminants will be removed as far as reasonably practicable before and during processing. However, loads that are deemed to contain contaminating materials in excess of what can be practically managed will be rejected. It is envisaged that rejected loads will predominately be associated with material supplied by external suppliers (as opposed to material supplied by internal Fulton Hogan managed projects), as is observed at other Fulton Hogan recycling yards. In these cases, rejected loads would not be accepted to the site, and, in accordance with agreements with suppliers the contaminated loads would remain under the ownership and responsibility of the external supplier. If loads sourced from Fulton Hogan managed sources are deemed to be excessively contaminated, then this material will be managed in accordance with Fulton Hogan waste procedures (refer to Section 10.1 for further detail).

6.3.4. Waste Glass

The main source of waste glass is expected to be glass packaging (bottles, jars etc) from local Councils' kerbside recycling programs (i.e., collection of glass packaging from households and businesses). Agreements are in place with Moyne Shire Council and Cleanaway Waste Management Ltd for the receival of glass at the proposed facility. Discussion for the same arrangements with Glenelg and Corangamite Shire Councils are underway. It is expected that up to 5,000 tonnes per year will be trucked to site for processing. Contamination of glass is likely to comprise metal bottle lids

and organics such as paper labels. Agreements include a clause that excessive contamination (e.g. more than approximately 5% w/w) in glass delivered to the site will be removed by the supplier as soon as practicable and disposed of appropriately. Generally, it is envisaged that Council trucks delivering waste glass to site, will remove accumulated glass contaminant waste from site on a regular basis. Refer to Section 10.1 for further discussion.

6.4. Storage of feedstock materials

6.4.1. Bitumen

Bitumen and bitumen related products will be stored in a 'tank farm' comprising 6 tanks within a bunded area adjacent the batch plant (refer site layout Appendix E). Rainwater captured within the bunded area will be directed to an interceptor / treatment system after inspection for contamination (refer Section 8 for further discussion).

Three tanks (1 x 50,000L, 1 x 55,000L and 1 x 60,000L capacity) will contain bitumen and will be hard-plumbed to the batch plant. Bitumen in these tanks will be maintained at 180ºC. Total quantity to be imported to the site will be approximately 3,000 tonnes per annum and the maximum amounts to be stored at any one time will be approximately 150 tonnes.

One 10,000L tanks and two 30,000L tank will contain bitumen and various bitumen emulsions. Material in these tanks will be maintained at varying temperatures (e.g., between ambient and 80 ºC) and will be used on an as needed basis in road construction (e.g., for spray seal operations); that is, these products will not be used in the batching process, rather they will be loaded to trucks for use in Fulton Hogan projects in the region.

While it is not envisaged that there will be an immediate demand for bitumen for spray seal operations, future throughput at the depot may be up to 500 tonnes per annum with maximum storage at any given time up to 60 tonnes. Bitumen emulsions for use in spray seal and asphalt operations will use approximately 500 tonnes per annum with a maximum storage at any given time of 80 tonnes.

Allowance has been made for an additional two tanks within the bunded 'tank farm' area for future storage of bitumen / emulsion for direct use in road making projects. These two tanks will be approximately 60,000 L capacity and may be constructed and commissioned in future if needed.

6.4.2. Aggregate and filler material

Aggregates will be stored in 8 x covered storage bays within a three-sided shed constructed from Colourbond cladding to height of approximately 8m atop 3m high precast concrete walls.

Filler (e.g., hydrated lime) will be loaded into a 'filler silo' that is a component of the asphalt batch plant and allows filler to be added during the batching process.

6.4.3. Reclaimed asphalt pavement and crushed rock

Unprocessed RAP and crushed rock will be unloaded directly from tipping trailers / trucks to the uncovered stockpiling area in the south-east corner of the site (refer Appendix E) in stockpiles up to approximately 4 metres in height. Raw feed stockpiles shall be created by layering materials in layers as they arrive in the yard. In general, RAP materials are blended by way of front-end loader and/or excavator to produce a homogenous feedstock material for processing.

All contaminants (e.g., plastic, wood, metal) are to be separated as far as practicable and stockpiled in a clearly labelled bay / area in the yard for subsequent disposal to a landfill facility that meets the definition of a lawful place. Management of this waste stream including consideration of maximum volumes to be stockpiled is described at Section 10 and considers guidance from EPA's *Management and storage of combustible recyclable and waste materials – guideline* (publication1667-3).

Maximum amounts of unprocessed RAP (including crushed rock) stored on site at any one time will be less than 5,000 m^3.

6.4.4. Waste Glass

Unprocessed glass will be unloaded directly from tipping trailers / trucks into a three-sided shed constructed from Colourbond cladding to height of approximately 8 m atop 3 m high precast concrete walls. Maximum amounts of unprocessed glass stored on site at any one time will be approximately 500 tonnes.

6.5. Material processing and asphalt batching

6.5.1. Resource recovery

RAP and Crushed Rock

RAP and crushed rock will be transferred to the glass crusher via front end loader where it will be crushed and screened. This plant is existing plant owned by Fulton and Hogan and currently operated at the Koroit Quarry site. This plant will be modified and reconfigured as require for use in crushing and screening on the proposed site. Processed material from the crusher / screener will then be transferred (via front end loader) and stored in one or more covered material storage bays (of dimensions: 13mD x 2mH x 6mW), for subsequent loading via front end loader to the asphalt batching plant.

A portion of this material will be unsuitable for asphalt production (e.g., oversize, or excessive crushed rock content) and will be therefore used as road base material in Fulton Hogan road making projects. A very small amount may be sold directly to customers.

At any one time the maximum amount of this processed material onsite will be approximately 2,000 tonnes.

Glass

Glass will be processed by glass crushing plant which will either be existing Fulton Hogan plant (modified to suit the site orientation) or newly acquired plant (yet to be determined) . Figure 6-3 shows a photo of the existing Fulton Hogan glass crusher / screener in-situ at Koroit quarry). The glass crusher will be setup in the glass crushing shed. Processed glass is kept separate from other material streams and stockpiled in covered storage bays (of dimensions 7.8mD x 2mH x 5mW) (refer to miscellaneous material storage area in drawing TP02 Appendix E). Stockpiled processed glass will be loaded to the asphalt batch plant feeder bins via front end loader as a sand replacement for the batching process. A portion of the processed glass will be sold and loaded into haul trucks for transport off site (for use as pipe bedding material for example) or blended with crushed rock.

Metal (e.g., bottle tops) and paper (e.g., labels) contamination is removed during processing for subsequent stockpiling and offsite disposal. Where insufficient removal of metal / paper waste is

identified the glass material can be reprocessed. It is expected that up to 0.5 tonnes of this waste material may be stockpiled at any one time. Management of this waste stream including consideration of maximum volumes to be stockpiled, is described at Section 10 and considers guidance from EPA's *Management and storage of combustible recyclable and waste materials – guideline* (publication1667-3).

Figure 6-3 Photo of glass crushing and screening plant (in-situ at Koroit quarry)

6.5.2. Asphalt batching

Aggregate (and crushed rock) and sand is loaded into cold feeder bins on the batch plant before being combined in a rotating drum and dried at temperatures between 150 and 180 to remove any moisture. 'Fillers' such as hydrated lime are then added before the mixture is coated with bitumen.

Asphalt must be used hot and therefore is not stored as a finished product other than in sealed surge bins where it is loaded into trucks for subsequent dispatch to the job site within hours of being produced.

6.6. Hours of Operation

Table 6-2 presents proposed site operating hours.

Table 6-2 Proposed Warrnambool Asphalt Batch Plant operating hours

Activity	Hours
Site operational hours including: • **Operational Teams** • **Asphalt production** • **Truck material delivery** • **Truck loadout**	24 hours per day 7 days per week Note: Typically (approx.. 70% of the time), operational hours are 6am –6pm Monday to Friday. Nighttime and weekend operations are driven by Council and State Government project requirements.
Crushing and Screening	Mon to Sat 7am to 6pm

6.7. Traffic Management

The site is in an Industrial 3 Zone and was recently approved for subdivision. As part of the assessment of the subdivision and industrial use, traffic and vehicle management for industrial uses was undertaken. Furthermore, the need for a traffic management plan was discussed with Council at the pre-application meeting for the panning permit, and it was agreed that a traffic management plan was not required, provided the application could demonstrate site access can provide for vehicles proposing to use the site. TP04 in Appendix E includes sweep paths for trucks proposing to access the site.

Up to approximately 200 load-outs per month (10 loadouts per day average, maximum 20 loadouts per day) are expected from the site

7. AIR QUALITY

7.1. Relevant Legislation and Guidelines

Part 2 (Ambient Air) of the ERS sets out environmental values, indicators and objectives that serve as a benchmark for assessing ambient air environment in Victoria. Indicators (and objectives) relevant to the proposal are listed in Table 2.2 of the ERS. The beneficial uses for ambient air in the ERS have largely been adopted from the State Environment Protection Policy (Ambient Air Quality) (SEPP (AAQ)) as environmental values, as well as the relevant indicators and objectives. Prior to the commencement of the ERS, the SEPP(AAQ) was the Victorian implementation of the *National Environment Protection (Ambient Air Quality) Measure* (the NEPM (AAQ)). Like many other documents linked to the *Environment Protection Act 1970*, the SEPP (AAQ) now contributes to the general state of knowledge on ambient air quality in Victoria.

It is noted that the SEPPs are to be replaced with the new EPA '*Guideline for assessing and minimising air pollution in Victoria'* (draft EPA Air Quality Guidelines 2021) by the end of 2021. In assessing the proposed development consideration and reference has been made to these new guidelines. Other EPA guidelines that have been considered and referenced in the following sections include:

- EPA Publication 1730 Solid Storage and handling guidelines (2019)
- EPA Publication 1518 Recommended separation Guideline distances for industrial residual air emissions (2013)
- Consideration of greenhouse gas legislation is provided at Section 7.3.

7.2. Air Emissions – Sources and Background

The draft EPA Air Quality Guidelines (2021) class air pollutants into the following key groups:

- **Criteria air pollutants** are widely distributed in the environment and contribute incrementally to the potential for health impacts in the population, meaning that even small increases in concentrations contribute to the overall risk. The guideline lists criteria pollutants as particles ($PM_{2.5}$ and PM_{10}), carbon monoxide, nitrogen dioxide, ozone and sulfur dioxide.
- **Air toxics** are usually less common than criteria pollutants. They are associated with specific sources and do not pose a significant risk when present at sufficiently low concentrations. This group of pollutants broadly comprises most airborne toxic substances that are not criteria air pollutants.
- **Other pollutants** is the term used to describe substances other than criteria pollutants or air toxics, such as radioactive substances or bioaerosols.

All expected emissions from the proposed facility can be classed as criteria air pollutants and air toxics and are discussed further below. As per Section 3.3 of the EPA Air Quality Guidelines (2021), nuisance dust can be described as 'other pollutants'.

Key emission sources from the batch plant are as follows:

- Baghouse Stack Emissions

  Emissions from the baghouse stack will contain odour, gases and particulates. This will include volatile organic compounds (VOCs), polycyclic aromatic hydrocarbons (PAHs), trace metals and dioxins and furans. Fumes from the mixing tower will be

drawn down and recirculated through the jet burner to reduce emissions of VOCs. Flue gas emissions from the dryer drum unit will be discharged via the bag filters to remove particulates.

- Asphalt Loadout Emissions

  Emissions from the asphalt load out process (when the hot mixed asphalt is transferred directly from the hot mix plant into a truck positioned underneath) will contain a combination of gases, particulates and odours. These loadout odour emissions will be reduced by maintaining the tower unit at a negative pressure and ducting the fumes back through the jet burner.

- Asphalt Silo Filling Emissions

  Emissions from the asphalt silo filling process (when the hot mixed asphalt is transferred from the hot mix plant to the in-line silos for temporary storage) will contain a combination of gases, particulates and odours. These silo filling emissions will be reduced by maintaining the tower unit at a negative pressure and ducting the fumes back through the jet burner.

Emissions for the sources at the proposed facility have been referenced from similar asphalt batch plants. Emission rates were calculated based on a proposed annual asphalt production rate of approximately 150,000 tonnes per annum. While this far exceeds the expected production rate for the proposed plant (at 50,000 to 100,000 tonnes per annum), it provides a worst case scenario in terms of emissions.. For the assessment it has therefore been assumed that the volumetric flow rate of the gases in the exhaust stack would be the same as the existing facility, along with other parameters including. stack diameter and exit velocity (as production volumes are similar)

The air quality assessment at Appendix F provides further information on estimating emissions of air pollutants (gases, particulates and odours) from the operational activities at the proposed facility.

7.2.1. Criteria Air Pollutants

Particles

'Primary' particulates are emitted directly from sources such as motor vehicles or wood fires, while 'secondary' particulates are formed through atmospheric reactions of sulfur dioxide, nitrogen oxides and certain organic compounds. Particles are generally classified into four categories:

- Total suspended particles (TSP) include suspended particles larger than 10 μm and are currently addressed as an amenity issue. Current health research indicates that the smaller size fractions have a greater influence on human health.
- PM_{10} – 'thoracic' particles smaller than 10 μm in diameter that can penetrate the lower respiratory system and cause wheezing and difficulty breathing in people with heart or lung conditions when PM_{10} levels are high. The main potential source of PM_{10} at the proposed facility includes dust that is generated during stockpile management, loading/unloading and processing materials and vehicle movements and the operation of the glass crusher. While background air quality may be affected by (low density) existing industry and agriculture in the area and traffic associated with the Princes Freeway (approximately 900 m south of the site), background PM_{10} concentrations at and around the subject site are expected to generally be low. Further discussion regarding dust related impacts is provided below.
- $PM_{2.5}$ – 'respirable' particles smaller than 2.5 μm that can penetrate the gas-exchange region of the lungs and cause wheezing, coughing and difficulty breathing in people with lung conditions when $PM_{2.5}$ levels are high. Sources of $PM_{2.5}$ at the proposed facility are

vehicle, truck and plant exhausts. Background $PM_{2.5}$ concentrations at and around the subject site are not expected to be significantly affected by existing industry and agriculture in the area and traffic associated with the Princes Freeway given the relatively low density of existing industry and distance to the freeway (approximately 900 m south of the site).

- Ultrafine particles – particles smaller than 0.1 µm, which contribute little to particle mass due to their small size but have the greatest ability to enter the lungs. There are no sources of ultrafine particles expected from the proposed facility.

Carbon monoxide, nitrogen dioxide, ozone and sulfur dioxide.

Carbon monoxide is a colourless, odourless and flammable gas which is absorbed from the lungs into the blood stream where it can impair oxygen release into tissue and adversely affect the brain and heart.

Nitrogen oxides (NOx) contribute both to morbidity and mortality, especially in susceptible groups such as young children, people with asthma and other chronic respiratory conditions.

Sulfur dioxide (SO_2) is formed by the oxidation of sulfur contaminants in fuel on combustion and is a potent respiratory irritant and has been associated with increased hospital admissions for respiratory and cardiovascular disease, as well as mortality.

Tropospheric ozone (O_3) is a secondary air pollutant formed by reactions of nitrogen oxides and volatile organic compounds in the presence of strong sunlight.

Ozone contributes both to morbidity and mortality, especially in susceptible groups such as those with asthma and chronic lung disease and people over 65.

Dust

As per the draft EPA Air Quality Guidelines 2021, dust can result in unsightly soiling of surfaces, can create visible plumes and reduce visibility. All of these are amenity impacts that can impact people's wellbeing.

A number of activities on the proposed site have potential to result in the generation of dust with subsequent mobilisation of nuisance dust off site. Fugitive emissions of dust may occur from the outdoor storage areas from loading and unloading of materials, movement of material around the site, vehicle movements and storage of unprocessed materials.

Specifically, there is potential for dust emissions to occur during:

- the asphalt batching process'; generation of dust from conveyors and drop points
- loading and use of filler (hydrated lime) during batching process
- maintenance activities
- unloading materials from tipper truck and/or trailer to covered and outdoor stockpiles
- storage of material in outdoor stockpiles
- vehicle movements on internal haulage roads crushing materials spilled to road
- processing of material including crushing and screening
- loading from stockpile to truck or trailer via front end loader

Generally, during periods of prolonged dry weather when the above materials have low moisture content, risks associated with dust are elevated as dust is more easily windborne.

7.2.2. Air Toxics

As per the draft EPA Air Quality Guidelines 2021:

'Unlike criteria pollutants, air toxics are generally not widespread in high concentrations in the environment and are emitted by specific activities or processes. Air toxics can therefore usually pose a risk at a more local scale close to sources. Air toxics encompass hundreds of substances such as volatile organic compounds (VOCs) and semi-volatile organic compounds (SVOCs), heavy metals, acid gases and other toxic airborne substances. These substances range widely in their toxicity and associated health effects, and include hazardous substances like carcinogens, mutagens and some pollutants that result in severe health effects even at low doses…

The assessment of air toxics includes many chemicals for which there are clearly defined thresholds or concentrations that pose an 'acceptable risk'. Below this threshold, the risk of health impacts becomes negligible … However, these thresholds are not intended to be used as levels that emitters can 'pollute up to' as this is inconsistent with the intent of minimising risks so far as reasonably practicable.'

7.2.3. Odour

The operation of the asphalt plant will generate ducted and at times possibly fugitive emissions such as VOCs, and these emissions can cause odours.

An odour assessment (Appendix G) was commissioned by Fulton Hogan to determine the extent of the odour plume from a reference site (Fulton Hogan asphalt plant at 10-30 Dana Court, Dandenong). The assessment coincided with key odour producing activities, including the production of asphalt and the bituminous compounds *A10e polymer bitumen* and *bitumen 310*. This included the loading and subsequent venting of the bitumen storage tanks, manufacturing of bitumen and loading bitumen trucks. The aim of this study was to provide an understanding of the risk of offsite odours from a plant that is analogous to the proposed facility at Warrnambool. Odour from the Dandenong facility can be considered a comparable worst-case scenario for the proposed Warrnambool facility as it produces significantly larger volumes of asphalt and also produces bitumen products. The assessment at the Dandenong site identified:

- No odour from 350 m to 500 m detected during survey and the assessment concluded there is a low to medium risk of odour impacts in this range.
- Beyond 500 m, assessment concludes that the risk of odour impacts on sensitive receptors is low.

The assessment noted that the above odour observations are congruous with there having been no odour reports or complaints from the nearest residences, approximately 370 – 400 m from the Dandenong site.

7.2.4. Potential Impacts

Airlabs Environmental Pty. Ltd. (Airlabs) were commissioned to undertake an Air Quality Impact Assessment (AQIA) (Appendix G) for the proposed facility. The AQIA identified the main pollutants of concern from operation of the proposed facility as emissions of gases, particulate matter and odours. The AQIA assessed potential for impacts from pollutants including NO_2, CO, SO_2, PM_{10}, $PM_{2.5}$ and lead (and other metals) and several other air toxicants. The assessment noted that trace amounts of other pollutants may be emitted but noted that elevated concentrations for these pollutants are unlikely.

To determine operational air quality impacts from the asphalt batching activities air dispersion modelling was conducted using the AERMOD dispersion model and included estimates of cumulative impacts. AERMOD was setup in accordance with EPA publication 1551 *Guidance notes for using the*

regulatory air pollution model AERMOD in Victoria. The results from the modelling were compared against the air quality objectives specified in draft EPA Air Quality Guidelines 2021 and the ERS.

Results from the modelling show that the incremental impacts (i.e., impacts from the proposed facility only) at the nearest sensitive receptors are minimal and well below the relevant assessment criteria.

To determine compliance for the modelled pollutants, cumulative concentrations (i.e., incremental plus background) were also determined and compared against the assessment criteria. The cumulative impact assessment shows compliance for all of the modelled pollutants at all identified sensitive receptors.

The AQIA concluded that operational activities at the proposed facility are not expected to cause any significant air quality impacts in the surrounding environment.

Odour

As discussed in Section 7.2.2, the odour plume from the reference facility at Dandenong was not detectable beyond 350 m, even during particular odorous activities (e.g., production and loading of A10e polymer bitumen),

The storage of A10e is a possibility at the proposed Warrnambool site (there will be no bitumen production at Warrnambool); however, it will not be the predominate modified bitumen stored (as it will not be typically used in the area).

As per the assessment of the odour plume at Dandenong (Appendix G), it is likely that odour impacts beyond 350 m of the plant will be a low to medium risk and a low risk beyond 500 m. The nearest sensitive receiver is approximately 650 m from the proposed site.

Separation from sensitive receivers

Buffers, or separation distances, are addressed in EPA Publication 1518. The guideline provides advice on recommended separation distances between industrial land uses that emit odour or dust, and sensitive land uses. Table 1 of the guideline provides a recommended separation distance of 500 m for asphalt plants (with production of >100 tonnes per week), As per Figure 5-8, the nearest sensitive receiver is approximately 650 m from the site boundary. It is considered unlikely that air emissions including fugitive dust emissions and odours from the proposed facility will impact on sensitive receivers.

7.2.5. Safeguards and Management Measures

The risk assessment undertaken for the proposal (Appendix H) recognises a number of potential impacts associated with air emissions, particularly dust. Similarly, the draft site EMP (Appendix D) recognises the on-site dust sources and outlines several control measures to be implemented to reduce dust. Management measures to address air quality risks are outlined in Table 7-1.

With the implementation of the proposed management measures, potential air quality issues, including dust emissions from the subject site will remain a low risk and are unlikely to affect off site receptors

Table 7-1 Air quality - Potential impacts and Management measures

Hazard	Activity / Hazard Source	Safeguards and Mitigating Measures
Emission of air pollutants	Emissions from operation of plant, equipment and vehicles	• Reduced VOC and associated emissions as from production of warm-mix asphalt and direct loading to trucks from overhead bins • Use of carbon neutral electricity • Machinery maintained appropriately to minimise vehicle emissions, • Mobile plant inspected for visible emissions (greater than 10 seconds) on start up.
Odour	Operating Asphalt Plant	• Plant can produce warm mix asphalt and direct loads to trucks from overhead bin (therefore reduced VOC and associated odour emissions) • Plant to be operated below recommended maximum binder temperatures and burners to be adequately maintained to minimise odour impacts. • Undertake commission testing prior to full operation to ensure that best practice industry standards are met during the operation of the works
	Delivery and Storage of Bituminous Products	• Store and handle at the minimum temperature possible to minimise odorous emissions.
Dust emissions	Dust generation from truck and vehicle movements	• Vehicle speeds restricted on site • all trafficable areas are to be sealed • water sprays / hoses used as required on high-risk days (dry / windy weather) • minimise generation of dust in trafficable areas by removing loose material regularly (e.g., via street sweeper, FEL etc.)

	Material stockpiling and handling	• For stockpiles:
		  ○ All materials (except unprocessed RAP) to be stored in covered three-sided bays
		  ○ Heights of RAP stockpiles monitored and maintained below height of shields,

Hazard	Activity / Hazard Source	Safeguards and Mitigating Measures
		○ Processed RAP material generally stored in three-sided covered bunkers ○ When conditions require it (e.g., dry and windy days) measures during stockpiling will be taken to minimise dust including keeping stockpiles wet, placement of stockpiles in protected areas, and minimising the height of stockpiles. ○ Additional dust suppression shall be provided by extra water sprayers or a water cart if dust mitigation controls are deemed not adequate. ○ Minimise generation of dust in trafficable areas by removing loose material regularly (e.g., via street sweeper, FEL etc.) • During material loading / unloading ○ Avoid dropping materials from heights, ○ Water sprays/hoses used as required. ○ Any spillages of materials outside bunkers be cleaned up as soon as practicable.
	Crushing (RAP and glass)	• Crushing and screening will be undertaken within covered three-sided shed. Water sprays shall be applied to feed material via crusher sprays as required to minimise dust generation • Avoid crushing operations on days of excessive winds.
	Glass fines storage	• Store glass only within 3-sided storage bunkers with approx. 3 m high walls • Water sprinkler system can be used on windy days to create a damp crust on the surface of glass fines to better hold any coarse sand sized particles within the bulk glass material. • Minimise generation of glass dust in trafficable areas by removing loose glass including glass dust regularly (e.g., via street sweeper)
	Operating Asphalt Plant	• Covered incline conveyor, sealed baghouse (all dust captured and recycled into the batching process)
	Storage (silo) / handling of filler	• Deliveries in responsible manner - sealed hoses, emergency systems to prevent overfilling. Filter to prevent dust escaping during filling. Spillages cleaned up in timely manner

In addition to the safeguards listed in Table 7-1, the following monitoring and contingency measures will be applied as described in the draft site EMP (Appendix D):

- Observations of dust will be incorporated into the weekly environmental inspection.
- As per the Fulton Hogan *Incident and Emergency Response Flowchart – Extreme Dust*, where significant risk of offsite dust impact is identified (e.g. high wind days, visible dust plumes) the following shall be considered for implementation:
    - In the event of hot, dry, windy conditions where dust generation from a particular activity cannot be practically avoided, this activity shall cease, and non-dust-generating activities only will be undertaken.
    - Where uncontrolled dust or emissions are observed and the source cannot be immediately rectified, the SEQ Advisor and/or Environmental Advisor is to be notified. This shall be recorded in CAMs (Fulton Hogan incident reporting system) and the source shall be identified and remedied.

7.2.6. Conclusion

Whilst the proposed facility will present a number of sources of air emissions, it is expected that emissions from the facility will make minimal impact to ambient air quality and that objectives for relevant indicators (e.g., PM10, PM2.5, visible reducing particles and odour) defined in the ERS. Further, given separation distances to sensitive receivers and with the safeguards and management measures listed below it is expected that risks to offsite receivers will be low.

Dust has the potential to be generated at the proposed batch plant from several sources including the production of asphalt and the handling, processing and storage of processed and unprocessed aggregates, RAP (including crushed rock) and glass. With the appropriate engineered controls including:

- semi-enclosed material storage bunkers
- appropriate wind shielding,
- dust suppression infrastructure
- site layout, and
- preventative controls including appropriate watering of outdoor stockpiles and processing areas and cleaning of haul roads

the risk of significant amounts of dust mobilising off-site and impacting on neighbouring properties or sensitive receptors is generally considered low.

Risk of odour impacts beyond 350 m are likely to be low; given the nearest sensitive receivers are 650 m from the site it is unlikely odour impacts will occur.

7.3. Green House Gas Assessment

7.3.1. Relevant legislation

The *Climate Change Act 2017* came into effect on 1 November 2017 and sets Victoria's legislative framework for action on climate change. Section 17 of the *Climate Change Act 2017* states that "*Decision makers must have regard to climate change*" and sub sections 17(2), (3) and (4) require decision makers to have regard to greenhouse gas emissions and climate change impacts.

SEPP (AQM) requires that generators of greenhouse gas emissions avoid and minimise emissions in accordance with the waste hierarchy, pursue continuous improvement and apply best practice to the management of emissions.

7.3.2. Greenhouse gas emissions sources

Greenhouse gas emissions are categorised into direct and indirect emission sources as defined by the *National Greenhouse and Energy Reporting (NGER) Act* and the Greenhouse Gas Protocol (WRI and WBCSD, 2012). The NGER Scheme and the Greenhouse Gas Protocol classify direct emissions into Scope 1 and indirect emissions into Scope 2 and Scope 3 as follows:

- Scope 1: Direct greenhouse gas emissions
- Scope 2: Indirect greenhouse gas emissions from purchased electricity
- Scope 3: Other indirect greenhouse gas emissions

Scope 3 emissions were excluded from this assessment as they are not relevant to the proposed activity.

A review of potential greenhouse gas emission sources at the site associated with the combustion of fossil fuels and consumption of electricity was undertaken. The review identified electricity and diesel consumption from the operation of the asphalt batch plant, front-end loaders, trucks, the glass crusher plant, office and workshop facilities and other plant and equipment as the primary sources of energy use and greenhouse emissions at the site.

7.3.3. Melbourne Renewable Energy Project (MREP2)

Fulton Hogan is a member of the second Melbourne Renewable Energy Project (MREP2), an initiative that combines the purchasing power of a group of Melbourne's most prominent universities, manufacturers and businesses to support renewable energy. Fulton Hogan, together with six other members, have entered a long-term agreement to purchase renewable energy generated by off-site renewable energy sources. This will lead to Fulton Hogan (and other member sites across Melbourne) being powered using zero carbon renewable energy. This electricity will be primarily sourced from Pacific Hydro's 28.7MW Yaloak South wind farm. The group is purchasing 100% renewable energy, which is considered carbon neutral under the Australian Government's Climate Active program.

7.3.4. GHG calculations for Warrnambool Asphalt Batch Plant

Estimates for expected gas, diesel and electricity consumption were used in calculating CO_2-e emissions using Version 1.2 of the Australian Government's Clean Energy Regulator Emission and Energy Threshold Calculator.

The total energy use and Greenhouse Gas (GHG) emission calculations were based on calculations undertaken by Fulton Hogan to understand the reduction in energy use from changes associated with establishing the new site at Warrnambool compared to the existing batch plant, also in Warrnambool.

The existing Warrnambool asphalt batch plant has a production rate of 50 asphalt tonnes/hr using a burner rated at 33.76 GJ/hr. The nominal production rate of the proposed plant is expected to be 100 asphalt tonnes/hr, with burner rating of 37.90 GJ/hr, which is anticipated to reduce production hours and therefore gas burn by approximately 45%. This reduction in gas burn from 0.360 GJ/tonne to 0.201 GJ/tonne will result in a drop in CO2 emissions caused by gas burn from 18.5 kg CO2/tonne to 10.4 kg CO2/tonne.

An estimated 0.227 GJ of total energy use per tonne of asphalt productions was calculated based on gas consumption rating of the burner in the new batch plant and electricity usage which was assumed to be similar to the existing Warrnambool plant.

Maximum production amounts for the new plant are upwards of 50,000 tonnes per annum and therefore maximum total energy use for the plant is upwards of 11,350 GJ; made up of:

- 1,300 GJ of electricity and
- 10,050 GJ of natural gas.

Estimated total emissions for the proposed Warrnambool plant, calculated using the Energy Threshold Calculator (refer to outputs at Table 7-2), are 872 t CO_2-e with the breakdown as follows:

- 518 t CO_2-e for non-transport related natural gas related emissions; and
- 354 t CO_2-e for electricity related emissions.

Fulton Hogan's operation at the proposed Warrnambool asphalt batch plant is expected to have a negligible impact on climate change. Direct combustion in the manufacturing industries and construction sector in Victoria contributed an estimated 4.8 Mt CO2-e of GHG emissions in 2018. The average annual emissions from the proposed Warrnambool batch plant are estimated at approximately 0.00087 Mt CO2-e or 0.018% of Victoria's contribution to direct combustion in the manufacturing industries and construction sector.

The above assessment does not consider that the electricity will be purchased through the Melbourne Renewable Energy Project and will therefore be carbon neutral as discussed in Section 7.3.4. Further, the above assessment does not consider the net CO_2-e benefit generated by the production of RAP products. A study in the Netherlands (Bizarro *et.al* 2021) estimated the carbon footprints of asphalt mixtures with increasing RAP content using a life-cycle assessment methodology. A potential carbon footprint reduction of between 55% and 64% was found for one tonne of asphalt containing 93% RAP and produced at 105°C compared to the 0% RAP mixture produced at 175 °C (the study noted that considering the uncertainty of this technology the reduction could be as low as 45% or as high as 79%).

Table 7-2 Annual GHG calculations

CORPORATION EMISSIONS & ENERGY CALCULATOR

DATA AS ENTERED

	Scope 1 emissions	Scope 2 emissions	TOTAL EMISSIONS	ENERGY CONSUMED	ENERGY PRODUCED	DAYS COVERED
Facility 1	518	354	872	11,350	0	365
Facility 2	0	0	0	0	0	365
Facility 3	0	0	0	0	0	365
Facility 4	0	0	0	0	0	365
Facility 5	0	0	0	0	0	365
Facility 6	0	0	0	0	0	365
Total for corporation - as entered	518	354	**872**	**11,350**	**0**	

FULL-YEAR DATA

	Scope 1 emissions	Scope 2 emissions	TOTAL EMISSIONS	ENERGY CONSUMED	ENERGY PRODUCED
Facility 1	518	354	872	11,350	0
Facility 2	0	0	0	0	0
Facility 3	0	0	0	0	0
Facility 4	0	0	0	0	0
Facility 5	0	0	0	0	0
Facility 6	0	0	0	0	0
Total for corporation - full year	518	354	**872**	**11,350**	**0**

ANNUAL REPORTING THRESHOLDS

	EMISSIONS THRESHOLD	ENERGY CONSUMED THRESHOLD	ENERGY PRODUCED THRESHOLD
Facility 1	Not met	Not met	Not met
Facility 2	Not met	Not met	Not met
Facility 3	Not met	Not met	Not met
Facility 4	Not met	Not met	Not met
Facility 5	Not met	Not met	Not met
Facility 6	Not met	Not met	Not met
Corporation	**Not met**	**Not met**	**Not met**

7.3.5. Best practice energy and greenhouse gas management

Fulton Hogan has selected an asphalt batch plant with a high efficiency burner that emits significantly lower CO_2 per tonne of asphalt production than the existing batch pant at Warrnambool. The selected batch plant also allows for low temperature asphalt production which produces comparatively lower CO_2 emissions. Fulton Hogan also proposes to implement a number of practices and management systems to reduce the site's energy consumption as far as practicable onsite including to:

- Design, construct and operate the site in a way that will achieve an acceptable balance of minimising energy and water use and waste generation.
- Design, construct and operate the site to comply with the Protocol for Environmental Management 'Greenhouse Gas Emissions and Energy Efficiency in Industry'.
- Consider electricity and fuel efficiency and whole of life costs, including electricity and fuel consumption, when purchasing new plant and equipment.
- Maintain equipment to manufacturer specification
- Only using plant and equipment when required with vehicles not left idling.
- Integrate sustainability in purchasing decisions.
- Undertake energy audits regularly to identify energy efficiency and conservation opportunities.

7.3.6. Conclusion

Fulton Hogan's operation at the proposed Warrnambool asphalt batch plant is expected to have a negligible impact on climate change. The average annual emissions from the proposed plant are estimated at approximately 0.018% of Victoria's contribution to direct combustion in the manufacturing industries and construction sector. This assessment does not consider the use of carbon neutral electricity, or the net CO_2-e benefit generated by the use of RAP products. Further, the Warrnambool plant is a replacement operation for an existing operation within the Warrnambool area which is significantly less efficient in terms of energy use (this plant will be decommissioned at the commencement for the new site operations). As such the proposed plant will emit significantly lower CO_2 emissions than the existing plant.

8. WATER QUALITY

8.1. Relevant legislation and guidance

Relevant policy and guidance referred to and considered in the following assessment of risks to water quality includes Part 5 (Water) of the ERS which lists the environmental values of water environments in Victoria and describes the environmental quality that is needed to achieve and maintain these values. Part 5 of the ERS largely adopts the segments, environmental values (beneficial uses), indicators and objectives from the State Environment Protection Policy (Waters) (SEPP (Waters)), parts of which continue to provide guidance for the GED and may inform EPA's actions and expectations.

Under the *Environment Protection Act 2017*, SEPP (Waters) is no longer subordinate legislation and has been replaced by the ERS and the Environment Protection Regulations 2021 (the Regulations). Some parts of SEPP (Waters) that have not been translated into the ERS, Regulations or guidance will still provide relevant knowledge under the new environment protection framework.

EPA guidance considered includes:

- EPA Publication 978 - Reducing Stormwater Pollution – A guide for Industry
- EPA Publication 1730 - Solid storage and handling guidelines
- EPA Publication 1698 - Liquid storage and handling guidelines

8.2. Potential Impacts

Potential impacts to surface water resulting from stormwater run-off include:

- Spill and leaks from bituminous products especially during handling (e.g. transfer from truck to tank and vice-versa)
- Sediment (as fine material from aggregate, RAP and glass) becoming entrained in run-off.
- Gross debris such as uncontained litter, reject waste from various waste and material streams becoming entrained in run-off.
- Chemical / biological pollution sources including nutrients, microbes, oxygen demanding substances, pH (acidity) as leachate from rainwater percolating through unprocessed waste glass feedstock and glass waste.
- Run off or leachate from stockpiles of RAP containing elevated levels of metal or hydrocarbon contaminants.
- Spills and leaks of fuels and oils from plant and machinery (including refueling activities) and their migration off site also pose a risk to stormwater runoff.

With the exception of sprayed water to be applied to the feed material during RAP crushing and negligible volumes of water to be used in the batch plant foaming unit, the site will not use water as part of material processing. Water will be used as dust suppression on material stockpiles during windy days to create a damp crust on the surface of fines materials in the bunkers. However, volumes of water used in dust suppression will be limited so water does not permeate through the surface of the material stockpiles and wet the product or saturate the material and cause excess runoff.

8.3. Safeguards and Management Measures

The draft site EMP (Appendix D) and the Environmental Risk Assessment (Appendix H) recognise the risks to water quality from onsite activities and outline control measures to be implemented to reduce these risks appropriately.

The majority of the site will be asphalt sealed; areas that are not will be of a semi permeable hardstand. Appendix E (drawing TP10) shows a concept drainage plan for the site; whilst still under development, key features of the drainage system will include:

- Drainage and capture of runoff from the site directed (via swales and/or pit & pipe system) to the on-site stormwater treatment system (e.g., triple interceptor)
- The tank farm and adjacent loading slab will be bunded and bund outlets will be closed by default. All water captured in this bunded area will only be authorised for discharge if deemed free of oily residue or any other pollutants upon visual inspection (i.e. no sheen or slick visible). The bunds are to be managed so that standing water is minimised and the capacity of the bund is maintained. Bund water may require treatment before being discharged to the on-site stormwater treatment system (or may be diverted as trade waste).
- The on-site stormwater treatment system will discharge to the subdivision drainage system and retarding basin.
- All water generated at the truck washdown bay will be captured, treated (e.g., via an 'ultraspin' treatment system) and discharged as per an approved Trade Waste Agreement issued by Wannon Water. The site will have appropriate controls in place to ensure minimal contaminants as far reasonably practicable will enter the trade waste system. Only process water generated from washing operations may enter the trade waste system. All other water generated on site will be diverted and treated as described above.

The site stormwater treatment system will be designed to remove a range of pollutants potentially generated from the asphalt plant prior to discharge to the subdivision stormwater system; including.

  - Fine particulate material originating from aggregates, sand, glass and RAP etc
  - Hydrocarbons including fuels and oils
  - Gross pollutants hard rubbish (paper etc.).

Other management measures will include:

- Additional use of 'drain wardens', geotextiles or rock logs to divert water around drain entry pits or to protect pits as required.
- Materials that migrate from stockpiles onto roads or are spilled will be swept up regularly to avoid them entering stormwater drainage.
- Hard stand surfacing is to be maintained so that mud and loose material tracked onto the surface does not become a stormwater pollutant.
- Refueling of plant and equipment is to occur in accordance with the draft site EMP (refer also to Section 14.2.2)
- All fuels, oils and chemicals to be stored appropriately in bunded areas.
- Appropriate numbers and types of spill containment kits will be positioned at appropriate locations on site. All personnel will be made aware of the location of kits and trained in their effective deployment.

8.4. Conclusion

With the implementation of appropriate safeguards and management measures outlined in Section 8.3, the risk of significant impact to offsite surface waters from stormwater runoff is considered low.

As per the ERS (Part 5 - Water), environmental values do not apply to waters within stormwater drains.

9. NOISE

9.1. Relevant legislation and guidance

Part 3 (Ambient Sound) of the ERS sets out environmental values, land use categories, indicators and objectives that serve as a benchmark for assessing ambient sound in Victoria.

In accordance with Table 3.2 of the ERS, the site is categorised as Category 1 Land use (urban form with distinctive features or characteristics of taller buildings, high commercial and residential intensity and high site coverage). Category 1 Land use indicators and objectives are:

- Outdoor $L_{Aeq,8h}$ from 10 pm to 6 am – 55 dB(A)
- Outdoor $L_{Aeq,8h}$ from 6 am to 10 pm – 60 dB(A)

The ambient sound environmental values in the ERS have been adopted from the beneficial uses in the State Environment Protection Policies (SEPP) for noise. These beneficial uses are sleep during the night, normal domestic and recreational activities and normal conversation, which come from SEPPs including:

- SEPP (Control of Noise from Commerce, Industry and Trade) No. N-1 (SEPP N-1) (Victorian Government, 1989)

Childhood learning and musical entertainment are additional values included in the ERS.

The noise limits and obligations of the SEPPs, including SEPP N-1 do not form part of the ERS and are not related to the ERS indicators or objectives. Instead, the EP Regs set noise limits and assessment methods for noise emitted from industry (and entertainment venues and events).

EPA publication *Noise limit and assessment protocol* (publication 1826) (the Noise Protocol) is the Incorporated Nosie Protocol of the EP Regs and provides guidance to assess risk of noise emission from industrial premises. Table A.3 of the Noise Protocol lists Warrnambool local government area (which includes the subject site) as a 'Major Urban Area' and therefore has specific noise limits for commercial, industrial and trade premises.

9.2. Potential Impacts

Noise emissions from the proposed Warrnambool facility may arise from both mobile and fixed machinery including movements of transport vehicles entering and leaving the site. Examples of noise sources include:

- Operation of asphalt batch plant including:
    - operation of drum kiln
    - operation of stack exhaust
    - operation of vibrating screen
    - trucks loading under silos.
- Trucks entering and leaving the site.
- Operation of front-end loaders
- Crushing and screening of RAP and glass.

Audiometric & Acoustic Services undertook an environmental noise assessment for the proposal, which included background measurements at the nearest residential noise sensitive receivers to the subject site. The assessment followed guidelines and methodology in the Noise Protocol for setting noise limits at nearest sensitive receivers according to the 'Urban area method', determined predicted effective noise levels at those receivers and compared them with the Noise Protocol limits.

The assessment modelled sound pressure from the simultaneous operation of multiple noise generating plant and activities such that 'worst-case' (i.e., highest noise) scenarios were modelled. Modelled scenarios included with and without operation of the crusher noting that the crusher may only be operated on a limited basis. The modelling included assessment of octave band frequencies as recorded at the analogous Fulton Hogan asphalt plant in Dandenong South and batch plant manufacturer supplied data to help determine the tonal characteristics of the noise from the proposed facility. Relevant adjustments were made for tonal characteristics and predicted effective noise levels were calculated accordingly.

The assessment focussed on the two nearest sensitive noise receivers as follows:

- 140 Boiling Down Road, Warrnambool, approximately 650 m from the proposed site within the Farming Zone (FZ),
- 21 Veal Road, Warrnambool, approximately 700 m from the proposed site within the Rural Living Zone.

The Noise Protocol prescribes different levels for different times of the day; these periods are defined in the EP Regulations as follows:

Monday to Saturday:

- Day 0700 – 1800 hours
- Evening 1800 – 2200 hours
- Night 2200 – 0700 hours

Sunday and Public Holidays:

- Evening 0700 – 2200 hours
- Night 2200 – 0700 hours

The assessment considered the operating hours expected for the various plant and activities at the site (refer Section 6.6).

As per Table 9-1, noise levels at the two nearest sensitive receivers are expected to comply with relevant noise limits for each time period, with and without the crusher in operation. The exception is noise levels predicted at NSR2 during the night period, which are at or slightly exceed the noise limit (43 db(A)). Compliance for this period is noted as 'marginal' in the noise assessment at Appendix I and implies that noise impacts from the proposed facility at NSR2 are possible during the night period (i.e., 10pm to 7am). As per Section 9.3, noise monitoring will be undertaken during commissioning (or early in the operations phase) to confirm noise levels at the nearest sensitive receivers (including NSR2).

Table 9-1 Predicted effective noise levels and noise limits for NSR 1 and NSR 2 (based on Appendix I).

	Predicted effective noise level, dB(A) (with crusher operating)	Predicted effective noise level, dB(A) (without crusher operating)	Noise limit, dB(A)	Compliance Yes/No
NSR1				
Day (0700 – 1800)	54	44	56	Yes
Evening (1800 –2200)	NA	44	49	Yes
Night (2200 – 0700)	NA	44	44	Marginal
NSR2				
Day (0700 – 1800)	48	44	54	Yes
Evening (1800 –2200)	NA	44	48	Yes
Night (2200 – 0700)	NA	44	43	Marginal

NA – Not applicable; crusher will not operate during this period.

9.3. Safeguards and Management Measures

As per the noise assessment at Appendix I and Table 9-1, noise from the proposed facility is expected to generally meet relevant noise limits at the nearest sensitive receivers; with the exception of marginal compliance during the Night period. A number of standard noise management measures will be implemented on site as listed below.

To confirm compliance with noise limits at the nearest noise sensitive receivers (including NSR2), noise monitoring will be undertaken during the commissioning phase (or early in the operation phase) of the project. If relevant noise limits are exceeded and impacts from noise are confirmed, additional onsite controls to manage noise impacts will be investigated.

To mitigate potential noise issues, the following specific controls are to be implemented as per the draft site EMP (Appendix D):

- Ensuring all machinery is well maintained
- Do not leave vehicles unnecessarily idling and be conscious of revving and reversing (in vehicles / plant with reversing beepers) during noise sensitive hours (evening and night).
- Materials to be delivered preferentially during daylight hours
- Scheduled maintenance of fixed plant and daily pre-starts on all plant and machinery,
- Fit and maintain appropriate mufflers on mobile equipment as appropriate.
- Selection of machinery or works practices which produces less noise.
- Schedule noisy activities to the less sensitive periods of the day
- No dropping material from unnecessary heights. Driver /operator behaviour training.
- Site laid out for efficient truck movement and material handling.

Works undertaken will be conducted to minimise the environmental impacts associated with noise and vibration. The Fulton Hogan processes '*Manage Environmental Noise - Process – Au'* and '*Manage Vibration - Process – Au*' will be used to further guide the development and refinement of the site EMP.

9.4. Conclusion

Based on the noise assessment at Appendix I, offsite noise impacts, including impacts to the nearest sensitive receivers are considered unlikely. Confirmation monitoring during the commissioning phase (or early operation phase) will be undertaken to confirm there are no exceedances of noise limits and associated noise impacts.

Given that the nearest sensitive receptor (residential property) is approximately 650 m from the site (refer Figure 5-8) and the site and land surrounding the site is industrially zoned, significant offsite noise impacts are not considered likely. Regardless, the management measures in Section 9.3 will be employed to further reduce risks and manage noise impacts if they eventuate.

It is expected that Category 1 Land use indicators and objectives within the ERS are likely to generally be achieved.

10. WASTE MANAGEMENT

10.1. Waste Framework - Waste resource recovery

The site will receive multiple waste streams and beneficially recycle them to produce valued products. The site will utilise these waste products to create saleable road paving and construction materials, embracing the environmental protection principles of the EP Act and reversing the waste hierarchy by taking waste material disposed from several sources and treating them to be beneficially reused by others.

Table 10-1 provides an overview of the types of waste that will be imported to the site for resource recovery. Table 10-1 also shows EPA waste codes and classification as per Schedule 5 of the EP Regs 2021. As industrial wastes, RAP and waste glass will be imported to site up to the maximum quantities indicated in Table 10-1 in accordance with the relevant prescribed permission activities and permissions as described in Section 1.2.

Table 10-1 Wastes for resource recovery and EPA classification

Material	Amount per year (tonnes)	Source	Description	Waste Code (schedule 5 of EP Regs 2021)	Waste Classification
Reclaimed Asphalt Pavement (RAP) and Crushed Rock	30,000	Mostly from Fulton Hogan / South Western Alliance road works in Barwon South West region.	Unprocessed material comprising milled asphalt from road resurfacing works etc. Can also comprise significant amounts of crushed rock. Expected to contain very low contamination levels (e.g. plastics, metal or wood).	Y140	Industrial Waste
Waste Glass	5,000	Local council kerbside recycling programs (i.e., collection of glass packaging from households and businesses).	Unprocessed container glass cullet (from bottles, jars etc). Expected to contain up to 150 tpa of contamination, e.g., metal bottle lids and paper labels.	Z100	Industrial Waste

There are no priority wastes or reportable priority wastes to be imported to site (or generated at the site) (with the exception of minimal volumes of waste oil, oil filters, oily rags, dirty containers etc associated with maintenance and repairs of plant and machinery).

Processed RAP/ crushed rock and glass materials are to be blended with other materials (e.g. bitumen) as part of the asphalt batching process (and in the case of glass sand, sold as an unblended product) for use offsite under the EPA *Determination for Recycled Aggregates* (the Determination) made under Regulation 5(3)(a) of the EP Regs 2021.

Processed RAP/ crushed rock and glass materials will be used on site as feed material to the asphalt batch plant and sold to customers for offsite use in accordance with the conditions and limitations of the Determination (as published in the Victorian Government Gazette).

The Determination includes the following condition (clause 6 (2)):

> *The waste receiver must only receive recycled aggregates for the purpose of building or construction works.*

Use of the processed materials within the asphalt batching process and provision of the materials to third party customers will be for the purposes of building and construction works. While the product will be blended with other material (e.g., bitumen and virgin aggregates) at the batch plant, there will be no significant change to the physical or chemical properties on the product. Further, the intention of using the processed material as part of the batching process will be specifically for the purpose of building and construction works, in accordance with clause 6(2) of the Determination.

The effect of the Determination is that if recycled aggregates are received at a place or premises in accordance with the specifications set out in the Determination, then that place or premises is authorised to receive that industrial waste. Aggregates are defined in the Determination as:

- industrial waste or a mix of industrial wastes that comprise of: concrete (waste code Y100), brick (waste code Y110), glass (waste code Z100), asphalt (waste code Y140), natural rock or ceramics.

Specifications within the exemption that will be met prior to supply to offsite users of the product include:

- the recycled aggregates do not contain any industrial waste that is also a priority waste or reportable priority waste.
- the waste generator has:
  - so far as reasonably practicable, removed from the recycled aggregates all industrial wastes that are not recycled aggregates including plastics, metal or wood; and
  - for recycled aggregates other than glass, crushed or processed the recycled aggregates so as to make them suitable for use as an aggregate in building or construction works; and
  - for recycled aggregates that contain glass – removed, so far as reasonably practicable, all combustible contaminants; and crushed or processed the glass into glass sand so as to make it suitable for use as a substitute for sand in building or construction works.

All other specifications, conditions and limitations within the Determination will be met.

10.2. Waste generated on site - potential impacts

The following waste streams will be generated on site:

- Contamination in RAP segregated on site (gross contamination including plastic, wood etc)
- Contamination in glass segregated on site (gross contamination including plastic, paper, metal, organics etc)
- Waste from maintenance activities onsite including reportable priority waste (e.g. oily rags, waste oil)
- Office and other – general waste (printing and copying, food and drink packaging, cigarette butts etc)

As per Section 1.2, gross contaminants such as plastic, paper, and organics that are imported to site as contaminants in glass (and possibly RAP) will be received on site under prescribed permission activity A13(c) (Waste and resource recovery - small).

Risks from waste include:

- Potential for waste to disperse into the surrounding environment, impacting soils, water, biodiversity and amenity.
- Waste separated from glass material is potentially combustible when stored inappropriately, Putrescible contaminants in this material also present a potential odour risk. These risks increase as amounts of this waste stored on site increase.
- Incorrect separation and/or classification of waste resulting in human health and environment risks as well as lack of compliance with waste regulations.

10.3. Safeguards and Management measures

The Warrnambool plant will receive a range of Industrial Wastes (RAP, crushed rock and glass) that will be processed for subsequent beneficial use off site in accordance with the EPA Waste Framework as per Section 10.1. Management of the risks associated with handling, storing and processing of these wastes are described within this document.

Contaminants such as plastic, paper, metal and organics that are segregated from the useable waste streams, as well as those wastes generated on site (from offices and workshop etc) will be managed in accordance with the draft EMP (Appendix D) and controls identified in the Risk Assessment at Appendix H; management measures will include:

- Waste imported to site (RAP and glass) for processing will be handled, stockpiled and processed in accordance with management measures described in the Development Licence application
- All incoming RAP and glass loads will be inspected and excessively contaminated loads rejected. Rejected loads will be managed as follows:
    - Excessively contaminated loads from Fulton Hogan trucks / contractors (i.e., for RAP) will be accepted to site and will be managed in accordance with Fulton Hogan waste management procedure *Manage Waste AU* which identifies relevant classification, storage, transport and tracking of waste.
    - Excessively contaminated loads that arrive to site from non-Fulton Hogan contractors / sources will be rejected and remain under the ownership and responsibility of the external contractor / supplier.

- Contaminants in glass stream will be separated during glass crushing process.
- For waste that is separated from RAP and glass material streams:
  - Volumes of potentially combustible contaminants stored on site (e.g. paper, organics etc) will be minimised. This waste will be removed from site regularly by council trucks that have delivered waste glass to site.
  - Contain in covered bins / bays to avoid runoff.
  - Combustible waste will not be stored near other fuel or ignition sources
  - Regular site inspections will include inspections of this waste storage.
  - Refer to Section 14.2.3 for further discussion on fire risk management.
- Implement the waste hierarchy (Avoid, Reduce, Reuse, Recycle) to minimise waste to landfill
- Waste streams shall be identified and segregated with appropriate bins for disposal.
- Disposal of minimal volumes of reportable priority waste (hydrocarbons, oil filters, oily rags, dirty containers etc) must only be taken offsite to facilities that are licenced to accept that waste stream, in accordance with EPA waste guidelines.
- All reportable priority waste disposed of from the site shall be transported by a licenced carrier and shall be taken to a place lawful to accept that waste
- All tracking and reporting requirements for waste will be undertaken.
- EPA Waste Certificates must be kept as records of proper disposal. Waste oil filters and oily rags are to be segregated from general waste and disposed of in the oil filters and oily rags bins. Certificates must be retained for 7 years.

10.4. Conclusion

With appropriate safeguards and management measures as described in Section 10.3, risks from waste imported, processed and generated on the site are considered low.

11. WATER

With the exception of small volumes of sprayed water to be applied to the feed material during glass and RAP crushing, the proposed facility will not use significant volumes of water as part of systems and processes. Water will be used as dust suppression via yard sprinkler and/or hoses. Typically, dust suppression will only be used on windy days, when there is an increased chance of wind-borne dust being carried offsite, to create a damp crust on the surface of fines materials in the bunkers. It is not desirable for water to permeate through the surface of the material stockpiles and wet the product nor to saturate the material and have excess runoff.

It is difficult to quantify accurately the amount of water to be used in dust suppression activities at the site as this will vary considerably depending on weather, volumes of materials on site during dry weather and wind conditions amongst other variables. As an upper estimate, the following is assumed:

- Multiple hoses and sprinklers run concurrently may use up to 5 L/s of water.
- Days per month the system is turned on (for up to 8 hours per day) = 2 days
- Maximum daily water use is (5 L/s x 3600 x 8 hours) / 1000 = 144 kL/day or annual maximum water use of 3,456 kL/year.

Office and amenity water use is estimated at up to 50 L/day per employee. The proposed facility will have typical daily staff of up to 30 people, equating to a demand of 1,500 L/day. Allowing for 8 staff to also have a daily shower up to 10 mins at 6 L/min, the daily water use will be 1,980 L/d and 1,027.5 kL/year. In total the maximum annual water use demand for the site is up to 4,483.5 kL/yr.

It is noted that water demands for landscape watering and additional dust suppression activities (e.g. via water cart or hose) will likely be met by rainwater collection from rooves of the various covered material storage areas that will be stored in multiple rainwater storage tanks (indicative 50 kL size); the overflow is to be connected to Wannon Waters' rain water harvesting system. This initiative sees rainwater being collected from rooftops in new residential or industrial subdivisions and transported through pipes to an existing raw water storage. The water is then treated at the Water Treatment Plant and becomes part of the drinking water supply.

12. LAND AND GROUNDWATER

12.1. Relevant Legislation

Relevant policy and guidance referred to and considered in the following assessment of risks to ground water includes Part 5 (Water) of the ERS which lists the environmental values of water environments in Victoria and describes the environmental quality that is needed to achieve and maintain these values. Part 5 of the ERS has largely adopted the segments, environmental values (beneficial uses), indicators and objectives from the SEPP (Waters).

Under the *Environment Protection Act 2017,* SEPP (Waters) is no longer subordinate legislation and has been replaced by the ERS and the Environment Protection Regulations 2021(the Regulations). Some parts of SEPP (Waters) that have not been translated into the ERS, Regulations or guidance will still provide relevant knowledge under the new environment protection framework.

EPA guidance considered here also includes:

- EPA Publication 978 - Reducing Stormwater Pollution – A guide for Industry
- EPA Publication 1730 - Solid storage and handling guidelines
- EPA Publication 1698 - Liquid storage and handling guidelines

While the definition of land in section 35 of *the Environment Protection Act 2017* (with respect to contaminated land) includes groundwater, the ERS addresses groundwater as part of the water environment. Part 4 of the ERS (Land) largely adopts the land environmental values (beneficial uses), indicators and objectives from the State Environment Protection Policy (Prevention and Management of Contamination of Land) (SEPP (PMCL)). SEPP (PMCL) also included clauses related to the application of the environmental values, indicators and objectives in specific circumstances. These include circumstances such as planning decisions, licensing and remediation activities. These clauses have not been included in the ERS, but where relevant, they have been included in the Environment Protection Regulations 2021 (the Regulations) or updated in guidance documents.

12.2. Potential Impacts

Potential impacts to land and groundwater include:

- Spill and leaks associated with delivery, storage, and handling of bituminous products
- Spills and leaks from handling and storage of fuels and chemicals
- Spills and leaks of fuels and oils from plant and machinery (including refueling activities).
- Leachates from stockpiles of RAP and glass stored outside

Spills and leaks of hydrocarbons (including bitumen and diesel) pose a risk to groundwater if they are not remediated appropriately.

Stockpiled unprocessed RAP, when uncovered, can be infiltrated by rainfall. The amount of infiltration varies depending on the crust that is formed on the surface of the stockpile which in turn can depend on factors such as the age of the stockpile (RAP tends to form a crust over the first 200-250 mm of pile depth and this crust tends to help shed water).

While RAP's principal component is the mineral aggregate (~95%, by mass), it does contain aged asphalt (~5%, by mass), and over a road's lifetime the surface comes into contact with external depositions, including those from vehicles (e.g., brake pads/tire dust, fluids) and maintenance practices (e.g., sealants, traffic markings) which can in turn contain metals and PAH's. The release of the majority of metal and polycyclic aromatic hydrocarbons (PAH) contaminants is likely to be low to

non-detectable in RAP materials with concentrations in the leachate well below environmental limits or values of toxicological concern (Mehta et.al. 2017). However, it is acknowledged that constituents, and potentially contaminants in RAP can vary and that studies suggest that in some instances RAP can contain elevated leachate concentrations (Spreadbury et al. 2021).

Given the relatively small volumes of RAP to be stockpiled on site, and that processed RAP will be stored undercover and on an impermeable pad, significant risks to groundwater are unlikely.

12.3. Safeguards and Management Measures

The draft EMP for the subject site (Appendix D) and the Environmental Risk Assessment (Appendix H) recognises the risks to land groundwater from onsite activities and outlines control measures to be implemented to reduce these risks appropriately.

The following measures will be implemented to reduce risk to land and groundwaters appropriately:

- The majority of the site is on an impermeable concrete pad.
- For unprocessed RAP stockpiles on semi-permeable hardstand, there is an inherently low likelihood of significant concentrations of contaminants.
- Refueling of plant and equipment is to occur in accordance with the site EMP (refer to Section 14.2.2)
- Appropriate numbers and types of spill containment kits will be positioned at appropriate locations on site. All personnel will be made aware of the location of kits and trained in their effective deployment.

12.4. Conclusions

With the management measures and safeguards described in Section 12.3, risks to land and groundwater are considered low.

13. CLIMATE CHANGE IMPACTS

The *Climate Change Act 2017* came into effect on 1 November 2017 and sets Victoria's legislative framework for action on climate change. Section 17 of the Climate Change Act 2017 states that "*Decision makers must have regard to climate change*" and sub sections 17(2), (3) and (4) require decision makers to have regard to greenhouse gas emissions and climate change impacts.

It is noted that there is no specific ERS indicator or objective for the environmental value for climate change.

Victoria's climate has changed, and this is expected to continue in coming decades with increasing average temperatures, decreases in average rainfall, and higher frequencies and intensities of extreme weather events.

The Climate Projections Data Sheet for the Barwon South West region (DELWP 2015) provides projections of changes in climate variables against different possible future emissions scenarios. Under a high emission scenario (i.e., the same scenario experienced for the ten years up to 2015) modelling projects increases in yearly temperatures (by 0.5 to 1.20^{o}C), decreases in yearly rainfall (by 11.95 to 2.65%) and an increase in wind speed (by 0.39%) by the year 2030. These changes toward a warmer, drier and slightly windier climate have the potential to exacerbate dust impacts on and off site as periods of prolonged dry weather can reduce moisture content of the materials (i.e., RAP and glass) making them more easily windborne.

These potential changes will be identified by site operators from sources such as regular environmental inspections and audits. This will in turn allow for corrective actions to be implemented that may include increased frequency or amount of dust suppression activities or changes to engineering controls such as augmentation of wind screening. As per Section 9 of the Fulton Hogan Draft Site EMP (Appendix D), environmental management on the site will be reviewed on an annual basis and the EMP will be updated to reflect changes to management measures identified.

DELWP (2015) projects sea levels at Port Fairy to rise by approximately 0.12 to 0.13m and 0.33 to 0.40m by the year 2030 and 2070 respectively (under a continued high emission scenario). The subject site is approximately 33 m above mean seal level (based on Google Earth elevation data) and risks from sea level rise are therefore not considered significant.

Assessment of Greenhouse Gas Emissions is provided at Section 7.3.

As a Corporation, Fulton Hogan is committed to consider climate change issues that are relevant to its operation, including greenhouse gas emissions, use of diesel operated machinery, and on-site fire risks. Fulton Hogan will implement an adaptive program of continuous improvement.

14. HUMAN HEALTH AND ENVIRONMENT RISKS

14.1. Environmental Risk Assessment

An environmental risk assessment workshop was undertaken on 1 December 2021 and included regional and site operational and environmental managers from Fulton Hogan and an SPM environmental consultant. The risk register from this workshop is at Appendix H. Risk rankings in the risk register are based on the likelihood and consequence levels in the risk assessment matrix (also at Appendix H). Pre-control risk ratings were determined for activities expected to occur during operations and then the residual risk was determined based on application of appropriate controls and mitigation measures. This risk register is specific to the proposed Warrnambool Asphalt Batch Plant and has informed this Development Licence Application. The draft site EMP (Appendix D) will be finalised and will include risks and controls identified from the risk assessment. The risk assessment is a live document and will be updated as and when the risk profile of the site and activities undertaken on site change. Controls identified to manage the risks to an acceptable level will be added to the risk assessment and the EMP and subsequently communicated to staff.

14.1.1. Summary of Human Health and Environmental Risks

The following scenarios were identified as a medium residual risk (post-controls):

- Noise disturbance to neighbors from general operation of the asphalt plant, truck and vehicle movements and operation of the crusher.
- Generation of nuisance dust from material stockpiling and handling, asphalt plant operation, truck movements and during maintenance activities.
- Odour from asphalt plant operation and delivery and storage of bituminous products
- Pollution of stormwater from sediment and hydrocarbons in runoff associated with storage and handling of bituminous products, fuels, oils and chemicals and aggregates, sand, RAP, glass and fillers.
- Contamination of soil and/or groundwater from the storage, handling and use of bituminous products, fuels, oils and chemicals (including the use of the wash bay)

All other residual risks were ranked as low risks. There were no high residual risks identified.

14.1.2. Summary of Human Health and Environmental Risk Management

As noted, with the application of appropriate controls, many risks identified were ranked as low. Those risks with a residual rating of medium will be reduced so far as reasonably practicable as follows.

Section 9.2 gives an overview of potential noise sources and the expected noise related risk from the proposed facility and Section 9.3 describes safeguards and management measures to mitigate noise associated risks. The noise assessment (Appendix I), inclusive of modelling of expected noise sources, concluded that noise limits for the two nearest sensitive receivers to the site would not be exceeded. Noise at NSR2 (approximately 700 m from the site) was predicted to meet noise limits during night periods and this will be confirmed via noise monitoring during the commissioning (or early operational) phase.

Section 7.2 provides a description of sources of fugitive dust and Section 7.2.5 describes controls to mitigate potential impacts. It is considered that the risk will be adequately managed with the proposed controls in Section 7.2.5.

Sections 8.3 describes management measures to limit risks to surface waters from sediment laden runoff and from spills and leaks of bituminous products and fuels and chemicals. With the implementation of appropriate safeguards and management measures outlined in Section 8.3, the risk of significant impact to stormwater and offsite surface waters from site runoff is considered to be limited so far as reasonably practicable. Section 12.2 describes risks to soil and groundwater from loss of containment of hydrocarbon-based materials and Section 12.3 describes safeguards and management measures to mitigate these risks as far as reasonably practicable.

In accordance with the general environmental duty, Fulton Hogan have systematically identified and evaluated risks to identify risk control measures. Identified risks and associated controls will be documented in the site EMP and which is to be treated as a live document so that newly identified risks and controls are added to the EMP as they are encountered. Regular staff training / communication allows such updates to be communicated to all staff.

14.2. Site Risks

14.2.1. Emergency Management

Incident and emergency planning and response shall be managed in accordance with Fulton Hogan's *Conduct Incident & Emergency Response Planning - Process - AU* and Manage Incident Response, Notification & Investigation - Process - AU. These processes detail how to:

- Plan for incidents and emergencies by preparing a site-specific Emergency Response Plan. This contains site specific procedures to follow in the event of emergency scenarios
- Notify required persons
- Report, and
- Undertake incident investigation.

In accordance with the requirements of these processes, an Incident and Emergency Response Plan will be developed for the Warrnambool Asphalt Batch Plant.

14.2.2. Chemical Management

Up to 200 kL of bitumen and bitumen emulsion will be stored on site in tanks within a bunded tank farm area (see drawing TP02 in Appendix E). As per Section 8.3, runoff from this area (and the adjacent loading area) will be captured and if necessary, treated before being conveyed to the sites' stormwater treatment system (before discharge to the subdivision stormwater retarding basin).

Fulton Hogan will provide notification to WorkSafe Victoria under the *Occupational Health and Safety Regulations 2017* as the site will exceed relevant storage capacity criteria under Schedule 2 of the Regulations.

Fulton Hogan will also notify the local Country Fire Authority (CFA) branch to advise that the site will store dangerous goods exceeding the relevant criteria in the *Fire Protection Quantity the Dangerous Goods (Storage and Handling) Regulations 2012.* It is expected that the CFA will subsequently attend

the site once notified and review site documentation, controls, storage and provide advice as required.

Relatively small volumes of fuels, oils and chemicals will be stored and used on site for the purposes of refueling and servicing and maintenance of plant and equipment. As per the site EMP (Appendix D) the objective of chemical management is to store and use all chemicals in a manner that prevents pollution of the environment and harm to human health and to be compliant with legislative conditions. The Fulton Hogan *Managing Hazardous Chemicals and Dangerous Goods - Process - AU process*, outlines the following principles:

- Chemicals should be stored in accordance with EPA Publication 1698 – *Liquid storage and Handling* with adequate bunding used that is fit for purpose for the volume and type of chemicals being stored.
- Chemicals stored undercover is preferred to always retain 110% capacity of the volume being stored.
- To prevent spills, all chemicals will be stored in a manner that any leaks, drips and spills will be contained to prevent harm to the environment, including appropriate chemical storage bunds, trays or specialist chemical storage devices.
- Refueling and reloading must be undertaken in areas where if a spill was to occur, it can be contained. All re-fueling shall take place at least 10 metres from any drainage inlet.
- Safety Data Sheets (SDS) will be available for all chemicals stored on site.
- Adequate training will be provided to site staff, so that there is an understanding of chemical storage and spill response protocols. This can be in the form of site inductions, toolboxes or internal/external training.
- Fulton Hogan will ensure that Hazardous substances will be transported in accordance with *Victoria's Dangerous Goods (Transport by Road or Rail) Regulations 2018* using specialist Licenced contractors for all transporting of hazardous substances.
- Where spills have occurred, these will be controlled, contained and cleaned up. The used spill response equipment and impacted soils will be categorised and managed appropriately as a waste and disposed of accordingly.
- Plant and machinery shall be serviced and inspected regularly for oil and fuel leaks. Any leaks detected shall be rectified immediately.

In addition to the above safeguards the following monitoring and contingency measures shall be in place:

- During environmental inspections, areas where chemicals are used and stored should be checked, to ensure chemicals are not creating a hazard and that no spills have occurred.
- Spill kits should also be assessed to ensure they are appropriately located in areas where they may be required (i.e., chemical storage areas) and are adequately stocked.
- In the event of a chemical spill, this should be responded to in accordance with the Fulton Hogan *Incident and Emergency Response Flowchart, Chemical Oil and Fuel Spills*, which will form part of the site's Emergency Response Plan.

14.2.3. Fire Risk and Management

There are several potential sources of fire at the proposed site including:

- Combustion of bituminous products
- External fire source (e.g., grass fire or windblown embers)
- Exhaust and sparks from vehicles and equipment on site
- Combustion of stored waste including wood, cardboard, paper and plastic. Waste decomposes through microbial and chemical action and has the potential to generate considerable heat. It can spontaneously combust when the heat generated is higher than that lost to the surrounding environment. Fires at waste processing sites can rapidly escalate and have serious consequences.
- Combustion of RAP. While the risk is considered very low, under certain conditions (e.g., if heated to high temperatures), asphalt products may be flammable. Accordingly, asphalt stockpiles on the site will be separated from flammable/ combustible substance and ignition sources.

The site will have a site-specific Fire Prevention and Response Plan that will details specific management measures and safeguards to minimise the risk of fire and describe emergency response in the event of fire. This Plan may form part of (or will at least be consistent with) the Incident and Emergency Response Plan that will be prepared for the site (in accordance with relevant Fulton Hogan incident response procedures).

The site-specific Fire Prevention and Response Plan will consider guidance within EPA Publication 1667 *Management and Storage of Combustible Recyclable and Waste Materials guideline* which requires occupiers of facilities to take reasonable steps to manage and store material in a manner that minimises risks of harm to human health and the environment from fire. Publication 1667 identifies Hazard, Risk and Control as the important elements to understand and implement the fire risk management framework. Publication 1667 defines combustible recyclable and waste materials (CRWM) as recyclable and waste materials that could create a fire hazard, and includes the following materials of relevance to the proposed batch pant:

- Paper and cardboard
- Plastic
- Organic material
- Metal and other materials with combustible contaminants.

The waste glass stream is expected to include up to approximately 5% CRWM. Based on receiving up to 5,000 tpa, the proposed facility will also receive up to 250 tpa of CRWM as contaminants distributed throughout the low combustible waste glass.

While an assessment of this CRWM as a fire hazard in the risk assessment at Appendix H rated the risk as low, the site-specific fire prevention and response plan will include measures to reduce the fire hazard on site including:

- Volumes of potentially combustible contaminants stored on site (e.g. paper, organics etc) will be minimised. This waste will be removed from site regularly by council trucks that have delivered waste glass to site.
- Contain in covered bins / bays to avoid runoff.
- Combustible waste will not be stored near other fuel or ignition sources
- Regular site inspections will include inspections of CRWM storage.

The CRWM generated from the waste glass will be stored ‘indoors’ as defined in *The Management and Storage of Combustible Recyclable and Waste Materials - Indoor Storage* (Country Fire Authority/Metropolitan Fire and Emergency Service Board 2020). This guideline advises building owners, occupiers and operators of waste and resource recovery facilities in Victoria how to store CRWM indoors. The guidelines supplement EPA’s Management and Storage of Combustible Recyclable and Waste Materials Guideline (Publication 1667.2, October 2018). the site-specific Fire Prevention and Response Plan will consider guidance from this guideline.

15. ENVIRONMENTAL MANAGEMENT

15.1. Management Systems

Fulton Hogan currently operate multiple asphalt production facilities and RAP facilities in Victoria (refer Section 1.6 for details) under site specific EMPs that have been developed to ensure the environmental performance of each site. A draft site EMP for the proposed asphalt batch plant at Warrnambool is provided at Appendix D and aims to ensure that activities are undertaken consistently and with minimal impact on the environment; the draft EMP is founded upon Fulton Hogan's environmental and sustainability policies and processes. It is supported by the dedicated and qualified resources of Fulton Hogan. The draft EMP will be updated to reflect operations and identified risks and controls for the subject site.

Protection of the environment is integral to the philosophy of Fulton Hogan's ISO 14001:2015 accredited management systems. As such, Fulton Hogan's environment management system, defined in the EMP, is consistent with the ISO 14001 requirements and is independently certified as such.

The management framework outlined in the EMP provides clear guidelines for avoiding, reducing and managing environmental risks. It defines:

- Environment and Sustainability Policies,
- Objectives and Targets,
- Responsibilities,
- Environmental processes,
- Incident and emergency procedures,
- Monitoring, inspection and auditing regimes,
- Reporting processes,
- Rectification/improvement processes and
- Processes for the dissemination of information
- Environmental controls specific to the activities to undertaken at the site

All site personnel will receive training regarding environmental requirements and their responsibilities to ensure all activities are undertaken in accordance with the EMP.

16. BEST AVAILABLE TECHNIQUES AND TECHNOLOGY (BATT)

In assessing the best available techniques and technology (BATT) for the Warrnambool Asphalt Batch Plant, reference has been made to the following documents:

- EPA's best practice guidelines (EPA Publication 1517.1) - In Victoria, EPA Publication 1517.1 *Demonstrating Best Practice* is used as a guideline for proponents to demonstrate that their proposal meets the specific principles of best practice. While this document references the now superseded Environment Protection Act 1970, it is still considered relevant in assessing the proposal. Table 16-1 assesses the proposal against this document.
- The European Asphalt Pavement Association (EAPA) *Environmental Guidelines on Best Available Techniques (BAT) for the Production of Asphalt Paving Mixes.* This document describes the technologies and emission limits that are currently considered to be reasonable, economic and proven in practice. It is presented in the form of guidelines for voluntary adoption by the asphalt industry across Europe. Table 16-2 assesses the proposal against this document.
- European Parliament and Council Industrial Emissions Directive 2010/75/EU (Integrated Pollution Prevention and Control) incorporating the Best Available Techniques (BAT) Reference Document for Waste Treatment (BAT Reference Document). While this document provides guidance on best available techniques for waste treatment and therefore has relevance to the proposed processing of RAP and waste glass, it is generally concerned with the treatment of wastes with higher risks than those proposed for the Warrnambool Asphalt Batch Plant (i.e., it focuses on processing and treatment of wastes at higher volumes and of higher hazard ratings). While consideration of risks associated with lower risk operations like the proposed Warrnambool Asphalt Batch Plant are not within the scope of the document, it does include general BAT conclusions that are considered appropriate for consideration here. Table 16-3 assesses the proposal against this document.

Table 16-1 EPA Publication 1517.1 Demonstrating Best Practice

Requirement	Warrnambool Asphalt Batch Plant
Best practice for site selection and management systems	**Site selection -** The site is located about 650 m from the nearest sensitive receptor. The site is within Industrial zoned land. **Air** – Risk associated with impacts due to odour (and dust) emissions to nearby sensitive receptors is low (Refer to Section 7.2.4). Separation distance to receivers and appropriate management measures and controls to be in place. **Water** – Majority of the site will be asphalt sealed. Stormwater runoff will be captured and treated prior to discharge. Independent bunding of higher risk areas (tank farm etc). **Land and Groundwater** – Majority of the site will be asphalt sealed with bunding in high risk areas to manage risks from chemical / hydrocarbon leaks and spills, and leaching / contact water from material stockpiles, to land and groundwater. **Noise** – Noise impacts offsite unlikely; distance to sensitive receivers >650m and site is Industrial zoned. The site will continuously review and identify opportunities to apply improvements to ensure noise emissions do not impact sensitive receptors.

Requirement	Warrnambool Asphalt Batch Plant
Best practice is preventative	As described throughout this document, the site and operation are designed to avoid impacts where possible and where this is not possible, management measures will be employed to reduce to as low as practicable.
Best practice means undertaking all practicable measures	As described throughout this document, the site and operation are designed to avoid impacts where possible and where this is not possible management measures will be employed to reduce to as low as practicable.
Best practice may be internationally demonstrated and locally available	Best available techniques for asphalt plants (and for waste treatment) are described in various international documents. Assessment of the proposal against these documents is provided in Table 16-2and Table 16-3. Examples of best practice to be adopted by the proposal: • Low temperature bitumen • High efficiency burner • Surge bins – eliminates need for stop/start operation (minimises waste generation and limits electrical surge usage) • Undercover aggregate storage areas (reduce moisture content therefore reduces energy required to dry material) • On-site stormwater treatment • Fulton Hogan is a member of the second Melbourne Renewable Energy Project (MREP2 – all energy purchased is 100% renewable. • Facility will include use of reclaimed glass and RAP.

Table 16-2 EAPA *Environmental Guidelines on Best Available Techniques (BAT) for the Production of Asphalt Paving Mixes*

EAPA (2017) BAT Conclusion / Recommendation	Warrnambool Site
Particulates *Plant design and operation should ensure that fugitive dust emissions are minimised. It is suggested that further reduction of fugitive dust emissions could be more beneficial than any further reduction in stack emission limits. In locations of high amenity it is recommended to keep all fine material (e.g. under 3 mm) with a high fines content in silos or in covered storage for ordinary day-to-day use. It is recommended that stack particulate emissions should be in the range 20 – 50 mg/Nm3.*	Controls and management practices to minimise dust emissions are considered in Section 7.2.5. All materials that include high fines content are to be stored in covered bays (or in silos for hydrated lime). Stack particulate emissions are expected to be in the range 20 – 50 mg/Nm3.

EAPA (2017) BAT Conclusion / Recommendation	Warrnambool Site
Gaseous emissions *….'SOx emissions to be significantly less than the guideline value of 500 mg/Nm3…..* *NOx emissions will be significantly less than the value of 500 mg/Nm3… Stack height should provide sufficient dispersion of the emissions mentioned above to keep emission levels within acceptable limits. The height of a stack is carefully calculated for the specific site taking account of a number of factors. In general the outcome of these calculations varies between 10 m for smaller plants and 20 m or more for larger plants'*	As per the Air Quality Impact Assessment at Appendix F: • The maximum 1-hour average SO_2 concentration for incremental impacts across all the discrete receptors is predicted to be 1.4 µg/m^3, • The maximum 1-hour average NO2 concentration for incremental impacts across all the discrete receptors is predicted to be 8.1 µg/m3 Low sulphur fuels to be used Stack height of the proposed plant will be over 20 m. As per the Air Quality Impact Assessment at Appendix F the operational activities at the proposed facility are not expected to cause any significant air quality impacts in the surrounding environment.
Noise and Traffic *'Operating noise levels should not cause nuisance at the nearest dwellings, particularly outside normal working hours.'*	The proposed facility is not expected to result in nuisance noise at the nearest sensitive receivers as per the discussion in Section 9.3. Monitoring to confirm compliance with established noise limits will be undertaken in the commissioning phase / early operation phase.
Odour *'All practical steps should be taken in plant operation to ensure that there is no offensive odour outside the plant boundary or at the nearest dwellings. There are several ways to reduce odour, like using products and fuels that create less odour, not giving the odour the opportunity to leave the plant untreated, reducing (production) temperatures of the hot mix, by using (chemical) additives, by masking the odour and/or releasing the odour at a place where it does not create a problem (high stacks).'*	As per Section 7.2.4, the risk of odour impacting nearest sensitive receivers is low. The facility will be able to produce low temperature asphalt and directly loads to trucks from overhead bin and thereby reduced opportunity for VOCs to escape (and thus limits odorous emissions). The proposed site for the facility is approximately 650 m from the nearest sensitive receiver.
Energy *'In the asphalt industry lowering the production temperature of asphalt mixtures is nowadays under strong development because of environmental reasons and high energy prices. To achieve this, different methodologies are being used and developed, like low temperature asphalt (also called warm mixes) and cold mix technology. Warm mixes could be more expensive due to the additives, etc. and the technique is still developing. Lowering the manufacturing temperature reduces*	The proposed plant has the ability to produced low temperature asphalt. The selected burner is high efficiency and aggregates are kept as dry as possible within covered bays. All plant and machinery is to be serviced regularly.

EAPA (2017) BAT Conclusion / Recommendation	Warrnambool Site
the energy need. Using dry aggregate, properly working equipment and appropriate work methods can also reduce energy consumption. It is advantageous to store the raw material at a location where bulk moisture content can be kept at a minimum.'	
Water effluent, ground water preservation *'In plants the usual preventative measures (particularly spill containment for fuel tanks) will be required to prevent ground and ground water containment.'*	A number of management measures and safeguards will be employed at the site to protect surface water and ground water and land resources as per Section 8.3 and 12.3. The majority of the site will be sealed, and all runoff will treated by the sites stormwater treatment system (e.g. triple interceptor). Spill prevention measures (bunding, runoff capture and treatment etc) are to be employed at the site as described in Section 8.3.
Waste *'All incidental wastes should be recycled, or minimised where unavoidable, stored and then disposed of according to good practice.'*	Waste will be recycled wherever possible. The facility will include the recycling of reclaimed asphalt pavement and waste glass (from kerbside recycling programs).
Visual aspects *'Visual amenity should be maximised by appropriate landscaping, screening or enclosure of plant. Good housekeeping will also pay handsome dividends. Communications with neighbours should be encouraged.'*	Landscaping will be used as a screen as per plans at Appendix E. Visual amenity has been considered in the design (including colours) of building and plant. The site will comply with conditions of the planning permit which will take into account visual amenity considerations.

Table 16-3 Best Available Techniques (BAT) Reference Document for Waste Treatment

BAT Conclusion	Warrnambool Site
BAT 1 In order to improve the overall environmental performance, BAT is to implement and adhere to an environmental management system (EMS)… [This BAT goes on to list a number of elements that the EMS is to include]. The scope (e.g., level of detail) and nature of the EMS (e.g., standardised or non-standardised) will generally be related to the nature, scale and complexity of the installation, and the range of environmental impacts it may have (determined also by the type and amount of wastes processed).	Protection of the environment is integral to the philosophy of Fulton Hogan's ISO 14001:2015 accredited management systems. As such, Fulton Hogan's environment management system, defined in the site EMP (Appendix D), is consistent with the ISO 14001 requirements and is independently certified as such.
BAT 2. In order to improve the overall environmental performance of the plant, BAT is to use all of the techniques given below. • Set up and implement waste characterisation and pre-acceptance procedures • Set up and implement waste acceptance procedures • Set up and implement a waste tracking system and inventory • Set up and implement an output quality management system • Ensure waste segregation • Ensure waste compatibility prior to mixing or blending of waste • Sort incoming solid waste	Characterisation of wastes being imported to site for resource recovery will be inherently important to the production of materials of appropriate quality. As such, appropriate procedures (e.g., inspection and acceptance procedures on arrival of materials) will be implemented and documented. For waste stream separated from reusable product, these will be segregated, managed and reported as described in Section 10.
BAT 4 In order to reduce the environmental risk associated with the storage of waste, BAT is to use all the techniques given below. • Optimised storage location • Adequate storage capacity • Safe storage operation • Separate area for storage and handling of packaged hazardous waste	As described in this document the site is appropriately located and is not proximate to sensitive receivers. Consideration of suitable storage areas and capacity has been taken in the design. As per site plans at Appendix E, consideration of storage areas takes into account relevant waste (and processed materials) streams. Appropriate storage of wastes and hazardous substances (i.e., fuels and oils) and been considered and addressed in this document. Separate storage and handling of priority waste is addressed in this document.

BAT Conclusion	Warrnambool Site
BAT 5. In order to reduce the environmental risk associated with the handling and transfer of waste, BAT is to set up and implement handling and transfer procedures.	In accordance with relevant training elements of the Fulton Hogan Reclaimed Products EMP staff will be trained in: • handling and transfer of waste including documentation • spill prevention and response. • use of plant and equipment to minimise dust generation
BAT 6 – 10 (monitoring related)	Given the size and type of waste to be stored / handled / processed on the proposed site, many of the recommended monitoring practices described in these BATs are not applicable as they assume storage / handling / processing of waste that may contain chemicals of concern that will not be present in RAP / glass materials to be imported to the Warrnambool site.
BAT 11 BAT is to monitor the annual consumption of water, energy and raw materials as well as the annual generation of residues and wastewater, with a frequency of at least once per year.	Fulton Hogan report on energy consumption as part of National Greenhouse and Energy Reporting requirements.
BAT 12. In order to prevent or, where that is not practicable, to reduce odour emissions, BAT is to set up, implement and regularly review an odour management plan, as part of the environmental management system (see BAT 1) and BAT 13. In order to prevent or, where that is not practicable, to reduce odour emissions, BAT is to use one or a combination of the techniques given below.	Given the amounts of waste to potentially generate significant odours will be very low and therefore the associated risk of odour impacts to offsite receivers is very low, odour monitoring is not deemed necessary at this point. If odour is identified as a significant issue through subsequent inspections and / or complaints etc (as described in the EMP), then as part of the review and continuous improvement element of the EMP, the impact will be assessed and management measures (e.g., removal of waste at ore frequent intervals) introduced and documented.
BAT 14 In order to prevent or, where that is not practicable, to reduce diffuse emissions to air, in particular of dust, organic compounds and odour, BAT is to use an appropriate combination of the techniques given below. • Minimising the number of potential diffuse emission sources • Selection and use of high-integrity equipment • Corrosion prevention • Containment, collection and treatment of diffuse emissions • Dampening • Maintenance	Through the management measures and control described in this document as well as the risk assessment and EMP, air emissions will be managed to as low as reasonably practicable, for example: • Dust to be minimised by o limiting the drop height of material. o limiting traffic speed. o using wind barriers. o Storing materials in semin-enclosed strcures o Dampening stockpiles and roads as and when appropriate • Air emissions to be minimised by o Fuel efficient burner improves fuel combustion within the drum reducing fuel consumption, and carbon emissions and reduces other emissions such as NOx, SOx and CO;

BAT Conclusion	Warrnambool Site
• Cleaning of waste treatment and storage areas • Leak detection and repair (LDAR) programme	○ Reduced CO2 emissions from 26 kg/Asp ton to 18 kg/Asp ton. ○ WMA (Foamed Bitumen) system allows temperature of specific mixes to be manufactured at lower temperatures (i.e. <150oC); reduces fuel consumption, costs and carbon emissions; reduces bitumen oxidation and reduces ambient emissions during laying such as VOC's and blue smoke; ○ Maintaining plant and equipment appropriately ○ Undertaking daily prestarts on plant and equipment ○ Avoiding idling
BAT 15 & 16 – flaring related	Not applicable – no flaring required.
BAT 17. In order to prevent or, where that is not practicable, to reduce noise and vibration emissions, BAT is to set up, implement and regularly review a noise and vibration management plan, as part of the environmental management system (see BAT 1). This BAT goes on to list a number of elements that the noise management plan is to include	The site EMP (draft at Appendix D) includes management measures for noise.
BAT 18. In order to prevent or, where that is not practicable, to reduce noise and vibration emissions, BAT is to use one or a combination of the techniques given below. • Appropriate location of equipment and buildings • Operational measures • Low-noise equipment • Noise and vibration control equipment • Noise attenuation	The location of the proposed plant (650 m from sensitive receivers) in an Industrial zone will mitigate risk of noise impact to offsite receivers. Impact and assessment and description on proposed noise management measures is included in this document. The site EMP (draft at Appendix D) includes noise management measures and will be updated with outcomes of the risk assessment (Appendix H) as required.
BAT 19. In order to optimise water consumption, to reduce the volume of wastewater generated and to prevent or, where that is not practicable, to reduce emissions to soil and water, BAT is to use an appropriate combination of the techniques given below.	As described in this document, consumption of potable water at the site is minimised via collection of rainwater from rooves of building on site (for use in dust suppression and landscape irrigation). Overflow is directed to Wannon Waters' rain water harvesting system. This initiative sees rain water being collected from rooftops in new residential or industrial subdivisions and transported through pipes to an existing raw water storage. The water is then treated at the Water Treatment Plant and becomes part of the drinking water supply.
BAT 20. In order to reduce emissions to water, BAT is to treat wastewater using an appropriate combination of the techniques given below.	As discussed in Section 8, all stormwater from the site will be treated prior to discharge. Water from the truck wash will be captured and discharged via trade waste.

BAT Conclusion	Warrnambool Site
BAT 21. In order to prevent or limit the environmental consequences of accidents and incidents, BAT is to use all of the techniques given below, as part of the accident management plan (see BAT 1). • Protection measures • Management of incidental/accidental emissions • Incident/accident registration and assessment system	Protection measures – the site will be fully fenced. The site Emergency Management Systems will detail management controls relating to fire, explosion and other emergency scenarios. Given the site will be operable 24/7 opportunities for malevolent act are minimal. The site EMP (draft at Appendix D) describes the spill prevention and response measures that will be in place. Fulton Hogan maintain system to log all incidents (including environmental and safety) and have systems in place to determine root causes and communicate learnings across the business.
BAT 22. In order to use materials efficiently, BAT is to substitute materials with waste.	The site will recycle RAP and glass to supplement / partially replace use virgin aggregates and as such aligns with this BAT.
BAT 23. In order to use energy efficiently, BAT is to use both of the techniques given below: • Energy efficiency plan • Energy balance record	Given the relatively small size of the proposed plant, an energy efficiency plan and energy balance records are not proposed at this stage; however, as part of standard Fulton Hogan reporting and financial analysis procedures, analyses of energy consumption and assessment of opportunities to reduce energy use are undertaken regularly.
BAT 24. In order to reduce the quantity of waste sent for disposal, BAT is to maximise the reuse of packaging, as part of the residues management plan (see BAT 1).	Minimal packaging is expected on site. Packaging waste associated with the office and workshop will be managed in accordance with the waste hierarchy (Avoid, Reduce, Reuse, Recycle) to minimise waste to landfill

16.1. Choice of Process and Technology/Integrated Environmental Assessment

Fulton Hogan has considered several options for the proposed operation; these are summarised in Table 16-4.

Table 16-4 Options considered by Fulton Hogan

Do nothing – existing individual sites remain at existing location and as separate facilities	Benefits	No capital expenditure is required to decommission existing sites and establish new Warrnambool Plant.
	Disadvantages	Missed opportunity to expand operation and increase resource recovery and reduce traffic and transport and associated emissions. Existing plant cannot take RAP or produce warm mix.
RAP and other glass are treated as waste and directed to landfill	Benefits	No capital expenditure is required to establish RAP Plant.
	Disadvantages	Missed opportunity to contribute to circular economy and recycle RAP (up to 30% of mix) and glass that would otherwise go to land fill.
Continued use of Existing Mobile	Benefits	Good knowledge of Plant history in Fulton Hogan; including history of use of same plant at quarry site – none of which have been subject of complaints.

Crushing and Screening Plant	Disadvantages	None identified
Glass pulveriser – house in shed	Benefits	Reduced risk of noise and dust related impacts
	Disadvantages	Increased capital expenditure
Glass pulveriser – with contaminant separation features	Benefits	Cleaner end product with more efficient separation of waste stream for subsequent segregation and regular disposal off site.
	Disadvantages	More expensive upfront

16.1.1. Final Choice of Technology

Fulton Hogan has elected to consolidate existing facilities within the Warrnambool region to take the opportunity to improve efficiencies and expand production. Fulton Hogan will process RAP and glass at the site. A decision on whether to use the existing Fulton Hogan glass crusher and screener (currently located at the Koroit Quarry) or purchase new plant is yet to be made. The glass crusher will be housed in a shed which will minimize noise and dust risks.

17. POST DEVELOPMENT APPROVAL LICENCE

17.1. Commissioning

There is no intention to have a formal commissioning plan in place for the proposed facility (nor will the proposal require a proof of performance (commissioning) testing plan). However, the asphalt batch plant will undergo a commissioning phase during which the operation of the plant and equipment is inspected and tested as it is put through typical operating scenarios. During this phase, observations of emissions including noise, dust and exhaust will be observed to confirm they are in expected ranges.

As part of this phase Fulton Hogan will consider commissioning a noise assessment to confirm that noise generated from the operation of the site is commensurate with that predicted in Section 9.2 and that noise limits are not exceeded; review of measurements of current noise levels experienced at the nearest sensitive receivers will be included in this assessment.

In instance where observations and/or monitoring of commissioning activities indicate that environmental impacts (e.g., from noise or odour) may be higher than predicted then, the risk will be reassessed in accordance with the EMP, and adaptive management measures applied accordingly.

17.2. Permission – Operation Requirements

Once Fulton Hogan are granted a development licence and the asphalt batch plant is established, Fulton Hogan will register to process glass waste (less than 10,000 tonnes per year) at the subject site as required under prescribed permission activity H05c. Fulton Hogan will also register under A13c to accept and process RAP and combustible contamination (less than 5000 m^3) within the waste glass stream.

17.2.1. Financial Assurance

A financial assurance is used to provide a security for the costs of remediation or clean up associated with certain waste management and contaminated land activities. Under section 219(1) of the Act, EPA may require a financial assurance as a condition of a prescribed permission.

The activities from Schedule 1 of the Regulations that may be required to have a financial assurance as a condition of a permission, are set out in Regulation 167.

The proposed asphalt batch plant at Warrnambool does not include any activities that may require financial assurance.

Further, SPM consider that a financial assurance is not required for the proposed plant, as according to EP Regs (2021) clause 168, Fulton Hogan as a corporation and successful and diligent operator of similar facilities in Victoria:

- do not pose a risk to or potential risk of harm to human health and the environment associated with the activity, including consideration of the location of the activity.

- historically and currently comply with the current EP Act and previous EP Act (1970), these Regulations and environment protection legislation of the Commonwealth, another State or a Territory
- do not employ persons prohibited from undertaking the proposed activities of operating a batch plant
- are financially viable and profitable
- are legally bound to the site and cannot abandon the site of the activity
- the nature, duration, extent and costs of remediation or clean-up activities that may be required are achievable and not cost prohibitive.
- The bulk of the material that will be stored on site has a significant value and a ready market.

It is considered that financial assurance for the proposal is therefore not required.

17.3. Initial Decommissioning Plan

The following is an overview of an Initial Decommissioning Plan for the site. This plan will be updated progressively throughout the life of the operation as site and activity specific knowledge increases, with the level of detail reflecting the stage in the development of the activity.

To ensure that the site reverts to a safe and non-polluting site the following Initial Decommissioning Plan will be executed when appropriate:

1. Regular consultation with stakeholders including the regulators and community will occur with regards to the rehabilitation and closure process. These discussions will occur well in advance of commencement of the decommissioning phase so that input from stakeholders can be considered.
2. As part of planning for the decommissioning phase, risks to human health and the environment from both the decommissioning activities and the potential of contaminated water and soil from operations phase will be assessed. It is noted that risks will be assessed throughout the life of the operation and controls implemented as described in this document and the site EMP.
3. Outcomes of the decommissioning risk assessment may include testing of soil and water to identify, describe and delineate any contamination on the site.
4. In the event that soil, and water testing (post de-commissioning) determines that the site has been contaminated as a result of Fulton Hogan activities then a remediation action plan will be developed in consultation with relevant stakeholders. The remediation action plan will be executed, and the site will be validated to confirm that contamination has been remediated to achieve the *National Environment Protection (Assessment of Site Contamination) Measure* (1999) Health Investigation Levels (HILs) and Ecological Investigation Levels (EILs) for industrial/commercial sites.

18. REFERENCES

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Sustainability Victoria 2015; Recycled products in pavement construction - A business case for councils to use local recycled products in pavement construction; Sustainability Victoria

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This report is confidential and has been prepared by Sustainable Project Management Pty Ltd and may only be used and relied on by Fulton Hogan. Sustainable Project Management Pty Ltd disclaims responsibility for any third-party reliance of this report other than Fulton Hogan. The report may not contain sufficient information for the purposes of other parties or for other uses. This report shall be presented in full and shall not be used to support any other objectives than those set out in Section 1.1 of this report, without written approval from Sustainable Project Management Pty Ltd.

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The report supersedes all previous draft or interim reports, whether written or presented orally, before the date of this report. This report has not and will not be updated for events or transactions occurring after the date of the report or any other matters which might have a material effect on its contents, or which come to light after the date of the report. Sustainable Project Management Pty Ltd is not obliged to inform Fulton Hogan of such events, transaction or matters nor to update the report for anything that occurs, or of which Sustainable Project Management Pty Ltd becomes aware, after the date of this report.

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Appendix A – Fulton Hogan Policies

Environmental Policy

Protect our planet

It's the air we breathe, the water we drink, and land we enjoy. The environment we work in is the environment in which we live and play. We care for the planet, not only for ourselves, but also for future generations.

We will:

- Minimise our impact on the environmental footprint through innovation and being energy and resource efficient
- Always consider how to reduce, reuse and recycle
- Respect and care for our environment, encompassing diverse aspects including flora, fauna, water, community and cultural interests
- Work with our subcontractors and suppliers to help them meet our expectations
- Consider the environment when we design, plan and deliver our work
- Make proactive use of our environmental management systems
- Set measurable objectives and targets to ensure continual improvement

C W Bruyn
Managing Director

Community & Stakeholder Relations Policy

Achieving positive outcomes for our communities and stakeholders

Community and stakeholder engagement are fundamental to our business success. We need to understand what matters to our stakeholders and communities, what impacts or affects them, and how best we can engage with them. When we involve people in decisions that matter to them, and work with people to solve problems that affect them, we will achieve better outcomes for all.

We will:

- Develop trusting and honest relationships with our communities and stakeholders
- Engage with the community and stakeholders when we are making decisions that impact them; listen to what they say, and be open to alternative solutions and ways of doing things
- Respect local traditions, history and cultures and proactively seek to better encompass them in our work
- Minimise the impact of our works, through early planning, innovative methodologies, open communication, and ongoing monitoring
- Manage and communicate change with empathy, by providing accurate and timely information. Be open and respectful when we are interacting
- Contribute to our local communities
- Live our REAL Values of Respect, Energy & Effort, Attitude and Leadership

C W Bruyn
Managing Director

Sustainability Policy

A successful and enduring infrastructure company

As we deliver good work for our customers, we must meet the needs of the present, without compromising the ability of future generations to meet their needs. Our approach needs to create long-term value, by considering how we impact the ecological, social and economic environments in which we operate.

We will:

People

- Always put the health, safety and wellbeing of people first
- Value a performance culture, based on leadership, great people and personal development
- Live our REAL values (Respect, Energy & Effort, Attitude and Leadership) and behaviours to ensure we make sustainable decisions
- Harness and value diversity and inclusion

Planet

- Contribute towards and protect our natural environment
- Reduce our emissions and impact on the environment in which we work and live, always actively seeking ways to minimise our environmental footprint
- Seek out and promote the use of products and services that use sustainable materials and reduce the carbon footprint
- Apply innovation, life-cycle thinking and effective planning to drive sustainable performance

Profit

- Provide long term value to our shareholders, by building our reputation as a market leading business, whilst continuing to reinvest in the future growth of the company

Partnership

- Through developing an understanding of their key priorities, build long term relationships with our communities and stakeholders
- Share our sustainability journey with our partners, stakeholders, and the broader community

C W Bruyn
Managing Director

Appendix B – Fulton Hogan Australian Operations – Environmental Infringement History

Environmental Infringements* Register (AU All)

*inclusive of prosecutions, notices and other infringements involving a breach of environmental legislation

Date of Issue	Type of Infringement	Notice Number	Issuing Authority	Issued Against	Where Issued	Details	Penalty Applied
24/08/2018	Environmental Penalty Notice	55930	EPA Victoria	Fulton Hogan Industries ACN 000 538 689	26-28 Westall Road, Springvale VIC 3171	Cause an environmental hazard (oil into Mile Creek), contravention of s27A(1)(c) of Environment Protection Act 1970. Caused by oil heater boiling over while filling, and entering drain. (CAMs-140065)	$ 7,929
8/03/2018	Environmental Penalty Notice	200000040321738	DEHP Qld	Fulton Hogan Industries ACN 000 538 689	New Beith Road, Greenbank, Qld	Prime washoff into local creek due to intense rain event (EPA139 Unlawfully caused material environmental harm) (CAMs-109891 & CAMs-120712)	$ 12,615

Appendix C – Fulton Hogan letter to residents and industry operators

Fulton Hogan Industries Pty Ltd
ABN: 54 000 538 689
20-26 Strong Street, Warrnambool
Vic 3280
Tel: +61 3 5559 6000
www.fultonhogan.com

5 January 2022

Dear Neighbour,

PROPOSED NEW ASPHALT PLANT FOR THE REGION IN HORNE ROAD INDUSTRIAL ESTATE

Fulton Hogan is excited to share with you its plans for a new Asphalt Plant at Lot 58, 86 Rodgers Road, Warrnambool. The site chosen for this operation is within the Industrial 3 Zone within the Horne Road Industrial Estate as shown below:

Figure 1 - Proposed Asphalt plant site

The new asphalt plant project will modernised our existing operations in the Warrnambool region and allow us to continue to deliver asphalt for road projects in the region. The site will also recycle asphalt & glass, with the intention of driving resource recovery, sustainability and the circular economy.

The project requires a Development Licence approval from EPA, and a Planning Permit from Warrnambool City Council to proceed.

The Project
The new asphalt plant will include:

- Asphalt production manufacturing equipment

- Administration building
- Workshop
- Weighbridge for trucks
- Storage of products for use in asphalt manufacturing processing
- Parking areas for equipment, trucks & machinery related to road manufacture operations
- Water tanks
- Glass crusher plant

A layout plan of the site and operations will be available from Council and EPA when the project is advertised through the planning process.

Assessments we have undertaken to inform the project
Fulton Hogan have engaged experts to undertaken noise and air assessments to ensure the project is designed to meet EPA requirements. The following is a summary of the technical assessments we have undertaken. This information will be included in full in the EPA and Planning Applications.

Noise assessment
Our consultants have assessed the noise impacts of all plant and machinery proposed to be used on the site and determined that noise levels will not exceed EPA guidelines.

Odour assessments
Our consultants have assessed odour at an equivalent Fulton Hogan asphalt Plant to determine the likely odour impacts for this proposal. The assessment concludes that there is a low risk of odour impacts beyond the boundaries of the Industrial land.

Site Management Controls
Fulton Hogan has years of experience and knowledge in operating asphalt plant in Australia. Control of dust, noise, odour, and truck movements is paramount to our operations and minimising impacts on our neighbours. We have put measures in place to control dust and air emissions in accordance with EPA guidelines.
Fulton Hogan will also operate the site in accordance with their Environmental Management Plan, which outlines all operational controls to minimise any impacts from the site.

Planning and Environmental Approvals
Fulton Hogan is working closely with the Environment Protection Authority (EPA) and Warrnambool City Council to ensure our planning and environmental approval applications meet state and local government requirements.

We expect that our Development Licence Application to EPA and Planning Permit Application to Council will be submitted in early 2022 and advertised thereafter for public comment.
Once these applications are submitted you will have the opportunity to review the application documents and provide feedback to Council and EPA.

If you have any queries on our proposal thus far please feel free to get in touch at any time to discuss.

Mobile: 0426 976 969
Email: Nikhil.Patil@fultonhogan.com.au

Yours sincerely,

Nikhil Patil
Warrnambool Department Manager

Appendix D – Draft Site Environmental Management Plan

Fulton Hogan

Environmental Management Plan

WARRNAMBOOL DEPOT
HORNE ROAD, WARRNAMBOOL 3280

Environmental Management Plan (EMP) — Southern Region Infrastructure Services

Contents

1. Introduction

1.1. Purpose

This Environmental Management Plan (EMP) has been developed to ensure the environmental performance of Fulton Hogan's proposed Warrnambool Depot located at Mason St in Warrnambool. This Plan will ensure that activities are undertaken consistently and with minimal impact on the environment.

This EMP is founded upon Fulton Hogan's environmental and sustainability policies and processes. It is supported by the dedicated and qualified resources of Fulton Hogan.

Protection of the environment is integral to the philosophy of Fulton Hogan's ISO 14001:2015 accredited management systems. As such, Fulton Hogan's environment management system, defined in this Plan, is consistent with the ISO 14001 requirements and is independently certified as such.

The management framework outlined in this EMP provides clear guidelines for avoiding, reducing and managing environmental risks. It defines:

- Environment and Sustainability Policies,
- Objectives and Targets,
- Responsibilities,
- Environmental processes,
- Incident and emergency procedures,
- Monitoring, inspection and auditing regimes,
- Reporting processes,
- Rectification/improvement processes and
- Processes for the dissemination of information
- Environmental controls specific to the activities undertaken by Warrnambool Depot.

All Warrnambool Depot personnel will be familiar with the environmental requirements and their responsibilities. This ensures that all activities are undertaken in accordance with this EMP.

This EMP is subject to change, and Fulton Hogan reserves the right to update its environmental management system as per its document review procedures, and to reflect changes and updates to its operations.

1.2. Scope

This EMP applies to all Warrnambool Depot personnel and all activities undertaken at the Warrnambool Depot:

- Asphalt Production and sales
- RAP and Glass crushing and screening
- Storage and handling of chemicals, waste products
- General depot activities such as truck parking and maintenance
- Workshop facilities
- Vehicle washdown bay
- Production Laboratory
- Amenities and Offices

Note: This EMP does not include project and site works completed by the civil and spray seal departments.

1.3. Definitions

The following terms, abbreviations and definitions are used in this plan.

▶ Table 1: Terms, abbreviations and definitions used in this plan

TERM	EXPLANATION
ECP	Environmental Control Plan – A document that supports the EMP with site specific controls, locations of controls and site plan. Typically a 1-2 page A3 plan.
EMP	Environmental Management Plan – A detailed plan that provides framework for minimising environmental harm
Environment	Surroundings in which an organisation operates, including air, water, land, natural resources, flora, fauna, humans and their interrelation.
Environmental Aspect	Elements of organisations: activities, products or services that could interact with the environment.
Environmental Impact	Any change to the environment, whether adverse or beneficial, wholly or partially resulting from an organization's activities, products or services.
EPA	Environmental Protection Authority – environmental regulator in Victoria
ERA	Environmental Risk Assessment – Document that analyses activities being undertaken by the business, their likely risk based on likelihood and consequence, controls to be implemented to mitigate risk and the residual risk.
ERS	Environmental Reference Standard, supporting the Environmental Protection Act 2017 and Environmental Protection Regulations 2021
EWMS	Environmental Work Method Statement – a site and activity specific environmental risk management document that complements the EMP but also provide extra details on mitigations where high risk activities exist
GED	General Environmental Duty – Principle of minimising risks of harm to the environment under the Environmental Protection Act 2017.
ISO14001	An international voluntary standard for environmental management systems, this is one standard in the ISO 14000 series of International Standards on environmental management.
NEPM	National Environmental Protection Measures - a special set of national objectives designed to assist in protecting or managing particular aspects of the environment.
Sustainable	Characteristic of a process or state, that can be maintained at a certain level indefinitely.
SWMS	Safe Work Method Statement is a systematic approach to the identification of work task related hazards and controls.

2. Resources, roles and responsibilities

2.1. Management leadership, commitment and responsibilities

The Fulton Hogan management team displays its leadership and commitment to the development and implementation of the management system and continually improving its effectiveness by:

- Taking accountability of the effectiveness of the management system
- Ensuring the environment and sustainability policies, objectives and targets are established for the management system and are compatible with the strategic direction and the context of the organisation
- Ensuring the environment and sustainability policies are communicated, understood and applied within the organisation
- Promoting awareness of the process approach
- Ensuring the resources needed for the management system are available
- Communicating the importance of effective environment and sustainability management and of conforming to the management system requirements
- Ensuring that the management system achieves its intended results
- Engaging, directing and supporting persons to contribute to the effectiveness of the management system
- Supporting other relevant management roles to demonstrate their leadership as it applies to their areas of responsibility.

Management responsibilities are defined in the Fulton Hogan RASCI.

The acronym RASCI stands for:

R	Responsible	does the work
A	Accountable	has ultimate responsibility, signs off R's work
S	Supportive	provides resources / implementation support
C	Consulted	has information/perspective/capability used to complete the work
I	Informed	should be notified of outcomes but need not be consulted.

2.2. Operational responsibilities

The Operational RASCI identifies the operational responsibilities for each position involved in the implementation of environmental management at Warrnambool.

► Table 2: Operational responsibilities

RESPONSIBILITY	GENERAL MANAGER SRIS	REGIONAL MANAGER	DEPARTMENT MANAGER	PLANT FOREMAN	SEQ ADVISOR	REGIONAL ENVIRONMENT ADVISOR
Development of the EMP/ECP's		I	A	C	R	AC
Reviewing and approving EMP/ECP's		I	A	I	S	AR
Reviewing Subcontractor EMP's, Work procedures and SWMS for appropriate environmental content			A	AR	RS	C

RESPONSIBILITY	GENERAL MANAGER SRIS	REGIONAL MANAGER	DEPARTMENT MANAGER	PLANT FOREMAN	SEQ ADVISOR	REGIONAL ENVIRONMENT ADVISOR
Annual review of EMP, ECP/s and objectives and targets		I	I	A	R	AC
Communicating and training staff on the EMP and ECP/s			A	AR	RS	CS
Ensuring communication of relevant site environmental risks and controls as part of Site Inductions			A	AR	RS	CS
Implementing the EMP/ECP/s/SWMS/EWMS and managing sites to comply with legal and other requirements	I	I	A	AR	RS	CS
Maintaining necessary environmental management records for activities under area of responsibility			A	AR	RS	C
Inspecting sites against the requirements of the EMP and ensuring legal compliance monitoring is undertaken			A	AR	RS	I
Undertaking Monthly Environmental Reporting (Fulton Hogan and Client), including monthly assessment of performance against Objectives and Targets	I	I	A	AR	RS	I
Reporting and investigating incidents and non-conformances and ensuring corrective and preventive action is taken and is effective	I	A	AR	AR	RS	AS
Auditing sites against the requirements of the EMP	I	SI	S	S	S	AR

The Organisation chart for Warrnambool Depot identifies the personnel fulfilling each of the roles identified.

2.3. Sub-contractors

All subcontractors shall be engaged as per Set up a Subcontract, Purchasing or Hiring Agreement – Process - Au. This procedure requires that all Subcontractors and Suppliers have a signed Subcontract Agreement and produce required documentation. The ongoing management of the Subcontractor is then to be managed in accordance with Subcontract Management and Administration – Process – Au.

In line with the conditions of our contracts, approvals and/or sites, Sub-contractors shall comply with all statutory and Fulton Hogan Environmental Management System requirements. Sub-contractors will be required to operate in a manner that is in line with the requirements of this EMP and any relevant ECP or EWMS/SWMS.

Fulton Hogan may request that Subcontractors provide an EMP or SWMS for their work activity, should their work activity provide a risk to the environment. NGER data may also be requested.

Subcontractors are required to report all incidents to their Fulton Hogan Supervisor as soon as practicable and safe to do so.

2.4. Authorities

In undertaking environmental works, persons may only undertake actions allowed under their Delegations and Limits of Authority. The 'Delegations and Limits of Authority' for roles in the organisation and information on how they are managed can be found in Authority to Make Decisions (DLoAs and CLoLs) - Process – Au.

3. Environmental and sustainability commitments

3.1. Organisational policy

Organisational commitments to the environment and sustainability are detailed within the Environmental Policy and the Sustainability Policy.

All operations shall be undertaken in a manner consistent with the Policies.

The Policies shall be taken into account during the setting of Warrnambool Depot Objectives and Targets.

3.2. Objectives and targets

3.2.1. Objectives and targets

The environmental objectives and targets of Warrnambool are:

- Zero Infringements
- Zero High risk incidents
- Complete environmental reporting
- Complete environmental inspections
- Provision of Envirowise training

Refer to Regional Environment Management Strategy for the Regional Objectives and Targets. Business specific Os & Ts can be located in department business plans.

3.2.2. Measurement of objectives and targets

Ongoing tracking of performance against the objectives and targets shall be undertaken on a monthly basis as part of monthly internal reporting, as detailed later in this plan.

A more detailed assessment of the operations performance against the objectives and targets shall be undertaken on an annual basis as part of Management Reviews. Required improvements, in order to achieve the objectives and targets, should be identified as part of this review. Further information of management reviews is detailed later in this plan.

4. Planning and risk management

Environmental planning for Warrnambool Depot has been undertaken utilising relevant documentation from Fulton Hogan's Environmental Management System, legislation, environmental guidelines and our industry experience.

4.1. Environmental legal and other requirements

Adherence to compliance obligations is essential to the success of Warrnambool Depot. Warrnambool Depot personnel will undertake measures to manage all environmental impacts, in compliance with all relevant environmental legislative requirements.

4.1.1. Duties

Under the Environmental Protection Act (2017) there are numerous Duties that are applicable for our operations. These include:

- General Environmental Duty
- Duty to take action to respond to harm caused by pollution incident
- Duty to notify Authority of notifiable incidents
- Duty to manage contaminated land
- Duty to notify of contaminated land
- Duties for depositing, receiving and transporting industrial wastes
- Duties for persons managing priority wastes and reportable priority wastes

4.1.2. Legal, standards and guidelines register

A general overview of legislative requirements can be found in the National Legal Register – Au. The key pieces of environmental legislation, standards, guidelines and project specific approvals for Warrnambool Depot are identified in the table below:

► Table 3: Legal, Standards and Guidelines Register

ENVIRONMENTAL ELEMENT	REQUIREMENT
Noise & Vibration	Project's approval conditions (applicable to major infrastructure projects)
	Environment Protection Act 2017
	Environment Protection Regulations 2021
	Environment Reference Standard (ERS)
	AS 2436 - Guide to noise and vibration control on construction, demolition and maintenance site
	New noise boundaries for major urban areas
	1826.4: Noise limit and assessment protocol for the control of noise from commercial, industrial and trade premises and entertainment venues
	EPA Publication 1254.2: Noise Control Guidelines (2021)
Air Quality	Environment Protection Act 2017
	Environment Protection Regulations 2021
	National Greenhouse and Energy Reporting Act (2007)
	Environment Reference Standard (ERS)

ENVIRONMENTAL ELEMENT	REQUIREMENT
	EPA Publication 1820: Construction - guide to preventing harm to people and the environment
	EPA Publication 1834: Civil construction, building and demolition guide (Section 5.3.3 for controls to prevent dust generation and transport of dust)
	EPA Publication 1897: Managing truck and other vehicle movement
Erosion, Sedimentation and Water Quality	Environment Protection Act 2017
	Environment Protection Regulations 2021
	Environment Reference Standard (ERS)
	EPA Publication 1910.2: Victorian guideline for water recycling
	EPA Publication 275: Construction techniques for sediment pollution control
	EPA Publication 1895: Managing stockpiles
	EPA Publication 880: Spraying Bituminous Materials (2002)
Heritage	Heritage Act 2017
	Heritage Regulations 2017
	Aboriginal Heritage Act 2006 (2016 Amendments)
	Aboriginal Heritage Regulations 2018
	Site specific CHMP (where required)
Waste Management	Environment Protection Act 2017
	Environmental Protection Regulations 2021
	EPA Publication 1820: Construction - guide to preventing harm to people and the environment
	EPA Publication 1968: Guide to classifying industrial waste
	EPA Publication 1827.2: Waste classification assessment protocol
	EPA Publication 1828.2: Waste disposal categories – characteristics and thresholds
Chemical Storage	Environment Protection Act 2017
	Environment Protection Regulations 2021

ENVIRONMENTAL ELEMENT	REQUIREMENT
	EPA Publication 1820: Construction - guide to preventing harm to people and the environment
	EPA Publication 1698: Liquid storage and handling guidelines
	EPA Publication 1730: Solid storage and handling guidelines
	AS 1940 - Storage and Handling of Flammable and Combustible Liquids
Flora and Flora (including weeds)	Environmental Protection and Biodiversity Act (1999)
	Flora and Fauna Guarantee Act (1988)
	Planning and Environment Act (1987) (Planning Provision 52.17)
	Wildlife Act 1975
	Planning and Environment Act 1987
	Catchment and Land Protection Act 1994
Other	Water (Trade Waste) Regulations 2014
	Environment Protection (Scheduled Premises) Regulations 2017
	Radiation Act 2005
	EPA Victoria Publication 1741.1 Industry Guidance: Supporting You to Comply with the GED (2020)

4.1.3. Legislative updates

Fulton Hogan subscribes to Environmental Essentials legal update service for the monitoring of all Commonwealth, State and Local Government legislation.

When relevant changes to legislation occur, the Regional Environmental Advisor, will distribute the information to the SEQ Advisor and the site leadership team. Site will then facilitate the incorporation of any required changes into the operations management system. Any changes to legislation that have an impact on operations will be communicated via Toolbox, Green Alert and team meetings where applicable, to ensure operational changes are implemented.

4.1.4. Licences and approvals

The following licences and approvals will be obtained and are relevant to Warrnambool Depot operations.

LICENCE / APPROVAL	REGULATORY OR OTHER BODY	DETAILS
Planning Permit	Warrnambool City Council	For construction and operation of an asphalt batching plant and associated activities.

Development Licence	EPA	For construction and operation of an asphalt batching plant and associated activities.
EPA Permit	EPA	To establish site as a 'lawful place' to accept industrial waste (asphalt profilings).
EPA Registration	EPA	To establish site as a 'lawful place' to accept industrial waste (kerbside glass).
Trade Waste Consent	Wannon Water	For legal discharge of process wash water to sewer.
Other	Various	TBA

The requirements for management of approval/licence conditions are identified in this EMP, Fulton Hogan's Environmental processes, and any relevant Environmental Control Plans or EWMS/SWMS.

Note: Further detail will be included in this EMP and other site specific documentation upon the issuing of licences and approvals.

4.2. Stakeholders and Other Interested Parties

The following table details the sustainability and environmental needs of key stakeholders and interested parties to Warrnambool Depot:

STAKEHOLDER / INTERESTED PARTY	NEEDS
EPA Victoria	Potentially notifiable contamination or pollution incidents, compliance with site specific licences, compliance with duties
Warrnambool City Council	Compliance with issued planning permit and all accompanying approved documentation, compliance with general duties in the planning scheme
Wannon Water	Compliance with trade waste, harvest rainwater from roofed areas for potable water recycling
Local business, neighbours	Ensure all operations conducted at the site do not pose a nuisance to local businesses and neighbours
Developer/owner	Compliance with lease conditions

The practices to satisfy the identified needs shall be detailed in this EMP, Fulton Hogan's Environmental processes, and any relevant Environmental Control Plans or EWMS/SWMS.

4.3. Environmental risk assessment's (ERA's)

4.3.1. Significant environmental aspects

Significant environmental aspects of Warrnambool Depot operations have been identified through use of Develop Environmental Risk Assessment (ERA) - Process - Au and contained within the sites Environmental Risk assessment (ERA).

Aspects are deemed significant if they have a pre-controls risk rating of 7 (Med) or higher.

The key significant environmental aspects of Warrnambool Depot are as follows:

- TBA upon ERA

4.3.2. Risk assessment

Risk assessment and management shall be undertaken in accordance with Management of Risk and Opportunity – Process – Au and Develop Environmental Risk Assessment (ERA) - Process - Au. Outcomes of the risk assessment are documented on the Environmental Risk Assessment, with the template available on the Hub.

The ERA covers the general risks associated with the majority of the works conducted by the business, with a project specific ERA to be developed as required by Section **Error! Reference source not found.**.

Risk assessments shall be reviewed on an annual basis or if the scope/activities change significantly.

In the event of a high risk activity, where the site level risk assessment is not deemed to have appropriate coverage, a specific risk assessment shall be conducted for that activity. Dependant on the risk or activity, a standalone EMP, ECP, ERA, Safe Work Method Statement (SWMS) or Environmental Work Method Statement (EWMS) may be used – refer to the Environmental Risk Opportunity and Planning processes for further information.

4.4. Environmental control plans (ECPs)

Environmental Control Plans (ECPs) will be used to provide additional site specific controls based on the requirement for site specific controls being required where the department EMP does not provide adequate detail. Additionally, an ECP may be developed where a high risk activity may be required. This includes:

- Construction of waterway crossings
- Works over or abutting waterways
- Sites working in close proximity to significant flora/fauna
- Sites working in close proximity to areas of cultural significance
- Sites working with contaminated soil
- Sites working in close proximity to houses and other sensitive noise receivers

Environmental Control Plans shall be prepared in accordance with the Develop and Maintain Environmental Management Plans and Environmental Control Plans – Process – Au.

5. Environmental protection processes (managing environmental aspects & impacts)

5.1. National processes

National Fulton Hogan Environmental Protection processes are managed as part of 'Environment and Sustainability' in Fulton Hogan's management system (Our System). These are managed using Promapp process mapping software and are made available through theHub, ensuring personnel always have access to the up to date version of the best practice environmental practices.

These processes detail the best practice organisational approach to managing these aspects and avoiding associated impacts. Further information detailing the specific requirements for this Warrnambool Depot follows.

The following are key processes for managing environmental aspects and impacts at site:

- Assess and Manage Contaminated Soil
- Discharging Water
- Manage Acid Sulfate Soils
- Manage Environmental Air Quality
- Manage Environmental Noise

- Manage Erosion & Sedimentation
- Manage Flora & Fauna
- Manage Heritage
- Manage Vibration
- Manage Waste
- Manage Weeds and Pests
- Managing Hazardous Chemicals and Dangerous Goods
- Sustainable Use of Resources

5.2. Site specific processes

This section of the EMP aims to provide general environmental controls and management principles that can be employed for a majority of the work conducted by the Warrnambool Depot Department. This EMP is to be supported by the site specific (if required) ECP as required to show locations of controls and project specific environmental elements. Where this EMP is not adequate to address project specific risks, a project specific EMP will be developed.

5.2.1. Noise and vibration

The objective of managing noise and vibration is to undertake all works associated with this EMP without causing noise nuisance to any stakeholders including local residents and not causing any harm to structures or nuisance to stakeholders including residents as a result of vibration.

All operations undertaken will be conducted to minimise the environmental impacts associated with noise and vibration, specifically causing nuisance to stakeholders and residents in proximity to site regarding noise and vibration impacts. The processes Manage Environmental Noise - Process - Au and Manage Vibration - Process - Au are available on theHub and will be used to guide the development of the project specific EMP or ECP as required.

Noise requirements are predominately set out in the sites approval conditions and should be consistent with the Environmental Protection Regulations 2021 (Regulations), the Noise Protocol (EPA Publication 1826.4: Noise limit and assessment protocol for the control of noise from commercial, industrial and trade premises and entertainment venues).

The following management principles will be employed on site for all operations:

- All works are to be completed as per the approved working hours in the approved Planning Permit and/or other licences/approvals).
- To mitigate noise issues, the following methodologies can be used:
  - Ensuring all machinery is well maintained.
  - Selection of machinery or works practices which produces less noise.
  - Scheduling of noisy activities to the less sensitive periods of the day
  - Location of noisy activities away from neighbours and other sensitive areas
  - Raw materials to be delivered during daylight hours
  - Placement of stockpiles and design of trafficable areas to minimise plant and truck reversing where possible
  - Placement of sound walls or noise attenuating blankets around sources of noise such as generators and air compressor to enclose noise or between sources of noise and receptors
  - Avoid causing peak noise events e.g. by dropping equipment/materials from a height or into trucks
  - A formal assessment of noise and vibration impacts will be conducted monthly during the environmental inspection.
  - All trucks leaving site to be mindful of their impact on surrounding residents, particularly during evening and night operations.

5.2.1.1. Monitoring and contingencies

General noise and vibration monitoring will consist of assessing the noise and vibration levels during weekly environmental inspections, monitoring should be undertaken as part of risk management (under the GED) to determine how effective control measures are and to identify any changes that may need to be made.

Formal noise and vibration monitoring may be conducted based on possible complaints or where site specific environmental risk assessments indicate significant risk of noise or vibration impacts. Where required, contact the Regional Environmental Advisor for advice.

As per the environmental protection regulations (Regulation 113), prediction, measurement, assessment and analysis of noise must be in accordance with EPA Publication 1826.4: Noise limit and assessment protocol for the control of noise from commercial, industrial and trade premises and entertainment venues (Noise Protocol). The Noise Protocol sets out how to conduct the following noise related assessments:

(a) Noise limits

(b) Background levels

(c) Alternative assessment criterion at an alternative assessment location, including when the Live music entertainment venues provisions (which include reference to agent of change) set out in the VPPs apply

(d) Effective noise levels.

5.2.2. Air quality

The objective of managing air quality is to undertake all works associated with this EMP to ensure the generation of dust, emissions and odour does not cause nuisance to neighbouring properties or other stakeholders and complies with all legislative requirements. Further details can be found in the Manage Environmental Air Quality - Process - Au process on the Hub.

EPA Guideline 440.1: A guide to the sampling and analysis of air emissions and air quality (Dec 2002) and EPA Publication 1961 *Guideline for assessing and minimising air pollution in Victoria* can also be referred to for additional detail.

During general operations where an activity has a risk of impacting air quality from dust impacts - the following protocols will be put in place to minimise the risk of impacting sensitive receivers:

- Site will be asphalt sealed, and areas where it is not will be constructed with a semi permeable hardstand. Sealed areas will be periodically cleaned using street sweepers and other means available to remove fugitive dust sources that may accumulate.
- Limit vehicle speed on all trafficable areas to minimise dust generation. Where applicable, consider placing materials such as crushed rock on the access tracks to minimise soil disturbance.
- Potential point sources from fixed plant - such as transfer points, conveyors, crushers and screens, material load out – will be enclosed or partially enclosed as far as reasonably practicable to minimise emissions.
- Dust suppression sprinklers used to minimise dust generation. Wetting agents will be considered as required.
- Dust generated from the asphalt batching process will be captured in a baghouse and recycled into the mix.
- Maintenance of the baghouse and the collection bags inside will be appropriately managed and performed in a way that dust does not become an airborne nuisance.
- Where possible, materials will be stored in roofed and/or walled bunkers and bays. Stockpiles should be managed so that the contents are well contained within the nominated bay area and not overflowing into trafficable areas.
- Where stockpiles are not enclosed, limit the height of stockpiles to minimise the exposure to wind. Where stockpiles are to be left for a long period, consider other stabilisation techniques such as sterile rye

grass, polymer sprays or other applied soil binder. Consider the location of stockpiles in relation to prevailing winds.

- Minimise idling of vehicles and plant to prevent unnecessary emissions.
- Daily weather reports from the nearest meteorological station can be sought and used to direct the day's activities. Where hot, dry, windy conditions are forecast scheduling of works is to focus on activities that will not create uncontrollable dust.

Best available techniques will be adopted when procuring and purchasing plant to ensure odour emissions are reduced as far as reasonably practicable. Odour sources will be identified and appropriate controls implemented to mitigate the risk of nuisance odour emissions. Potential sources of odour include:

- Asphalt load-out
- Transfer of bitumen
- Stack emissions
- Mobile plant and truck exhaust

5.2.2.1. Monitoring and Contingencies

Formal dust or emissions monitoring may be conducted where required based on significant risk of dust impacts or client requirements, this can be conducted with specific information provided in a project specific ECP or EMP. Informal monitoring of dust should be incorporated into the weekly environmental inspection. Where there are concerns about significant dust, the Incident and Emergency Response Flowchart – Extreme Dust will be referred to, including the following protocol:

- In the event of hot, dry, windy conditions where dust generation can't be suitable controlled, works will be reallocated to non-dust generating activities.
- Where uncontrolled dust or emissions are observed and the source cannot be immediately rectified, advise the SEQ Advisor and/or Regional Environmental Advisor. This shall be recorded in CAMs and the source shall be identified and remedied.
- Vehicles or plant shall be stood down until repaired if excessive smoke is seen emitting from the vehicle/plant.

5.2.3. Erosion, sediment and water management

The objective of managing erosion, sedimentation and water is to prevent pollution of waterways and offsite discharge of water and operate in accordance with legislative obligations.

All works will assess the risks of sediment, erosion and water management in accordance with the processes Manage Erosion and Sediment - Process - Au and Discharging Water - Process - Au available on theHub. Refer to EPA Publication 1834, Section 5.3 for erosion and sediment management controls and Section 6.4 for managing potentially contaminated stormwater. The following protocols are key for management principles for erosion, sedimentation and water discharge.

- All water is to leave site only via authorised and approved methods at the approved discharge point. All water generated on site will be treated by on site treatment pits before leaving site, so that discharged water will be free of pollutants as far as reasonably practicable.
- Additional use of drain wardens, geotextiles and rock logs to divert water around drain entry pits or to protect pits may be required.
- All water captured in the bunded area will only be authorised for discharge if deemed free of oily residue or any other pollutants. The bunds are to be managed so that they are kept free of pooling water so that the capacity of the bund is retained. Bund water may require additional treatment methods to ensure it is discharged in a clean state.
- All water generated at the truck washdown will be captured and discharged as per an approved Trade Waste Agreement issued by Wannon Water. Site will put appropriate controls in place to ensure minimal contaminants as far reasonably practicable will enter the trade waste system. Only process water

generated from washing operations may enter the trade waste system. All other water generated on site will be diverted.

- Stockpiling of material should be avoided along drainage lines and channels, with street sweepers used to clean up material as required to prevent contaminated water ingress into stormwater system
- Saw cutting of concrete should be conducted to prevent slurry entering any drainage system, including using wet/dry vac, containing slurry or use of street sweeper to clean up slurry.

Onsite erosion is not anticipated on site, as the site is fully or semi sealed. Sources of potential erosion are likely to be limited to stockpile areas. Prevention of erosion and scouring will be implemented to minimise generation of sediment, and as the priority control for management of sediment discharge. Where this cannot be achieved, controls will be implemented to prevent turbid water from causing environmental harm.

- The main erosion control methods include:
  - Use of cut-off drains, rock logs/sand bags/coir logs to divert stormwater around works or to slow velocity of stormwater to minimise scouring.
  - Protection of drains, side entry pits, culverts, swales to prevent turbid water ingress. Several products are available including drain wardens, geofabrics and silt fencing.
  - Mud shall be kept off roads for both safety and environmental purposes. Mud that is tracked onto roads is washed into the drainage network, which flows into natural waterways.

5.2.3.1. Monitoring and contingencies

Where required, formal water quality monitoring should be undertaken either internally using a calibrated water quality meter, or collected and sent externally to a suitable water testing facility (e.g.: NATA accredited laboratory). Monitoring results hould be captured using on the Environmental Monitoring Register template. During monthly Environmental Inspections, water quality and signs of scouring/erosion shall be visually checked to ensure water quality is not being affected by operations. Water quality protection controls such as drain wardens shall also be checked at these inspections if being utilised.

Any non-compliant discharge to waters shall be recorded in CAMs and the source of the non-compliance shall be identified and remedied to prevent re-occurrence. The entry or likely entry of a contaminant into surface water is notifiable contamination, if the concentration of the contaminant in the surface water—

- Is, or is likely to be, above the default guideline value for that contaminant specified in the Australian and New Zealand Guidelines for Fresh & Marine Water Quality (ANZG) or the guideline value for that contaminant specified in the Australian Drinking Water Guidelines (ADWG); and
- Is likely to remain above that specified concentration.
- For the purposes of section 37(a) of the EP Act, the presence of any non-aqueous phase liquid in groundwater, surface water or an aquifer on or in land.

5.2.4. Waste and resource use

The objective of managing wastes and resource use for works undertaken by site is to minimise waste to landfill, prevent pollution, to comply with relevant company, client and legislative requirements and to minimise the resources required to deliver projects. Refer to the Manage Waste - Process - Au and Sustainable Use of Resources - Process - Au processes on the Hub for further details.

There are numerous duties under the Environmental Protection Act 2018 and are summarised in Publication 1756.2. Determinations should also be understood, especially for fill material and recycled aggregates.

Site may only accept industrial waste once it has been established as a ‘lawful place’ under an appropriate EPA Permission, or other legal instrument. Only industrial waste that meets these requirements may be accepted onto site. Any incoming loads that are identified as contaminated will be rejected, and either sent off site immediately or segregated on site for further classification as per EPA Publication 1968: Guide to classifying industrial waste prior to removal to a lawful place.

It is not anticipated that site will be in the business of managing contaminated soils. If contaminated soils are to be encountered on site due to either a major chemical spill or a contaminated load, site shall assess the risks in accordance with the process Assess and Manage Contaminated Soil - Process - Au available on theHub.

The following protocols are key management principles for general waste and resource use to be employed during all operations:

- Implement the waste hierarchy as per Figure 1**Error! Reference source not found.Error! Reference source not found.Error! Reference source not found.Error! Reference source not found.Error! Reference source not found.Error! Reference source not found.Error! Reference source not found.** t**Error! Reference source not found.Error! Reference source not found.Error! Reference source not found.Error! Reference source not found.Error! Reference source not found.Error! Reference source not found.Error! Reference source not found.**o minimise waste to landfill.
- Ensure all waste being taken off site are taken to a lawful place.
- Implement 'Just in Time' ordering methodology to prevent over ordering of materials **Error! Reference source not found.**
- Provide staff with an increased level of understanding and awareness of waste and resource use management issues. This includes posters, induction, signage on the bins and toolbox presentations.

Figure 1 - Waste hierarchy

- Identify and classify industrial waste in accordance with the EPA Publication 1968: Guide to classifying industrial waste to determine the waste code and waste type (industrial waste, priority waste or reportable priority waste) so that it is clear what duties apply. Ensure all records are maintained for at least two years.
- Have appropriate waste receptacles to encourage waste segregation, including metal and concrete skips for construction wastes and comingled, paper/cardboard and general waste bins for office wastes. Ensure there are enough bins and skips for the scope and needs of site.
- Storage of wastes will be conducted in a manner to prevent pollution, including using a location away from sensitive receptors, appropriate bunds/waste receptacles specific for the waste where required and appropriate segregation of wastes to prevent contaminated material going to landfill.
- Waste must only be taken offsite to facilities that are authorised to accept that waste stream, in accordance with the EP Act and EPA waste guidelines. All reportable priority waste (transport) disposed from the site shall be transported by a permitted carrier and shall be taken to a lawful place in

accordance with EPA waste guidelines. Every time a reportable priority waste (transaction) exchanges hand, it must be recorded via EPA Waste Tracker.

- Reduce energy use by using plant and vehicles with better fuel efficiency where there are options available, limiting idling of plant and operating plant at peak efficiency levels.
- Single use consumables are to be avoided as much as practicable, and use electronic means of communication where ever possible.
- Turning off heating, cooling and lighting at site amenities when not in use.
- Wherever possible, site shall pursue the following goals when purchasing products, materials and services:
  - Have minimal environmental impact in their manufacture and/or supply
  - Minimise waste
  - Maximise water efficiency
  - Minimise greenhouse gas emissions
  - Minimise habitat destruction
  - Minimise toxicity

5.2.4.1. Monitoring and Contingencies

During Environmental Inspections, areas where waste is stored and areas where people are generating waste shall be checked to ensure waste is not creating a hazard, pollution to the environment or nuisance to the public or other receivers. Opportunities for waste reduction should also be assessed during the inspections and project operations. In the event that uncontained waste is observed, this shall be cleaned up and the source of the inappropriate waste handling shall be identified and remedied. Where applicable, this should be raised in CAMs.

- To comply with applicable waste duties, the site must provide sufficient checks to ensure:
  - Vehicles collecting and transporting reportable priority waste (transport) hold the permission to transport such waste;
  - Every time a reportable priority waste (transaction) exchanges hand, it is recorded on the EPA Waste Tracker (it is noted that a waste contractor may raise a certificate on their waste tracker portal on behalf of Fulton Hogan); and
  - Waste facility or site where the industrial waste is delivered is authorised to receive such waste.

5.2.5. Chemical management

The objective of chemical management is to store and use all chemicals in a manner that prevents pollution of the environment and harm to human health and to be compliant with legislative conditions. Specific controls, locations of chemical storage areas and spill response equipment may be detailed in the site specific ECP or other site maps. The Managing Hazardous Chemicals and Dangerous Goods - Process - Au process on theHub can be consulted for further details, however the following principles will be employed during all operations:

- Chemical bulk storage on site will be in accordance with EPA guideline 1698 – Liquid storage and Handling Guidelines with adequate bunding used that is fit for purpose for the volume and type of chemicals being stored. The bulk storage bund consists of six upright storage tanks, with space for two tanks in the future if required.
- Minor quantities of chemicals are kept in an appropriate storage shed/shipping container type arrangement with suitable secondary containment. IBCs located around site (for example the truck slip stand and truck washdown area) are on pallet bunds
- In order to prevent spills, all chemicals will be stored in a manner that any leaks, drips and spills will be contained to prevent harm to the environment, including appropriate chemical storage bunds, trays or specialist chemical storage devices.
- High risk areas that have the potential for spills and drips from chemical handling shall be constructed on hardstand areas and suitably bunded to ensure that spills and drips are captured.

- Where refuelling or decanting of chemicals is required, this will be conducted in manner to prevent spills and drips, with appropriate spill equipment on hand.
- All plant and machinery will be refuelled only in designated refuelling areas.
- Safety Data Sheets (SDS) will be available for all chemicals stored on site.
- Adequate training will be provided to site staff, so that there is an understanding of chemical storage and spill response protocols. This can be in the form of site inductions, toolboxes or internal/external training.
- Spill kits will be available in areas where there is a risk of a chemical spill, including chemical storage areas and work areas where hydraulic equipment is being used or refuelling being undertaken. Refer to site ECP for storage locations.
- Spill kits will be fit for purpose and capable of responding to the types of chemicals being used on site (i.e. hydrocarbon specific spill kits).
- Plant and machinery shall be serviced and inspected regularly for oil and fuel leaks. Any leaks detected shall be rectified immediately.
- Fulton Hogan will ensure that Hazardous substances will be transported in accordance with Victoria's Dangerous Goods (Transport by Road or Rail) Regulations by the use of specialist licenced contractors for all transporting of hazardous substances.
- Where spills have occurred, these will be controlled, contained and cleaned up as per the Duty to respond to a pollution event. The used spill response equipment and impacted soils will be managed as a reportable priority waste as per EPA guidelines and taken to lawful place by a permissioned vehicle.
- Any soil contaminated with hydrocarbons from large fuel or oil spills on site, needs to be classified in accordance with EPA Publication 1968: Guide to classifying industrial waste prior to disposal for large spill events. Small spills can be captured, bagged and stored prior to disposal to a lawful place where volumes of contaminant are under 50L.

5.2.6. Monitoring and contingencies

During Environmental Inspections, areas where chemicals are used and stored should be checked, to ensure chemicals are not creating a hazard and that no spills have occurred. Spill kits should also be assessed to ensure they are appropriately located in areas where they may be required (i.e. chemical storage areas) and are adequately stocked.

In the event of a chemical spill, this should be responded to in accordance with the Incident and Emergency Response Flowchart, Chemical Oil and Fuel Spills, which will form part of the Emergency Response Plan. Significant spills should be reported to the Regional Environmental Advisor and where applicable will be notified to the environmental regulator.

5.2.7. Flora and flora

The objective is to conduct all works to adequately manage flora and fauna risks, comply with relevant approvals, project contractual conditions and to prevent the spread of weeds and pathogens. The projects undertaken by the Civil Department will be conducted in accordance with the Manage Flora and Fauna - Process - Au and Manage Weeds & Pests - Process - Au processes available on theHub and with specific management practices included in the project EMP or ECP documents as required.

On site vegetation will be limited to the approved landscaped areas as per the approved Plan. Therefore, operations and works that have a likelihood of impacting vegetation are not anticipated. However, the following management principles will be implemented across all works:

- Clearing of vegetation should not be completed unless an appropriate permit is in place.
- Vegetation in landscaped areas shall be maintained to the satisfaction of the Responsible Authority.
- Where fauna habitat or fauna including snakes are encountered, a suitably qualified professional may be required to relocate the animal.
- To prevent the spread of weeds and pathogens, all plant and equipment that is brought onto site will be decontaminated or free from mud, debris and vegetation prior to arrival.

- Where there are existing weeds present on site, plant and equipment will be decontaminated as required to prevent spread of weeds on site and to other areas off site.
- A formal assessment of weeds will be conducted on a weekly basis during the weekly environmental inspection.

5.2.7.1. Monitoring and contingencies

Site personnel shall undertake monitoring of the condition of flora and fauna, habitat sites and protective measures as a part of Environmental Inspections. All plant and machinery that comes onto site should be visually assessed for presence of mud/debris or vegetation, together with any weeds identified on site. This should also be captured on the weekly environmental inspection. In the event that unexpected fauna or flora is encountered refer to the sites Emergency Response Plan and the Incident and Emergency Response Flowchart – Encountering Wildlife (including snakes).

5.2.8. Heritage

The objective of managing heritage is to conduct all works with no detrimental impact on cultural heritage and comply with relevant legislation. Where there is known heritage on site with either a Cultural Heritage Management Plan (CHMP) or other formal heritage assessment with conditions in place, the specific requirements should be included in a site specific EMP or ECP and managed as per the requirements. Manage Heritage - Process - Au is available on theHub for further information and will also be used to develop the EMP or ECP documents and to ensure unexpected finds are managed appropriately.

There are no registered sites within the Warrnambool depot.

5.2.8.1. Monitoring and contingencies

In the event that unexpected heritage items such as stone tools, middens etc. are discovered or suspected, work shall immediately cease in the vicinity of the site (within 25m, or more if stipulated in CHMP or other requirements) and the response procedure Incident and emergency response flowchart - Encountering cultural heritage sites or human remains must be applied. Where operating under a CHMP or client requirements, a specialist protocol may be followed, dependent on the specific requirements, which should be documented on the ECP or EMP. The response should include no-go zone establishment, fencing and sourcing required approvals prior to works progressing. If remains (Bones) are found or suspected, inform the Regional Environmental Manager immediately. The remains shall not be touched or otherwise interfered with, other than to safeguard them from further disturbance.

Monitoring for heritage will consist of assessment through the weekly environmental inspections. Where required, known heritage sites shall be assessed for the need for additional monitoring, such as vibration monitoring on an as required basis.

5.3. Maintenance and removal of environmental protection measures

All environmental protection measures are to be maintained to ensure they are performing as originally intended when installed. For specific details of the maintenance requirements for an environmental protection measure, refer to the project specific ECPs.

If protection measures are no longer required they shall be removed and disposed in accordance with Manage Waste - Process - AU and the waste management hierarchy.

5.3.1. Awareness, training, competence and communication

The requirements stipulated in this EMP and all subordinate environmental documents must be conveyed to all persons involved in the works carried out by the project. Commitment shall be sought from these individuals that these requirements will be adhered to.

5.4. REALity culture

A culture of providing sound environmental performance is an integral part of the overall Fulton Hogan culture program. Fulton Hogan's REALity program highlights the integral values of the company.

- Respect;
- Energy and Effort;
- Attitude; and
- Leadership.

Each of these directly impact on the manner in which Fulton Hogan's operations interact with the environment.

5.5. Induction

Environmental induction is integrated within Fulton Hogan's Induction processes.

5.5.1. Company induction

All new salaried employees must undergo the Company Induction Process. The Company Induction must be completed in accordance with the Fulton Hogan On boarding and Induction Procedure.

5.5.2. Site / facility induction

The site undertakes inductions accordance with Conducting Site Induction - Process - Au. The induction, given on the first day on site, shall give detail to the key environmental risks and requirements of the site. Every person on site shall have some form of approved induction, including site visitors, who must be escorted around the site.

5.6. Communication

Communication shall be undertaken in accordance with Fulton Hogan's Communications processes. In particular;

5.6.1. Toolbox

Toolbox meetings shall be the main form of communication to address changes to the environmental requirements, as well as a platform for staff to raise suggestions and innovative ideas to their direct management. Tool Box meetings shall be undertaken monthly and must be undertaken and documented in accordance with Conduct Toolbox Meetings - Process - Au.

5.6.2. Southern Infrastructure Services quarterly environment meeting

This meeting is conducted quarterly and is represented by Environmental and SEQ staff from the Southern Construction business. It is the platform for each operation to raise ideas, concerns and innovative ideas and share learning's from their experiences.

At least one representative from the site shall attend each meeting.

5.6.3. Environmental (green) alerts

Environmental (Green) Alerts shall be used to communicate significant environmental incidents, innovations or changes in requirements. These allow the learning's and any required changes to be shared across all operations across Australia.

The site shall ensure that learning's from Green Alerts are communicated to all relevant personnel.

5.7. Training

Training shall be undertaken and records shall be maintained in accordance with the Fulton Hogan Learning, Development and Training processes.

5.7.1. EnviroWise

All Fulton Hogan Personnel are required to undertake Fulton Hogan's internal Environmental Training Program- EnviroWise. Key subcontractors may also be invited to attend this training.

This 2-3 hour training package details the environmental requirements, risk and controls to personnel to ensure they have a good baseline environmental awareness and knowledge for the undertaking of their works.

5.7.2. Green Card training

All supervisors, foreman, leading hands and superintendents shall be encouraged to undergo Green Card training, a third party accredited environmental awareness course.

5.7.3. Continued training

Continued training will be carried out as necessary to ensure staff are adequately competent and understand their role in ensuring sustainable outcomes.

6. Monitoring, inspection and audits

Regular monitoring, inspections and audits shall be conducted to assure compliance with the requirements of this EMP and any regulatory requirements.

6.1. Monitoring and inspection schedule

A Monitoring and Inspection Schedule for site shall be developed and maintained. This will identify the key monitoring and inspections required for the operation. This shall be developed and managed in accordance with Implement a Monitoring and Inspection Schedule - Process - Au.

6.2. On-going visual monitoring

Environmental monitoring, including monitoring of subcontractors' activities, must be conducted as an on-going activity during the normal (continuous) course of supervision of works.

Records of such surveillance should be kept if any environmental issues are observed. These should be documented as an environmental incident/ non-conformance in CAMs or a diary note as appropriate.

6.3. Site inspections

In addition to periodic inspections, additional inspections must be undertaken prior to significant weather events (i.e. rain, wind etc) to ensure the site is safe and the weather will not create an environmental incident.

Areas for inspection must include:

- The Site - to identify if any additional areas require measures
- The Environmental Protection Measures - to identify if they are working effectively (i.e. are they appropriate for the location, installed correctly or require maintenance?)
- The processes of work – to identify if people are undertaking correct work practices
- The Receiving Environment - to identify if any impact is occurring

The project or department specific inspection is available on the Inspections application within Salesforce should be used for documenting all environmental inspections. In the event that specific elements that are not covered by the inspection, the Salesforce Inspection tool should be uploaded in Salesforce that adequately addresses the risks.

6.4. Physical / chemical and resource monitoring

Monitoring should be undertaken as part of risk management (under GED) to determine how effective control measures are and to identify any changes that may need to be made.

Specific monitoring requirements should be detailed in Section 5 of this EMP.

6.5. Audits

6.5.1. Internal audits

Audits of the application of the EMP and ECP's shall be undertaken by the Regional Environmental Advisor. Southern Region Infrastructure Services shall maintain an Audit Schedule in the Salesforce Self-Assessment Tool application, with audits to be scheduled on a risk based approach.

The audit will be conducted using an appropriate template relevant for the scope of the audit on the Self-Assessment Tool application in Salesforce.

6.5.2. ISO14001 certification audits

As part of Fulton Hogan's ISO 14001 certification, the operation may be required to participate in certification audits. This will occur if the operation is randomly sampled for audit.

6.5.3. External audits

Independent audits will be conducted as determined by risk (through the ERA process) or by client/regulatory requirements. The audit will be raised on CAMs, with the audit report attached and actions tracked through the CAMs case.

7. Incident and emergency preparedness and response

Incident and emergency planning and response shall be managed in accordance with Fulton Hogan's Conduct Incident & Emergency Response Planning - Process - Au and Manage Incident Response, Notification & Investigation - Process - Au. These processes detail how to:

- Plan for incidents and emergencies by preparing a site specific Emergency Response Plan. This contains site specific procedures to follow in the event of emergency scenarios;
- Notify required persons;
- Report; and
- Undertake incident investigation.

In accordance with the requirements of these processes, an Incident and Emergency Response Plan has been developed for this operation and should be referred to for further information.

Pollution incidents (e.g. spill or leak that cause or threaten to cause material harm to the environment or human health) must be reported to EPA as soon as practicable after becoming aware of the incident, even where the incident is contained on site. EP Act Section 5 defined Material harm:

• there is an adverse effect on human health or the environment; or

• there is an adverse effect on an area of high conservation value or of special significance; or

• the clean-up or management of the pollution would cost $10,000 or more

8. Reporting

8.1. Non-conformance

All environmental non-conformances must be raised, actioned and recorded in accordance with Fulton Hogan's Nonconformity Procedure.

Non-conformance records are to be raised in CAMs.

8.2. Monthly environmental reporting

Environmental statistics shall be complied and trend analysis shall occur every month, as part of Fulton Hogan's monthly internal Environmental and Sustainability reporting. As part of this process, an assessment

is made on the performance of the Objectives and Targets. Reporting shall be undertaken and managed in accordance with Monthly Environmental & Sustainability Reports - Process – Au.

9. Review and continuous improvement

The project management will review the environment and sustainability management system as outlined in this plan, annually as a minimum, to ensure its continuing suitability, adequacy and effectiveness via Management Review - Process - Au.

Other triggers for update may include legislative change, approval change, client change, operational change, and incident or innovation improvement.

This plan will be revised as necessary to reflect any amendment to the Fulton Hogan Quality System or to capture identified areas of improvement.

10. Document control – documents, data and records

All documentation specifically relating to the management of environment and sustainability, including this plan, are to be stored and maintained in accordance with Control of Documents, Data and Records - Process - AU and the site specific requirements detailed in the Quality Management Plan.

11. Revision history

DATE	AUTHOR	BRIEF DESCRIPTION OF CHANGE
9/11/2021	Patrick Boyce	Development of document

Appendix E – Drawing Set for Warrnambool site

FULTON HOGAN - WARRNAMBOOL
PROPOSED ASPHALT &
GLASS PROCESSING PLANT

PROJECT NORTH

SITE LOCATION PLAN
1 : 5000

DRAWING INDEX	
DRG. No.	TITLE
TP01	SITE LOCATION PLAN & DRAWING INDEX
TP02	PROPOSED SITE - PLAN
TP03	PROPOSED SITE - SITE ELEVATIONS
TP04	VEHICLE ACCESS PATHS ,CARPARK & SIGNAGE DETAILS
TP05	ASPHALT PLANT PROCESS AREA - PLAN & ELEVATIONS
TP06	ADMIN & WORKSHOP BUILDING - PLAN & ELEVATIONS
TP07	PRODUCTION LAB - PLAN & ELEVATIONS
TP08	AGGREGATE STORAGE BUNKERS & GLASS PROCESS AREA
TP09	MISC MATERIAL STORAGE BUNKERS - PLAN & ELEVATIONS
TP10	SITE - DRAINAGE PLAN - CONCEPT

Rev	Description	Date
F	SITE UPDATE & UNDEVELOPED LAND AREA	28-01-22
E	ISSUED FOR INFORMATION	22-12-21
D	ISSUED FOR INFORMATION	30-11-21
C	ISSUED FOR INFORMATION	22-11-21
B	ISSUED FOR INFORMATION	19-11-21
A	ISSUED FOR INFORMATION	03-11-21

ISSUED FOR
PRELIMINARY

CLIENT
Fulton Hogan
MASON STREET WARRNAMBOOL.
VIC. 3212.

PROJECT
PROPOSED ASHALT PRODUCTION &
GLASS PROCESSING PLANT
MASON STREET. WARRNAMBOOL. VIC. 3280.

SITE LOCATION PLAN & DRAWING INDEX

DRAWN B & C	PLOT DATE 28-01-22
DESIGNED D.J.D.	SCALE 1 : 5000
APPROVED	
DRG No. TP01	REV. F

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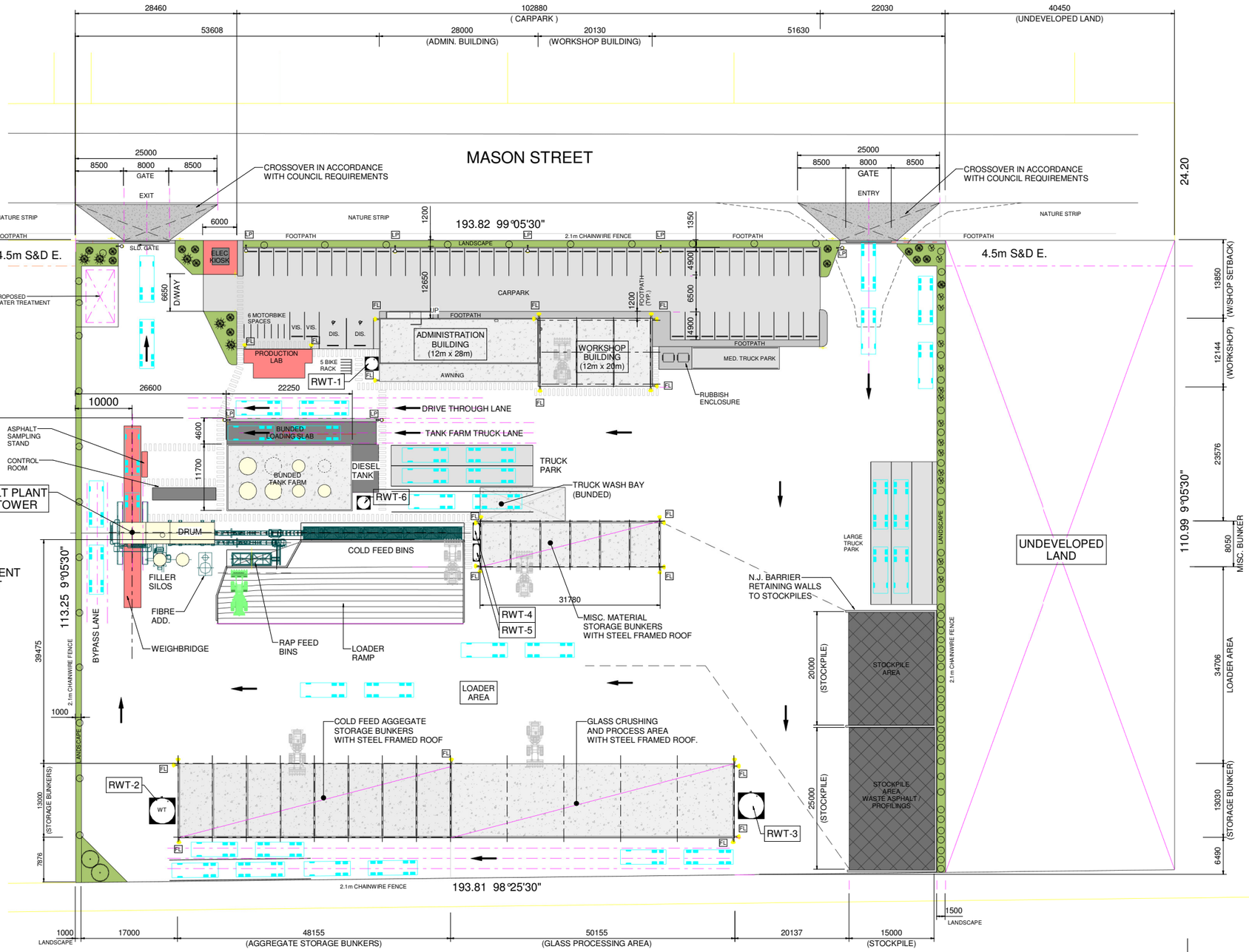
A3 AT 50%



SITE PLAN
1 : 400

LIGHTING SCHEDULE						
MARK	DESCRIPTION	REMARKS	QTY.	Wattage	Illuminance	Luminous Intensity
FL	300W Incandescent - 230V	FLOOD LIGHT (OVERHEAD ON BUILDING)	27	300 W	52 lx	486 cd
LP	400W Halogen - 230V	LIGHT POLE	8	400 W	86 lx	796 cd

SITE USAGE AREA SCHEDULE		
DESCRIPTION	Area	REMARKS
ADMINISTRATION BUILDING	312 m²	
PRODUCTION LAB	30 m²	
CONTROL ROOM	25 m²	
OFFICE - WORKSHOP	241 m²	
WEIGHBRIDGE	96 m²	
TANK FARM BUNDED SLAB	260 m²	
TANK FARM TRUCK UNLOADING SLAB	106 m²	
DIESEL TANK SLAB	39 m²	
AGGREGATE STORAGE BUNKERS	628 m²	
GLASS CRUSHER & PROCESS AREA	650 m²	
MISC. STORAGE BUNKERS	256 m²	
ASPHALT SAMPLING STAND	5 m²	
RUBBISH ENCLOSURE	24 m²	CONCRETE
TRUCK WASH	90 m²	
ELEC KIOSK	36 m²	
CARPARK	1496 m²	ASPHALT
TRUCK PARKING AREA	534 m²	ASPHALT
DRIVEWAY CROSSOVER	116 m²	CONCRETE
DRIVEWAY CROSSOVER	104 m²	CONCRETE
FOOTPATH	123 m²	CONCRETE
GLASS STOCKPILE AREA	300 m²	
WASTE ASPHALT/PROFILINGS	375 m²	
LANDSCAPE	532 m²	TO PERMIT REQUIREMENTS
UNDEVELOPED LAND	4498 m²	

CAR PARKING SPACE SCHEDULE		
TYPE	REMARKS	QTY.
CAR - 4900 x 2600		48
CAR - 4900 x 2800 - END BAY		3
CAR - DISABLED SHARED AREA - 5400 x 4800		2
MOTORBIKE - 1200 x 2500		6
PUSH BIKE - 1800 x 500		5
TRUCK PARK - 15000 x 3600		1
TRUCK PARK - 25000 x 3600		7

ROOF RAIN WATER CATCHMENT SCHEDULE			
BUILDING	ROOF AREA	WATER CATCHMENT AT 10L/m²	ALLOCATED WATER TANK
ADMIN	303 m²	3028 L	RWT-1
WORKSHOP	245 m²	2451 L	RWT-1
PRODUCTION LAB	54 m²	543 L	NONE
AGG. STORAGE BUNKER	630 m²	6303 L	RWT-2
GLASS PRODUCTION	652 m²	6524 L	RWT-3
MISC. STORAGE BUNKER	263 m²	2628 L	RWT-4 & RWT-5
COLD FEED BIN CANOPY	126 m²	1256 L	RWT-4 & RWT-5
RAP BIN CANOPY	39 m²	393 L	NONE

WATER TANK SCHEDULE			
Mark	Description	Type	REMARKS
RWT-1	10kl - Rain Water Tank	2.3m dia x 2.55m High	
RWT-2	50kl - Rain Water Tank	4.5m dia. x 3.15 High	
RWT-3	50kl - Rain Water Tank	4.5m dia. x 3.15 High	
RWT-4	7kl - Rain Water Tank	1.1m x 3.0m x 2.0m High	
RWT-5	7kl - Rain Water Tank	1.1m x 3.0m x 2.0m High	
RWT-6	10kl - Rain Water Tank	2.3m dia x 2.55m High	OPTIONAL TANK LOCATION

PROJECT NORTH

SITE AREA - 21730m²

NOTES

1. ALL LANDSCAPE AREAS ARE TO BE PLANTED IN ACCORDANCE WITH THE LOCAL COUNCIL SPECIFICATIONS AND PERMIT REQUIREMENTS.
2. SITE AREA TO BE GENERALLY GRADED TOWARDS MASON STREET FOR WATER COLLECTION / TREATMENT AND CONNECTIONS TO STORMWATER & SEWER L.P.O.D. (TO BE DETERMINED) IN ACCORDANCE WITH LOCAL AUTHORITY REQUIREMENTS.
3. REFER TRUCK TURNING CIRCLE DRAWINGS FOR TRUCK SWEEP PATHS.
4. SITE LIGHTING IS INDICATIVE ONLY AND TO BE DESIGNED BY ELECTRICAL ENGINEER.
5. AUTOMATIC SLIDDING GATES TO BE PROVIDED AT SITE ENTRY & EXIT.
6. APPROVED ROOF RAIN WATER CATCHMENT TANKS TO BE PROVIDED AND CONNECTED TO RAIN WATER HARVESTING DRAINAGE IN ACCORDANCE WITH LOCAL AUTHORITY REQUIREMENTS.
7. ELECTRICAL KIOSK TO BE 1000kVa PROVIDING 1400 amps. TO OFFICE , WORKSHED & PRODUCTION LAB & PLANT
8. NBN CONNECTION TO BE PROVIDED TO OFFICE , WORKSHED & PRODUCTION LAB.

ISSUED FOR
PRELIMINARY

Rev	Description	Date
H	TANK FARM TANK REVISION	01-02-22
G	SITE UPDATE & UNDEVELOPED LAND AREA	28-01-22
F	ISSUED FOR INFORMATION	22-12-21
E	ISSUED FOR INFORMATION	20-12-21
D	ISSUED FOR INFORMATION	30-11-21
C	ISSUED FOR INFORMATION	22-11-21
B	ISSUED FOR INFORMATION	19-11-21
A	ISSUED FOR INFORMATION	03-11-21

CLIENT
Fulton Hogan
MASON STREET WARRNAMBOOL.
VIC. 3212.

PROJECT
PROPOSED ASHALT PRODUCTION & GLASS PROCESSING PLANT
MASON STREET. WARRNAMBOOL. VIC. 3280.

PROPOSED SITE - PLAN

DRAWN B & C	PLOT DATE 01-02-22
DESIGNED D.J.D.	SCALE 1 : 400
APPROVED	
DRG No. TP02	REV. H

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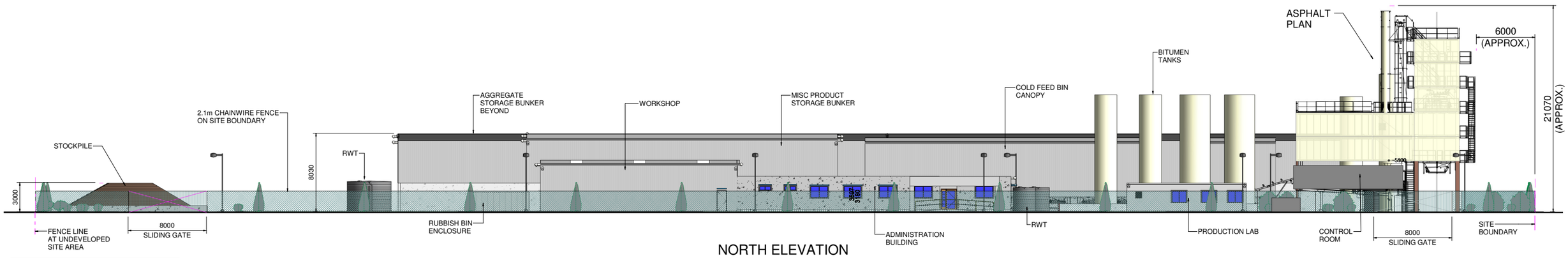
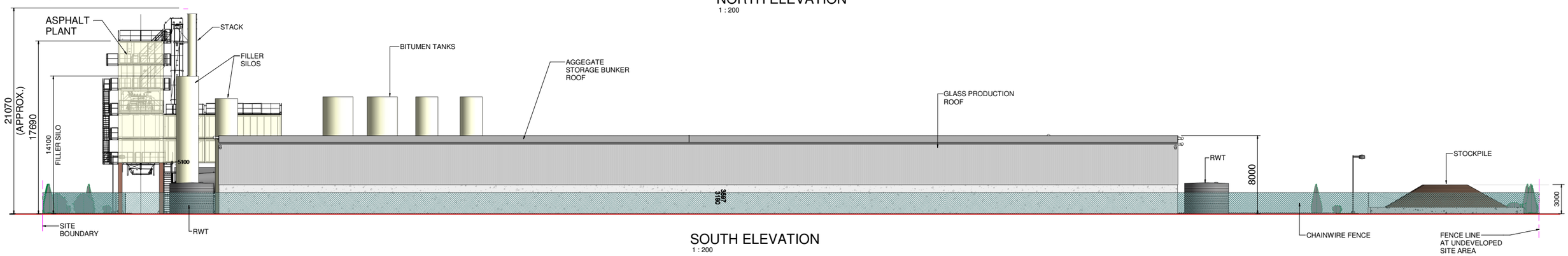
A3 AT 50%



NORTH ELEVATION
1 : 200



SOUTH ELEVATION
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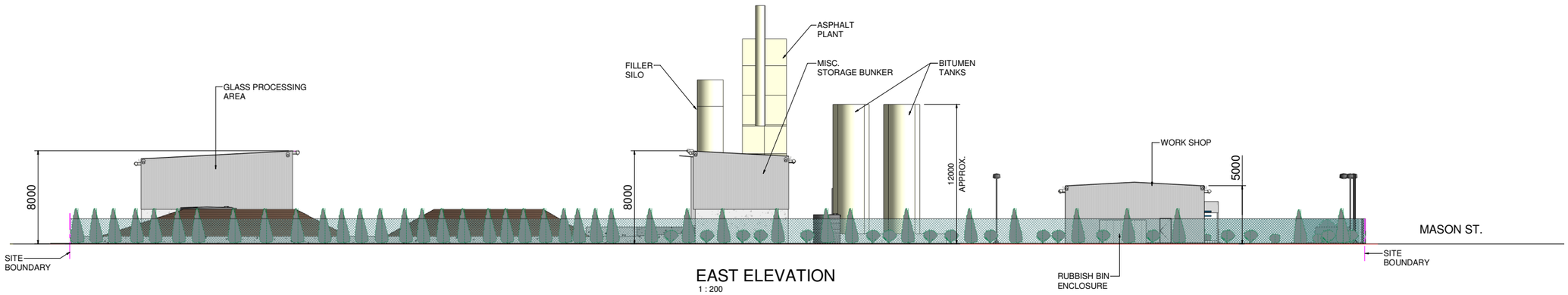
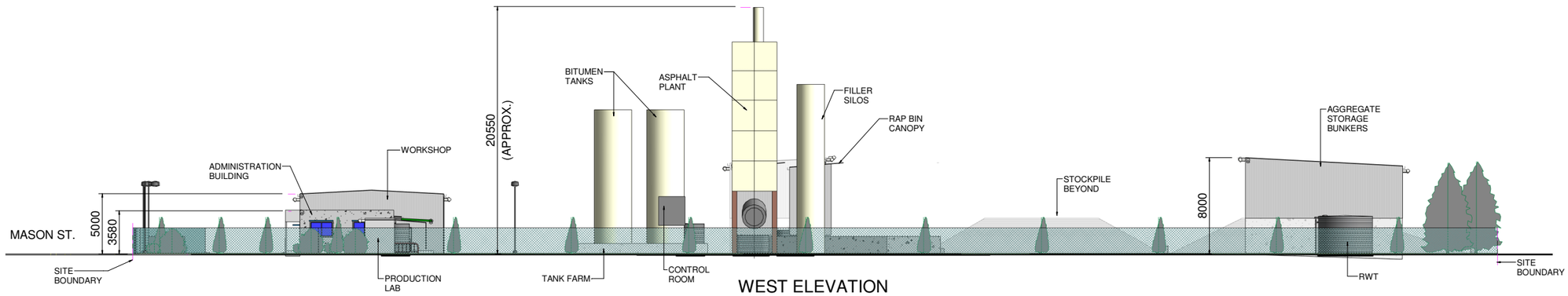


EAST ELEVATION
1 : 200



WEST ELEVATION
1 : 200

COLOUR SCHEDULE

ROOF & WALL CLADDING

- MUTED GREY TONES
- ASTEC ASPHALT PLANT

Rev	Description	Date
G	TANK FARM TANK REVISION	01-02-22
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PROPOSED SITE - SITE ELEVATIONS

ISSUED FOR
PRELIMINARY

DRAWN B & C	PLOT DATE 01-02-22
DESIGNED D.J.D.	SCALE As indicated
APPROVED	
DRG No. TP03	REV. G

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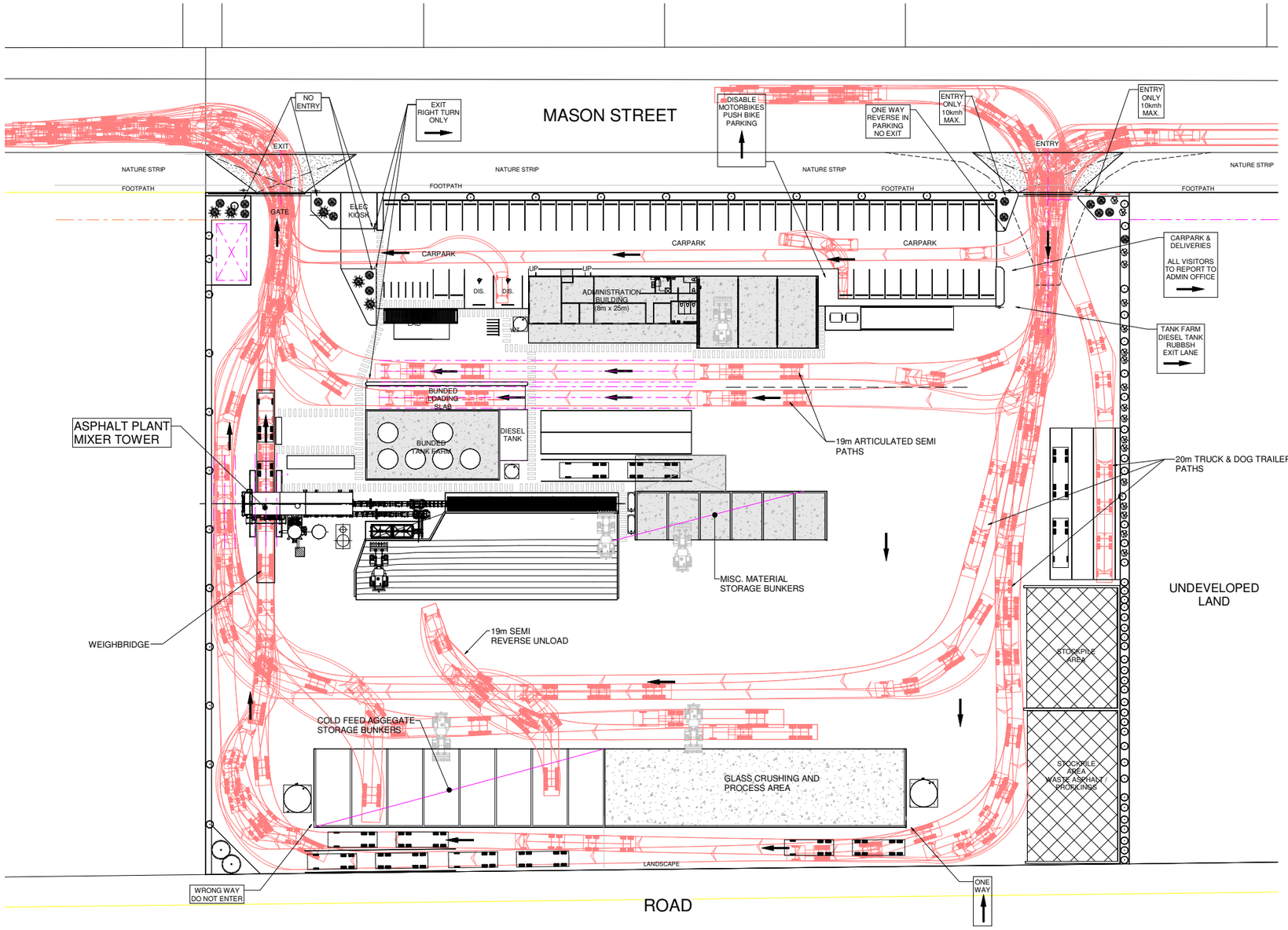
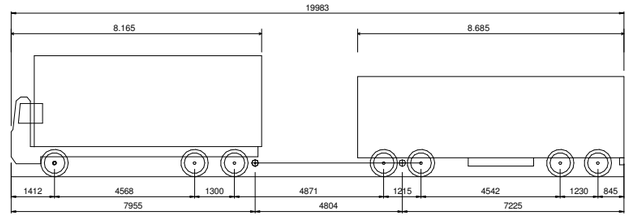
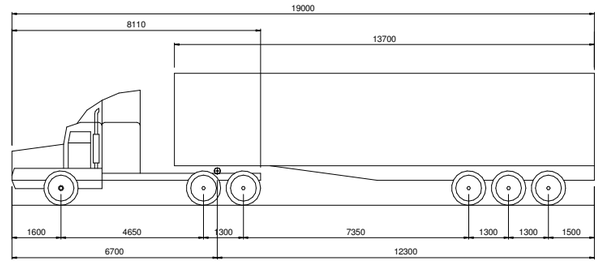


PLAN - VEHICLE ACCESS PATHS ,PARKING & SIGNAGE DETAILS
1 : 400



TRUCK & DOG - QUAD AXLE TRAILER	
Overall Length	19.983m
Overall Width	2.550m
Overall Body Height	3.942m
Min Body Ground Clearance	0.346m
Track Width	2.550m
Lock-to-lock time	4.00s
Curb to Curb Turning Radius	12.500m

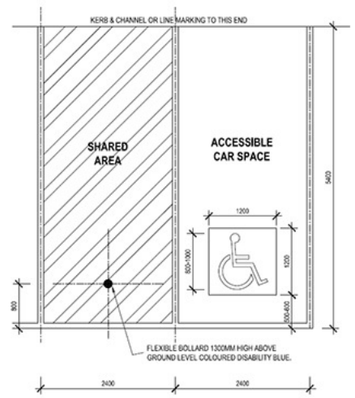
TRUCK & DOG - QUAD AXLE DETAIL ELEVATION
1 : 100



PRIME MOVER AND SEMI-TRAILER (19 M)

PRIME MOVER AND SEMI-TRAILER (19 M)	
OVERALL LENGTH	19.000m
OVERALL WIDTH	2.500m
OVERALL BODY HEIGHT	4.300m
MIN BODY GROUND CLEARANCE	0.540m
TRACK WIDTH	2.500m
Lock-to-lock time	6.00s
Curb to Curb Turning Radius	12.500m

19m ARTICULATED SEMI - DETAIL ELEVATION
1 : 100



RIGHT HAND ACCESSIBLE CAR PARKING SPACES IN ACCORDANCE WITH AS2890.6

DISABLED PARKING SPACE
1 : 10

(2 OFF)

ISSUED FOR
PRELIMINARY

Rev	Description	Date
F	SITE UPDATE & UNDEVELOPED LAND AREA	28-01-22
E	ISSUED FOR INFORMATION	22-12-21
D	ISSUED FOR INFORMATION	30-11-21
C	ISSUED FOR INFORMATION	22-11-21
B	ISSUED FOR INFORMATION	19-11-21
A	ISSUED FOR INFORMATION	03-11-21

CLIENT
Fulton Hogan
MASON STREET WARRNAMBOOL.
VIC. 3212.

PROJECT
PROPOSED ASHALT PRODUCTION & GLASS PROCESSING PLANT
MASON STREET. WARRNAMBOOL. VIC. 3280.

VEHICLE ACCESS PATHS , CARPARK & SIGNAGE DETAILS

DRAWN B & C	PLOT DATE 28-01-22
DESIGNED D.J.D.	SCALE As indicated
APPROVED	
DRG No. TP04	REV. F

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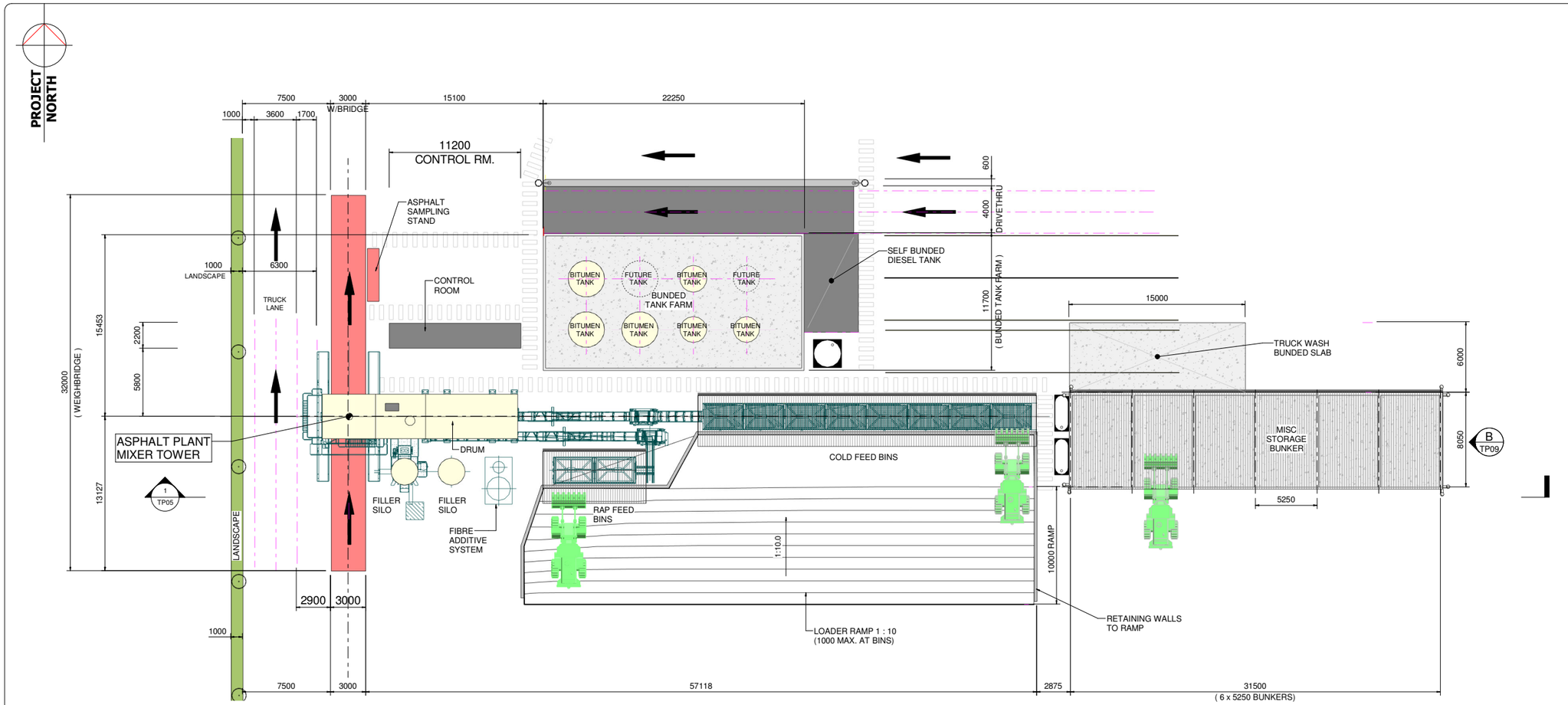
A3 AT 50%



PLAN - ASPHALT PLANT

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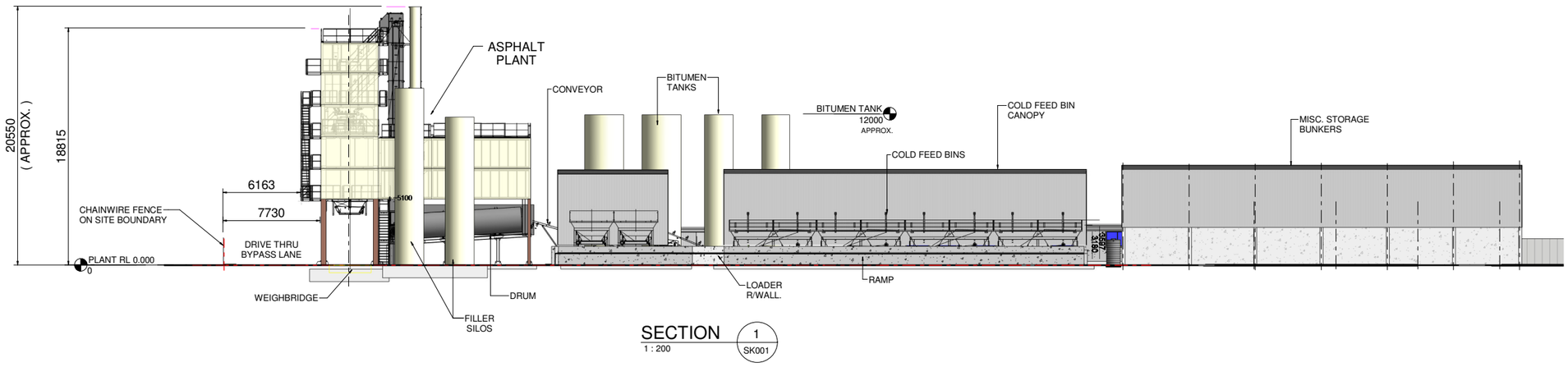

SECTION

1 : 200

1 SK001

COLOUR SCHEDULE

ROOF & WALL CLADDING

- MUTED GREY TONES
- ASTEC ASPHALT PLANT

ISSUED FOR
PRELIMINARY

Rev	Description	Date
G	TANK FARM TANK REVISION	01-02-22
F	ISSUED FOR INFORMATION	22-12-21
E	ISSUED FOR INFORMATION	20-12-21
D	ISSUED FOR INFORMATION	30-11-21
C	ISSUED FOR INFORMATION	22-11-21
B	ISSUED FOR INFORMATION	11-11-21
A	ISSUED FOR INFORMATION	03-11-21

CLIENT
Fulton Hogan
MASON STREET WARRNAMBOOL.
VIC. 3212.

PROJECT
PROPOSED ASHALT PRODUCTION & GLASS PROCESSING PLANT
MASON STREET. WARRNAMBOOL. VIC. 3280.

ASPHALT PLANT PROCESS AREA
PLAN & ELEVATIONS

DRAWN B & C	PLOT DATE 01-02-22
DESIGNED D.J.D.	SCALE As indicated
APPROVED	
DRG No. TP05	REV. G

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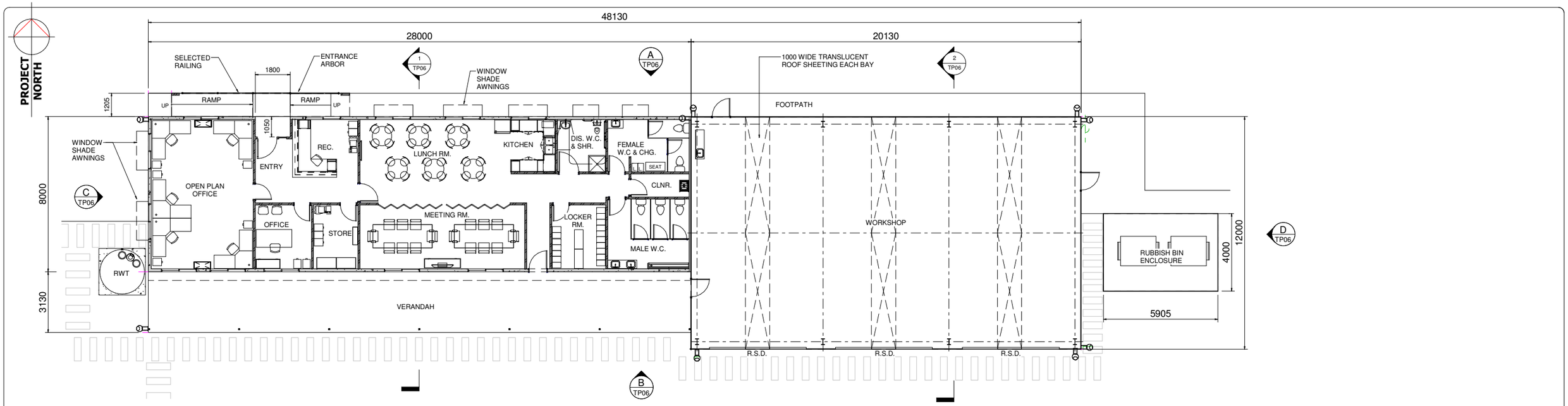
A3 AT 50%



TP_PLAN - ADMINISTRATION & WORKSHOP BUILDING

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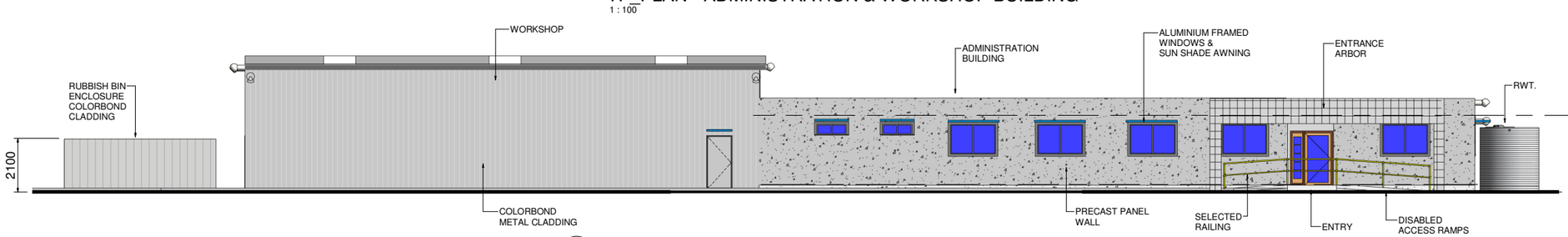

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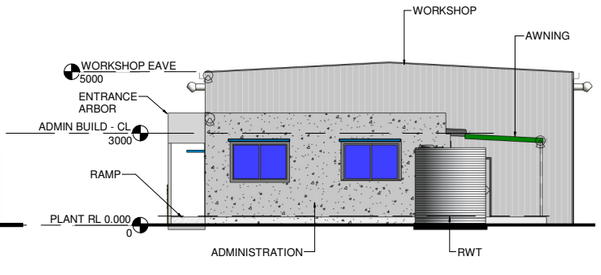

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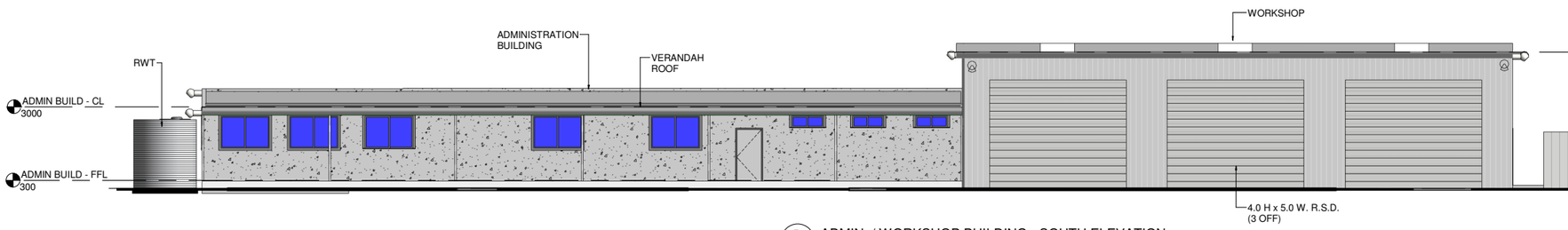
1 : 100



B TP06 ADMIN / WORKSHOP BUILDING - SOUTH ELEVATION

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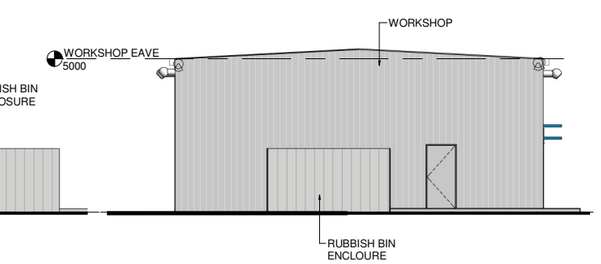

D TP06 ADMIN / WORKSHOP BUILDING - WEST ELEVATION

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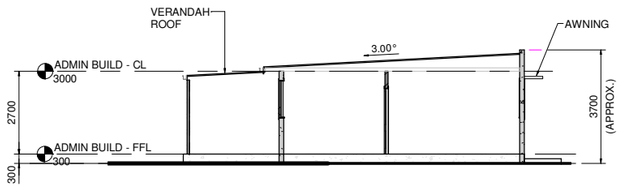
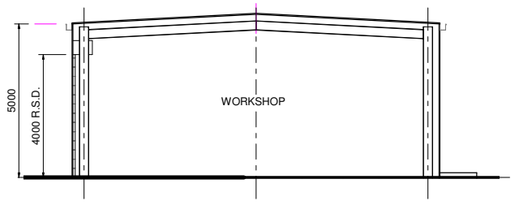


SECTION 1 TP06

1 : 100



SECTION 2 TP06

1 : 100

COLOUR SCHEDULE

ROOF & WALL CLADDING

- MUTED GREY TONES

ISSUED FOR
PRELIMINARY

Rev	Description	Date
E	ISSUED FOR INFORMATION	22-12-21
D	ENTRANCE ARBOR & PPT P.C. WALLS. W/SHOP R.S.D.	21-12-21
C	ISSUED FOR INFORMATION	30-11-21
B	ISSUED FOR INFORMATION	22-11-21
A	ISSUED FOR INFORMATION	03-11-21

CLIENT

Fulton Hogan

MASON STREET WARRNAMBOOL.
VIC. 3212.

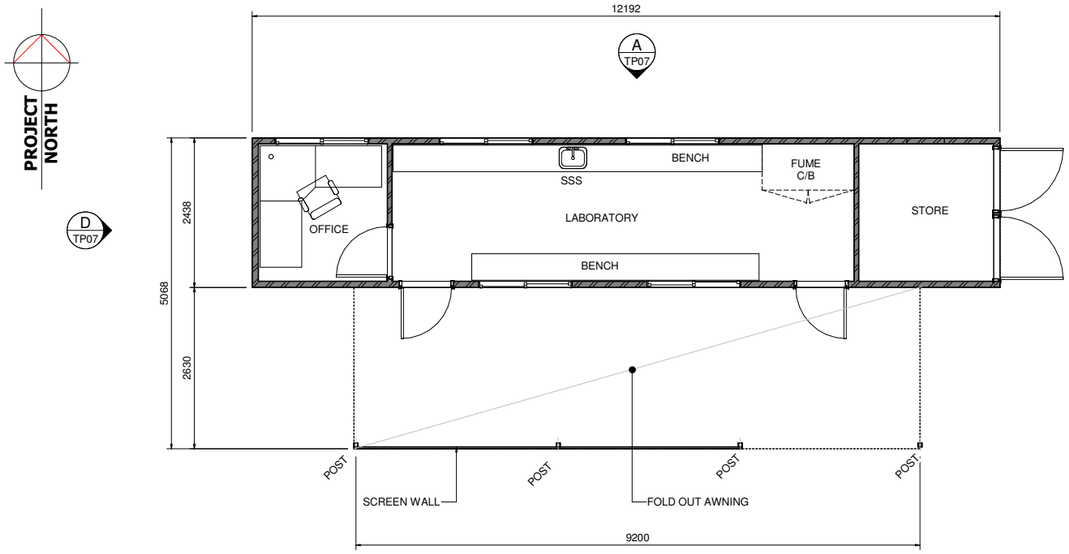
PROJECT

PROPOSED ASHALT PRODUCTION &
GLASS PROCESSING PLANT
MASON STREET. WARRNAMBOOL. VIC. 3280.

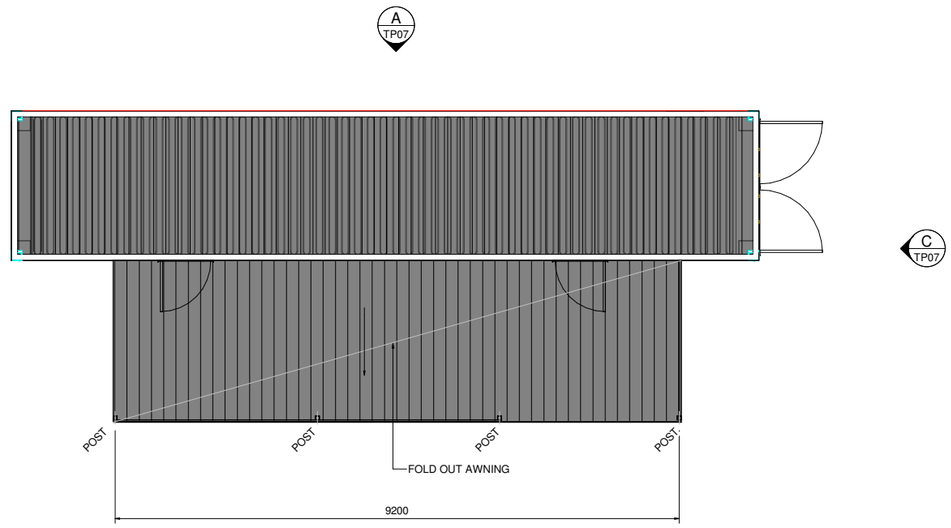
ADMINISTRATION & WORKSHOP BUILDING
PLAN & ELEVATIONS

DRAWN B & C	PLOT DATE 22-12-21
DESIGNED D.J.D.	SCALE As indicated
APPROVED	
DRG No. TP06	REV. E

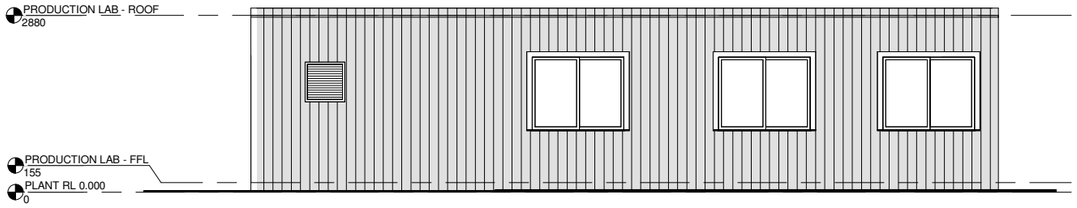
A1 AT 100% FULL SIZE.
A3 AT 50%



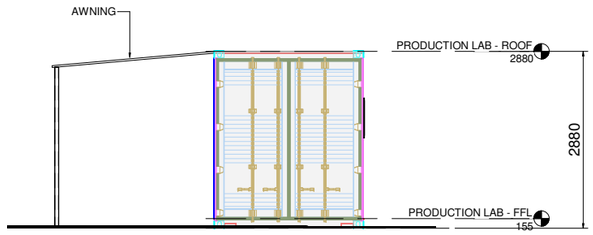
PLAN - PRODUCTION LAB - FLOOR
1 : 50



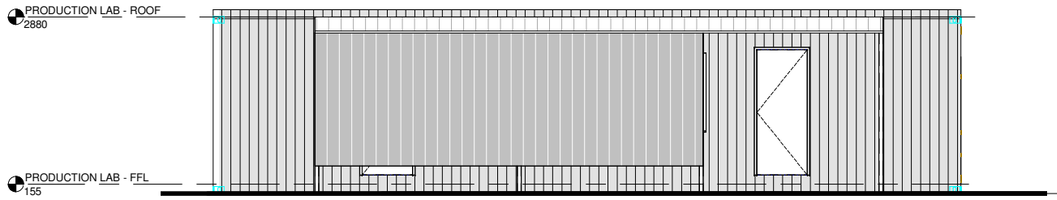
PLAN - PRODUCTION LAB - ROOF
1 : 50



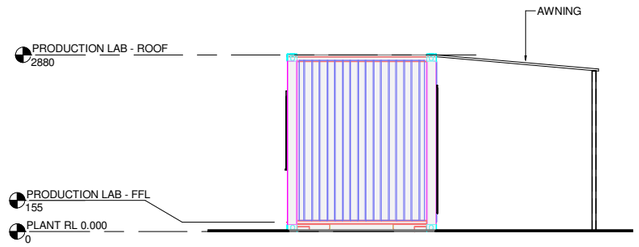
A TP07 NORTH ELEVATION
1 : 50



C TP07 EAST ELEVATION
1 : 50



B TP07 SOUTH ELEVATION
1 : 50



D TP07 WEST ELEVATION
1 : 50

COLOUR SCHEDULE

ROOF & WALL CLADDING

- MUTED GREY TONES

ISSUED FOR
PRELIMINARY

Rev	Description	Date
E	ISSUED FOR INFORMATION	22-12-21
D	ISSUED FOR INFORMATION	30-11-21
C	ISSUED FOR INFORMATION	22-11-21
B	ISSUED FOR INFORMATION	10-11-21
A	ISSUED FOR INFORMATION	03-11-21

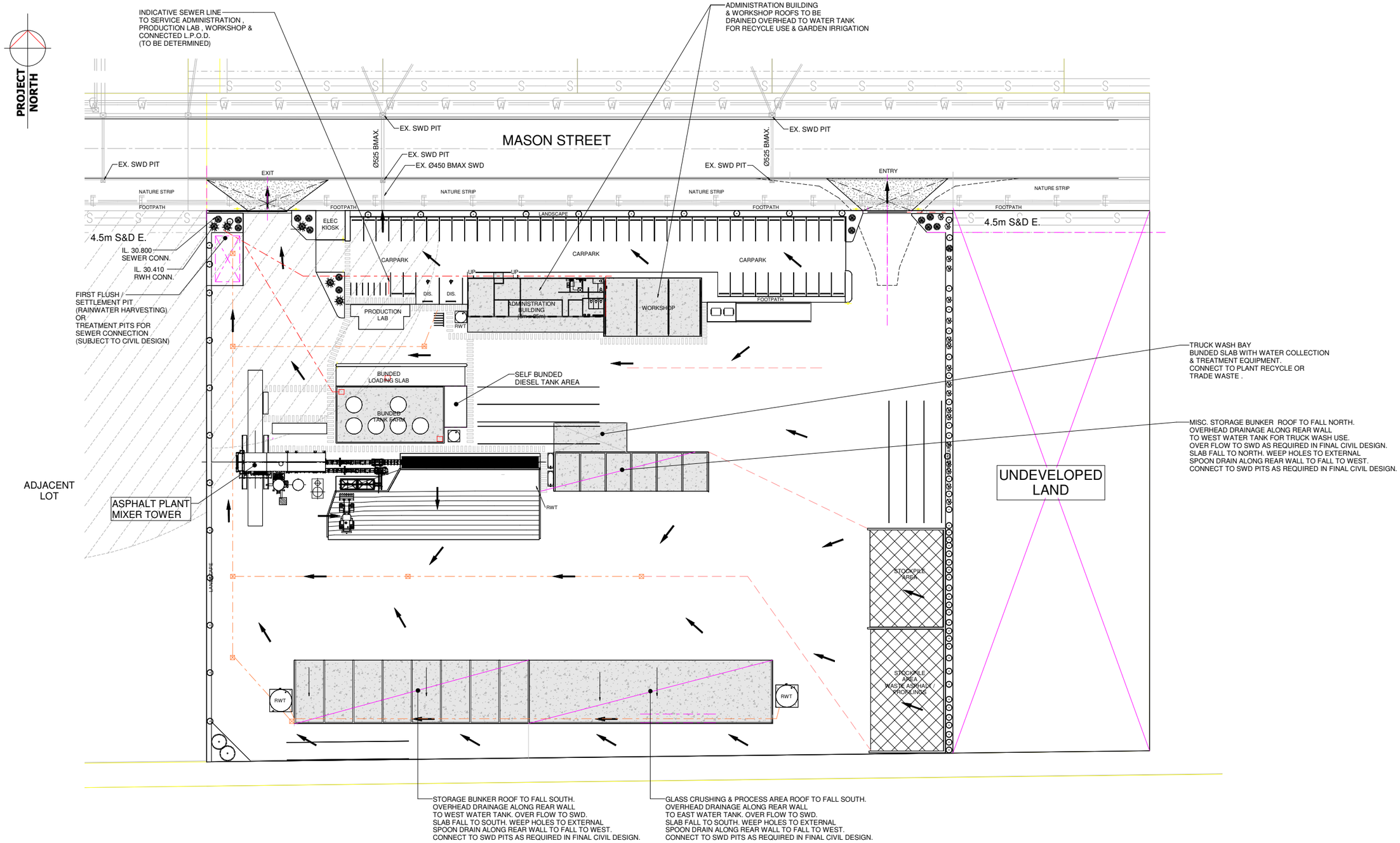
CLIENT
Fulton Hogan
MASON STREET WARRNAMBOOL.
VIC. 3212.

PROJECT
PROPOSED ASHALT PRODUCTION &
GLASS PROCESSING PLANT
MASON STREET. WARRNAMBOOL. VIC. 3280.

PRODUCTION LAB - PLAN & ELEVATIONS

DRAWN B & C	PLOT DATE 30-11-21
DESIGNED D.J.D.	SCALE As indicated
APPROVED	
DRG No. TP07	REV. E

A1 AT 100% FULL SIZE.
A3 AT 50%



SITE DRAINAGE CONCEPT PLAN

1 : 400

ISSUED FOR
PRELIMINARY

Rev	Description	Date
F	SITE UPDATE & UNDEVELOPED LAND AREA	28-01-22
E	ISSUED FOR INFORMATION	22-12-21
D	ISSUED FOR INFORMATION	30-11-21
C	ISSUED FOR INFORMATION	22-11-21
B	SITE LAYOUT & GENERAL REVISIONS	10-11-21
A	ISSUED FOR INFORMATION	03-11-21

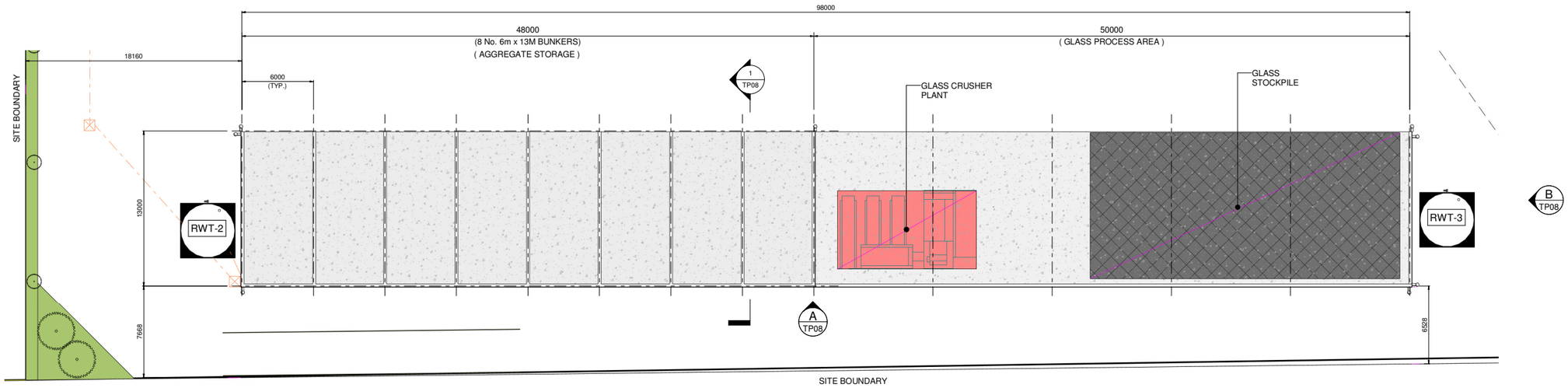
CLIENT
Fulton Hogan
MASON STREET WARRNAMBOOL.
VIC. 3212.

PROJECT
PROPOSED ASHALT PRODUCTION & GLASS PROCESSING PLANT
MASON STREET. WARRNAMBOOL. VIC. 3280.

SITE - DRAINAGE PLAN - CONCEPT

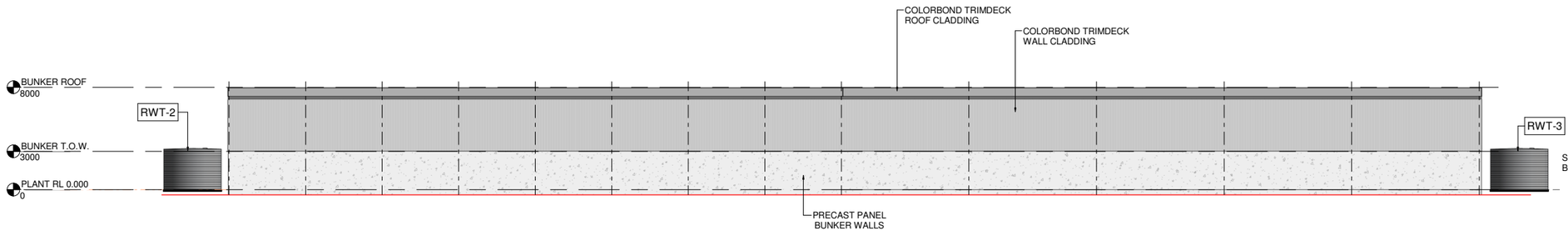
DRAWN B & C	PLOT DATE 28-01-22
DESIGNED D.J.D.	SCALE 1 : 400
APPROVED	
DRG No. TP10	REV. F

A1 AT 100% FULL SIZE.
A3 AT 50%



TP_PLAN - STORAGE BUNKERS & GLASS PROCESS AREA

1 : 200



A TP08 STORAGE BUNKER - SOUTH ELEVATION

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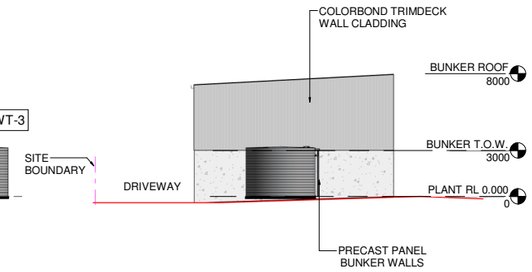
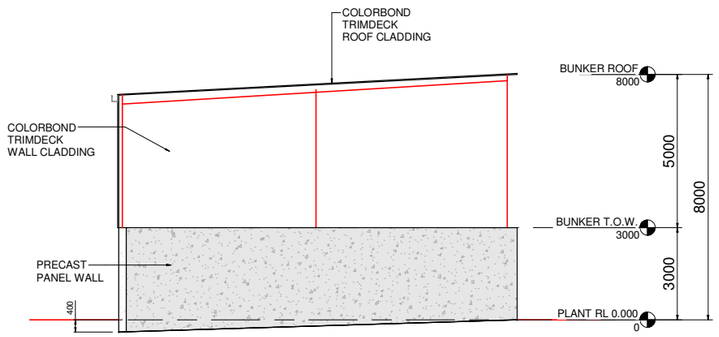


B TP08 STORAGE BUNKER - EAST ELEVATION

1 : 200



SECTION 1 TP08

1 : 100

COLOUR SCHEDULE

ROOF & WALL CLADDING

- MUTED GREY TONES

ISSUED FOR
PRELIMINARY

Rev	Description	Date
D	ISSUED FOR INFORMATION	22-12-21
C	ISSUED FOR INFORMATION	30-11-21
B	ISSUED FOR INFORMATION	22-11-21
A	ISSUED FOR INFORMATION	03-11-21

CLIENT

Fulton Hogan

MASON STREET WARRNAMBOOL.
VIC. 3212.

PROJECT

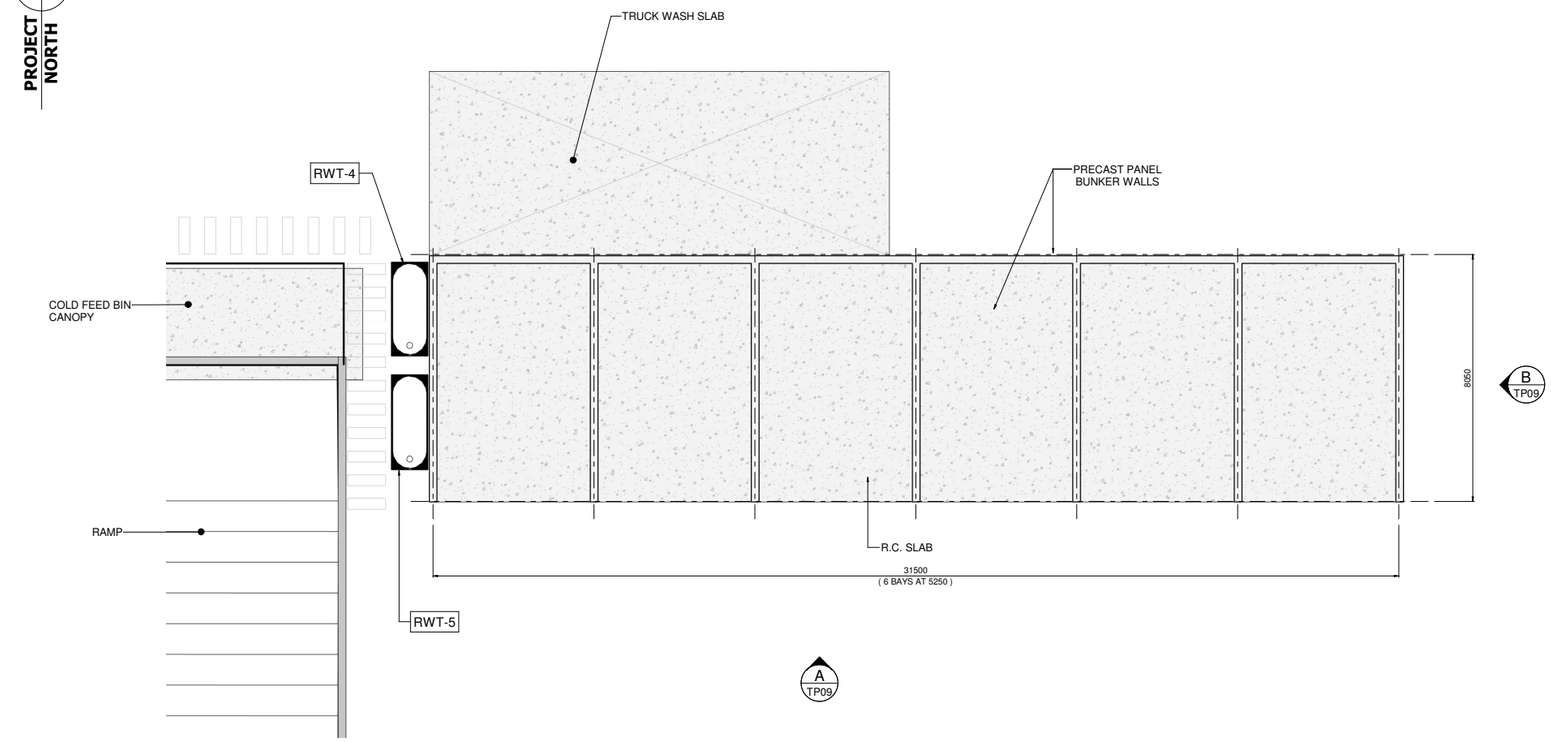
PROPOSED ASHALT PRODUCTION &
GLASS PROCESSING PLANT
MASON STREET. WARRNAMBOOL. VIC. 3280.

AGGREGATE STORAGE BUNKERS & GLASS PROCESS AREA
PLAN & ELEVATIONS

DRAWN B & C	PLOT DATE 22-12-21
DESIGNED D.J.D.	SCALE As indicated
APPROVED	
DRG No. TP08	REV. D

A1 AT 100% FULL SIZE.
A3 AT 50%

PROJECT NORTH

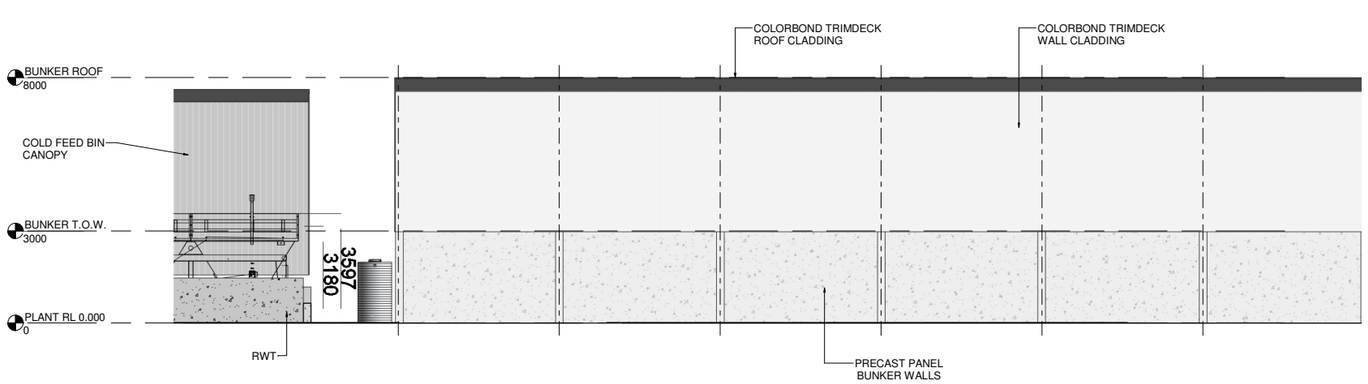


PLAN - MISC MATERIAL - STORAGE BUNKERS
1 : 100

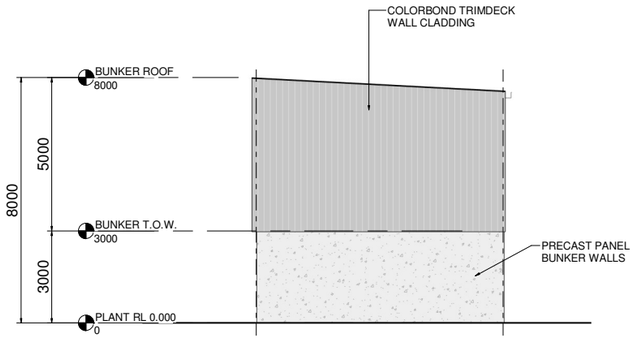
COLOUR SCHEDULE

ROOF & WALL CLADDING

- MUTED GREY TONES



A TP09 MISC MATERIAL BUNKER - SOUTH ELEVATION
1 : 100



B TP05 MISC MATERIAL BUNKER - EAST ELEVATION
1 : 100

ISSUED FOR
PRELIMINARY

Rev	Description	Date
D	ISSUED FOR INFORMATION	22-12-21
C	ISSUED FOR INFORMATION	30-11-21
B	ISSUED FOR INFORMATION	22-11-21
A	ISSUED FOR INFORMATION	03-11-21

CLIENT
Fulton Hogan
MASON STREET WARRNAMBOOL.
VIC. 3212.

PROJECT
PROPOSED ASHALT PRODUCTION &
GLASS PROCESSING PLANT
MASON STREET. WARRNAMBOOL. VIC. 3280.

MISC MATERIAL STORAGE BUNKERS
PLAN & ELEVATIONS

DRAWN B & C	PLOT DATE 22-12-21
DESIGNED D.J.D.	SCALE As indicated
APPROVED	
DRG No. TP09	REV. D

A1 AT 100% FULL SIZE.
A3 AT 50%

Appendix F – Air Quality Impact Assessment

PROPOSED ASPHALT BATCH PLANT – LOT 58, MASON STREET, WARRNAMBOOL, VIC

AIR QUALITY IMPACT ASSESSMENT

DOCUMENT CONTROL

Report Number	Date Issued	Version	Prepared	Checked	Released
OCT21143.1	15 December 2021	Version 1	N Page	C Clunies-Ross / A Aitharaju (Virid IFC)	N Page
OCT21143.2	1 February 2022	Version 2	N Page	C Clunies-Ross	N Page

PREPARED FOR
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1. INTRODUCTION

Airlabs Environmental Pty. Ltd. (Airlabs) were commissioned by Sustainable Project Management Pty Ltd (Sustainable PM) on behalf of their client (Fulton Hogan) to conduct an air quality impact assessment (AQIA) for a proposed asphalt batch plant located at Lot 58, Mason Street, Warrnambool, VIC ('the proposed facility').

The proposed facility would be developed as a part of a proposed subdivision of one large lot (Lot D on PS835886V into eight (8) individual lots, with the asphalt batch plant proposed to be developed on Lot 58, whose area is estimated to be 17,208 m^2.

Airlabs have been notified that an AQIA is needed to determine the impacts from the proposed facility and inform an application for an Environmental Protection Authority (EPA) Development Licence would be lodged seeking approval for the asphalt batch plant. Subsequently, air dispersion modelling has been conducted to determine impacts from the proposed facility on the surrounding environment.

Modelling has been undertaken in accordance with:

- Publication 1961: *Guideline for assessing and minimising air pollution in Victoria*;
- *Environment Reference Standard: No. S 245 Wednesday 26 May 2021*; and
- Publication 1883: *Guidance for assessing odour;*

This report outlines the specifics of the proposed facility, the assessment methodology and the expected air quality impacts.

2. PROPOSAL DETAILS

2.1 Location of the Proposed Facility

The proposed facility would be developed on Lot 58 of the proposed subdivision plan. The plan encompasses subdividing Lot D on PS835886V into eight (8) individual lots numbered 58 – 61A, with the asphalt batching plant proposed to be developed on Lot 58, which has an approximate area of 17,208 m^2. It is proposed that the remaining seven (7) lots would be used for commercial / light industrial purposes, details of which are not available to Airlabs at the time of preparing this assessment.

The location of the asphalt batch plant on Lot 58 with context to the remaining seven (7) lots (Lot 58A – Lot 61A) is shown in **Figure 1**.

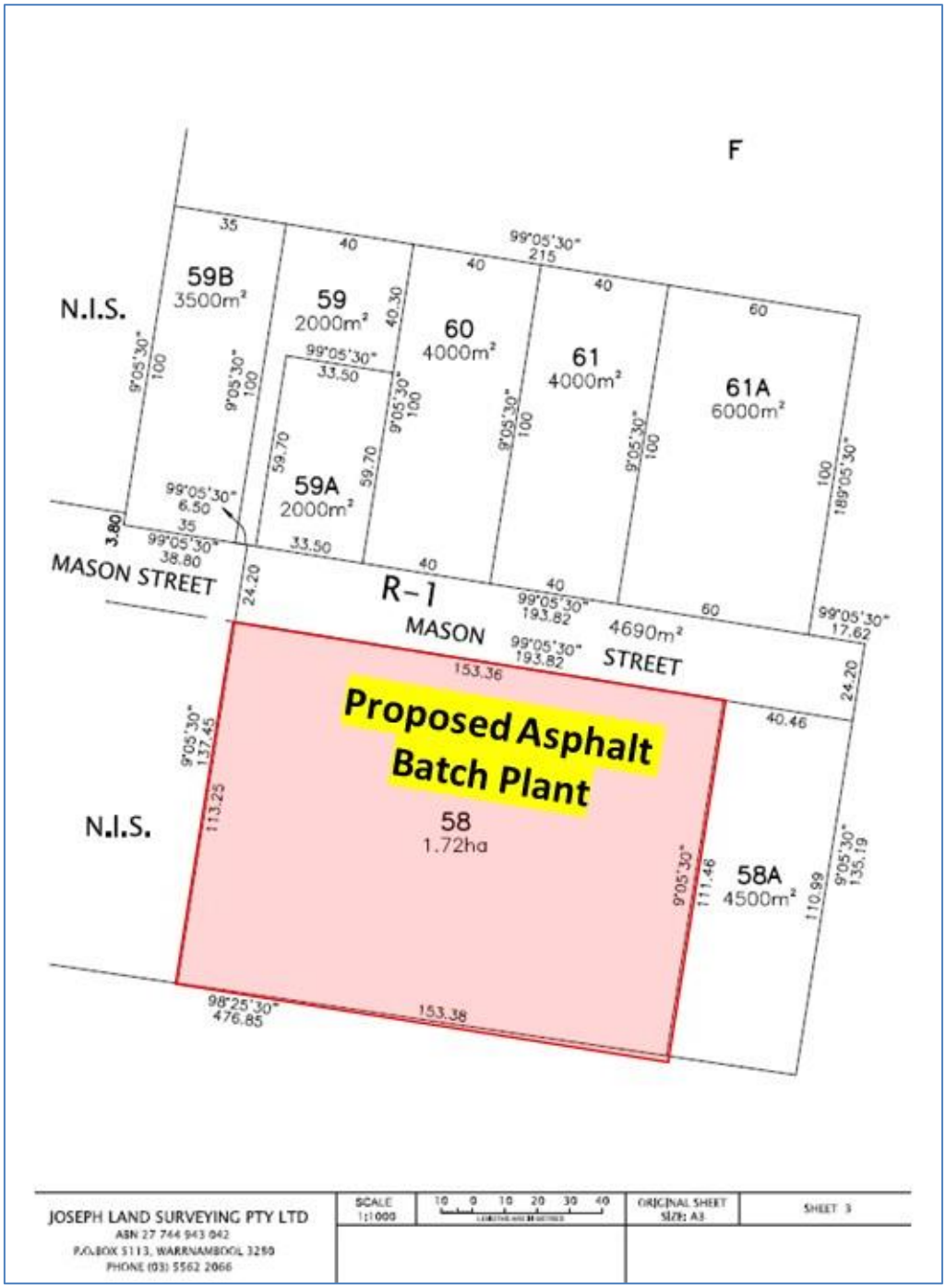


Figure 1: Proposed Asphalt Batch Plant on Lot 58

2.2 Proposal Specifics

The plant is proposed to typically operate during daylight hours only (6:00 am to 3:00 pm), but at times (rare occasions based upon client demand) will operate at any hour of the night. Crushing and screening activities will only be undertaken during daylight hours. The plant is currently forecast to produce up to approximately 50,000 to 100,000 tonnes per annum (tpa).

With reference to **Figures 2 to 3** the plant is expected to have the following specifications upon commissioning:

- 50,000 to 100,000 tonnes annual production capacity.
- 145 tonnes per hour (tph) maximum mixing capacity (at optimal moisture conditions).
- 100 tph anticipated mixing capacity.

- Recycled crushed asphalt (RAP):
    - 30,000 tpa, with 10,000 tpa to be crushed.
    - Unprocessed material stockpile: ~5,000 tonnes.
    - Processed material stockpile: ~2,000 tonnes.
- Glass:
    - 5,000 tpa to be crushed, with 2,000 tpa to be reused in asphalt.
    - 100 to 200 tph to be crushed.
    - Unprocessed material stockpile: ~200 tonnes.
    - Processed material stockpile: ~200 tonnes.
- Bitumen:
    - 3,000 tpa total quantity used.
    - 150 tonne max storage.
- Weight of 1.8 tonne per batch.
- 8 x Raw (virgin) aggregate cold feeders.
- 2 x Recycled asphalt pavement (RAP) aggregate cold feeders.
- 1 x Drum Whisper Jet Gas/Oil Burner (fuel: low sulfur natural gas).
- 1 x Dryer drum unit (capacity: 120 tph).
- 1 x glass crusher & screen (capacity: 100-200 tonnes per hour).
- 1 x hot mixing unit (capacity: 145 tonnes per hour at optimal moisture conditions).
- Up to 8 x Vertical bitumen storage tanks (maximum storage: 150 tonnes).
- The baghouse exhaust stack will have a proposed height of 22.0 metres above ground level to allow for unobstructed dispersion of the emission plume.
- Employee and customer cars: maximum of 14 return trips per day (approximately).
- Agitator trucks: maximum of 8 return trips per day.
- Raw material trucks entering site:
    - Average 9 per day, maximum of 18 per day.
    - Raw aggregate: ~140 loads per month.
    - Glass: ~7 loads per day over 3 days (21 loads) per fortnight.
    - Bitumen: ~2 loads every 3 days.
- Asphalt product trucks exiting site:
    - Maximum of 200 loads per month.
    - Average 10 per day, maximum 20 per day.
- Hours of operation: 24/7 (though typically: 7:00 am to 6:00 pm Mon to Sat.

2.3 Proposed Operations

Fulton Hogan is proposing to establish a new asphalt batch plant at Lot 58, Mason Street in Warrnambool. An overview of the proposed operations is detailed below:

2.3.1 Raw Materials

The proposed facility will utilise both raw (virgin) aggregate materials and recycled asphalt pavement (RAP) material. These materials will be sourced from local quarries and other local sources. All the internal roads at the proposed facility will be sealed and then swept as required to avoid dust emissions from vehicle movements. The external roads leading to the proposed facility are also sealed.

The raw aggregate and filler materials will typically be delivered to site by truck and dumped within one of the eight (8) walled cold storage bins.

2.3.2 Glass Crushing Plant

Glass for crushing is primarily delivered from kerbside recycling and stored in the unprocessed stockpile. A front end loader will be used to extract the glass and load it into the hopper attached to the glass processing plant. The glass is then crushed and taken via a conveyor to the shaker screen where it is cleared of impurities. The processed glass is then stored in the processed stockpile for subsequent use in asphalt production.

2.3.3 Feeding Cold Aggregates

A front end loader will then extract the individual virgin aggregate and RAP materials from the cold storage bins (and filler from the silo) and load these into the cold feeder bins. Each of the individual cold feeder bins will have their own gates to create the feed material by controlling the flow of aggregates and filler materials.

Proportioned quantities of the feed material will then be transferred to the dryer drum unit via a charging conveyor.

2.3.4 Heating by the Dryer Drum Unit

The dryer drum unit will come fitted with a jet (gas/oil) burner that will be used to heat-dry the feed material. The dryer drum unit will also be equipped with a primary dust collector that settles heavy dust particles and a secondary dust collector known as the bag filter.

2.3.5 Tower Unit

The hot-dried feed material will then be transferred to the tower unit. A hot bucket elevator will be used to lift the hot feed material to the top of the tower unit. It will then be passed through a multi-layered vibrating screen that separates the hot feed material into different sized aggregates and stores these in separate hot mineral bins.

2.3.6 Bitumen Tank Farm

The bitumen tank farm will consist of up to eight (8) vertical heated bitumen (and bitumen emulsion) storage tanks. Tanker trucks will periodically deliver bitumen and modified bitumen, this will be pumped into the storage tanks. The headspace breather vents on each of the tanks will be fitted with condensers to reduce fugitive emissions of volatile organic compounds (VOCs).

Three 50,000L tanks will contain bitumen and will be hard-plumbed to the batch plant. Bitumen in these tanks will be maintained at 180°C.

One 10,000L and two 30,000 L tanks will contain bitumen and various bitumen emulsions and bitumen primers. Material in these tanks will be maintained at varying temperatures (e.g., between 30°C and 80°C) and will be used on an as needed basis in road construction (e.g., for spray seal operations); that is, these products will not be used in the batching process, rather they will be loaded to trucks for use in Fulton Hogan projects in the region.

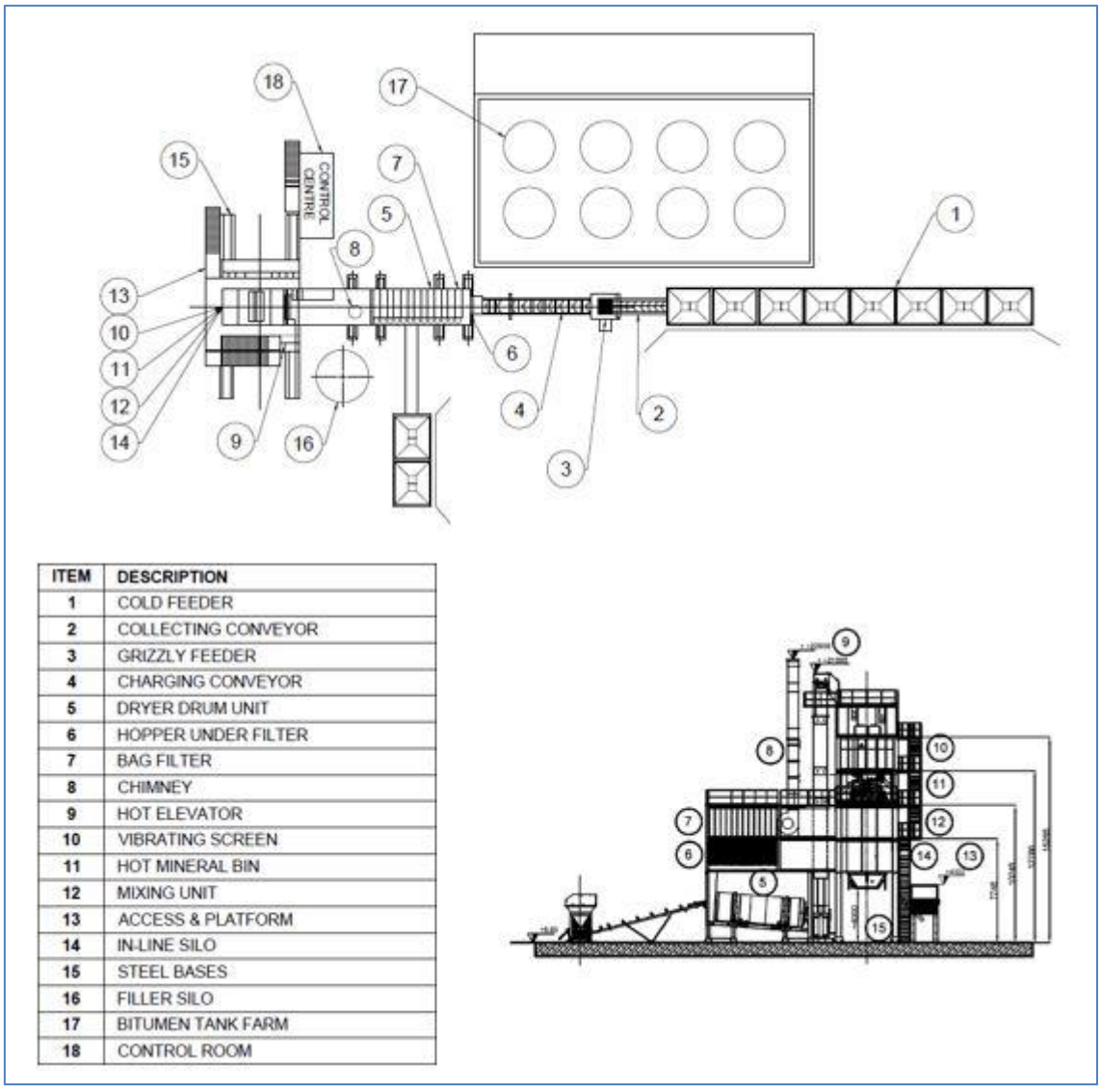
Another two 60,000L tanks within the bunded 'tank farm' arrangement may be constructed at a later date to be used for future storage of bitumen / emulsion for direct use in road making projects.

2.3.7 Hot Mix Plant

The aggregates will then be weighed, and controlled amounts discharged into the hot mix plant (mixing unit) where weighed amounts of pre-heated bitumen binder will be added from the bitumen tank farm to create hot mixed asphalt.

2.3.8 Asphalt Product Trucks

The hot mixed asphalt will then be transferred directly from the hot mix plant into a waiting truck positioned underneath. Once filled, the trucks will be promptly covered before leaving the site.



ITEM	DESCRIPTION
1	COLD FEEDER
2	COLLECTING CONVEYOR
3	GRIZZLY FEEDER
4	CHARGING CONVEYOR
5	DRYER DRUM UNIT
6	HOPPER UNDER FILTER
7	BAG FILTER
8	CHIMNEY
9	HOT ELEVATOR
10	VIBRATING SCREEN
11	HOT MINERAL BIN
12	MIXING UNIT
13	ACCESS & PLATFORM
14	IN-LINE SILO
15	STEEL BASES
16	FILLER SILO
17	BITUMEN TANK FARM
18	CONTROL ROOM

Figure 2: Plan and elevation view of the proposed asphalt batch plant

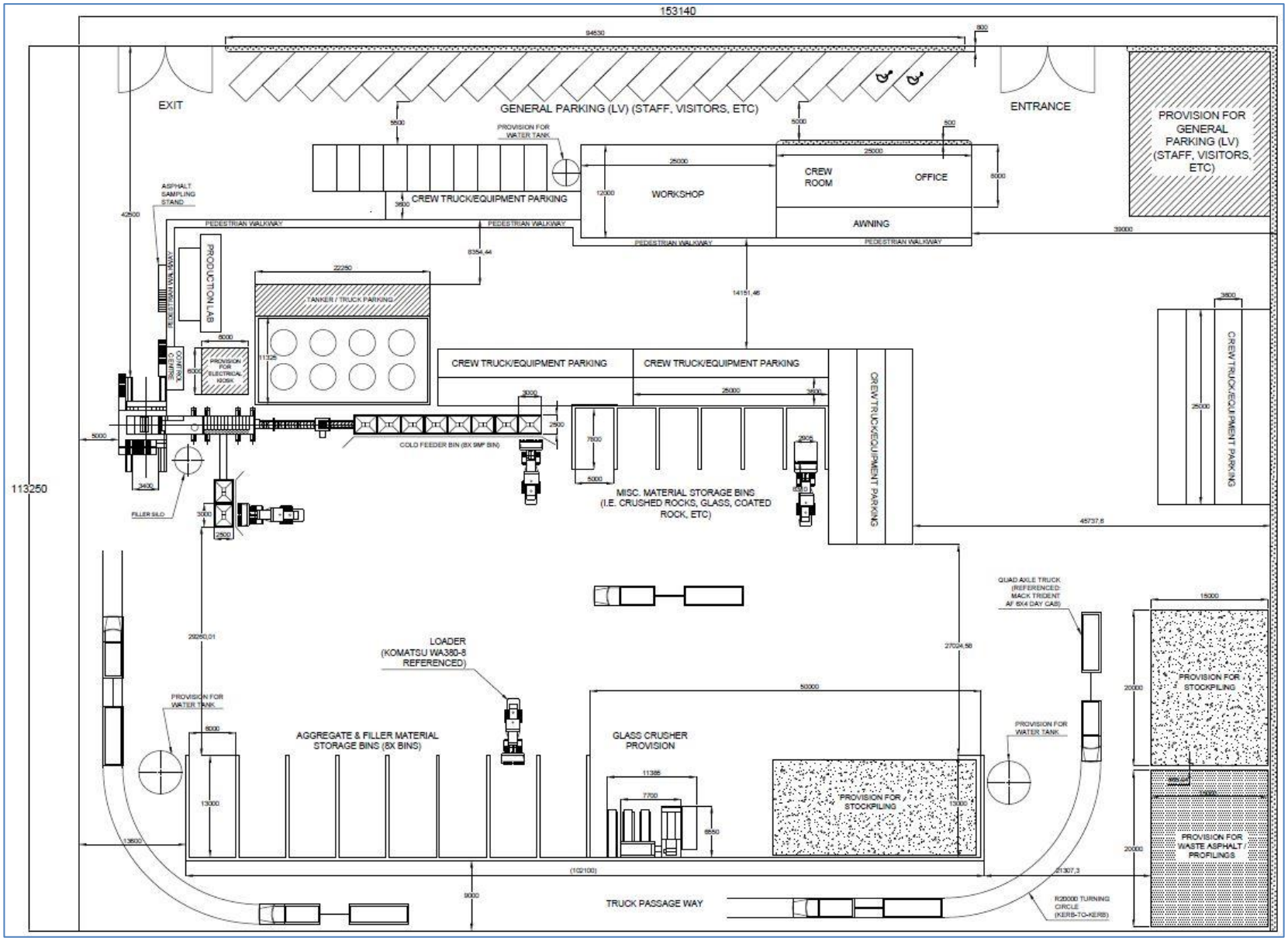


Figure 3: Site plan for the proposed asphalt batch plant

2.4 Air Quality Control Measures

Air quality control measures proposed to minimise the impacts from the asphalt batching plant are as follows:

- Implementation of water misting sprays on aggregate and filler material stockpiles.
- Restricting the maximum height of the stockpile to be less than the height of the enclosure walls. This will create a wind barrier and thereby considerably minimise the extent of fugitive windborne particulate dispersion.
- Access haulage surface for light and heavy vehicles to be paved and maintained – which includes periodic mechanical sweeping and regular maintenance.
- Odour emissions will be reduced by managing the temperature of the dried raw (virgin) material, RAP and the bitumen binder to below levels that would produce blue smoke during mixing.
- The fumes produced in the hot mix plant will be ducted through the flame of the jet (gas/oil) burner to reduce VOC concentrations before being discharged to the atmosphere via the baghouse filter.
- The tower unit will be maintained at a negative pressure to reduce fugitive emissions.

3. STUDY AREA AND SURROUNDS

3.1 Existing Land-Use and Topography

The proposed facility is located off Mason Street in Warrnambool, VIC. There is existing industrial development immediately to the west and to the north-west of the proposed facility. There are existing residential developments to the east of the proposed facility and the township of Warrnambool is located to the south-west.

Air quality impacts resulting from the operations at the proposed facility have been predicted at the identified sensitive receptors – which include the existing industrial receptors, residential receptors and the seven (7) industrial lots that would be subdivided from Lot D on PS835886V.

The topography in the immediate surrounds of the proposed facility is relatively flat as seen in **Figure 4**, with elevations gradually increasing towards the north and north-east of the facility.

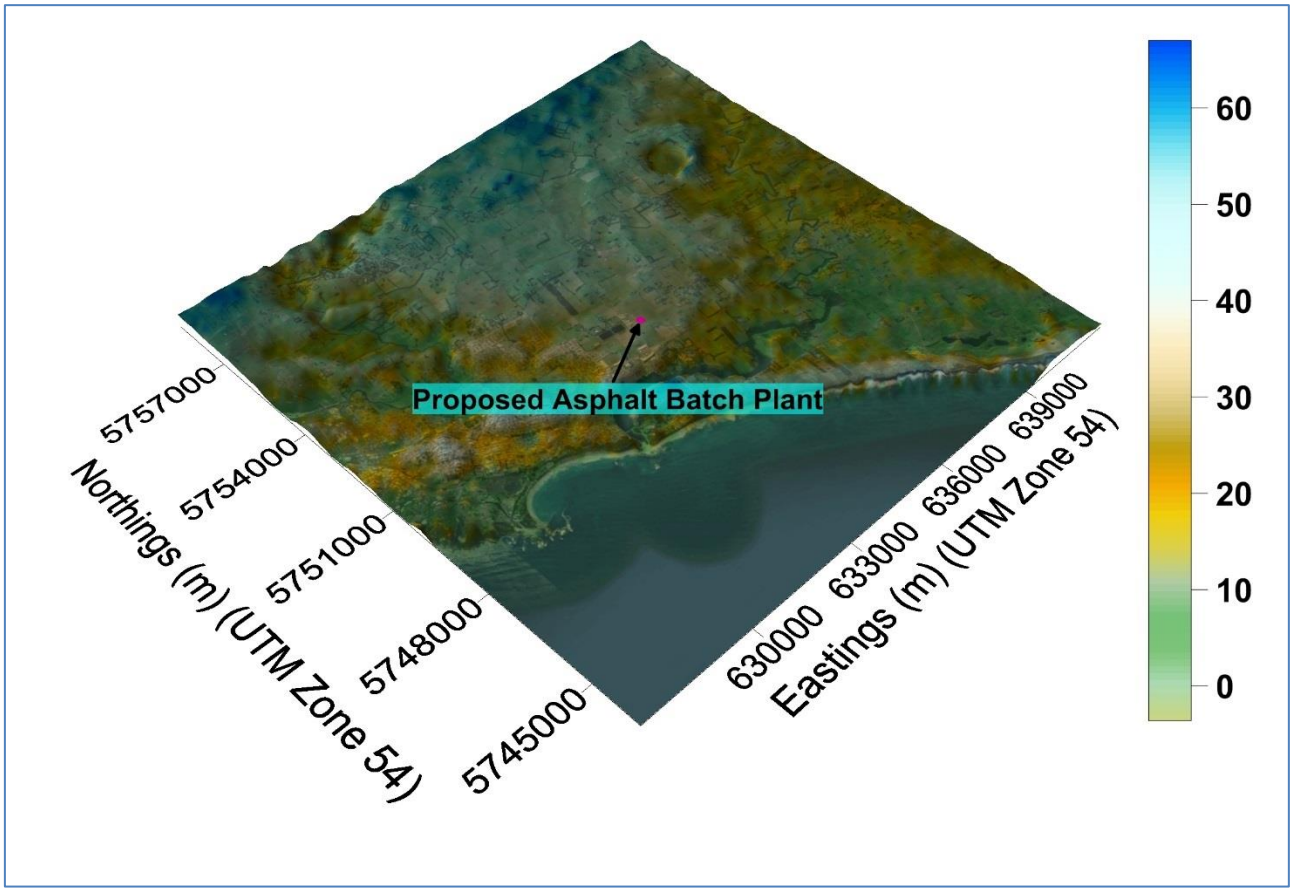


Figure 4: Topographical Features Surrounding the Proposed Facility

3.2 Identification of Sensitive Receptors

To predict air quality impacts from the proposed facility, a mix of sensitive receptors representing residential dwellings and industrial developments were identified. Impacts from the facility's' operations were predicted at these sensitive receptors.

Sensitive receptors identified for this assessment are summarised in **Table 1** and are visually illustrated, with context to the subject site in **Figure 5**.

Table 1: Details of Identified Sensitive Receptors

Receptor I. D	Receptor Category	Eastings (m) (UTM Zone 56)	Northings (m) (UTM Zone 56)
R1	Residential	634791	5751931
R2	Residential	634902	5751922
R3	Residential	634951	5751838
R4	Residential	635200	5751769
R5	Residential	635299	5751702
R6	Residential	635363	5751632
R7	Residential	635305	5751496
R8	Residential	635186	5751345
R9	Residential	635166	5751212
R10	Residential	635276	5751055
R11	Residential	635261	5750968
R12	Residential	635061	5750478
R13	Residential	634803	5750484
R14	Residential	633048	5750925
R15	Residential	632970	5751055
R16	Residential	632949	5751180
R17	Residential	632798	5751270
R18	Residential	632743	5751441
R19	Residential	632775	5751618
R20	Residential	632819	5751806
R21	Residential	633801	5751820
R22	Residential	632431	5752123
R23	Residential	632485	5752502
R24	Residential	633027	5750443
R25	Residential	633070	5750150
R26	Residential	633401	5750172
R27	Residential	633813	5750031
R28	Industrial	634285	5751187
R29	Industrial	634307	5751300
R30	Industrial	634260	5751308
R31	Industrial	634219	5751303
R32	Industrial	634179	5751314
R33	Industrial	634189	5751202

Receptor I. D	Receptor Category	Eastings (m) (UTM Zone 56)	Northings (m) (UTM Zone 56)
R34	Industrial	634111	5751248
R35	Industrial	634117	5751354
R36	Industrial	634118	5751515
R37	Industrial	634174	5751601
R38	Industrial	633794	5751613
R39	Industrial	633388	5751597
R40	Industrial	633854	5750531
R41	Industrial	634111	5750304
R42	Industrial	633829	5750269
R43	Industrial	633152	5750561
R44	Industrial	632824	5750774
R45	Industrial	634647	5749946

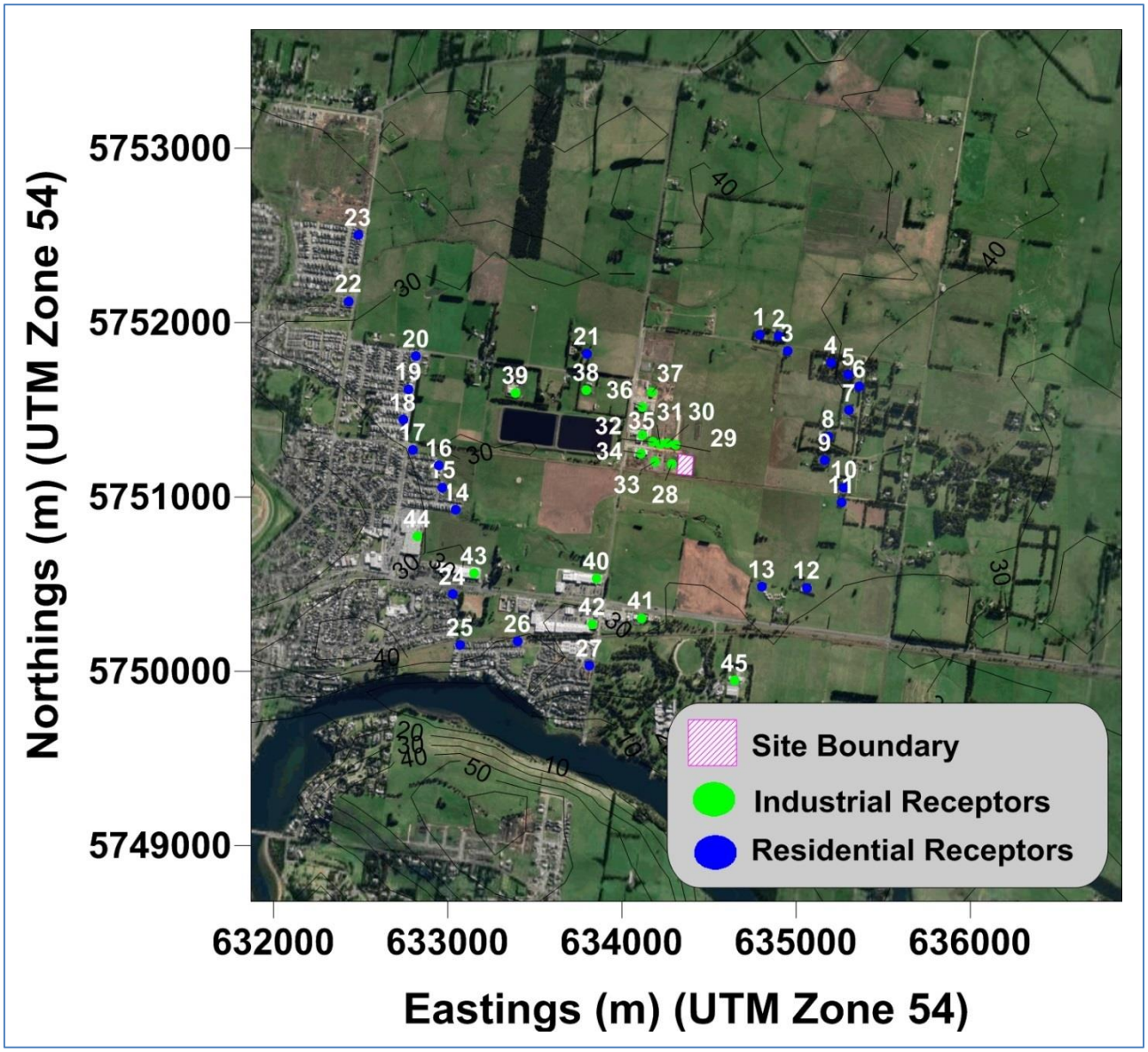


Figure 5: Aerial Imagery of the Identified Sensitive Receptors

4. IDENTIFIED POLLUTANTS AND ASSESSMENT CRITERIA

The main pollutants of concern with regards to the operational activities at the proposed facility include emissions of gases, particulate matter (PM) and odours. The assessment focussed on determination of impacts from the key pollutants, namely – NO_2, CO, SO_2, PM_{10}, $PM_{2.5}$ and lead. Along with these pollutants, there could be trace amounts of other pollutants which might be emitted; however, elevated concentrations are unlikely based on the emission estimated for these pollutants. Also, for certain pollutants there are no assessment criteria published in the regulatory guidelines. Consequently, the assessment focussed only on the key pollutants detailed in **Table 2**.

Airborne particulate matter typically consists of particles of varying size fractions. Publication 1961 and the Environment Reference Standard (ERS): No. S 245 specify air quality limits for particulate matter with an equivalent diameter of 10 microns or less (PM_{10}) and particulate matter with an equivalent diameter of 2.5 microns or less ($PM_{2.5}$) for assessing impacts from dust-generating activities and operations.

Air quality in Victoria is managed by the Environment Protection Act 1970 (EP Act); and the relevant State environment protection policies created under Section 16 of the Act:

- Publication 1961: *Guideline for assessing and minimising air pollution in Victoria*;
- *Environment Reference Standard: No. S 245 Wednesday 26 May 202; and*
- Publication 1883: *Guidance for assessing odour*.

Publication 1961 and the (ERS): No. S 245 set out the criteria to be used in the assessment of design of new or expanded sources of emissions such as industrial premises. Common air pollutants are classified as Class 1 indicators and the air toxics as Class 2 and 3 indicators. Class 3 indicators are those air toxics that are considered to be extremely hazardous because of their carcinogenic, mutagenic, teratogenic, highly toxic or highly persistent properties. The criteria for odour emissions are set out in Publication 1883.

Table 2 below provides the health-based air quality assessment criteria (AQAC) specific to the pollutants of interest as specified in Publication 1961 and (ERS): No. S 245. Ambient air quality assessment criteria for the assessment are based on Table 3 of Publication 1961 and Table 2.2. of (ERS): No. S 245.

Table 2: Air Quality Assessment Criteria

Pollutant	Air Quality Objective (µg/m3)								Class	Classification
	30-min	1-hour	8-hours	24-hours	7-days	30-days	Annual			
							Incremental	Cumulative		
Total Suspended Particulates (TSP)	-	-	-	-	-	-	-	-	1	Criteria pollutants
PM_{10}	-	-	-	50	-	-	-	20		
$PM_{2.5}$	-	-	-	25	-	-	-	8		
SO_2	-	524	-	209	-	-	-	52		
CO	-	-	10,304	-	-	-	-	-		
NO_x as NO_2	-	226	-	-	-	-	-	56		
Lead	-	-	-	-	-	-	-	0.5		
Acetaldehyde	-	470	-	-	-	-	4.5	9	2	Toxicity
Benzene	-	580	-	29	-	-	1.7	9.6	3	Carcinogen, mutagen, highly toxic (chronic)
Formaldehyde	100	-	-	49	-	-	-	9.8	2	Carcinogen
Toluene	-	15,000	-	-	260	-	-	-	2	Toxic to reproduction
Xylene	-	22,000	-	8,685	-	-	-	100	2	Toxicity
Carcinogenic PAHs (as benzo(a)pyrene)	-	-	-	-	-	-	0.0001	0.002	3	Carcinogen, mutagen, toxic to reproduction, bioaccumulative
Arsenic	-	9.9	-	-	-	-	0.007	0.015	3	Carcinogen
Cadmium	-	18	-	0.03	-	-	-	0.005	3	Carcinogen, highly toxic (chronic)
Chromium (hexavalent)	-	1.3	-	-	-	-	-	0.005	3	Carcinogen
Chromium (trivalent)	-	-	-	-	-	0.1	-	-	2	Carcinogen
Copper	-	100	-	-	-	-	-	-	-	Toxicity
Manganese	-	9.1	-	-	-	-	-	0.15	2	Toxicity
Mercury	-	-	-	-	-	-	-	1	2	Highly toxic (chronic), bioaccumulative
Nickel	-	0.2	-	-	-	-	-	0.09	3	Highly toxic (chronic)
Zinc	-	20	-	-	-	-	-	2	-	Toxicity

Note: *the reporting percentiles for the data are as follows:*

- *the 99.9th percentile for averaging periods of 1-hour or less;*
- *the 100th percentile (maximum) for averaging periods greater than 1-hour.*

5. ESTIMATES OF BACKGROUND CONCENTRATIONS

The Class 1 air pollutants identified in Publication 1961 and the (ERS): No. S 245 are of concern at a regional level due to the large number of sources of these pollutants. It is necessary to estimate the cumulative impacts for these pollutants.

Pollutants specified in Classes 2 and 3 of Publication 1961 and the (ERS): No. S 245. are mainly of concern for local air quality. For these pollutants, it is proposed that incremental-only impacts from the proposed facility are compared against the criteria without requiring a cumulative assessment. Some Class 3 indicators, such as benzene, can also be of concern at a regional level due to widespread use of motor vehicles.

Hence, background concentrations have been characterised for the following pollutants.

- Carbon monoxide (CO)
- Nitrogen dioxide (NO_2)
- Sulfur dioxide (SO_2)
- Particulates (PM_{10})
- Particulates ($PM_{2.5}$)
- Benzene
- Lead

As per instruction from EPA, hourly time series of the pollutants of interest were downloaded from the *Data Vic* portal. The EPA does not maintain any air monitoring stations within the local vicinity (approximately 100 km) of the proposed facility. Therefore, representative background concentrations were obtained from the Altona North, Footscray and Morwell South air monitoring stations for a five year period from January 2016 until December 2020 (Data Vic, 2021). SO_2 background levels for the period 2016 to 2019 were obtained from Altona North and for 2020 from Morwell South. Two stations were used for the SO_2 data as none of the individual stations covered the entire 2016 to 2020 period. Background levels of CO, NO_2, PM_{10} and $PM_{2.5}$ were obtained from Footscray. Lead and benzene are not currently monitored at any NEPM air monitoring stations in Victoria. Background levels for lead were obtained from the 2004 NEPM Air Monitoring report (NEPM, 2004) and for benzene from a recent study conducted for the West Gate Tunnel Project (Golder, 2019).

Hourly background concentration of the NO_2, SO_2, CO, PM_{10} and $PM_{2.5}$ were fed into the AERMOD dispersion model to contemporaneously assess the cumulative impacts. For Lead and Benzene, a constant background was assumed for all five modelling years. Summary of background characterisation is presented in **Table 3**.

Table 3: Background Characterisation

Substance	Value	Reference
SO_2	Hourly varying	Hourly data from Altona North for 2016, 2017, 2018 & 2019 Hourly data from Morwell South for 2020
NO_2		Hourly data from Footscray for 2016, 2017, 2018, 2019 & 2020
PM_{10}		
$PM_{2.5}$		
CO		
Lead	0.02 µg/m³	NEPM Air Monitoring at Collingwood in 2004
Benzene	7.6 µg/m³	Baseline monitoring for the West Gate Tunnel Project in 2019

A summary of observed background levels used for each pollutant provided in the subsections below.

5.1 Nitrogen Dioxide (NO_2)

To characterise the background levels of NO_2, hourly timeseries data for five (5) modelling years, 2016 through to 2020 were sourced from the Footscray air monitoring station. Hourly background concentrations were fed into AERMOD to contemporaneously assess the cumulative impacts. Missing gaps in the dataset were replaced with the 70th percentile one-hour average concentration.

Table 4: NO_2 Background Concentration (µg/m³) – AERMOD Background Timeseries Statistics

Parameter	2016	2017	2018	2019	2020	AQ Objective
1-hour (99.9th percentile)	84.0	90.6	80.1	89.7	108.6	190
Annual Average	20.4	23.6	21.1	21.3	21.9	62

It is noted that background levels of NO_2 are well below the assessment criteria for all averaging periods.

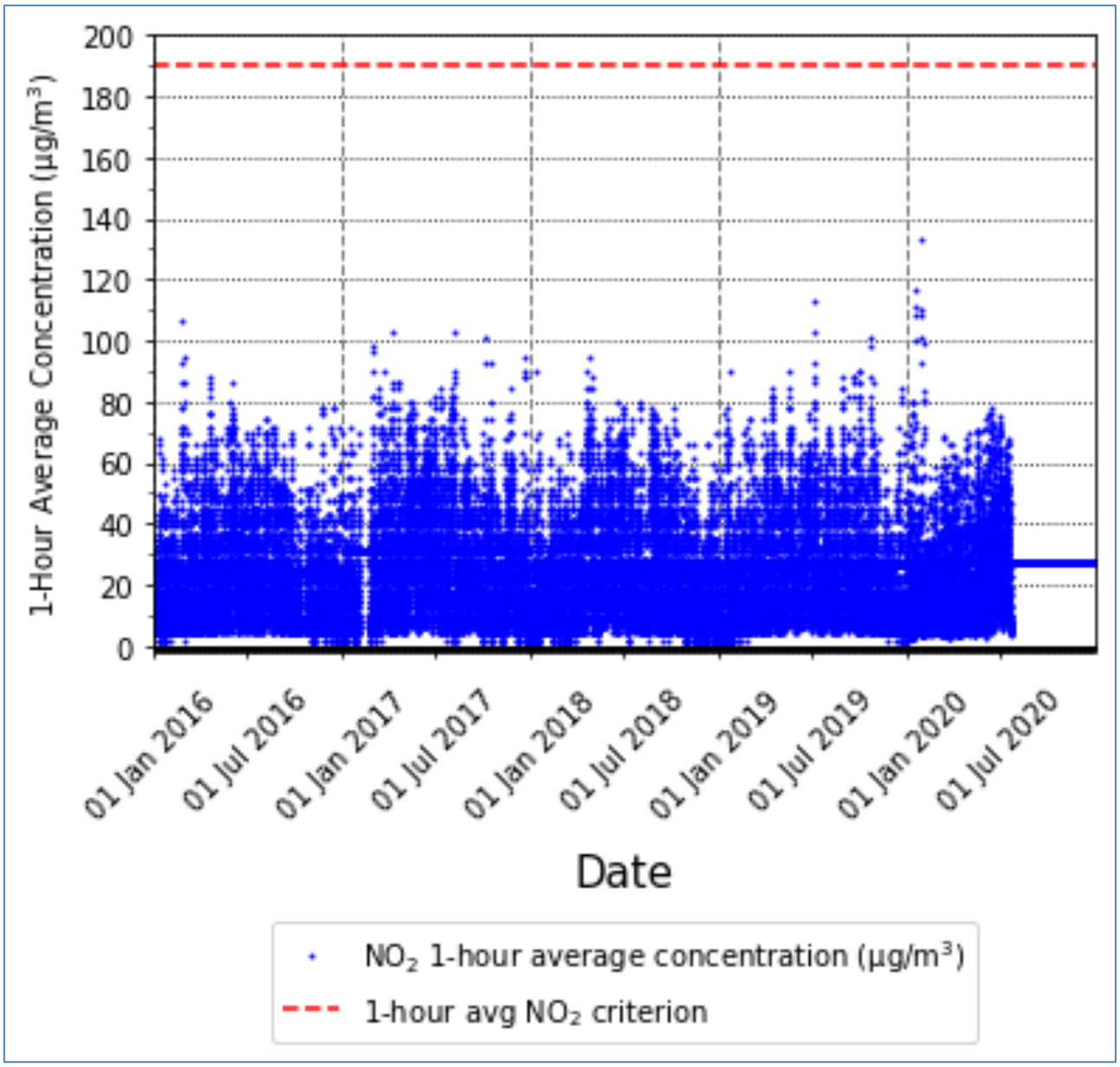


Figure 6: Hourly Timeseries – Background NO_2 Concentrations (µg/m³)

5.2 Sulphur Dioxide (SO_2)

To characterise the background levels of SO_2, hourly timeseries data for four (4) modelling years, 2016 through to 2019 were sourced from the Altona North air monitoring station. Hourly timeseries data for 2020 was sourced from the Morwell South air monitoring station due to an absence of data for 2020 at Altona North. Hourly background concentrations were then fed into AERMOD to contemporaneously assess the cumulative impacts. Missing gaps in the dataset were replaced with the 70th percentile one-hour average concentration.

Table 5: SO_2 Background Concentration (µg/m³) – AERMOD Background Timeseries Statistics

Parameter	2016	2017	2018	2019	2020	AQ Objective
1-hour (99.9th percentile)	91.9	97.2	104.6	85.7	53.4	450
24-hour (100th percentile)	37.4	39.0	44.6	22.4	16.5	229
Annual Average	3.5	4.3	4.3	4.3	1.8	57

It is noted that background levels of SO_2 are well below the assessment criteria for all averaging periods.

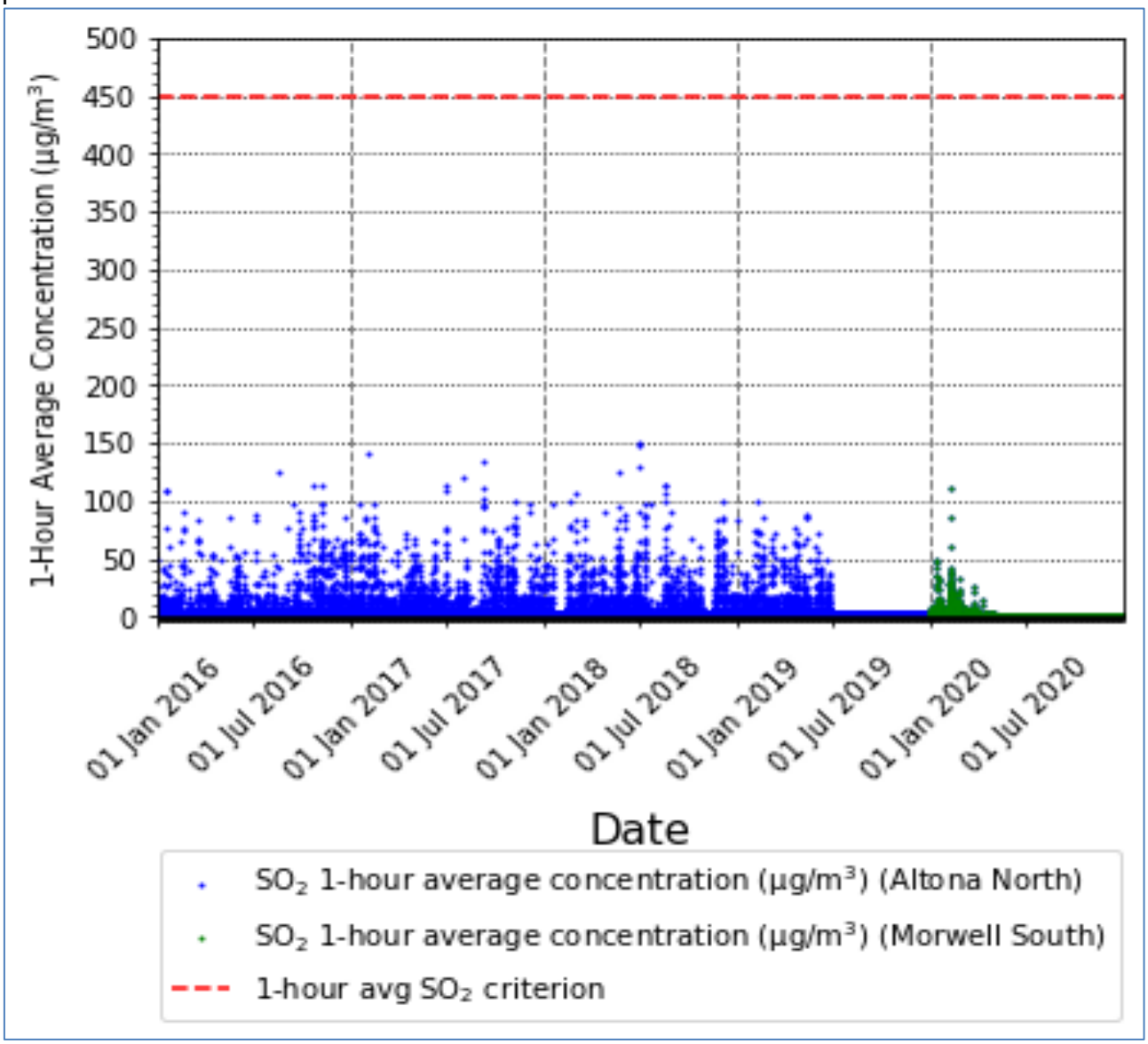


Figure 7: Hourly Timeseries – Background SO_2 Concentrations (µg/m³)

5.3 Particulate Matter (PM_{10})

To characterise the background levels of PM_{10}, hourly timeseries data for five (5) modelling years, 2016 through to 2020 were sourced from the Footscray air monitoring station. Hourly background concentration were then fed into AERMOD to contemporaneously assess the cumulative impacts. Missing gaps in the dataset were replaced with the 70th percentile one-hour average concentration.

Table 6: PM_{10} Background Concentration (µg/m^3) – AERMOD Background Timeseries Statistics

Parameter	2016	2017	2018	2019	2020	AQ Objective
1-hour (99.9th percentile)	101.1	121.6	137.1	156.8	106.9	80
24-hour (100th percentile)	42.7	50.3	58.6	90.7	42.4	50
Annual Average	15.2	17.2	18.4	19.0	15.6	20

It is noted that background levels of PM_{10} are well above the air quality objective for 1-hour averaging period for all years. The 24-hour average air quality objective is also exceeded for three (3) out of the five (5) met years included in the dispersion modelling. For the annual average, the background levels are slightly lower than the air quality objective of 20 µg/m^3.

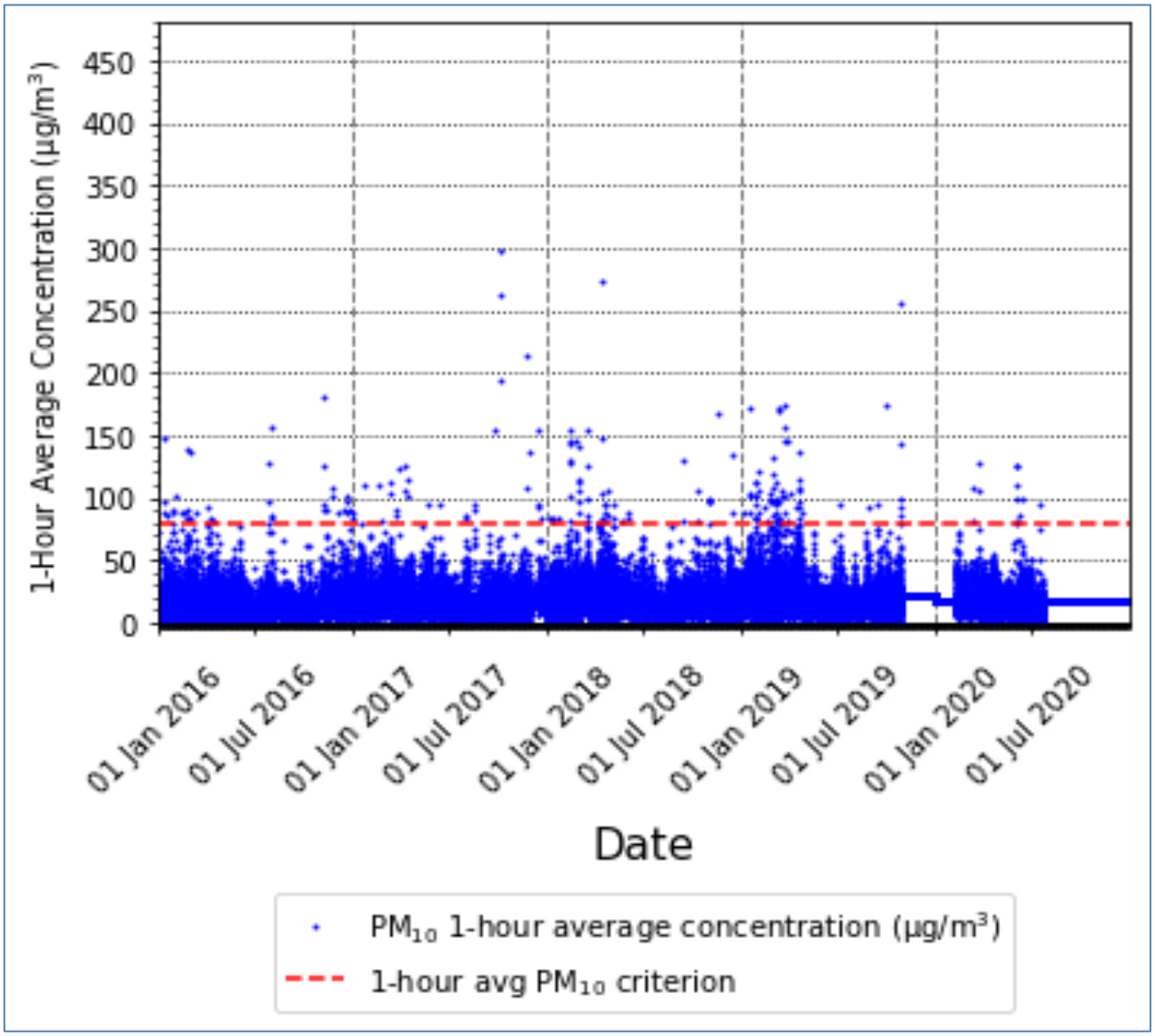


Figure 8: Hourly Timeseries – Background PM_{10} Concentrations (µg/m^3)

5.4 Particulate Matter ($PM_{2.5}$)

To characterise the background levels of $PM_{2.5}$, hourly timeseries data for five (5) modelling years, 2016 through to 2020 were sourced from the Footscray air monitoring station. Hourly background concentrations were then fed into AERMOD to contemporaneously assess the cumulative impacts. Data for the final six months of 2020 were not available, hence the missing gaps in the dataset were replaced with the 70th percentile one-hour average concentration.

Table 7: $PM_{2.5}$ Background Concentration (µg/m³) – AERMOD Background Timeseries Statistics

Parameter	2016	2017	2018	2019	2020	AQ Objective
1-hour (99.9th percentile)	35.6	43.1	42.5	50.7	323.8	50
24-hour (100th percentile)	23.1	34.8	31.2	29.6	212.9	25
Annual Average	6.9	7.8	7.7	7.5	10.4	8

It is noted that background levels of $PM_{2.5}$ are exceeded for two (2) out of the five (5) years, with the background level for 2020 being well above the air quality objective for the 1-hour averaging period. This period coincides with extensive bushfire activity throughout eastern Australia, including in the vicinity of the air monitoring station. The 24-hour average air quality objective is also exceeded for all five (5) met years included in the dispersion modelling. For the annual average, the background levels are slightly lower than the air quality objective of 8 µg/m³ for all years, except for 2020.

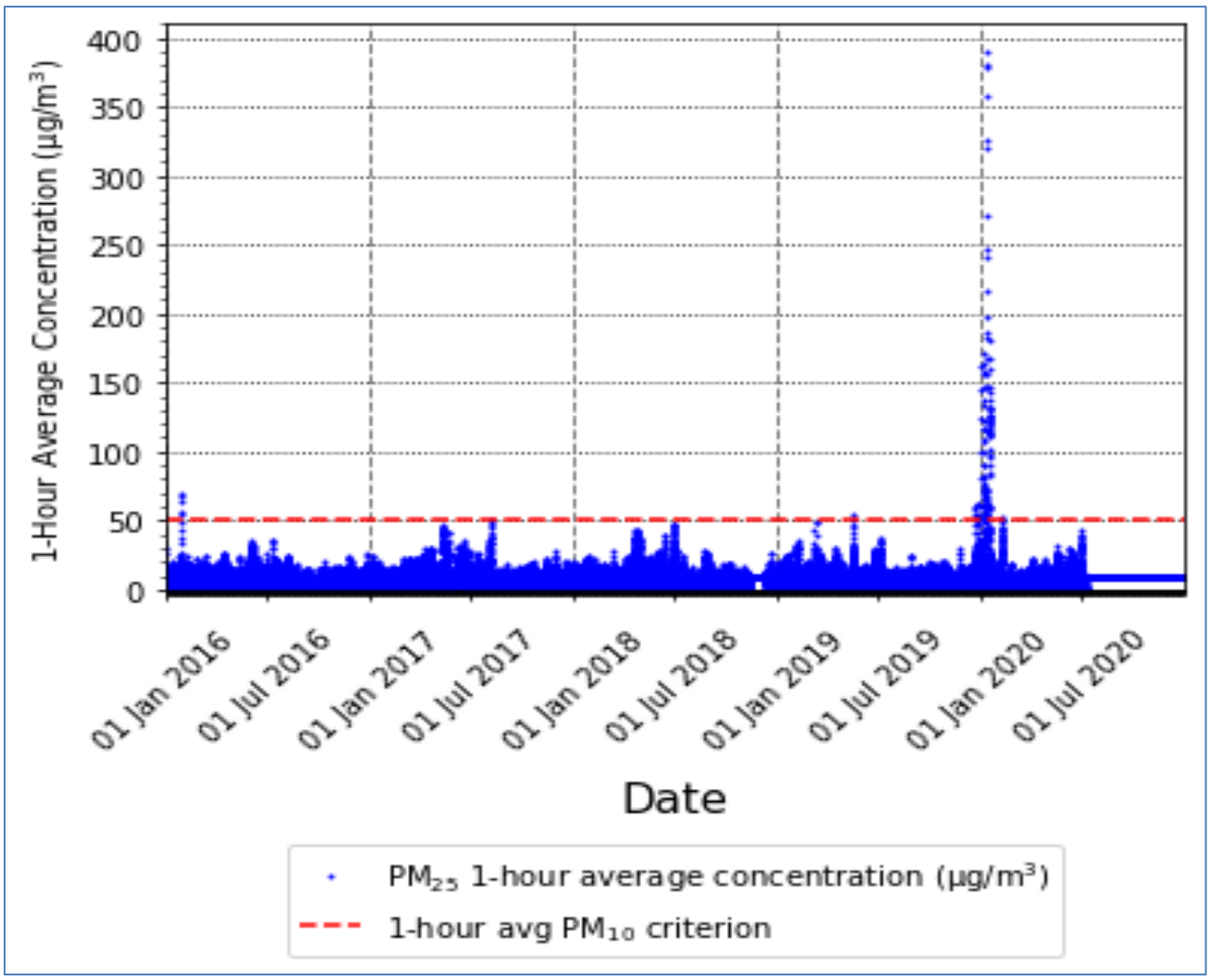


Figure 9: Hourly Timeseries – Background $PM_{2.5}$ Concentrations (µg/m³)

5.5 Carbon Monoxide (CO)

To characterise the background levels of CO, hourly timeseries levels for five modelling years, 2014 through to 2018 were sourced from the Footscray air monitoring station. Hourly background concentrations were then fed into AERMOD to contemporaneously assess the cumulative impacts. Data for the final six months of 2020 were not available, hence the missing gaps in the dataset were replaced with the 70th percentile one-hour average concentration.

Table 8: CO Background Concentration (µg/m³) – AERMOD Background Timeseries Statistics

Parameter	2016	2017	2018	2019	2020	AQ Objective
1-hour (99.9th percentile)	1745.1	1378.8	1249.7	1249.7	4026.4	29,000
8-hour (100th percentile)	1687.1	1390.3	1093.5	1359.1	3365.3	10,304

It is noted that background levels of SO_2 are well below the assessment criteria for all averaging periods.

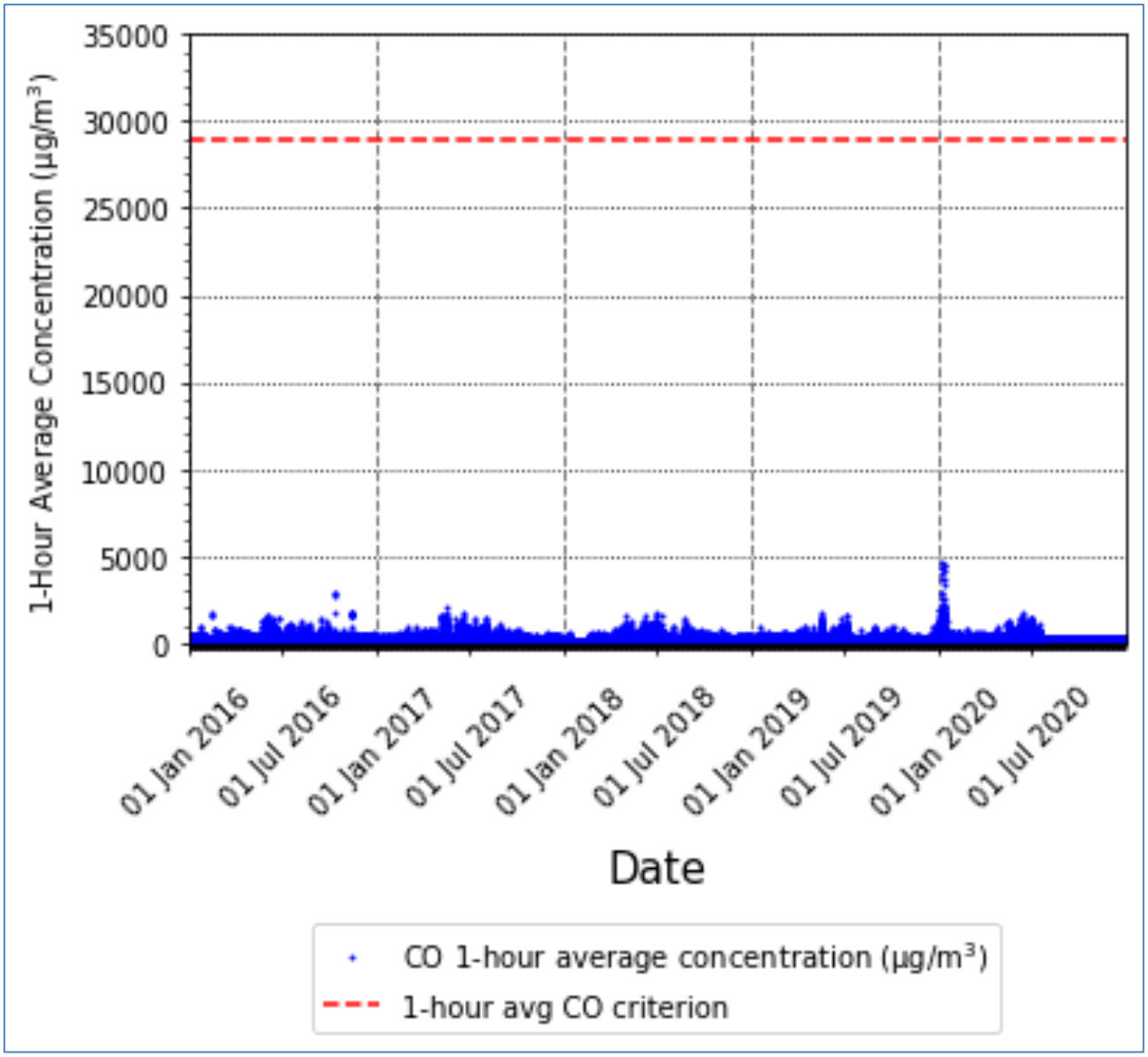


Figure 10: Hourly Timeseries – Background CO Concentrations (µg/m³)

6. AIR EMISSIONS FROM THE PROPOSED FACILITY

This section provides information on estimating emissions of air pollutants (gases, particulates and odours) from the operational activities at the proposed facility.

Emissions for the sources at the proposed facility have been referenced from similar asphalt batch plants. For the assessment it has been assumed that the volumetric flow rate of the gases in the exhaust stack would be the same as the existing facility, along with other parameters including stack diameter and exit velocity (as production volumes are similar)

Emission rates were calculated based on a proposed annual asphalt production rate of approximately 150,000 tonnes per annum. While this far exceeds the expected production rate for the proposed plant (at 50, 000 tonnes per annum), it provides a worst case scenario in terms of emissions. Estimated TSP, PM_{10} and $PM_{2.5}$ emissions for the operational activities at the proposed facility are presented below in **Table 9**.

Table 9: Source emission rates for each pollutant

Pollutant	Source Emission Rate (g/sec)					
	Baghouse Stack	Asphalt Loadout[(a)]	Silo Filling	Stockpiles[(b)]		
				A	B	C
TSP	0.383	0.012	0.010	5.89E-04	2.21E-04	2.83E-04
PM_{10}	0.115	0.005	0.004	2.94E-04	1.10E-04	1.42E-04
$PM_{2.5}$	0.080	0.002	0.002	4.41E-05	1.66E-05	2.12E-05
SO_2	0.092					
CO	2.600	0.024	0.027			
NO_x as NO_2	0.520					
Acetaldehyde	6.40E-03					
Benzene	5.60E-03	4.33E-05	7.80E-05			
Formaldehyde	1.48E-02	7.32E-05	1.68E-03			
Toluene	2.00E-02	1.75E-04	1.51E-04			
Xylene	5.40E-02	4.08E-04	6.26E-04			
Carcinogenic PAHs (as benzo(a)pyrene)[(c)]	6.36E-08	8.84E-07	3.91E-07			
Arsenic	9.20E-06					
Cadmium	1.22E-05					
Chromium (total)	1.20E-05					
Copper	9.60E-07					
Lead	1.78E-05					
Manganese	1.38E-04					
Mercury	8.20E-06					
Nickel	6.00E-05					
Zinc	1.36E-04					
VOC	1.64E-01	7.82E-02	2.44E-01			
Odour	3820 $OU.m^3/sec$	3333 $OU.m^3/sec$				

(a) Asphalt loadout is uncontrolled.
(b) 50% reduction on stockpiles (water sprays).
(c) Emission rates adopted from US-EPA. (2000) Table 1.

6.1 Baghouse Stack Emissions

Emissions from the baghouse stack will contain odours, gases and particulates. This will include volatile organic compounds (VOCs), polycyclic aromatic hydrocarbons (PAHs), trace metals and dioxins and furans. Fumes from the mixing tower will be drawn down and recirculated through the jet (gas/oil) burner. This is standard practice for new asphalt plants and helps to reduce emissions of VOCs. Flue gas emissions from the dryer drum unit will be discharged via the bag filters to remove particulates.

The emissions inventory for the proposed facility is based on the following:

- The flue emissions data for the gases and particulates released from the baghouse stack was taken from direct testing of a similar asphalt plant producing a comparable type of asphalt (refer **Appendix C**).
- Emission rate data for odour was adopted testing undertaken for a similar asphalt plant in Lismore, NSW (Assured Environmental, 2021).
- The baghouse stack geometry is as per design data provided by Fulton Hogan, noting that the vent baghouse stack height will be raised to 2.5 m above ground level. The exit conditions adopted were based on the direct testing of the identical plant.

Characteristics for the proposed baghouse stack are detailed in **Table 10**. Estimates of the pollutant emission rates from the baghouse stack are in **Table 9**.

Table 10: Baghouse Stack Characteristics

Parameter	Value
Stack height from ground (m)	21.50
Stack diameter (m)	0.90
Stack area (m^2)	0.64
Stack temperature (K)	388.75
Exit velocity (m/s)	20.10
Actual flow rate (m^3/min)	767
Dry standard flow rate (Nm^3/min)[(a)]	364
Moisture content (%)	32.5

(a) At 273.15 K (0 ℃) and a standard atmospheric pressure of 1 atm.

6.2 Asphalt Loadout Emissions

Emissions from the asphalt load out process (when the hot mixed asphalt is transferred directly from the hot mix plant into a tray truck positioned underneath) will contain a combination of gases, particulates and odours. These loadout odour emissions will be reduced by maintaining the tower unit at a negative pressure and ducting the fumes back through the jet (gas/oil) burner.

Estimates of the pollutant emission rates from the asphalt loadout were characterised in the AERMOD model as a volume source, with the following characteristics to represent a tray truck approximately 8 metres long by 3 metres high:

- Initial horizontal spread, σ_y = 2 m.
- Initial vertical spread from ground level, σ_z = 0.75 m.

6.3 Asphalt Silo Filling Emissions

Emissions from the asphalt silo filling process (when the hot mixed asphalt is transferred from the hot mix plant to the in-line silos for temporary storage) will contain a combination of gases, particulates and odours. These silo filling emissions will be reduced by maintaining the tower unit at a negative pressure and ducting the fumes back through the jet (gas/oil) burner.

Characteristics for the asphalt silo filling process are detailed in **Table 11**. Estimates of the pollutant emission rates from the silo filling process are detailed in **Table 9**. For this report a conservative

approach was undertaken whereby emissions from the silo filling process where assumed to be uncontrolled.

Table 11: Silo Filling Characteristics

Parameter	Value
Source height from ground (m)	7.0
Source diameter (m)	1.13
Source area (m^2)	1.00
Stack temperature (K)	210.93
Exit velocity (m/s)	8.47
Actual flow rate (m^3/min)	707
Dry standard flow rate (Nm^3/min)[(a)]	434.1
Moisture content (%)	3

(a) At 273.15 K (0 ℃) and a standard atmospheric pressure of 1 atm.

6.4 Fugitive Dust Risk

Based on the proposed operations outlined in **Section 2**, there are a number of activities that have the potential to generate fugitive dust emissions within the project area. These include:

- Trucks unloading sand and aggregate at storage bays;
- Trucks unloading RAP to the RAP stockpile;
- Conveyor transfer point sources;
- Conveying aggregates, sand and RAP from the stockpiles into the cold feeder bins;
- Operation of the glass crusher; and
- Wheel generated dust from light and heavy vehicle haulage on the paved surfaces.

The main fugitive sources at the site would be vehicle movements and stockpiles for aggregates, filler materials and RAP. For this assessment the area of the individual stockpiles were combined to create three separate stockpiles (refer **Table 9**). To determine TSP, PM_{10} and $PM_{2.5}$ emission rates from the proposed facility, reference was drawn to the following Emission Estimation Technique (EET) manuals:

- National Pollutant Inventory (NPI), *Emission Estimation Technique Manual for Mining*, Version 3.1, Australian Government – Department of Sustainability, Environment, Water, Population & Communities, January 2012.
- AP-42 Emission Factor Database, *Chapter 11.1 Hot Mix Asphalt Plants*, United States Environmental Protection Agency (US-EPA 2006 (a)).
- AP-42 Emission Factor Database, *Chapter 13.2.1 Paved Roads*, United States Environmental Protection Agency (US-EPA 2006 (b)); and
- AP-42 Emission Factor Database, *Chapter 13.2.4 Aggregate Handling and Storage Piles*, United States Environmental Protection Agency (US-EPA 2006 (c)).

6.5 Air Quality Control Measures

The following air quality control measures are being proposed to effectively manage particulate emissions generated from the proposed operational activities.

List of air quality control measures proposed include:

- Implementation of water misting sprays on aggregate and sand stockpiles.

- Restricting the maximum height of the stockpile to be less than the height of the enclosure walls. This will create a wind barrier and thereby considerably minimise the extent of fugitive windborne particulate dispersion.
- Paving the haul roads to minimise particulate matter emissions from wheel-generated dust. Quality of the paved road surface would be managed through mechanical sweeping and regular maintenance.

6.6 Odour Emissions

Section 2.2 details the specifics of the proposed facility, along with control measures to minimise odour emissions. Although standard asphalt production is an odour risk, higher odour emissions during asphalt production are typically related to the use of additives to improve the application of asphalt at lower temperatures or an unexpectedly high sulfur content.

The primary controls for odour emissions include the use of using low sulfur bitumen, ducting fumes through the Jet Gas/Oil Burner to reduce VOCs, and producing asphalt at a temperature below the threshold for blue smoke emissions. These controls are now standard practice with new asphalt plants.

The odour emission rates were based on testing conducted by Ektimo (2021) for an Asphalt Batch Facility at Lismore, NSW. The emission rates were based on average tested emissions from the baghouse stack and during the loadout of freshly mixed asphalt. The Lismore facility has a capacity of 80 tph, the emission rates where therefore scaled to 100 tph to match the operating capacity of the proposed facility.

As per Publication 1883 – *Guidance for Assessing Odour*, published by the Vic EPA (2021), asphalt plants are classified as a source of moderate odour potential. As per the guideline, a detailed odour assessment is required for sources with a high odour potential. Taking into consideration the moderate potential of odour emissions from the asphalt plant, a detailed odour assessment is not warranted and therefore has been excluded in this assessment.

7. DISPERSION MODELLING

The EPA recommends the use of AERMOD as a regulatory model for air dispersion modelling in Victoria. AERMOD is a steady-state plume model that incorporates air dispersion based on planetary boundary layer turbulence structure and scaling concepts, including treatment of both surface and elevated sources, and both simple and complex terrain (EPA, 2013).

7.1 Meteorological Input Files

Meteorological mechanisms govern the generation, dispersion, transformation and eventual removal of pollutants from the atmosphere. The local meteorology at the site plays a significant role in understanding the pollutant transport and dispersion mechanisms, and to adequately characterise the local meteorological conditions, information is needed on key parameters such as prevailing wind regime, mixing depth, atmospheric stability, ambient temperatures, rainfall and relative humidity.

AERMOD requires the input of two meteorological files; a 'surface' data file and a 'profile' data file. The guideline document 'Construction of Input Meteorological Data Files for Regulatory Air Model (AERMOD)' describes the methods to be used in the construction of the AERMOD meteorological input data files when using AERMOD for air impact assessments in Victoria. For this assessment, surface data was obtained from the Bureau of Meteorology (BoM) station at Warrnambool and upper air data was collected from Mount Gambier Airport. Details for the of construction of the met files are presented in **Appendix B.**

7.2 AERMOD Dispersion Modelling

Following recommendations from the EPA, the AERMOD model was configured in accordance with the EPA *Guidance notes for using the regulatory air pollution model AERMOD in Victoria*, publication 1551, October 2013, revised July 2014 (EPA, 2014). Key points for the setup of AERMOD are as follows:

- AERMOD version 21112;

- Five (5) consecutive years of meteorological input files, 2016 through to 2020;
- The 2018 year was selected for AERMOD dispersion modelling;
- Modelling resolution (receptor sampling resolution) of 50 m to capture the peak concentration outside facility boundary;
- Use of 30m resolution SRTM terrain data in developing the model;
- The use of the peak-to-mean method for converting 1-hour average concentrations to shorter averaging periods (e.g. 3-minute and 30-minute);
- Use of the 99.9th percentile predicted concentrations (pollutants with one-hour or sub-hourly averaging period) to compare against assessment criteria outlined in Publication 1961 and (ERS): No. S 245.
- Use of the 100th percentile predicted concentrations for pollutants with averaging period higher than one-hour;
- NO_x to NO_2 conversion ratio was assumed to be 100 %; and
- The impact of building wake effects on plume dispersion has been included in the modelling for buildings and structures located around the incinerator stack. The heights and locations of these structures were entered into the Building Profile Input Program (BPIP) utility. The wind direction specific building dimensions calculated by BPIP for the tower unit at their corresponding heights were then entered into the AERMOD model.

General run control parameters and technical options that were selected in the AERMOD model are summarised in **Table 12.**

Table 12: AERMOD Dispersion Model Configuration

Parameter	Value
AERMOD version	21112
Meteorological data	Five years of hourly meteorological data processed for use with AERMOD in accordance with EPA (2013b). Meteorological observations used in generating the SFC and PFL files included BoM Warrnambool surface station and Mount Gambier Airport for the upper air data. The five sets of annual AERMOD meteorological files were constructed for the years 2016, 2017, 2018, 2019 and 2020.
Model Centre	634370.78 m Easting, 5751179.82 m Northing, UTM Zone 54H
Modelling domain	101 x 101 grids, 50 m spacing providing extents of 5 km x 5 km
Terrain	Elevated, data obtained from SRTM 30 m
Wake/downwash effects	BPIP algorithm
Dispersion Coefficient	Rural
Background concentrations	Hourly varying background concentration file for PM_{10}, $PM_{2.5}$, NO_2, CO and SO_2. Constant background for benzene and lead. Not included for other pollutants.
Emission rates	Constant for every hour of the year, all modelled years

Parameter	Value
NO_x to NO_2 Option	100 % Conversion assumed
Wind speed categories	AERMOD Default

In order to assess cumulative impacts, background levels for the common pollutants i.e. NO_2, SO_2, CO, PM_{10}, and $PM_{2.5}$ were sourced from the nearest and representative ambient air quality monitoring stations and were included as hourly varying timeseries for the 2018 modelled years. Constant background levels were also included for Benzene and Lead.

7.3 PM10/TSP Ratio and PM2.5/TSP ratio

The historical emissions testing data adopted for this assessment specifies particulates concentrations for TSP. The ambient air quality objectives are for PM_{10} and $PM_{2.5}$. It was conservatively assumed that 90% of TSP will be in the form of PM_{10}, whereas $PM_{2.5}$ would be 75% of TSP.

7.4 Toxicity equivalency calculations

The ambient air quality objectives in Appendix C of Publication 1961 specify that carcinogenic polycyclic hydrocarbons (PAHs) be expressed as the toxic equivalency (TEQ) of benzo(a)pyrene (BaP). This is done because multiple PAHs are commonly emitted simultaneously from a single source, have a similar toxic mode of action and their impacts on human health are additive.

Calculation of PAHs was undertaken by first multiplying each compounds concentration by its TEQ factor and then finding the sum of the resulting concentrations. The TEQ factors for PAHs and calculated emission rates are detailed below in **Table 13**.

Table 13: Toxicity equivalency factors for PAHs

Compound	TEQ factor (as BaP equivalents)	Emission Rate (g/sec)		
		Baghouse Stack	Asphalt Loadout	Silo Filling
Benzo(a)anthracene	0.1	9.20E-09	1.30E-07	2.84E-07
Benzo(a)pyrene	1	6.20E-09	1.50E-07	Not detected
Benzo(b)fluoranthene	0.1	1.88E-08	5.18E-08	Not detected
Benzo(g,h,i)perylene	0.01	1.00E-10	1.30E-09	Not detected
Benzo(k)fluoranthene	0.1	2.60E-08	1.50E-08	Not detected
Chrysene	0.01	7.60E-10	1.57E-09	1.07E-07
Dibenz(a,h)anthracene	1	1.90E-09	5.32E-07	Not detected
Indeno(1,2,3-cd)pyrene	0.1	6.00E-10	2.52E-09	Not detected
Carcinogenic PAHs (as benzo(a)pyrene)	**Total**	**6.36E-08**	**8.84E-07**	**3.91E-07**

8. MODELLING RESULTS AND DISCUSSION

AERMOD was set to predict incremental (i.e. impacts from the proposed facility only) and cumulative (incremental + background) concentrations of modelled pollutants (refer to **Table 9** for pollutant emission rates and **Section 5** for background concentrations) at the 45 identified discrete receptors.

In addition to the discrete receptors, regularly spaced gridded receptors were placed over a 5km x 5km modelling domain at 50m intervals. Contour plots showing the predicted impacts on local

surrounding area were generated based on results at these gridded receptors using a Kriging algorithm. Contour plots have only been generated for ground-level concentrations (i.e. 0 m).

For all averaging periods (including averaging times of an hour or less), the maximum 100th percentile ground level concentrations have been reported. Publication 1961 allows for averaging times of an hour or less to be reported at the 99.9th percentile, however the 100th percentile has been reported here to provide a conservative estimate.

The maximum predicted incremental concentrations, as well as the cumulative concentrations (including background) are presented in **Table 14** and **Table 15** respectively. To present the dispersion modelling results at the receptors in a concise manner, rather than presenting results for each receptor, only the three highest values (1st, 2nd and 3rd ranked) across the 45 sensitive receptors are presented. To readily compare the predicted levels against the air quality objectives, the highest predicted concentration has also been presented as percentage of the respective air quality objective. To understand the impact of the pollutant background levels on cumulative concentrations, a background level value is also presented in **Table 15**.

Predicted incremental and cumulative impacts at the nearest residential receptor are presented in **Table 14** and **Table 15** respectively. The maximum predicted incremental impacts at the identified discrete receptors are below 6% of the assessment criteria for all pollutants, except for Carcinogenic PAHs (as benzo(a)pyrene). The maximum predicted cumulative impacts at the identified discrete receptors are also below the assessment criteria for all pollutants. It is noted that for particulates even though the incremental impacts from the proposed facility are very low (<6% of the criteria), the cumulative impacts are significant, 91.2% and 97.4% of the criterions for 24-hour averaged PM_{10} and $PM_{2.5}$ respectively. This is attributed to the elevated background levels of particulates observed across the air monitoring stations adopted for the proposed facility. It should be noted that background particulate levels observed at the monitoring stations are likely to be significantly higher that what would typically be expected of background levels at the facility and its surrounds. As such, cumulative impacts for the facility are likely to be lower than predicted in this report.

Model predicted ground-level (0 m) concentration isopleths for PM_{10} and $PM_{2.5}$ have been presented in **Appendix A**.

A summary of the predicted incremental and cumulative impacts for each pollutant and the maximum concentrations predicted at the identified discrete receptors, are presented in the subsections below.

8.1 Particulate Matter (PM_{10})

The maximum 24-hour average PM_{10} concentration for incremental impacts across all the discrete receptors is predicted to be 2.9 µg/m^3, which is approximately 5.8% of the assessment criterion of 50 µg/m^3. The corresponding predicted cumulative concentration is 45.6 µg/m^3, approximately 91.2% of the assessment criterion of 50 µg/m^3.

The predicted annual average incremental PM_{10} concentration across all the discrete receptors is 0.6 µg/m^3, approximately 3.0% of the assessment criterion of 20 µg/m^3. The corresponding predicted cumulative concentration is 15.8 µg/m^3, approximately 79.0% of the assessment criterion of 20 µg/m^3.

8.2 Particulate Matter ($PM_{2.5}$)

The maximum 24-hour average $PM_{2.5}$ concentration for incremental impacts across all the discrete receptors is predicted to be 1.2 µg/m^3, which is approximately 5.0% of the assessment criterion of 25 µg/m^3. The corresponding predicted cumulative concentration is 24.3 µg/m^3, approximately 97.4% of the assessment criterion of 25 µg/m^3.

The predicted annual average incremental $PM_{2.5}$ concentration across all the discrete receptors is 0.3 µg/m^3, approximately 3.1% of the assessment criterion of 8 µg/m^3. The corresponding predicted cumulative concentration is 7.2 µg/m^3, approximately 89.4% of the assessment criterion of 8 µg/m^3.

Table 14: Model predicted maximum incremental concentrations at the identified sensitive receptors

Pollutant	Averaging Period	Assessment Criteria (µg/m3)	Model Predicted Maximum Incremental Concentrations for the 1st, 2nd and 3rd ranked Sensitive receptors (1-45)				Sensitive Receptor ID where the 1st, 2nd and 3rd ranked incremental concentrations are predicted			Compliance Achieved
			1st	2nd	3rd	1st ranked (% of criteria)	1st	2nd	3rd	
PM10	24-hour	50	2.90	1.29	1.27	5.80%	28	29	30	YES
	Annual	20	0.59	0.27	0.18	2.95%	28	29	30	YES
PM25	24-hour	25	1.24	0.62	0.60	4.96%	28	30	35	YES
	Annual	8	0.25	0.12	0.08	3.14%	28	29	30	YES
SO2	1-hour	524	1.44	1.41	1.35	0.27%	34	35	32	YES
	24-hour	209	0.64	0.59	0.54	0.31%	35	36	32	YES
	Annual	52	0.05	0.04	0.04	0.10%	37	36	13	YES
CO	8-hour	10304	29.47	28.72	26.88	0.29%	28	36	35	YES
NO2	1-hour	226	8.14	7.98	7.62	3.60%	34	35	32	YES
	Annual	56	0.28	0.25	0.22	0.51%	37	36	13	YES
Lead	Annual	0.5	0.00001	0.00001	0.00001	0.002%	12	13	32	YES
Acetaldehyde	1-hour	470	0.10	0.10	0.09	0.02%	34	35	32	YES
	Annual	4.5	0.003	0.003	0.003	0.08%	37	36	13	YES
Benzene	1-hour	580	0.12	0.09	0.09	0.02%	28	34	35	YES
	24-hour	29	0.04	0.04	0.04	0.14%	35	36	32	YES
	Annual	1.7	0.007	0.004	0.003	0.41%	28	29	37	YES
Formaldehyde	30-min	100	2.53	1.26	1.06	2.53%	28	29	30	YES
	24-hour	49	0.47	0.26	0.25	0.96%	28	29	30	YES
	Annual	9.8	0.08	0.05	0.03	0.83%	28	29	30	YES
Toluene	1-hour	15000	0.35	0.13	0.10	0.002%	28	29	30	YES
	7-day	260	0.05	0.02	0.02	0.02%	28	29	30	YES
Xylene	1-hour	22000	1.02	0.85	0.84	0.005%	28	34	35	YES
	24-hour	8685	0.39	0.36	0.34	0.004%	35	36	32	YES
	Annual	100	0.06	0.03	0.03	0.06%	28	29	37	YES

Carcinogenic PAHs (as benzo(a)pyrene)	Annual	0.0001	0.00007	0.00003	0.00002	70.00%	28	29	30	YES
Arsenic[(a)]	1-hour	9.9	0.0001	0.0001	0.0001	0.001%	34	35	32	YES
	Annual	0.007	0.00001	-	-	0.14%	37	0	0	YES
Cadmium	1-hour	18	0.0002	0.0002	0.0002	0.001%	34	35	32	YES
	24-hour	0.03	0.0001	0.0001	0.0001	0.30%	35	36	32	YES
	Annual	0.005	0.00001	0.00001	0.00001	0.20%	13	36	37	YES
Chromium (hexavalent)	1-hour	1.3	0.0002	0.0002	0.0002	0.01%	34	32	35	YES
	Annual	0.005	0.00001	0.00001	0.00001	0.20%	13	36	37	YES
Chromium (trivalent)	30-day	0.1	0.0001	0.0001	0.0001	0.08%	35	36	32	YES
Copper	1-hour	100	0.00002	0.00001	0.00001	0.00002%	34	32	35	YES
Manganese	1-hour	9.1	0.002	0.002	0.002	0.02%	34	35	32	YES
	Annual	0.15	0.0001	0.0001	0.0001	0.05%	37	36	13	YES
Mercury[(a)]	Annual	1	-	-	-	0.0%	-	-	-	YES
Nickel	1-hour	0.2	0.001	0.001	0.001	0.47%	34	35	32	YES
	Annual	0.09	0.00003	0.00003	0.00003	0.03%	13	36	37	YES
Zinc	1-hour	20	0.002	0.002	0.002	0.01%	34	35	32	YES
	Annual	2	0.0001	0.0001	0.0001	0.00%	36	37	13	YES

(a) Predicted concentrations of Arsenic and Mercury where below the minimum simulation limit of AERMOD.

Table 15: Model predicted maximum cumulative concentrations at the identified sensitive receptors

Pollutant	Averaging Period	Assessment Criteria (µg/m3)	Background Concentration (µg/m3)	Model Predicted Maximum Incremental Concentrations for the 1st, 2nd and 3rd ranked Sensitive receptors (1-45)				Sensitive Receptor ID where the 1st, 2nd and 3rd ranked incremental concentrations are predicted			Compliance Achieved
				1st	2nd	3rd	1st ranked (% of criteria)	1st	2nd	3rd	
PM10	24-hour	50	42.7	45.60	43.99	43.97	91.20%	28	29	30	YES
	Annual	20	15.2	15.79	15.47	15.38	78.95%	28	29	30	YES
PM25	24-hour	25	23.1	24.34	23.72	23.70	97.36%	28	30	35	YES
	Annual	8	6.9	7.15	7.02	6.98	89.39%	28	29	30	YES
SO2	1-hour	524	104.6	106.04	106.01	105.95	20.24%	34	35	32	YES
	24-hour	209	44.6	45.24	45.19	45.14	21.65%	35	36	32	YES
	Annual	52	4.3	4.35	4.34	4.34	8.37%	37	36	13	YES
CO	8-hour	10304	1093.5	1122.97	1122.22	1120.38	10.90%	28	36	35	YES
NO2	1-hour	226	80.1	88.24	88.08	87.72	39.04%	34	35	32	YES
	Annual	56	21.1	21.38	21.35	21.32	38.18%	37	36	13	YES
Lead	Annual	0.5	0.02	0.02	0.02	0.02	4.00%	12	13	32	YES
Benzene	1-hour	580	7.60	7.72	7.69	7.69	1.33%	28	34	35	YES
	24-hour	29	7.60	7.64	7.64	7.64	26.35%	35	36	32	YES
	Annual	9.6	7.60	7.61	7.60	7.60	79.24%	28	29	37	YES
Carcinogenic PAHs (as benzo(a)pyrene)[(a)]	Annual	0.002	NA	0.00007	0.00003	0.00002	3.50%	28	29	30	YES
Acetaldehyde[(a)]	Annual (Cum)	9	NA	0.00348	0.00312	0.00267	0.04%	37	36	13	YES
Arsenic[(a)]	Annual (Cum)	0.015	NA	0.00001	-	-	0.07%	37	-	-	YES

(a) No background estimates of PAHs, Acetaldehyde or Arsenic were available; hence the results for predicted cumulative impacts and incremental impacts are same.

8.3 Carbon Monoxide (CO)

The maximum 8-hour average CO concentration for incremental impacts across all the discrete receptors is predicted to be 29.5 µg/m^3, which is approximately 0.3% of the assessment criterion of 10,304 µg/m^3. The corresponding predicted cumulative concentration is 1123.0 µg/m^3, approximately 10.9% of the assessment criterion of 10,304 µg/m^3.

8.4 Nitrogen Dioxide (NO_2)

The maximum 1-hour average NO_2 concentration for incremental impacts across all the discrete receptors is predicted to be 8.1 µg/m^3, which is approximately 3.6% of the assessment criterion of 226 µg/m^3. The corresponding predicted cumulative concentration is 88.2 µg/m^3, approximately 39.0% of the assessment criterion of 226 µg/m^3.

The predicted annual average incremental NO_2 concentration across all the discrete receptors is 0.3 µg/m^3, approximately 0.5% of the assessment criterion of 56 µg/m^3. The corresponding predicted cumulative concentration is 21.4 µg/m^3, approximately 38.2% of the assessment criterion of 56 µg/m^3.

8.5 Sulphur Dioxide (SO_2)

The maximum 1-hour average SO_2 concentration for incremental impacts across all the discrete receptors is predicted to be 1.4 µg/m^3, which is approximately 0.3% of the assessment criterion of 524 µg/m^3. The corresponding predicted cumulative concentration is 106.0 µg/m^3, approximately 20.2% of the assessment criterion of 524 µg/m^3.

The maximum 24-hour average SO_2 concentration for incremental impacts across all the discrete receptors is predicted to be 0.6 µg/m^3, which is approximately 0.3% of the assessment criterion of 209 µg/m^3. The corresponding predicted cumulative concentration is 45.2 µg/m^3, approximately 21.7% of the assessment criterion of 209 µg/m^3.

The predicted annual average incremental SO_2 concentration across all the discrete receptors is 0.1 µg/m^3, approximately 0.1% of the assessment criterion of 52 µg/m^3. The corresponding predicted cumulative concentration is 4.4 µg/m^3, approximately 8.4% of the assessment criterion of 52 µg/m^3.

8.6 Lead

Predicted annual average incremental Lead concentration across all the discrete receptors is 0.00001 µg/m^3, approximately 0.002% of the assessment criterion of 0.5 µg/m^3. The corresponding predicted cumulative concentration is 0.02 µg/m^3, approximately 4.0% of the assessment criterion of 0.5 µg/m^3.

8.7 Benzene

The maximum 1-hour average Benzene concentration for incremental impacts across all the discrete receptors is predicted to be 0.12 µg/m^3, which is approximately 0.02% of the assessment criterion of 580 µg/m^3. The corresponding predicted cumulative concentration is 7.7 µg/m^3, approximately 1.3% of the assessment criterion of 580 µg/m^3.

The maximum 24-hour average Benzene concentration for incremental impacts across all the discrete receptors is predicted to be 0.04 µg/m^3, which is approximately 0.14% of the assessment criterion of 29 µg/m^3. The corresponding predicted cumulative concentration is 7.6 µg/m^3, approximately 26.4% of the assessment criterion of 29 µg/m^3.

The predicted annual average incremental Benzene concentration across all the discrete receptors is 0.007 µg/m^3, approximately 0.4% of the assessment criterion of 9.6 µg/m^3. The corresponding predicted cumulative concentration is 7.6 µg/m^3, approximately 79.2% of the assessment criterion of 9.6 µg/m^3.

It is noted that even though incremental benzene concentrations from the proposed facility are low, the cumulative benzene concentration for the annual average is significant. This is attributed to the constant level of 7.6 µg/m^3 that has been used to characterise the background levels of Benzene.

8.8 Carcinogenic PAHs (as benzo(a)pyrene)

Predicted annual average incremental Carcinogenic PAHs (as benzo(a)pyrene) concentration across all the discrete receptors is 0.00007 µg/m^3, approximately 70.0% of the incremental assessment criterion of 0.0001 µg/m^3 and 3.5% of the cumulative assessment criterion of 0.002 µg/m^3.

No background estimates of PAHs were available; hence the results for predicted cumulative impacts and incremental impacts are same.

8.9 Acetaldehyde

The maximum 1-hour average Acetaldehyde concentration for incremental impacts across all the discrete receptors is predicted to be 0.1 µg/m^3, which is approximately 0.02% of the assessment criterion of 470 µg/m^3.

The predicted annual average incremental Acetaldehyde concentration across all the discrete receptors is 0.0035 µg/m^3, approximately 0.08% of the incremental assessment criterion of 4.5 µg/m^3 and 0.04% of the cumulative assessment criterion of 9.0 µg/m^3.

No background estimates of Acetaldehyde were available; hence the results for predicted cumulative impacts and incremental impacts are same.

8.10 Formaldehyde

The maximum 30-minute average Formaldehyde concentration for incremental impacts across all the discrete receptors is predicted to be 2.5 µg/m^3, which is approximately 2.5% of the assessment criterion of 100 µg/m^3.

The maximum 24-hour average Formaldehyde concentration for incremental impacts across all the discrete receptors is predicted to be 0.47 µg/m^3, which is approximately 0.96% of the assessment criterion of 49 µg/m^3.

The predicted annual average incremental Formaldehyde concentration across all the discrete receptors is 0.08 µg/m^3, approximately 0.8% of the assessment criterion of 9.8 µg/m^3.

8.11 Toluene

The maximum 1-hour average Toluene concentration for incremental impacts across all the discrete receptors is predicted to be 0.35 µg/m^3, which is approximately 0.002% of the assessment criterion of 15.000 µg/m^3.

The maximum 7-day average Toluene concentration for incremental impacts across all the discrete receptors is predicted to be 0.05 µg/m^3, which is approximately 0.02% of the assessment criterion of 260 µg/m^3.

8.12 Xylene

The maximum 1-hour average Xylene concentration for incremental impacts across all the discrete receptors is predicted to be 1.02 µg/m^3, which is approximately 0.005% of the assessment criterion of 22,000 µg/m^3.

The maximum 24-hour average Xylene concentration for incremental impacts across all the discrete receptors is predicted to be 0.39 µg/m^3, which is approximately 0.004% of the assessment criterion of 8,685 µg/m^3.

The predicted annual average incremental Xylene concentration across all the discrete receptors is 0.06 µg/m^3, approximately 0.06% of the assessment criterion of 100 µg/m^3.

8.13 Metals (Arsenic, Cadmium, Chromium, Copper, Manganese, Mercury, Nickel, Zinc)

Predicted maximum 1-hour average incremental concentrations for Arsenic, Cadmium, Chromium (hexavalent), Copper, Manganese, Nickel and Zinc are all below 1% of their respective assessment criterions.

The maximum 24-hour average Cadmium concentration for incremental impacts across all the discrete receptors is predicted to be 0.0001 µg/m^3, which is approximately 0.3% of the assessment criterion of 0.003 µg/m^3.

The maximum 30-day average Chromium (trivalent) concentration for incremental impacts across all the discrete receptors is predicted to be 0.0001 µg/m^3, which is approximately 0.01% of the assessment criterion of 0.1 µg/^{m3}.

The predicted annual average incremental Arsenic concentration across all the discrete receptors is 0.00001 µg/m^3, approximately 0.14% of the incremental assessment criterion of 0.007 µg/m^3 and 0.07% of the cumulative assessment criterion of 0.015 µg/m^3.

Predicted annual average incremental concentrations for Cadmium, Chromium (hexavalent), Manganese, Mercury, Nickel and Zinc are all below 1% of their respective assessment criterions.

9. CONCLUSION

Airlabs were commissioned by Sustainable PM to conduct an AQIA for a proposed asphalt batch plant that would be built and operated at Lot 58, Mason Street, Warrnambool, VIC.

To determine operational air quality impacts from the asphalt batching activities air dispersion modelling was conducted. Hourly time series of the pollutants of interest were downloaded from the DataVic portal for the most representative air monitoring stations and used in AERMOD model to estimate the cumulative impacts.

Air quality impacts on the receiving environment have been predicted for the proposed facility using the AERMOD dispersion model for the 2018 calendar year. AERMOD was setup in accordance with VIC EPA publication 1551: *Guidance notes for using the regulatory air pollution model AERMOD in Victoria*. The predicted results are compared against the air quality objectives specified in Publication 1961 and (ERS): No. S 245.

Impacts from the facility's operations were predicted at all 45 identified sensitive receptors (27 residential and 18 industrial) receptors.

Results from the modelling show that the incremental impacts (i.e. impacts from the proposed facility only) at the nearest sensitive receptors are minimal and well below the relevant assessment criteria. However, to determine compliance for the modelled pollutants, cumulative concentrations (i.e. incremental + background) were also determined and compared against the assessment criteria.

To determine existing air quality levels, reference was drawn to the background concentrations recorded at the Altona North, Footscray and Morwell South monitoring stations for the period 2016 to 2020.

The cumulative impact assessment shows compliance for all of the modelled pollutants at all identified sensitive receptors. It is noted that for particulates even though the incremental impacts from the proposed facility are very low (<6% of the criteria), the cumulative impacts are significant, 91.2% and 97.4% of the criterions for 24-hour averaged PM10 and PM2.5 respectively. This is attributed to the elevated background levels of particulates observed across the air monitoring stations adopted for the proposed facility. Overall, assessment of the cumulative impacts shows that no exceedances are predicted for the operational activities at the proposed facility, and as-such it is in compliance with the assessment criteria.

Based on the overall findings of the AQIA, it can be summarised that the operational activities at the proposed facility are not expected to cause any significant air quality impacts in the surrounding environment.

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(ERS) No. S 245: Victoria Government Gazette, Environment Reference Standard, No. S 245 Wednesday 26 May 2021.

APPENDIX A – CONCENTRATION ISOPLETHS

Incremental Impacts – PM_{10} and $PM_{2.5}$ Concentrations

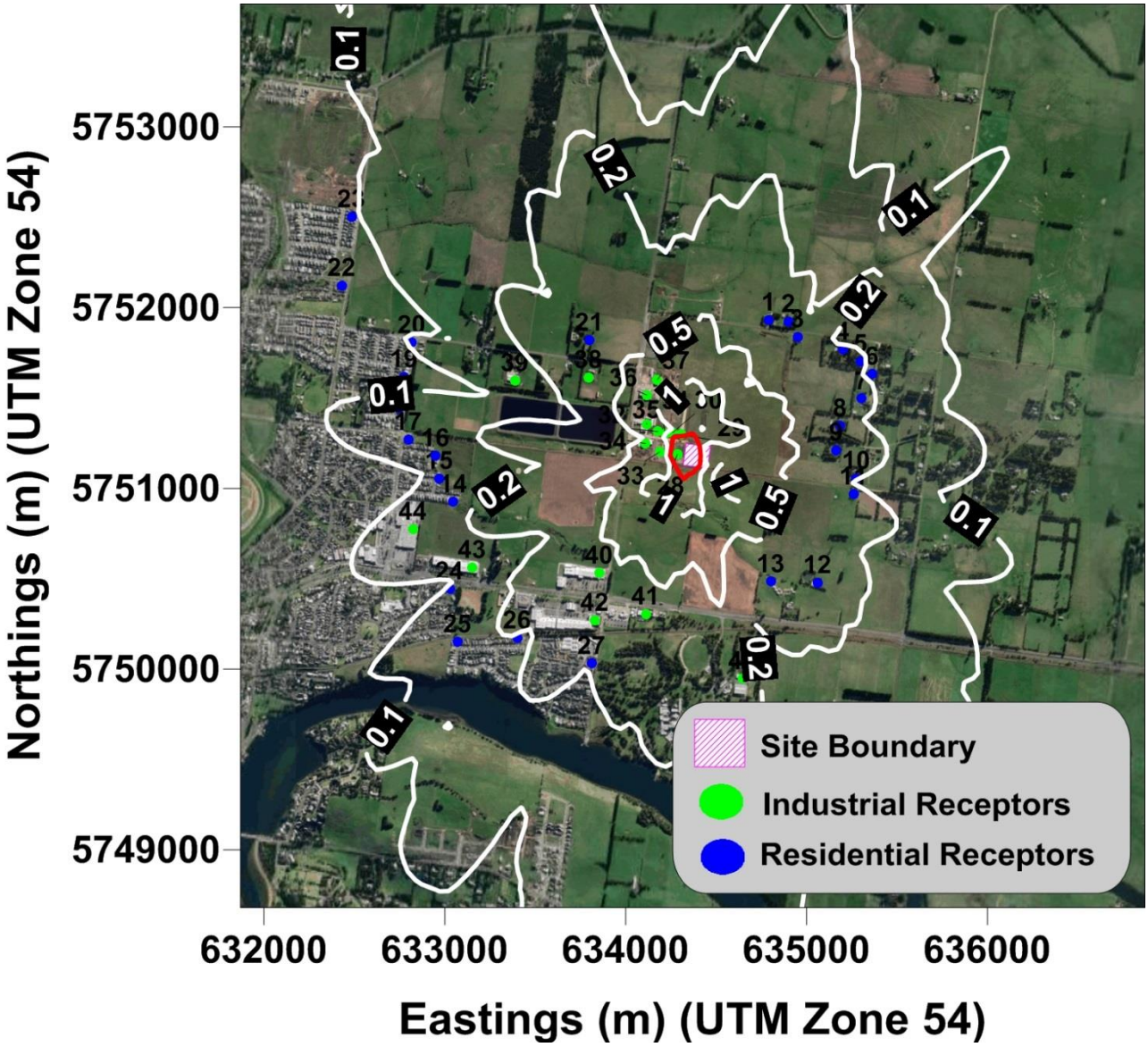


Figure A.1: Predicted Incremental (Proposed Facility only) 24-hour Average PM_{10} Concentrations ($\mu g/m^3$). The red line represents concentrations of 1 $\mu g/m^3$, 5% of the 20 $\mu g/m^3$ assessment criterion.

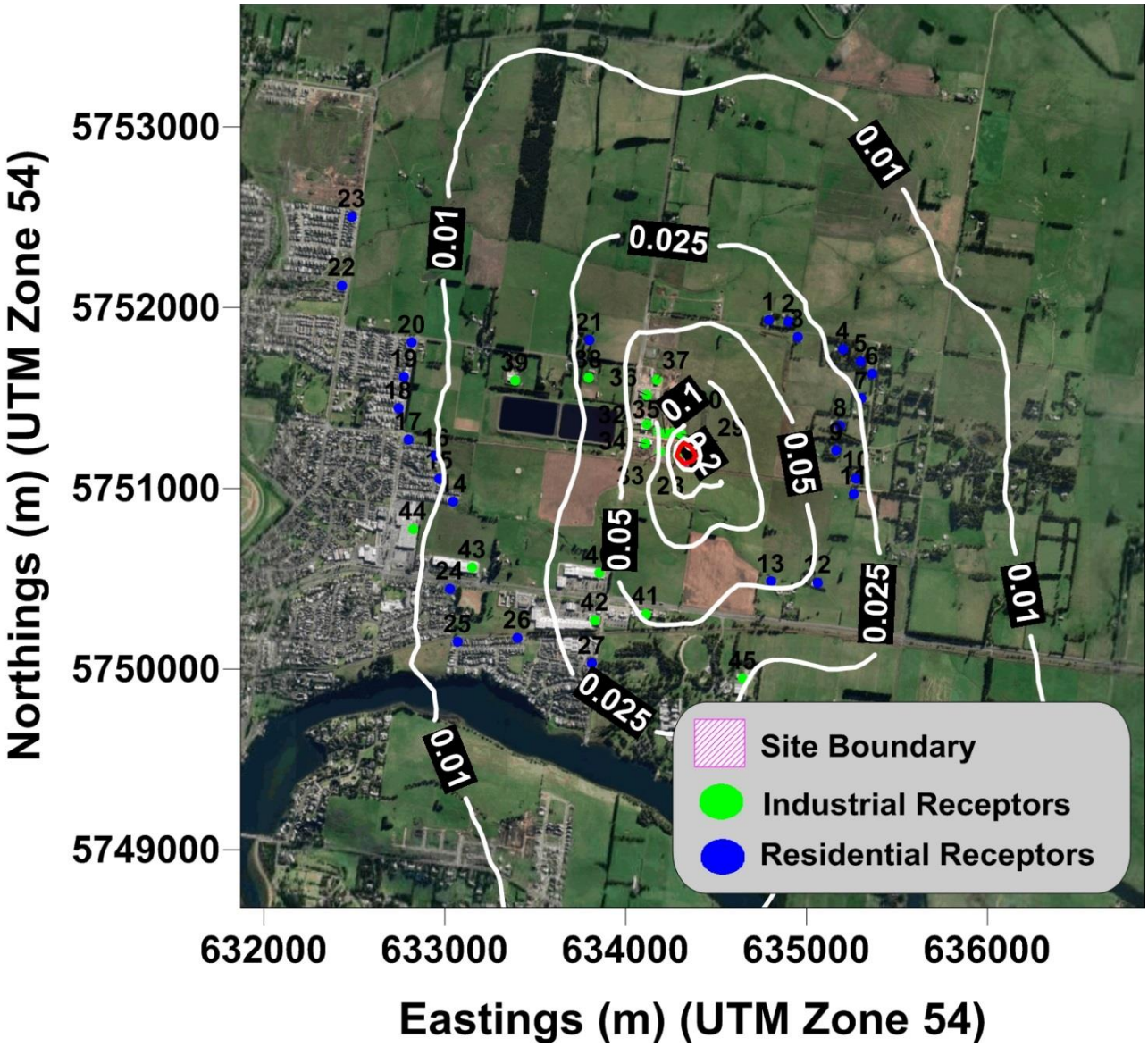


Figure A.2: Predicted Incremental (Proposed Facility only) Annual Average PM_{10} Concentrations ($\mu g/m^3$). The red line represents concentrations of 1.5 $\mu g/m^3$, 3% of the 50 $\mu g/m^3$ assessment criterion.

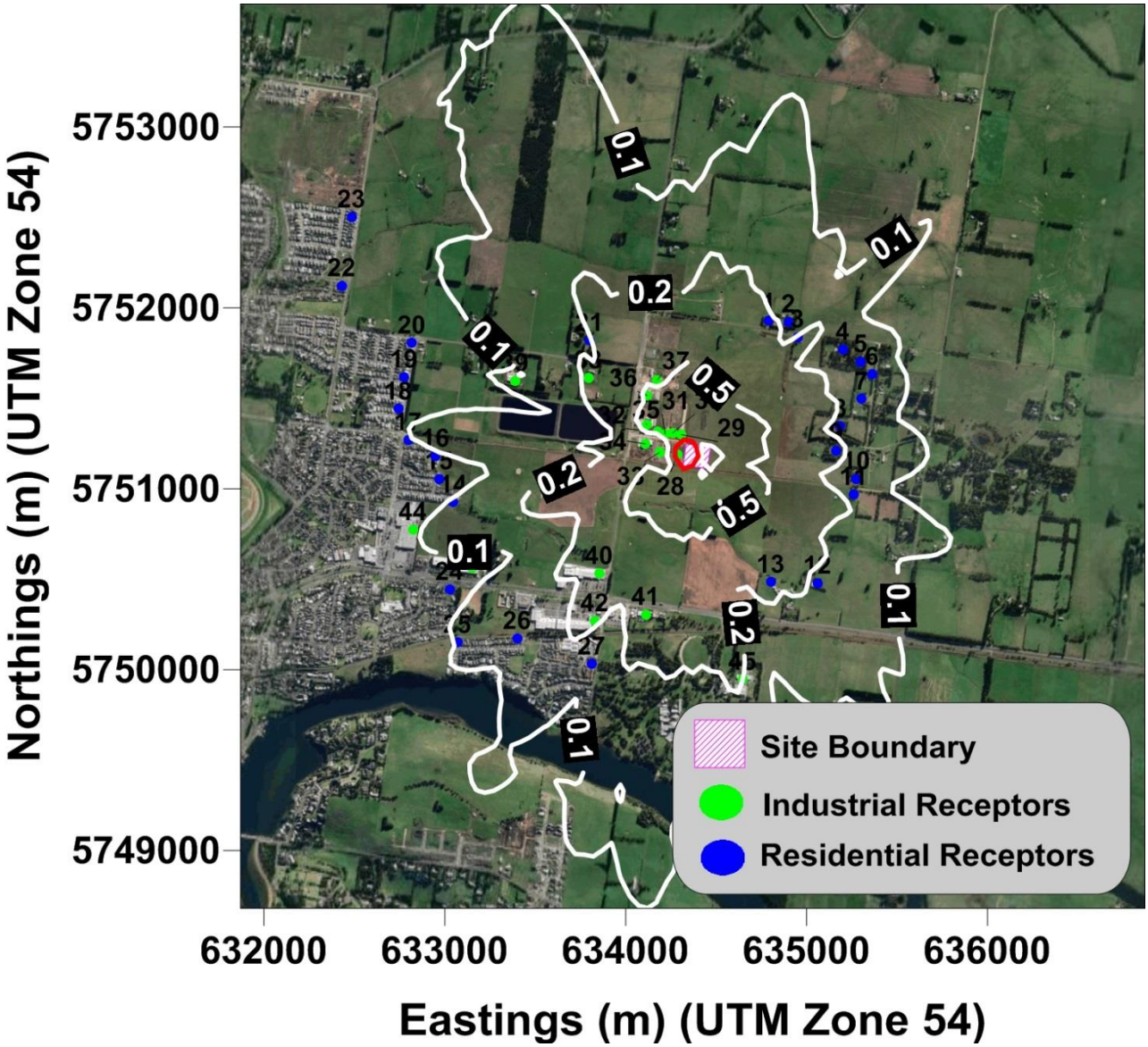


Figure A.3: Predicted Incremental (Proposed Facility only) 24-hour Average $PM_{2.5}$ Concentrations ($\mu g/m^3$). The red line represents concentrations of 1 $\mu g/m^3$, 4% of the 25 $\mu g/m^3$ assessment criterion.

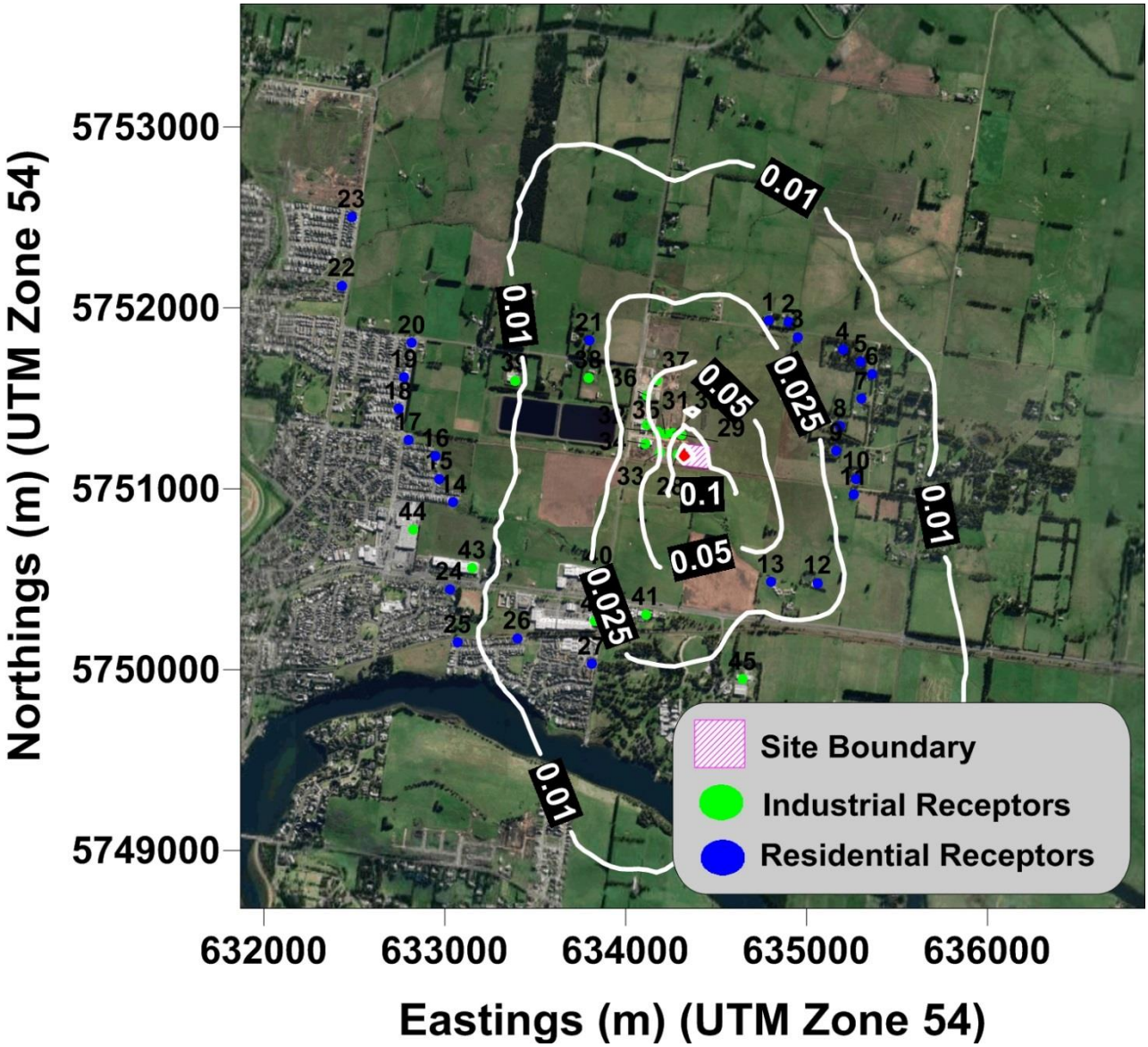


Figure A.4: Predicted Incremental (Proposed Facility only) Annual Average $PM_{2.5}$ Concentrations ($\mu g/m^3$). The red line represents concentrations of 1 $\mu g/m^3$, 4% of the 25 $\mu g/m^3$ assessment criterion.

APPENDIX B – METEOROLOGICAL INPUT FILES

Summary report for the synthesis of the meteorological data

AERMOD Ready Meteorological data files for

Warrnambool- VIC

This file was exclusively compiled for **Airlabs** By pDs Consultancy.

pDs Consultancy
@1999-2021

INTRODUCTION

New generation regulatory model AERMOD requires hourly averaged meteorological data from a single site that is preferably within the model domain ('on-site' or site-specific data). However, data from the nearest 'off-site' meteorological station can be used when on-site data are not available, and the off-site data are representative of the area of concern (i.e. the meteorological parameters as well as surface characteristics characterise the transport and dispersion conditions of the location in question).

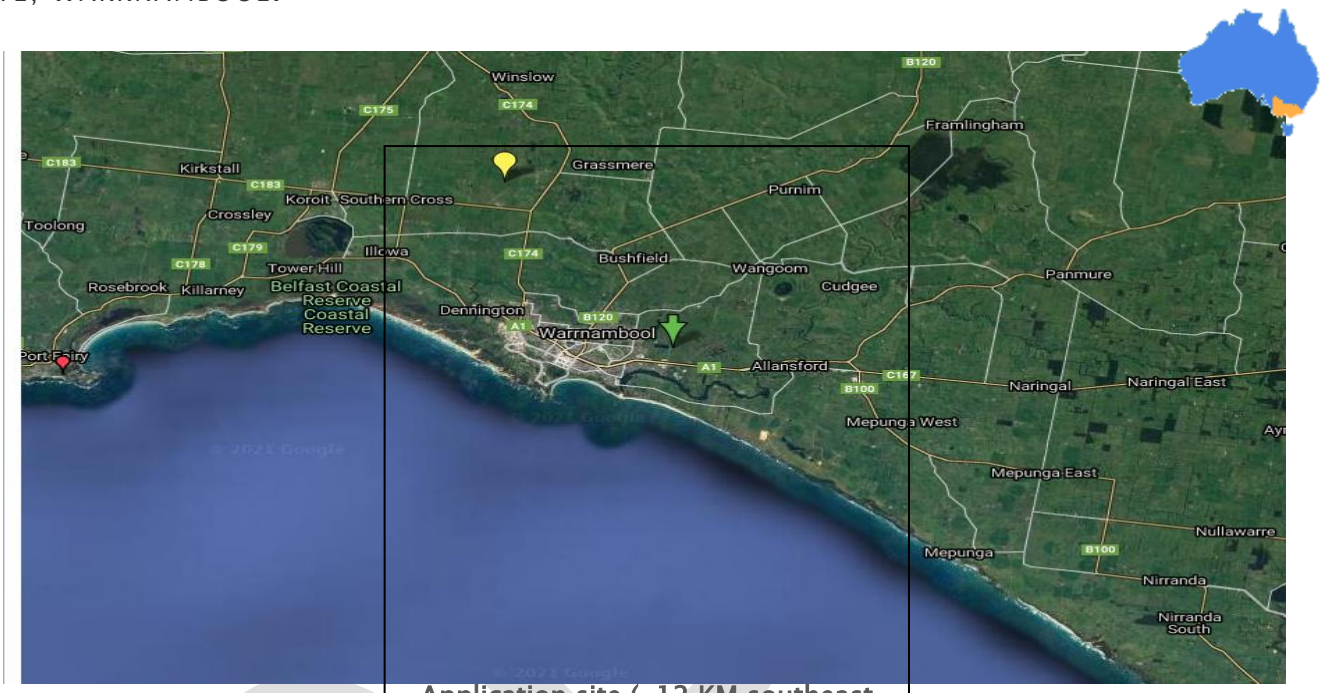
It is also preferable that:

- The compilation of the input meteorological data file is done in accordance with 'best practice', with procedures and algorithms recommended or set by environment regulators/US & VIC EPA.

pDs Consultancy has been engaged by **AIRLABS** to compile an 'AERMOD-ready' meteorological file for an application site which is about 12 KM Northwest of **Warrnambool** weather station which is maintained by Australian Bureau of Meteorology.

These AERMOD ready meteorological data files have been compiled basically following the EPA, Victoria's draft guidelines: "Construction of input meteorological data files for EPA Victoria's regulatory air pollution model (AERMOD) (Publication No.1550)" and incorporating latest development added by the US EPA.

LOCATION OF THE APPLICATION SITE & MET DATA SOURCE:
YELLOW PLACE MARK SHOWING THE MET SITE, GREEN PEG SHOWING THE APPLICATION SITE; WARRNAMBOOL.



Data Processing

Input Information

Data Used for the compilation

Meteorological Data

1. Mandatory Data (Warrnambool)
    i. 10m Wind Direction and Speed
    ii. Ambient Temperature (Screen Level)

2. Supplementary data (Warrnambool)

I. Surface Pressure
II. 3 Hourly Cloud observations
III. Relative Humidity
IV. Rainfall Rate

3. Upper air Data (Mt Gambier Airport)

I. Pressure Levels
II. Geopotential Heights
III. Temperature
IV. Dew Point

DATA SOURCE

- National Climate Centre, Bureau of Meteorology, Melbourne
- Period :1 Jan 2016 to 31 Dec 2020

QA/QC ON RAW DATA

I. Hourly averaged winds both direction and speed and temperature examined for gaps and wind stalls
   - Suspected wind stalls (both wind direction and speed) removed and filled appropriately preserving the temporal consistency.

II. Small gaps filled with pervious or following hour records

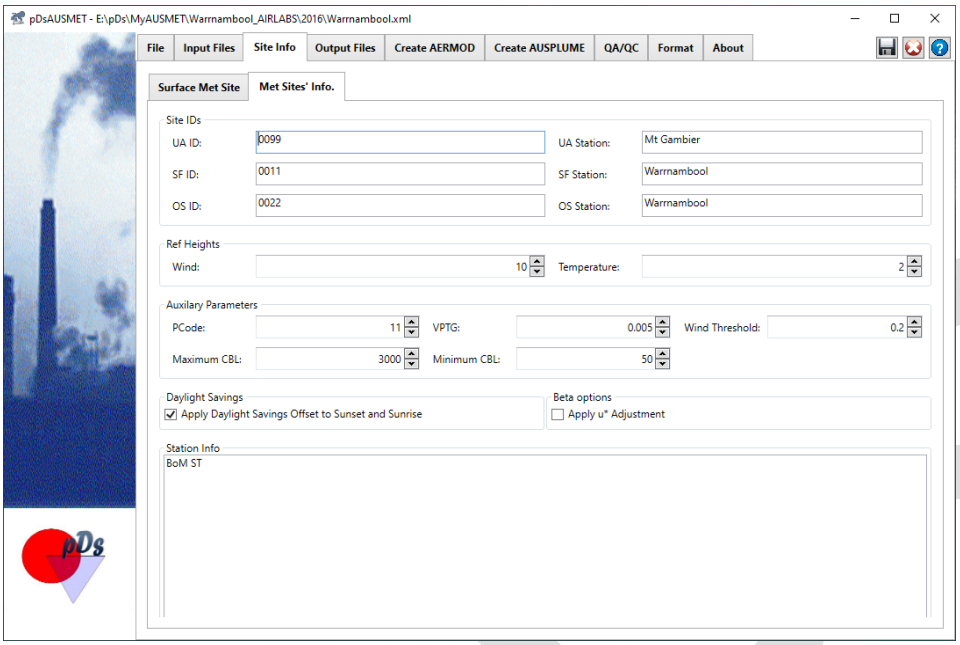
III. Days with big gaps removed maintaining 90% data recovery

IV. Parameters QA/QCed based on extreme values

V. Wind speed threshold was set to 0.6 m/s

VI. Gaps in vertical temperature profiles were filled with previous or following day data for the completeness.
   - It was found poor representativeness (less vertical resolution) of upper air data for 2018 at Mt. Gambier. Melbourne airport's upper air data were used to address this problem only for the year 2018.

METSITE INFORMATION



DATA COVERAGE:

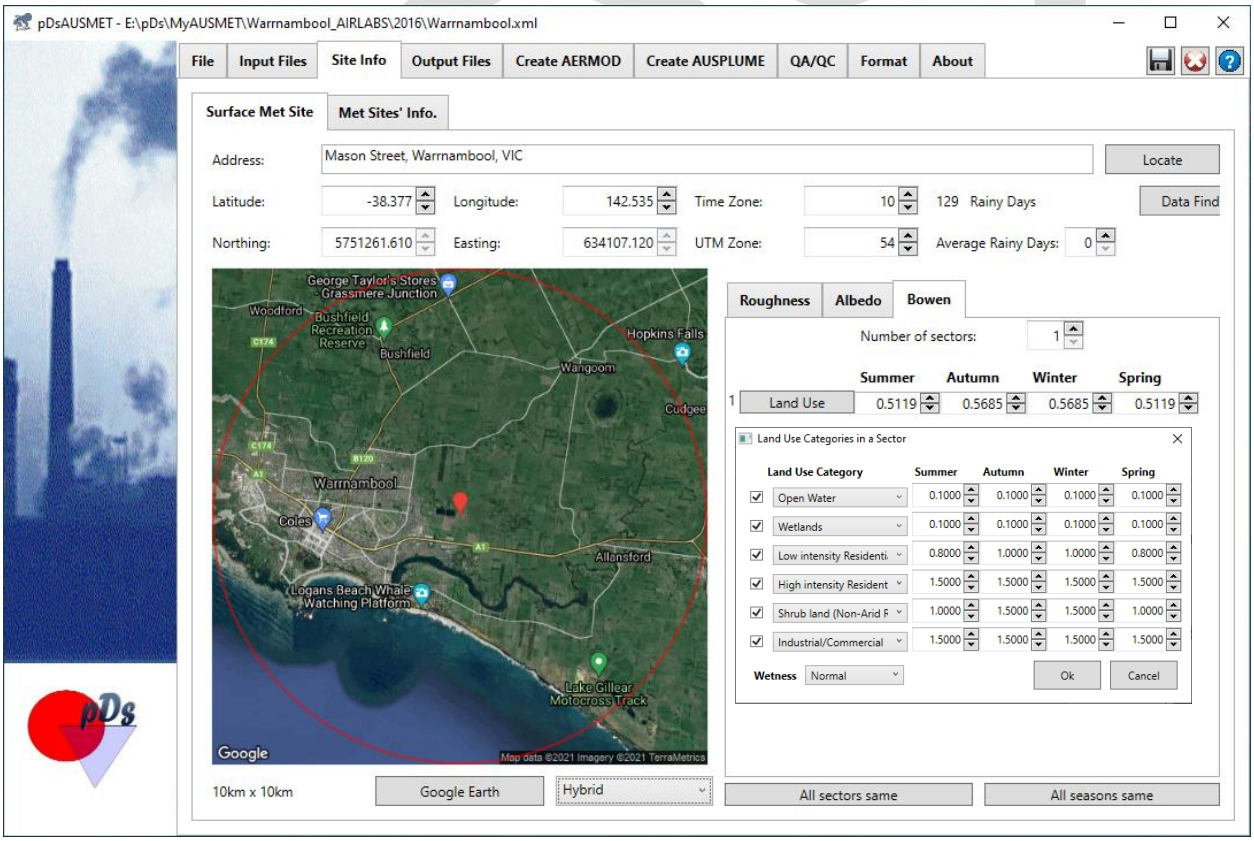
Season	Data Coverage %				
Year	2016	2017	2018	2019	2020
Summer	98	100	98	100	100
Autumn	98	100	100	100	100
Winter	100	98	100	100	100
Spring	100	100	100	100	100
Annual	99.7	99.7	99.7	100	100

Annual and Seasonal data coverage are meeting regulatory requirement (90% or better).

DETERMINATION OF SURFACE CHARACTERISTICS

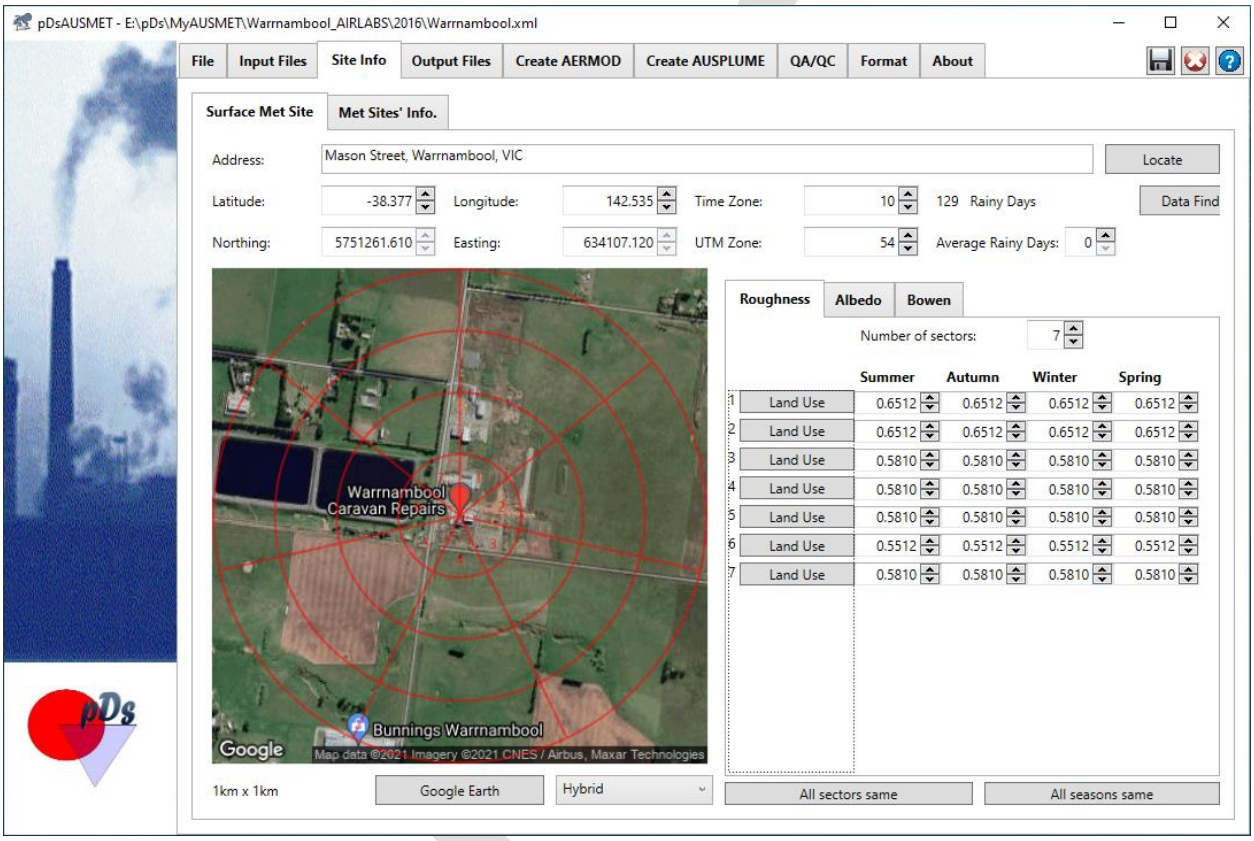
All available surface maps including google maps examined to determine correct land use categories within 10 Km by 10 KM area centring the application site.

Albedo and **Bowen ratio** were determined using land use categories shown below.



SURFACE ROUGHNESS

Sector dependent surface roughness was determined considering 07 sectors. Roughness of each sector with 4 segments (250m) was assigned carefully examining land use distribution.



The following parameters were determined/computed following EPA, VIC and US EPA guidelines.

Sensible Heat flux –Calculated based on cloud observations

I. Friction Velocity (U*)
II. Monin-Obukhov Length (L)
III. Height of the Stable Boundary Layer (SBL)
IV. Vertical Velocity Scale (W*)
V. Height of the Convective Boundary Layer (CBL)

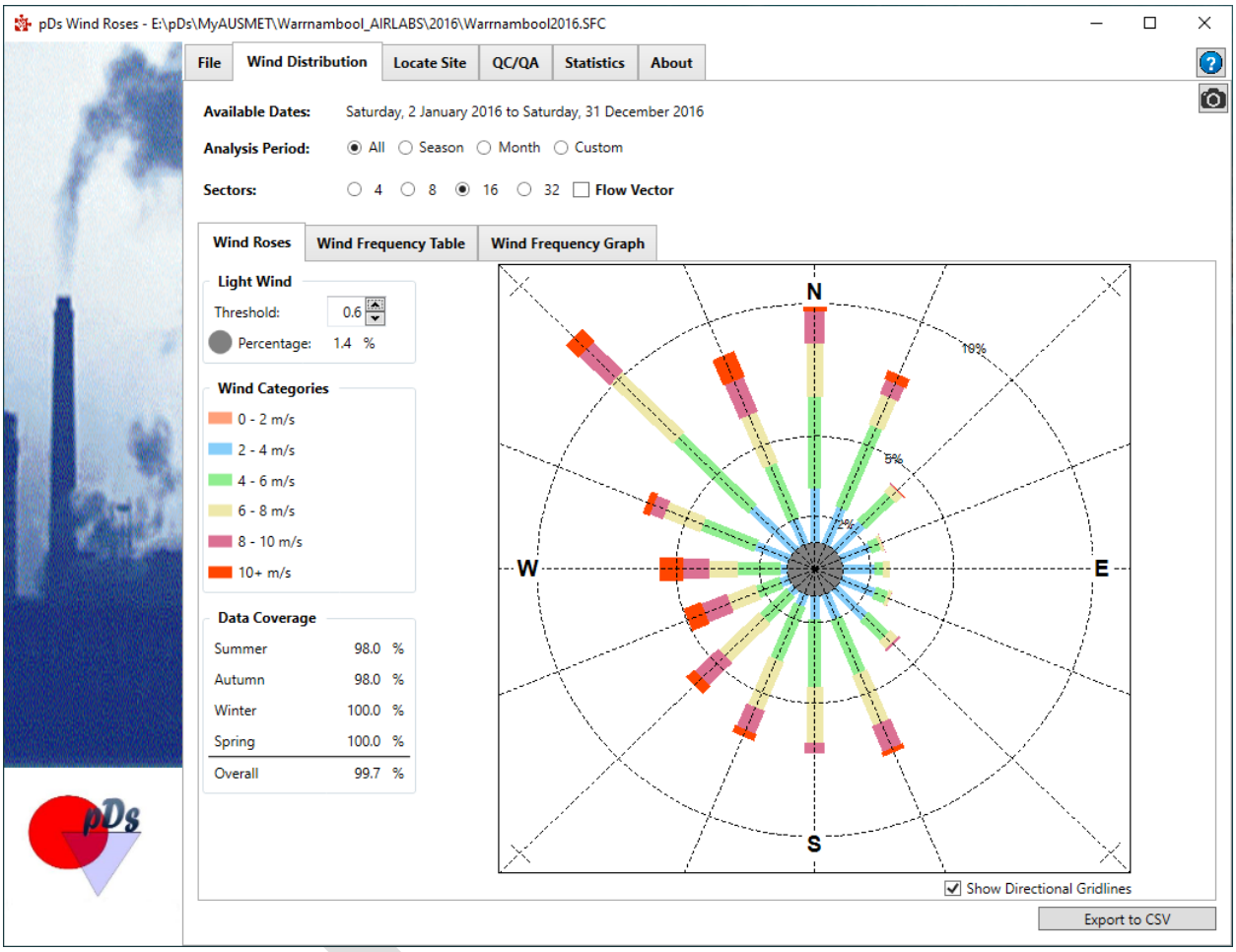
Mixing height (Convective)-CBL

DEFINITION:

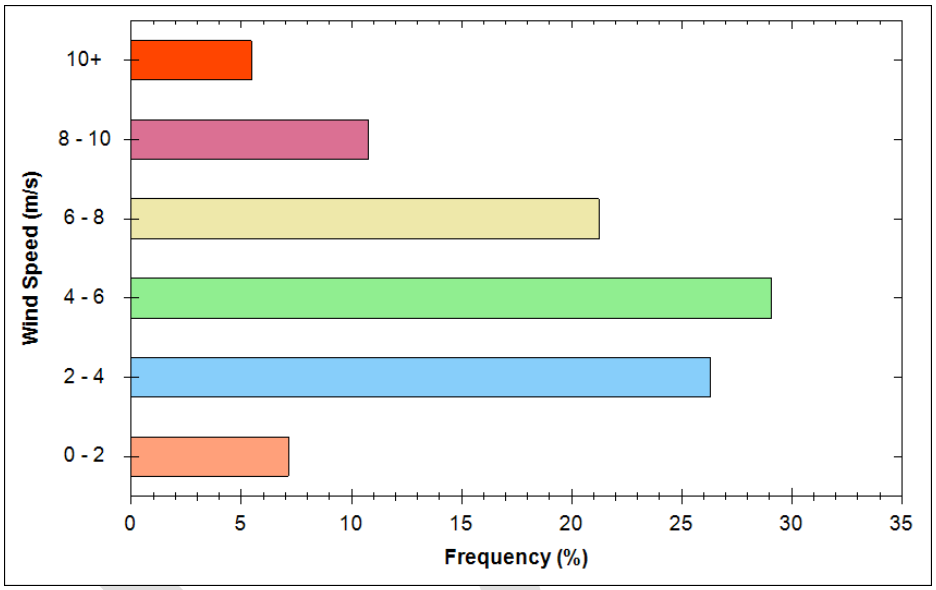
The convective mixing height, the depth of the surface mixed layer is the height of the atmosphere above the ground, which is well mixed due either to mechanical turbulence or convective turbulence. This height was determined by using the methodology of Benkley and Schulman (Journal of Applied Meteorology, Volume 18, 1979,pp 772-780). **Mt Gambier Airport** upper air observation containing temperature and moisture profiles and surface temperature, pressure and relative humidity at **Warrnambool** were used to determine daytime mixing height.

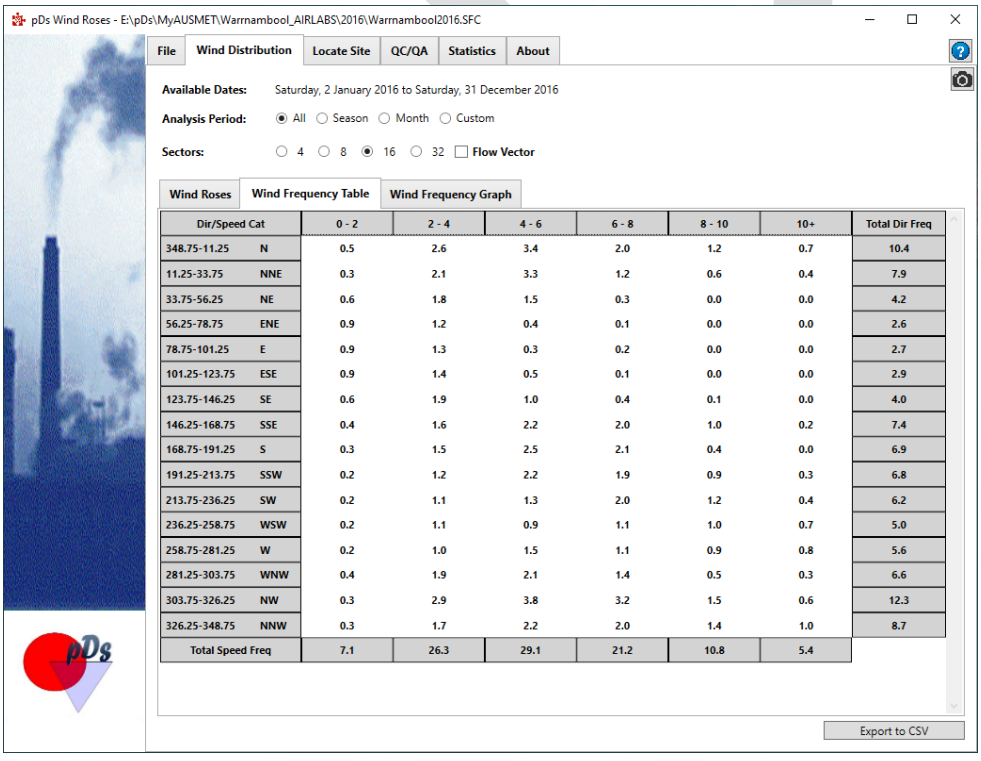
DATA ANALYSIS

ANNUAL WINDROSES FOR WARRNAMBOOL-2016



FREQUENCY OF WIND SPEED

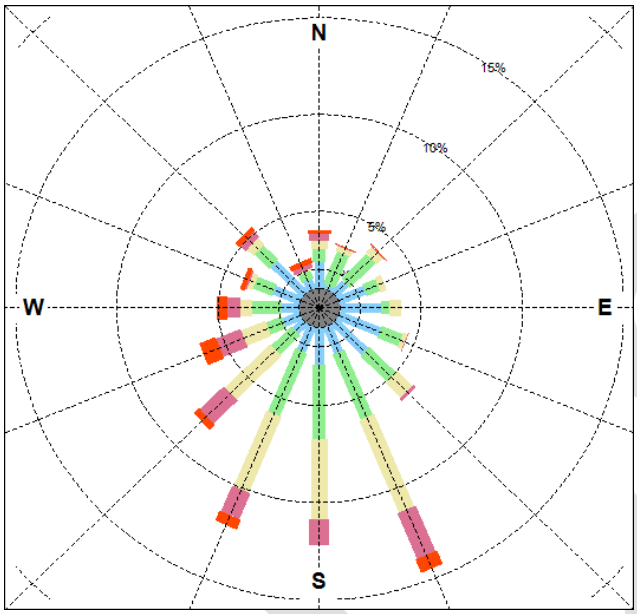


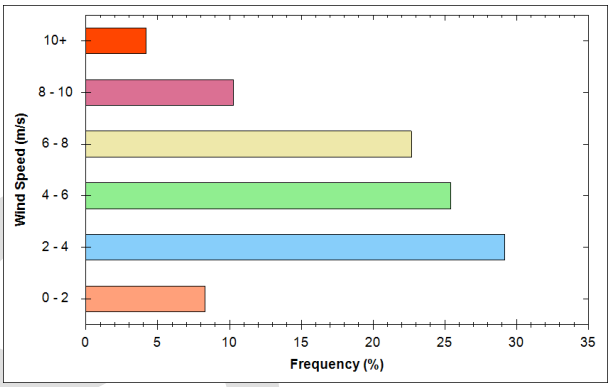


Dir/Speed Cat		0 - 2	2 - 4	4 - 6	6 - 8	8 - 10	10+	Total Dir Freq
348.75-11.25	N	0.5	2.6	3.4	2.0	1.2	0.7	10.4
11.25-33.75	NNE	0.3	2.1	3.3	1.2	0.6	0.4	7.9
33.75-56.25	NE	0.6	1.8	1.5	0.3	0.0	0.0	4.2
56.25-78.75	ENE	0.9	1.2	0.4	0.1	0.0	0.0	2.6
78.75-101.25	E	0.9	1.3	0.3	0.2	0.0	0.0	2.7
101.25-123.75	ESE	0.9	1.4	0.5	0.1	0.0	0.0	2.9
123.75-146.25	SE	0.6	1.9	1.0	0.4	0.1	0.0	4.0
146.25-168.75	SSE	0.4	1.6	2.2	2.0	1.0	0.2	7.4
168.75-191.25	S	0.3	1.5	2.5	2.1	0.4	0.0	6.9
191.25-213.75	SSW	0.2	1.2	2.2	1.9	0.9	0.3	6.8
213.75-236.25	SW	0.2	1.1	1.3	2.0	1.2	0.4	6.2
236.25-258.75	WSW	0.2	1.1	0.9	1.1	1.0	0.7	5.0
258.75-281.25	W	0.2	1.0	1.5	1.1	0.9	0.8	5.6
281.25-303.75	WNW	0.4	1.9	2.1	1.4	0.5	0.3	6.6
303.75-326.25	NW	0.3	2.9	3.8	3.2	1.5	0.6	12.3
326.25-348.75	NNW	0.3	1.7	2.2	2.0	1.4	1.0	8.7
Total Speed Freq		7.1	26.3	29.1	21.2	10.8	5.4	

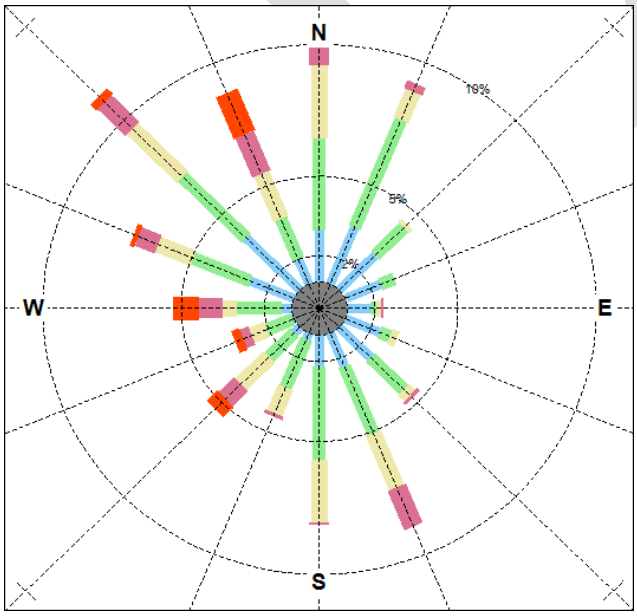
SEASONAL WINDROSES

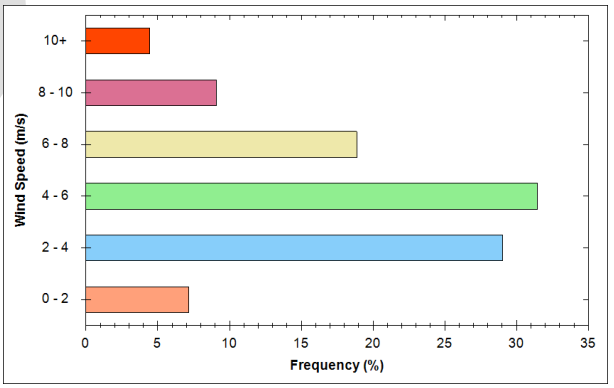
Summer



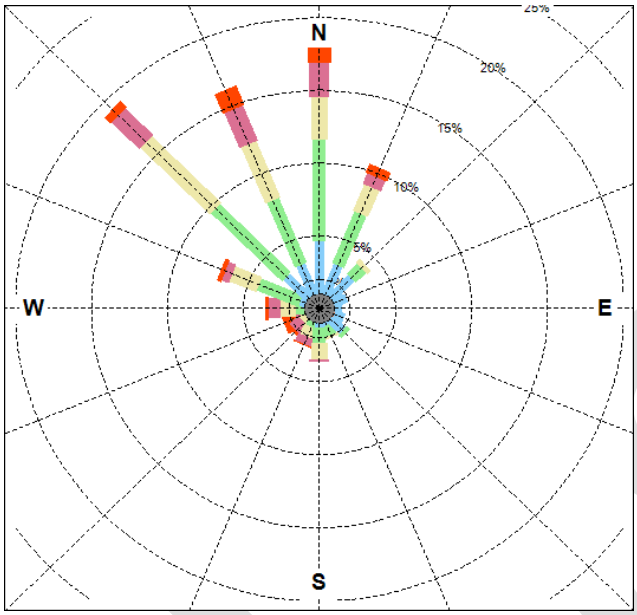


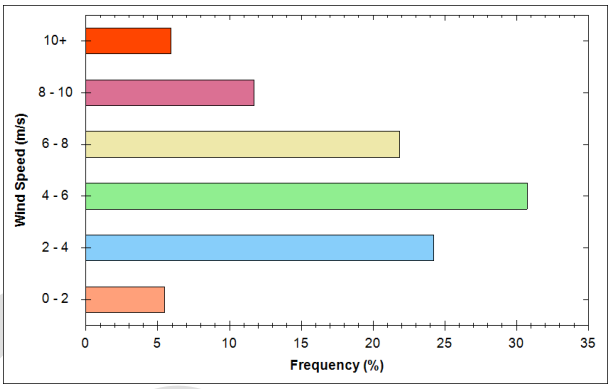
Autumn



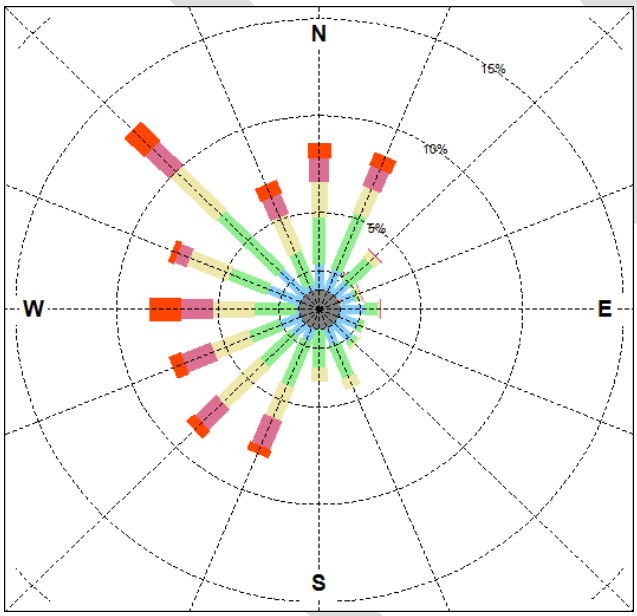


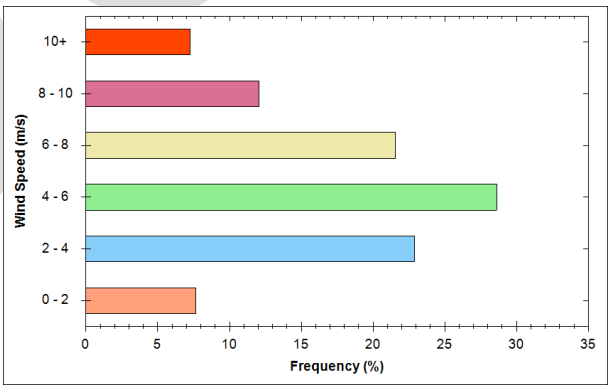
Winter





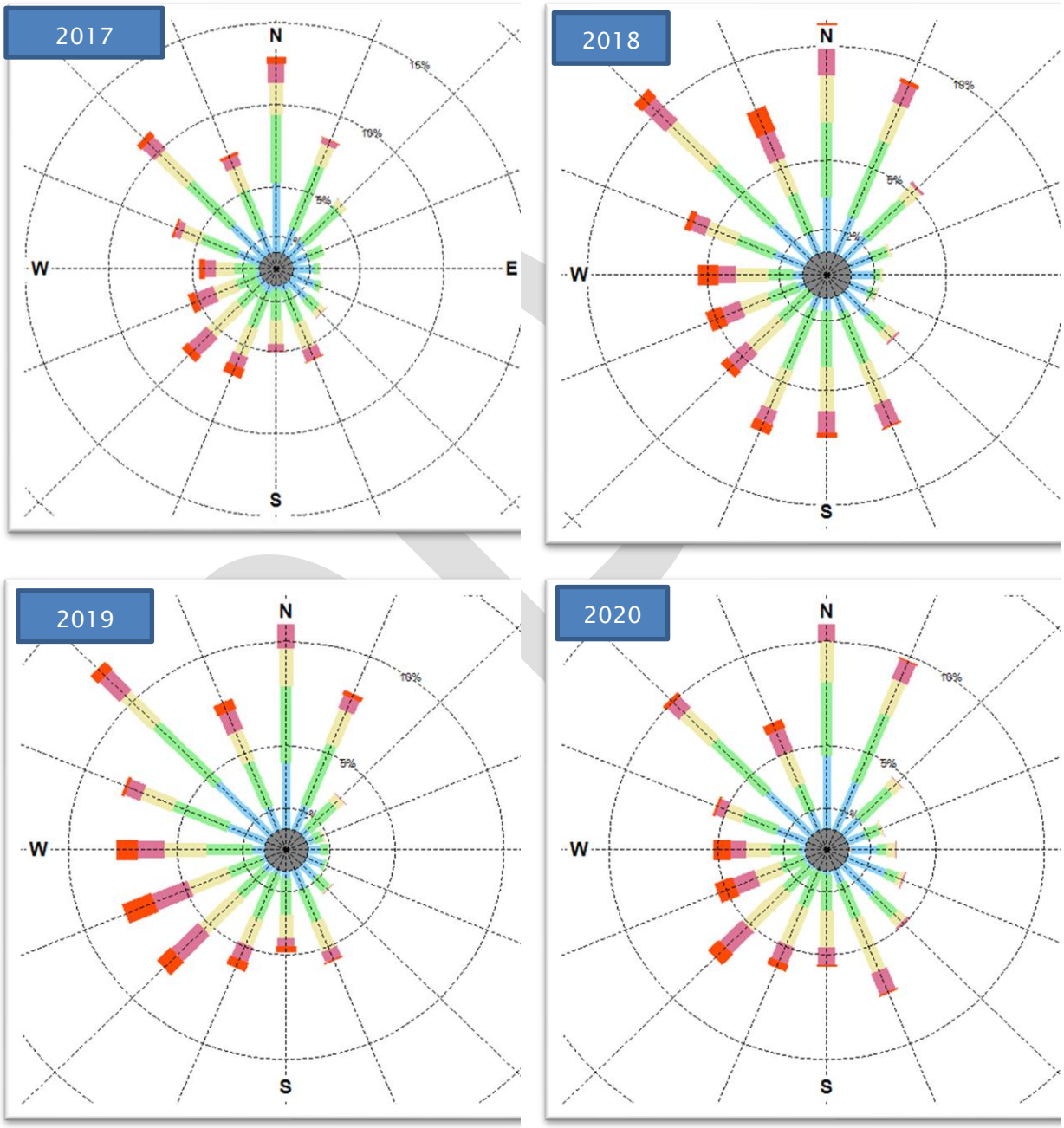
Spring





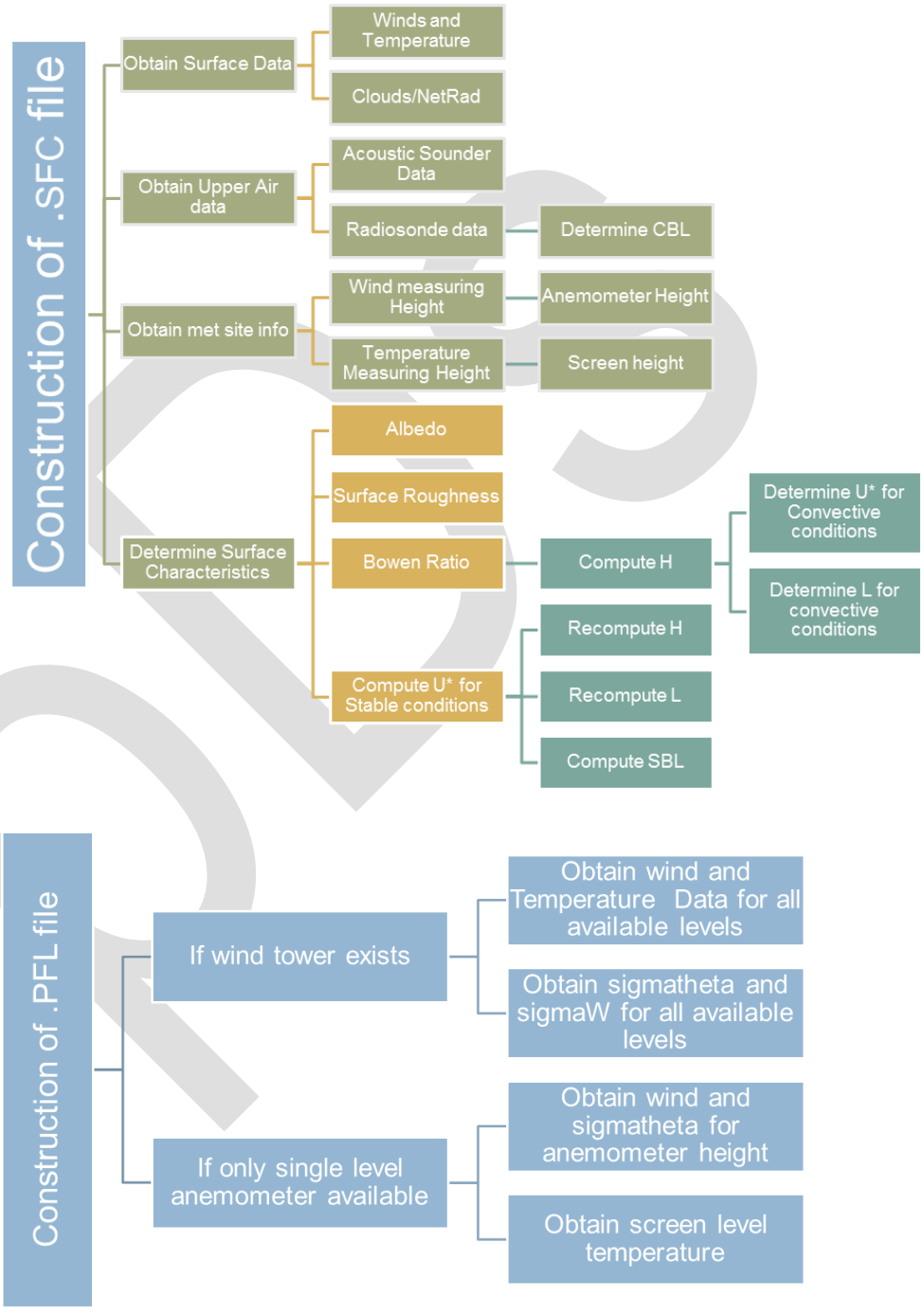
Seasonal variations are clearly depicted.

ANNUAL WINDROSES FOR WARRNAMBOOL FOR THE REST OF THE YEARS



Appendix A

FLOW CHARTS - CONSTRUCTION PROCEDURE



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DISCLAIMER

Compilation of input meteorological data files for AERMOD was done under the supervision of qualified and experienced meteorologists. Although all due care has been taken, we cannot give any warranty, nor accept any liability (except that required by law) in relation to the information given, its completeness or its applicability to a particular problem. These data and other material are supplied on the condition that you agree to indemnify us and hold us harmless from and against all liability, losses, claims, proceedings, damages, costs, and expenses, directly or indirectly relating to, or arising from the use of or reliance on the data and material which we have supplied.

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APPENDIX C – ASPHALT BATCH EMISSIONS

Emissions testing data (FH Warrnambool – Batch Facility Emissions (CSCS 27Jul2021).xlsx)

Facility Name	**Fulton Hogan**
Facility Location	**Warrnambool, Victoria, AUS**

Dryer	Stationary 6.56' x 27.89' [2 m x 8.5 m] Double RAP Dryer
Drum Burner	**WJ-35U-GOH** 35MMBTU [xx MW]Whisper Jet Gas/Oil Burner
Asphalt Mixer	**BG 1800** 1800kg twin shaft pugmill mixer
PM Control	Stationary 95,832 ACFM [46 000 m^3/hr] Reverse Air Baghouse
Fiberbed	**BSC-18-FBF** 18,000 ACFM [xx CMM] Fiberbed Mist Collector

NOTES	Baghouse Specifications
Plant's rated capacity is based on the production of 300F (149C) conventional-type virgin surface mix, having 5% composite aggregate moisture removal, at 68 F (20C) and sealevel.	* BCS490 exhaust fan with VF 300hp direct drive
	* Variable frequency Pulse Jet cleaning with self-adjusting cycle to maintain 2 - 6 inWC [6 - 15 mbar] ΔP across filter media
	* Inertial separator inlet section for coarse particle collection
DSCFM = dry std ft^3/min @ 68F & 1 atm; Sm^3/min = dry std m^3/min @ 20C & 101.3kPa Nm3/min = dry std m^3/min @ 0C & 101.3kPa	* Vertical exhuast stack with unobstructed discharge opening
	* (1024) 4-5/8" dia X 10' [3 m] long 14 oz/yd^2 [475 g/m^2] aramid felt bags contained in one compartment
Heat input based on firing rate required for given production rate @ design conditions	* 12,390 sq.ft. of cloth @ 5.5 fpm [1.68 m/min] filtering velocity (air/cloth ratio)

OPERATIONS

Batch Size	3968	**lb**	1800	**kg**		
Max RAP per mix	45	**sec**				
Production Capacity	159	**ton/hr**	120	**tonne/hr**		
	317466	**lb/hr**	120000	**kg/hr**		
Annual Production	165344	**ton/yr**	150000	**tonne/yr**		
Max RAP per mix	30	**%**				
RAP Usage per yr	50	**%**				
Avg AC per mix	5	**%**				
Exhaust Flow Rate	27091	**ACFM**	767	**m^3/min**		
Standard Flow Rate	13793	**DSCFM**	390	**Sm^3/min**	364	**Nm^3/min**
Maximum Heat Input	75	**MMBTU/hr**	79.1	**GJ/hr**	22.0	**MW**
Exhaust Temperature[1]	240	**F**	115.6	**C**		
Exhaust Moisture[2]	32.5	**%**				
Stack Discharge Height	70.5	**ft**	21.50	**m**		
Stack Diameter (ID)	35.4	**in**	0.90	**m**		
Stack Area	6.85	**ft^2**	0.64	**m^2**		
Stack Velocity	65.9	**ft/sec**	20.1	**m/sec**		
	3956.2	**ft/min**	1205.8	**m/min**		

[1] Exhaust temperature may range from 200 F [93.3 C] to 375 F [191 C] during normal operation depending on mix type.

[2] Average stack moisture content at design conds - varies with EMISSION RATES material moistures

Raw Material Usage Rates

	lb/hr	ton/hr	ton/yr	kg/hr	tonne/hr	tonne/yr	
Virgin Aggregate	301592	151	157077	136800	137	142500	
Liquid AC	15873	8	8267	7200	7	7500	(NO RAP)
(8.5 lb/gal)	1867		1.9E+6	7069		7.4E+6	
	gal/hr		**gal/yr**	**liter/hr**		**liter/yr**	
	lb/hr	**ton/hr**	**ton/yr**	**kg/hr**	**tonne/hr**	**tonne/yr**	
Recycled material	95240	48	24802	43200	43	22500	
Virgin aggregate	211115	106	133515	95760	96	121125	(WITH
Liquid AC	11111	6	7027	5040	5	6375	RAP)
(8.5 lb/gal)	1307		1.7E+6	4948		6.3E+6	
	gal/hr		**gal/yr**	**liter/hr**		**liter/yr**	

Filterable Particulate Emissions *(AP-42 Table 11.1-3)*

	gr/dscf	lb/hr	ton/yr	kg/hr	mg/Sm^3	mg/Nm^3	tonne/yr
Uncontrolled PM [1]	43.0	5079	2646	2304	98.4E+3	105.6E+3	2400
Controlled PM	0.01	0.96	2.1	0.44	18.6	20.0	1.9
Control Efficiency	99.98	**%**	** Filterable PM inlet loading based on Manufacturer Data*				
Uncontrolled PM-10	6.0	714	529	324	13.8E+3	14.8E+3	480
Controlled PM-10	0.013	1.56	0.32	0.71	30.1	32.3	0
Control Efficiency	99.78	**%**					
Uncontrolled PM-2.5	0.4	43	529	19	830.0E+0	890.8E+0	480
Controlled PM-2.5	0.011	1.32	0.32	0.60	25.5	27.4	0
Control Efficiency	96.93	**%**					

[1] *Filterable PM inlet loading based on Manufacturer Data*

Condensable Particulate Emissions *(AP-42 Table 11.1-3)*

	gr/dscf	lb/hr	ton/yr	kg/hr	mg/Sm^3	mg/Nm^3	tonne/yr
Inorganic PM	0.010	1.17	0.6	0.53	22.7	24.4	1
Unctrl'd Organic PM	0.078	9	4.8	4.18	178.3	191.4	4
Ctrl'd Organic PM	0.016	1.90	1.0	0.86	36.9	39.6	1
Control Efficiency	79.31	**%**					

Facility Name Fulton Hogan
Facility Location Warrnambool, Victoria, AUS

Burner Fuels - Net Heating Values & Usage Rates

	BTU/scf	kJ/m^3	Sulfur	ft^3/hr	m^3/hr	ft^3/yr	m^3/yr
Natural Gas	1037	38680.1	negligible	72.3E+3	2047	75.3E+6	2.13E+6

Facility Name Fulton Hogan
Facility Location Warrnambool, Victoria, AUS

Criteria Pollutants AP-42 Tables 11.1-7 & 11.1-8

POLLUTANT	CASRN	MW	FACTOR	ACTUAL			
			lb/ton	lb/hr	ton/yr	kg/hr	tonne/yr
Sulfur Dioxide	7446-09-5	64.06	0.0046	0.73	0.38	0.33	0.3
Carbon Monoxide	630-08-0	28.01	0.13	20.6	10.75	9.36	9.8
Oxides of Nitrogen	10102-44-0	46.0	0.026	4.1	2.15	1.87	2.0
Volatile Organics	74-98-6	44.1	0.0082	1.3	0.68	0.59	0.6

NON-PAH HAPS AP-42 Table 11.1-10

POLLUTANT	CASRN	MW	FACTOR	ACTUAL			
			lb/ton	lb/hr	ton/yr	kg/hr	tonne/yr
Acetaldehyde	75-07-0	44.05	0.00032	0.051	0.026	0.023	0.024
Benzene	71-43-2	78.11	0.00028	0.044	0.023	0.020	0.021
Ethylbenzene	100-41-4	106.17	0.0022	0.35	0.182	0.158	0.165
Formaldehyde	50-00-0	30.03	0.00074	0.117	0.061	0.053	0.056
Quinone	106-51-4	108.1	2.70E-03	0.429	0.223	0.194	0.203
Toluene	108-88-3	92.14	0.001	0.159	0.083	0.072	0.075
Xylene	1330-20-7	106.17	2.70E-03	0.429	0.223	0.194	0.203
TOTAL NON-PAH HAPS			0.0051	**0.81**	**0.42**	**0.37**	**0.38**

PAH HAPS AP-42 Table 11.1-10

POLLUTANT	CASRN	MW	FACTOR	ACTUAL			
			lb/ton	lb/hr	ton/yr	kg/hr	tonne/yr
2-Methylnaphthalene	91-57-6	142.2	7.1E-05	1.13E-02	5.87E-03	5.1E-03	5.3E-03
Acenaphthene	83-32-9	154.21	9.0E-07	1.43E-04	7.44E-05	6.5E-05	6.8E-05
Acenaphthylene	208-96-8	152.2	5.8E-07	9.21E-05	4.79E-05	4.2E-05	4.4E-05
Anthracene	120-12-7	178.23	2.1E-07	3.33E-05	1.74E-05	1.5E-05	1.6E-05
Benzo(a)anthracene	56-55-3	228.3	4.6E-09	7.30E-07	3.80E-07	3.3E-07	3.5E-07
Benzo(a)pyrene	50-32-8	176.5	3.1E-10	4.92E-08	2.56E-08	2.2E-08	2.3E-08
Benzo(b)fluoranthene	205-99-2	252.3	9.4E-09	1.49E-06	7.77E-07	6.8E-07	7.1E-07
Benzo(g,h,i)perylene	191-24-2	276.3	5.0E-10	7.94E-08	4.13E-08	3.6E-08	3.8E-08
Benzo(k)fluoranthene	207-08-9	252.3	1.3E-08	2.06E-06	1.07E-06	9.4E-07	9.8E-07
Chrysene	218-01-9	228.3	3.8E-09	6.03E-07	3.14E-07	2.7E-07	2.9E-07
Dibenz(a,h)anthracene	53-70-3	278.3	9.5E-11	1.51E-08	7.85E-09	6.8E-09	7.1E-09
Fluoranthene	206-44-0	202.3	1.6E-07	2.54E-05	1.32E-05	1.2E-05	1.2E-05
Fluorene	86-73-7	166.2	1.6E-06	2.54E-04	1.32E-04	1.2E-04	1.2E-04
Indeno(1,2,3-cd)pyrene	193-39-5	276.3	3.0E-10	4.76E-08	2.48E-08	2.2E-08	2.3E-08
Naphthalene	91-20-3	127.17	3.6E-05	5.71E-03	2.98E-03	2.6E-03	2.7E-03
Phenanthrene	85-01-8	178.2	2.6E-06	4.13E-04	2.15E-04	1.9E-04	2.0E-04
Pyrene	129-00-0	202.3	6.2E-08	9.84E-06	5.13E-06	4.5E-06	4.7E-06
TOTAL PAH HAPS			**0.00011**	**1.75E-02**	**9.1E-03**	**7.9E-03**	**8.3E-03**
TOTAL HAPS			**0.0076**	**1.21**	**0.63**	**0.55**	**0.57**

Facility Name Fulton Hogan
Facility Location Warrnambool, Victoria, AUS

NON-HAP Organics AP-42 Table 11.1-10

POLLUTANT	CASRN	MW	FACTOR	ACTUAL			
			lb/ton	lb/hr	ton/yr	kg/hr	tonne/yr
Benzaldehyde	100-52-7	106.1	0.00067	0.106351	0.055	0.048	0.050
Butyraldehyde	78-84-2	72.1	0.007	1.11	0.58	0.50	0.53
Crotonaldehyde	4170-30-3	70.1	0.0094	1.49208859	0.78	0.68	0.71
Hexanal	66-25-1	100.2	0.004	0.63	0.331	0.288	0.300
TOTAL NON-HAP ORGANICS			**0.00019**	**0.03**	**0.02**	**0.01**	**0.01**

Trace Metals AP-42 Table 11.1-12

POLLUTANT	CASRN	MW	FACTOR	ACTUAL			
			lb/ton	lb/hr	ton/yr	kg/hr	tonne/yr
Arsenic	7440-38-2	74.9	4.6E-07	7.30E-05	3.80E-05	3.3E-05	3.5E-05
Barium	7440-39-3	137.3	1.5E-06	2.38E-04	1.24E-04	1.1E-04	1.1E-04
Beryllium	7440-41-7	9.0	1.5E-07	2.38E-05	1.24E-05	1.1E-05	1.1E-05
Cadmium	7440-43-9	112.4	6.1E-07	9.68E-05	5.04E-05	4.4E-05	4.6E-05
Chromium	7440-47-3	52.0	5.7E-07	9.05E-05	4.71E-05	4.1E-05	4.3E-05
Copper	7440-50-8	63.5	4.8E-08	7.62E-06	3.97E-06	3.5E-06	3.6E-06
Hexavalent Chromium	18540-29-9	52.0	2.8E-08	4.44E-06	2.31E-06	2.0E-06	2.1E-06
Lead	7439-92-1	207.2	8.9E-07	1.41E-04	7.36E-05	6.4E-05	6.7E-05
Manganese	7439-96-5	54.9	6.9E-06	1.10E-03	5.70E-04	5.0E-04	5.2E-04
Mercury	7439-97-6	200.6	4.1E-07	6.51E-05	3.39E-05	3.0E-05	3.1E-05
Nickel	7440-02-0	58.7	3.0E-06	4.76E-04	2.48E-04	2.2E-04	2.3E-04
Selenium	7782-49-2	79.0	4.9E-07	7.78E-05	4.05E-05	3.5E-05	3.7E-05
Zinc	7440-66-6	65.4	6.8E-06	1.08E-03	5.62E-04	4.9E-04	5.1E-04

Appendix G – Odour Assessment

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November 2021

Risk Assessment Audit

Odour assessment to determine the extent of the odour plume from Fulton Hogan Asphalt Plant, 10-30 Dana Ct, Dandenong VIC 3175

By: Jim Demetriou,
AOC Specialist

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1 Introduction

AOC Specialist was engaged to undertake odour surveys to determine the extent of the odour plume at a reference facility– Fulton Hogan Asphalt Plant, 10-30 Dana Ct, Dandenong VIC. The site has been operational at this location for over 20 years.
The odour assessments were undertaken to capture odorous operating activities and variations in meteorological conditions.

2 Executive summary

In-field odour plume assessments were undertaken on 6,11 and 28 October and 8 November 2021.

The key activities being undertaken while assessments were underway were, the production of both A10e polymer bitumen and 310 polymer bitumen. This included the loading and subsequent venting of the bitumen storage tanks, manufacturing of asphalt and loading asphalt trucks.

Assessments were undertaken to capture both north and south winds and light to medium wind strength.

The data obtained indicated that the obvious odour plume is restricted to 350m from the site. No odour was detected beyond this point up to 500m from the boundary of the premises. This is supported by the fact that there have been no odour reports from the residential zone (sensitive receptors) located approximately 370-400m from odorous activities undertaken on site.

The odorous activities included, the filling of the bitumen storage tanks, manufacturing the asphalt and the loading of the trucks. The distance at which the plume travels appear to be associated with meteorological conditions. The data indicates that moderate wind strength, gusting between 20-30 km/hr, appears to transport the plume at an obvious level the furthest from the site. Although there was no significant variation in ambient air temperature, the data does not indicate that air temperature is a significant influencing factor. The production of A10e bitumen formed the most intense odour observed offsite and was only in use for one of the assessments.

3 Plume Odour Assessments

3.1 Odour assessment 6th October 2021

- Arrived at 9:40 am, temperature 14^{0}C wind N/NE 14km/hr.
- No odour detected outside the premises.
- Table 1 presents results of the odour survey. Refer to Figure 1 for odour survey map; including points at which odour observations were made.
- Obvious odour with bitumen characteristics could be detected on site. No clear source.
- Observed tanker refilling storage tank with polymer bitumen A10e at 9:52 am
- Obvious odour was detected near the truck.
- Obvious odour was detected at points 1-3 along Dana Ct opposite the bitumen storage tanks.
- No odour detected at points 4-7.
- No odour detected between point 7 and 8.
- Continued along Stephens Rd where an obvious transient odour with bitumen characteristics was detected at point 8, 350m from storage tanks.
- Obvious odour detected at point 9 and 10 Stephens Rd, 200m from storage tank

Table 1 Results of odour survey 6/10/21

Points	*Odour observation*	*Frequency*	*Characteristic*	*Distance*
1-3	Obvious	Frequent 90%	Bitumen	20-50m
4-7	No odour			460-550m
8-9	Obvious	transient <20%	Bitumen	200-350m

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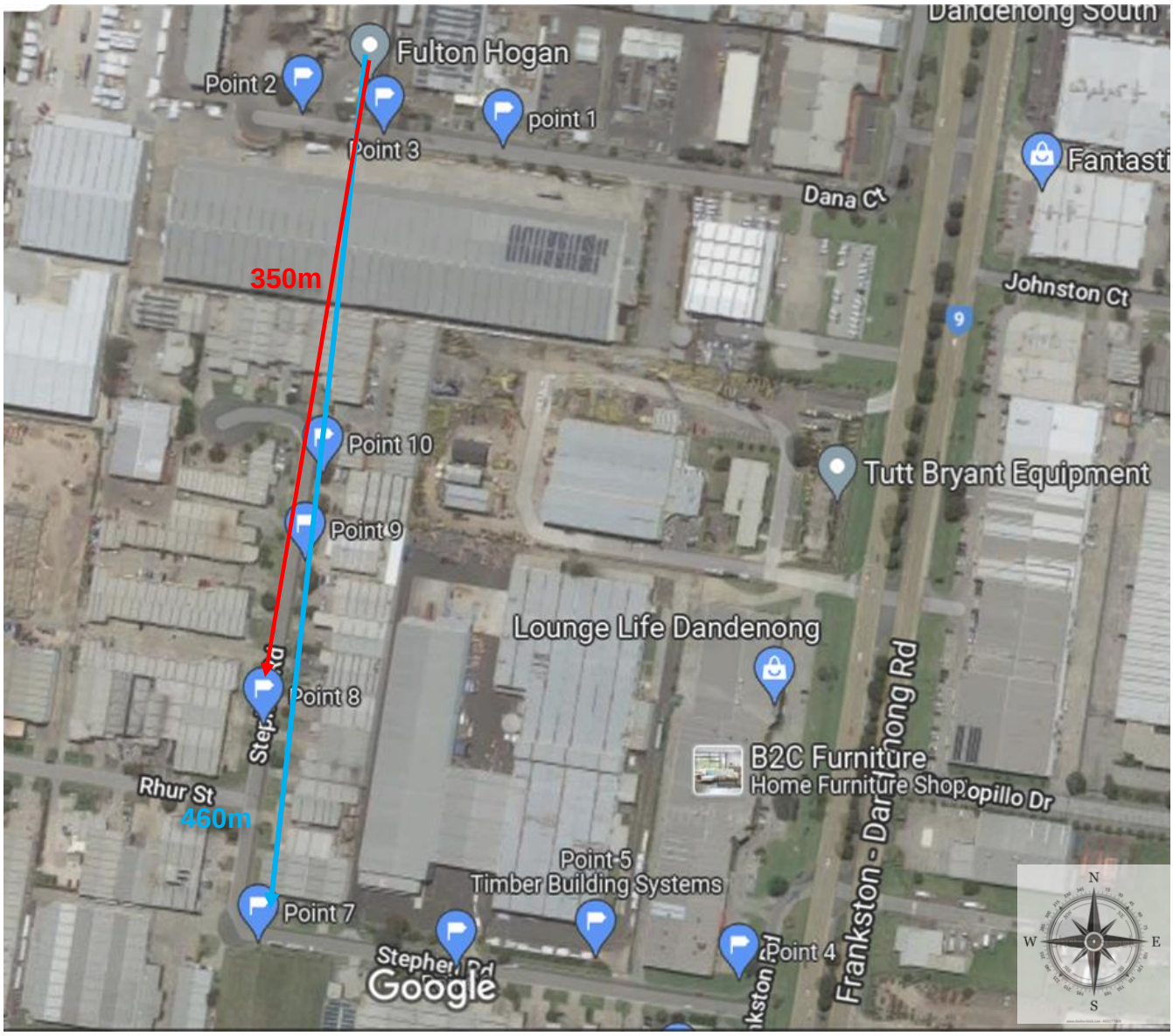
Figure1 Odour Survey Map 6/10/21



3.2 Odour Assessment 11th October 2021

- Began survey at 9:45am finished at 11:00am, temperature 10-12^{0}C, wind SSE 10-13km/hr. Cloudy with isolated showers.
- Normal operating conditions producing bitumen 320.
- Table 2 presents results of the odour survey. Refer to Figure 2 for odour survey map; including points at which odour observations were made.
- Loading of bitumen in storage tanks, producing Asphalt and loading trucks.
- Tanker refilling storage tank with bitumen commenced at 10:20am.
- No odour detected along Kirkham Rd downwind of the premises.
- No odour detected between Deepdale and Trewin St 520-540m.
- No odour detected along Amberley Crescent.
- Obvious odour with bitumen characteristics detected along Glomar Court
- Obvious transient odour with bitumen characteristics detected at points 11-13 along Dandenong bypass approximately 250m from source.
- This odour could not be further delineated due to access restrictions. The closest downwind point accessible was along Amberly crescent located at approximately 340m from the source.

Table 2 Results of odour survey 11/10/21

Points	*Odour observation*	*Frequency*	*Characteristic*	*Distance*
1-7	No Odour			330-560m
8-10	Obvious	Frequent 60-80%	Bitumen	130-140m
11-13	Obvious	Frequent 20/40%	H2S/sulphur	240-260m

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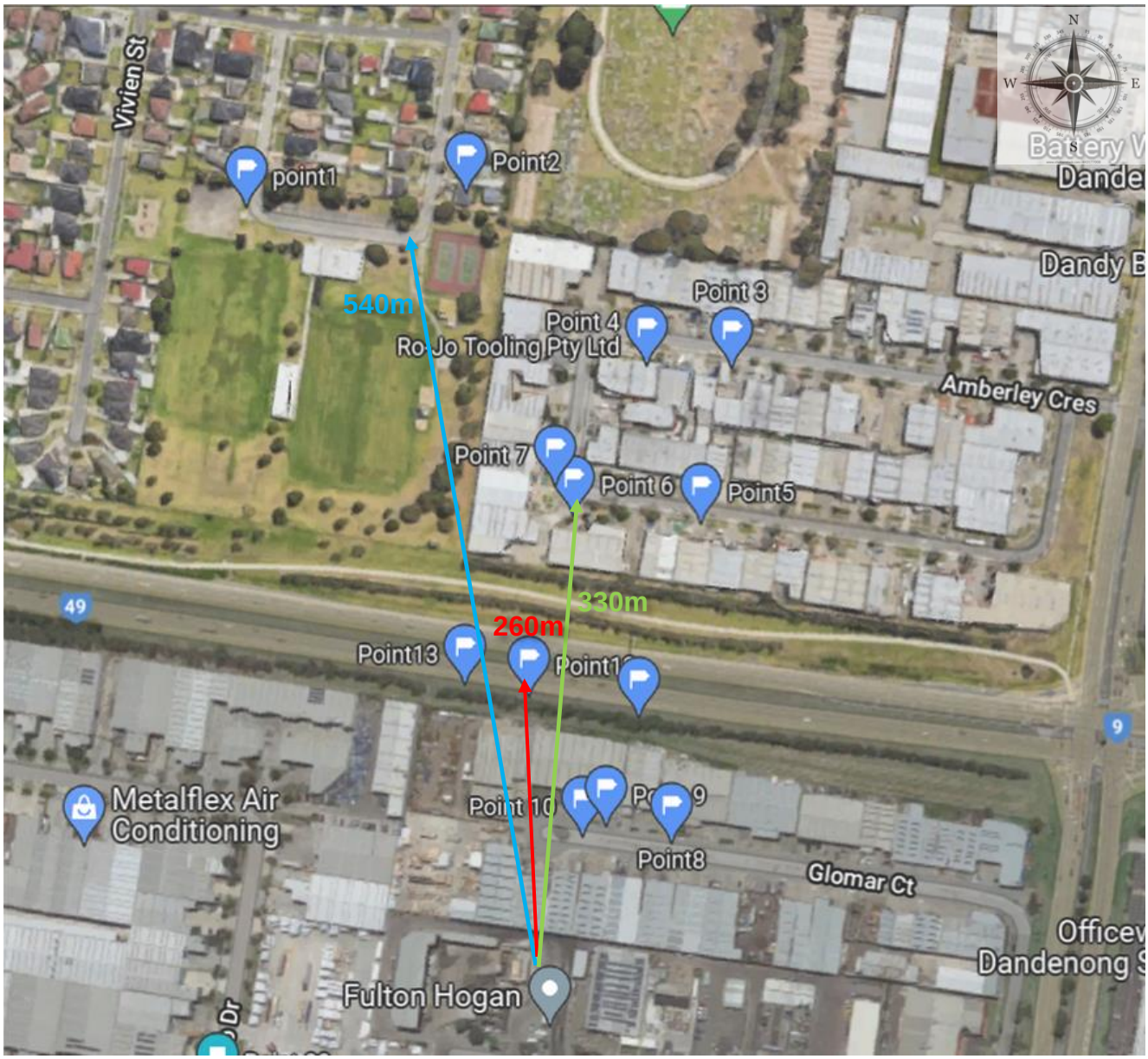
Figure 2 Odour Survey Map 11/10/21



3.3 Odour Assessment 28th October 2021

- Began survey at 9:45am finished at 11:35am, temperature 17-25C, wind East Northeast 10-13km/hr. Cloudy with isolated showers clearing.
- Normal operating conditions producing Bitumen 320.
- Table 3 presents results of the odour survey. Refer to Figure 3 for odour survey map; including points at which odour observations were made.
- Tanker refilling storage tank with bitumen completed at 8:20am.
- No odour detected along Hammond Rd downwind of the premises point 17-20.
- No odour detected along Rodeo Dr up to point 2.
- No odour detected along Rhur St.
- No odour detected along Stephen Rd.
- Obvious transient odour detected at point 21 and 22, 200m from the mixing and loadout area. Present for less than 10% of the 5-minute assessment period.
- Obvious odour with bitumen characteristics detected along Dana Court point 23, 50m from the mixing and loadout area. This odour was present for 60% of the assessment period.

Table 3 Results of odour survey 28/10/21

Points	*Odour observation*	*Frequency*	*Characteristic*	*Distance*
17-21	No Odour			
22	Obvious	Transient <10%	Bitumen	200m
23	Obvious	Frequent 60%	Bitumen	50m

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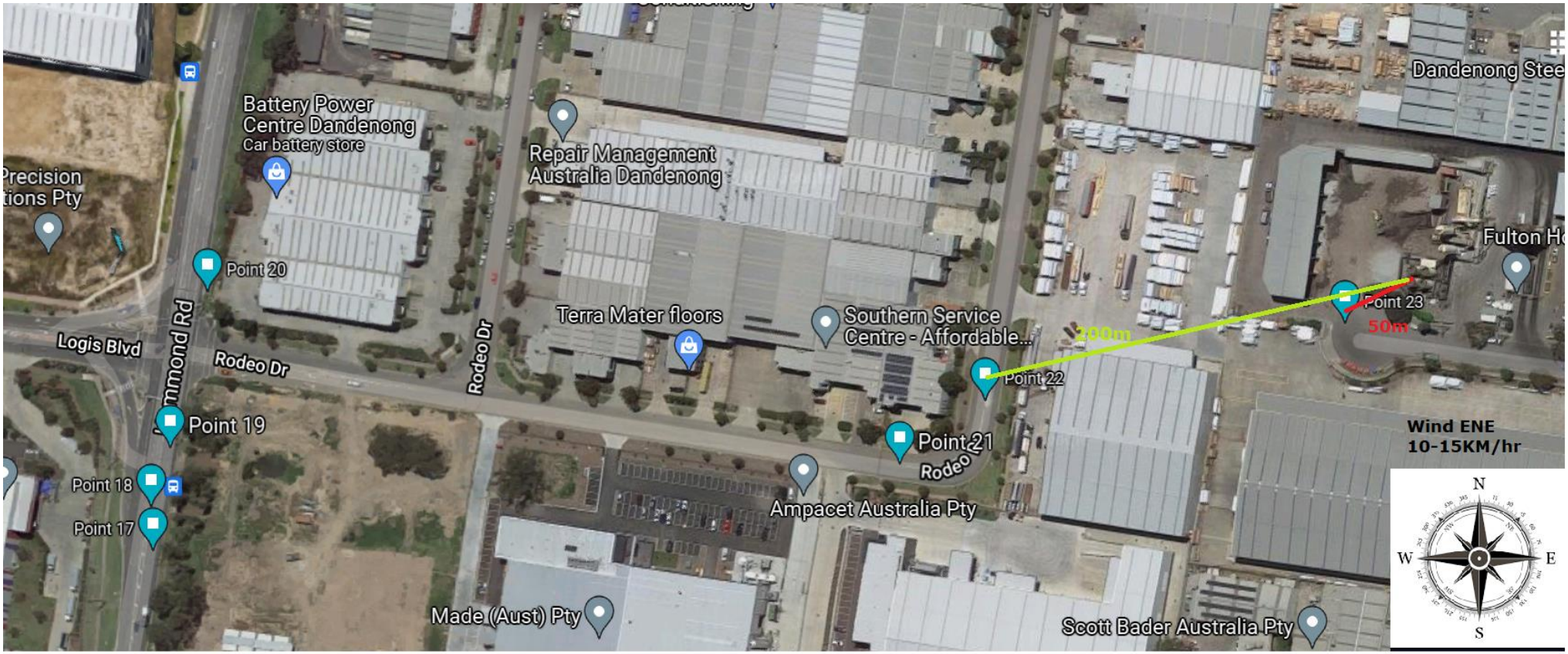
Figure 3 Odour Survey Map 28/10/21



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3.4 Odour Assessment 8th November 2021

- Began survey at 12:50 finished at 13:45, temperature 18C, wind gusting SW-WSW 18-30km/hr. Cloudy.
- Normal operating conditions producing Bitumen 320.
- Refilling storage tank with bitumen at 6pm.
- Table 4 presents results of the odour survey. Refer to Figure 4 for odour survey map; including points at which odour observations were made.
- No odour detected along Aberly Cres downwind of the premises point 1.
- No odour detected along Frankston Dandenong Rd point 2 450m from the premises.
- Obvious odour detected along Dandenong South Trail Points 3-5, 350m m from site. The odour was transient due to the fluctuating wind direction and strength.
- Obvious consistent odour detected along Glomar Ct points 7-8 100 to 130m from the premises

Table 4 Results of odour survey 8/11/21

Points	Odour observation	Frequency	Characteristic	Distance
1-2	No Odour			420-480m
3-5	Obvious	Transient <10%	Bitumen	300-350m
6-7	Obvious	Frequent 60%	Bitumen	100-130m

Figure 4 Odour Survey Map 8/11/21

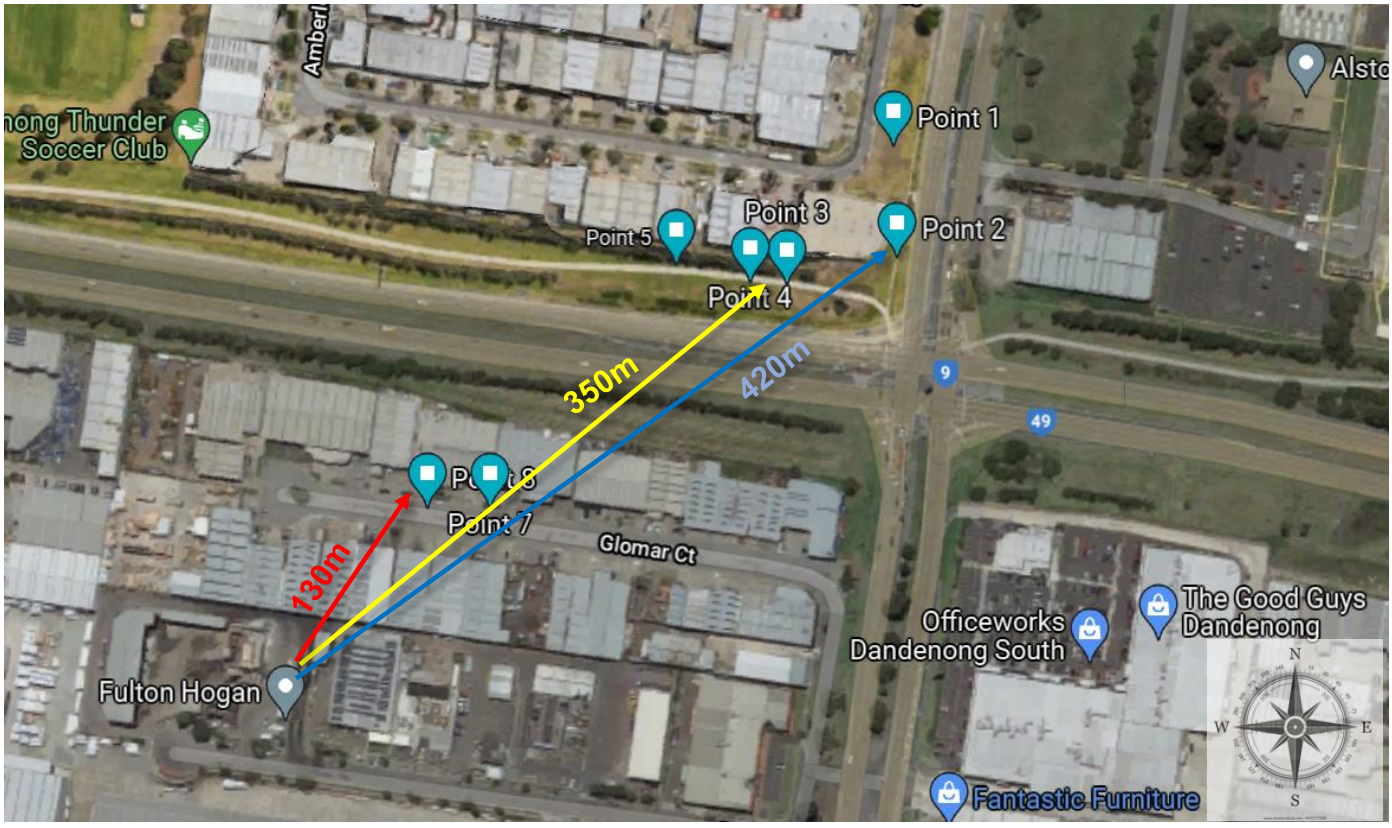

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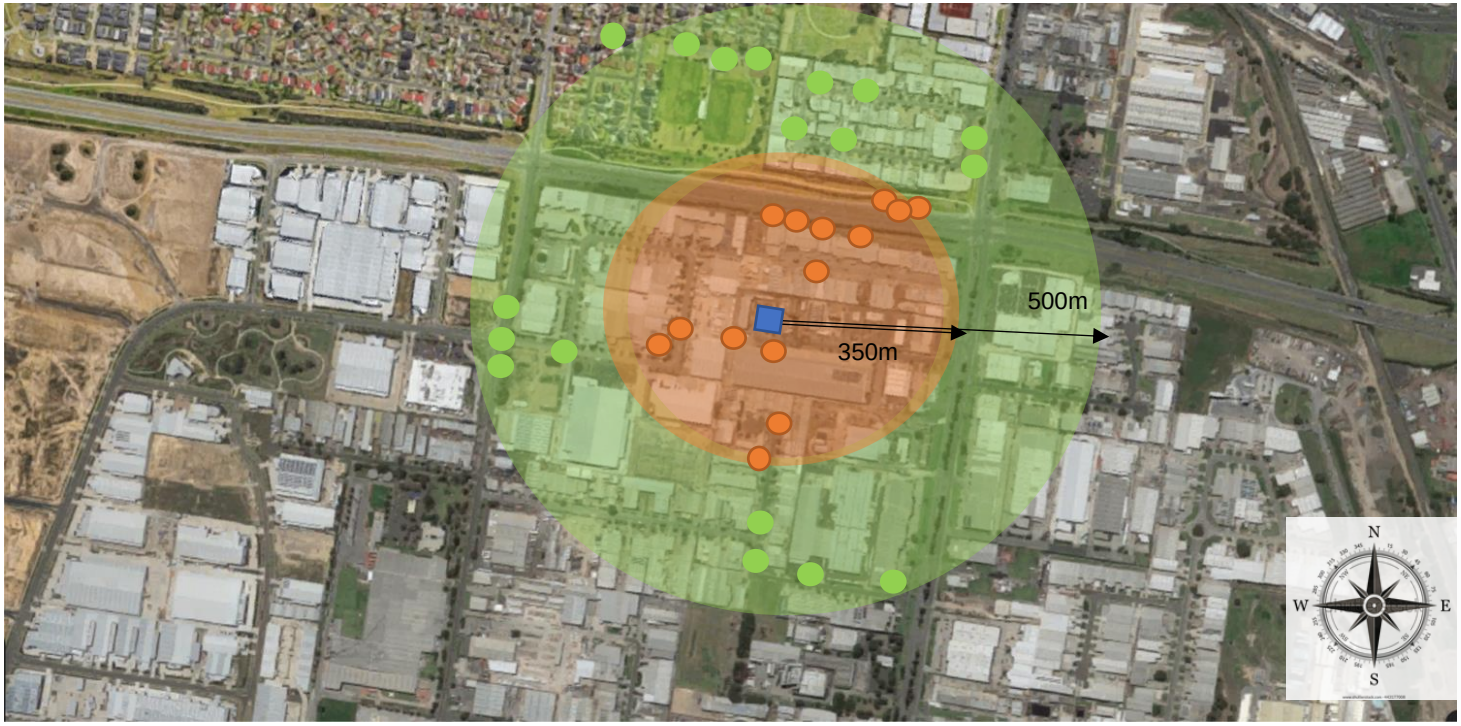
Figure 5 presents survey points at which obvious odour could be detected during surveys (i.e. up to 350 m from the site) and points at which no odour could be detected (i.e. from 350 m to 500 m from the site).

Figure 5 Odour impact zone

- Delineation points where obvious odour could be detected yet transient.
- No odour detected
- Fulton Hogan



4 Conclusion

Distinct odour that was mainly transient, could be detected within 350m radius of the premises. This is considered as a medium to low risk of odour impacts beyond this distance.
No odour was detected between 370 and 600m from the premises.
The fact that there are established sensitive receptors, (370-400m) from odorous activities undertaken on-site and no odour reports, supports the medium to low risk beyond 350m from the site rating.
The most intense odour detected off-site was associated with A10e polymer Bitumen and was considered as the highest risk of offsite impact.
An obvious odour associated with filling bitumen storage tanks and the associated venting of the volatile compounds was observed.
The other activities that generate odour were, the loading of the trucks and production of the asphalt.
Meteorological conditions did influence the odour plume, with it travelling the furthest under medium gusting wind speeds.

Although the study was just a snapshot in time and did not capture seasonal variation, it captured enough data to form an opinion on the risk of odour impacts beyond 500m.
The risk of odour impacts on sensitive receptors beyond 500m is considered as low.

Appendix H – Warrnambool Batch Plant – Risk Assessment Register

Fulton Hogan

Environmental Risk Assessment (ERA)

Warrnambool Asphalt Plant

Date of Assessment: 1/12/2021

This document to be read in accordance wiith the risk assessment process

ACTIVITY BEING UNDERTAKEN *(What am I doing?)*	IMPACT ON ENVIRONMENT *(What can wrong?)*	PRE-CONTROL RISK			CONTROLS *(How can we protect the environment?)*	POST-CONTROL RISK		
		CONSEQUENCE	LIKELIHOOD	RISK RATING		CONSEQUENCE	LIKELIHOOD	RISK RATING
Noise and Vibration								
General operation of Asphalt Plant	Disturbance to neighbours	**Sig.**	**Pos.**	**13 M**	Comply with relevant controls in EMP (for example selection of machinery or works practices which produces less noise and scheduling of noisy activities to the less sensitive periods of the day). Undertake noise monitoring to confim no exceedances of noise limits as per modelling in noise assessment for Development Licence.)	**Sig.**	**U.Li.**	**9 M**
Truck and Vehicle Movements	Disturbance to neighbours	**Sig.**	**Pos.**	**13 M**	Comply with relevant controls in EMP. Minimise reversing where possible, do not leave vehicles unnecessarily idling, be conscious of engine revving during sensitive hours, maintenance of machinery. Driver awareness when leaving site; drive to conditions; conscious of neighbours on access work	**Sig.**	**U.Li.**	**9 M**
Operation of crusher/ screener (glass / RAP)	Disturbance to neighbours	**Sig.**	**Pos.**	**13 M**	Operate plant within allowable hours for crushing screening ('daytime-period' only: 07:00 to 18:00), scheduled maintenance of plant, daily prestarts on all plant and machinery, site achieves good separation from sensitive receptors, land zoned Industrial; Significant noise issues identified during daily observations, prestarts, monthly environmental inspections.	**Sig.**	**U.Li.**	**9 M**
Unloading aggregates and reclaimed materials (glass / RAP)	Disturbance to neighbours	**Min.**	**Pos.**	**8 M**	No dropping material from unnecessary heights. Driver /operator behaviour training. Site laid out for efficient truck movement and material handling.	**Min.**	**U.Li.**	**5 L**
FEL / large machinery operations	Disturbance to neighbours	**Min.**	**Pos.**	**8 M**	Machinery maintained to minimise noise emissions, speed limits, no dropping material from unnecessary heights. Driver /operator behaviour training. Site laid out for efficient machinery movement and material handling.	**Min.**	**U.Li.**	**5 L**
Air Quality								
Storage of aggregates, sand and waste glass	Generation of dust from stockpiles resulting in emissions of dust to atmosphere	**Sig.**	**Pos.**	**13 M**	Stockpiles on asphalt sealed areas, materials stored within covered, three walled material bays, bays not to be overstocked, yard sprinkler used as necessary, spillages immediately cleaned up, cold feed bays covered.	**Sig.**	**U.Li.**	**9 M**

Fulton Hogan

Environmental Risk Assessment (ERA)

Warrnambool Asphalt Plant

Date of Assessment: 1/12/2021

This document to be read in accordance wiith the risk assessment process

ACTIVITY BEING UNDERTAKEN *(What am I doing?)*	IMPACT ON ENVIRONMENT *(What can wrong?)*	PRE-CONTROL RISK			CONTROLS *(How can we protect the environment?)*	POST-CONTROL RISK		
		CONSEQUENCE	LIKELIHOOD	RISK RATING		CONSEQUENCE	LIKELIHOOD	RISK RATING
Storage of RAP	Generation of dust from stockpiles resulting in emissions of dust to atmosphere	**Sig.**	**Pos.**	**13 M**	Heights of stockpiles monitored and maintained. Landscaping along east boundary. Processed RAP generally enclosed on three sides and covered (bunkers); Contingency measures on high wind days - -review or minimise dust generating activities; - wet-down stockpiles as necessary; - minimise heights of new stockpiles being created. - Observe and record visible dust plumes, - adapt management accordingly if complaints received	**Sig.**	**U.Li.**	**9 M**
Crushing and Screening Process	Generation of dust during crushing and screening glass/RAP	**Min.**	**Pos.**	**8 M**	Crushing & screening pPlant located in covered 3-sided shed, water sprays and mists to be used as required. Enclosed chute from conveyor to stockpile	**Min.**	**U.Li.**	**5 L**
Truck unloading and loader operation	Generation of dust (from vehicle moveents on internal haulage routes and during stockpile material movement)	**Sig.**	**Pos.**	**13 M**	Yard sprinkler used as necessary, drive to conditions and reduce traffic unnecessary traffic movements.Avoid dropping materials from heights, water sprays/hoses used as required. Any spillages of materials to be cleaned up as soon as practicable	**Sig.**	**Pos.**	**13 M**
Operating Asphalt Plant	Greenhouse gas emissions and other pollutants into the atmosphere	**Min.**	**Li.**	**12 M**	Essential plant maintenance, annual NPI and NGERS reporting. High efficiency burner; ability to produce warm mix asphalt. FH member of MREP2 (all electricity use is carbon neutral).	**Min.**	**Li.**	**12 M**
	Odour emissions impacting sensitive receivers	**Sig.**	**U.Li.**	**9 M**	Plant can produce warm mix asphalt and direct loads to trucks from overhead bin (therefore reduced VOC and associated odour emissions)	**Sig.**	**U.Li.**	**9 M**
	Generation of dust from conveyors and drop points reslting in emissions of dust to atmosphere	**Maj.**	**Li.**	**21 H**	Covered incline conveyor, sealed baghouse (all dust captured and recycled into the batching process)	**Maj.**	**U.Li.**	**14 M**
Storage (silo) / handling of filler	Dust emission during loading and use of filler (hydrated lime); risk of large dust emission event	**Maj.**	**Pos.**	**18 H**	Deliveries in responsible manner - sealed hoses, emergency systems to prevent overfilling. Filter to prevent dust escaping during filling. Spillages cleaned up in timely manner	**Maj.**	**U.Li.**	**14 M**
Delivery and Storage of Bituminous Products	Odour creating nuisance impact on local residents/businesses	**Min.**	**Li.**	**12 M**	Store and handle at recommended temps (reduce volatiles / odour)	**Min.**	**Pos.**	**8 M**
Truck and Vehicle Movements	Greenhouse gas emissions and other pollutants into the atmosphere	**Min.**	**Li.**	**12 M**	Essential plant maintenance, annual NPI and NGERS reporting	**Min.**	**Li.**	**12 M**
	Generation of dust (in particular from the main driveway and internal haulage routes)	**Sig.**	**Pos.**	**13 M**	Majority of site is asphalt sealed, drive to conditions and obey speed limits, clean up spillages as soon as practical (use of mechanical sweepers etc).	**Sig.**	**U.Li.**	**9 M**
Maintenance activities	Generation of dust and airborne pollutants resulting in emissions to atmosphere	**Maj.**	**Pos.**	**18 H**	Maintenance activities that may generate dust (e.g. baghouse maintenance) not to be completed on days with adverse weather (high wind days). Use of specialised equipment (e.g. sucker truck) to clean out dust build up in particular areas such as cyclone, baghouse etc.	**Maj.**	**U.Li.**	**14 M**
Erosion, Sedimentation and Water Quality								

Fulton Hogan

Environmental Risk Assessment (ERA)

Warrnambool Asphalt Plant

Date of Assessment: 1/12/2021

This document to be read in accordance wiith the risk assessment process

ACTIVITY BEING UNDERTAKEN *(What am I doing?)*	IMPACT ON ENVIRONMENT *(What can wrong?)*	PRE-CONTROL RISK			CONTROLS *(How can we protect the environment?)*	POST-CONTROL RISK		
		CONSEQUENCE	LIKELIHOOD	RISK RATING		CONSEQUENCE	LIKELIHOOD	RISK RATING
Storage, handling and use of bituminous products, fuels, oils and chemicals (incl. use of wash bay)	Pollution of stormwater and/or local waterways with hydrocarbons and petroleum products	**Maj.**	**Li.**	**21 H**	Bitumen tanks within bunded area, diesel tank double skinned, minor chemicals stored in bunded container (or similar), IBCs bunded, all runoff treated by the sites stormwater treatment system (e.g. triple interceptor); routine monitoring and maintenance of all treatment systems. Process in place to visually inspect / verify presence of oil sheen / slick prior to discharge of bunded areas (tank farm area, loading slab, truck wash bay) to the onsite stormwater treatment system.	**Maj.**	**U.Li.**	**14 M**
Truck and Vehicle Movements	Pollution of stormwater and/or local waterways with hydrocarbons and petroleum products	**Maj.**	**Pos.**	**18 H**	Spill kits on site to clean any spills from trucks, maintenance of trucks, prestart inspections, all runoff treated by the sites stormwater treatment system (e.g. triple interceptor);monitoring and maintenance of treatment systems, spill kits positioned in appropriate location, spill response trailer available	**Sig.**	**U.Li.**	**9 M**
	Pollution of stormwater and/or local waterways with sedimentation	**Sig.**	**Pos.**	**13 M**	Site is predominately asphalt sealed, all runoff treated by the sites stormwater treatment system (e.g. triple interceptor), drivers responsible for keeping trucks clean, yard swept as required	**Sig.**	**U.Li.**	**9 M**
Refuelling	Pollution of stormwater and/or local waterways with diesel	**Sig.**	**Pos.**	**13 M**	Refuelling within dedicated area, fuelling procedure, all runoff treated by the sites stormwater treatment system (e.g. triple interceptor), spill kits positioned in appropriate location.	**Sig.**	**U.Li.**	**9 M**
Stockpiling of RAP	Pollution of Stormwater with hydrocarbons or heavy metals	**Min.**	**Pos.**	**8 M**	Stockpile placed away from water flows, all runoff treated by the sites stormwater treatment system (e.g. triple interceptor), routine monitoring and maintenance of system.	**Min.**	**U.Li.**	**5 L**
Storage (silo) / handling of filler	Loss of product leading to pollution of stormwater and/or local waterways	**Maj.**	**U.Li.**	**14 M**	Deliveries in responsible manner - sealed hoses, emergency systems to prevent overfilling. Filter to prevent dust escaping during filling. Spillages cleaned up in timely manner	**Maj.**	**Rare**	**10 M**
Stockpiling and handling of RAP and glass	Contaminants from RAP (e.g. hydrocarbons) and glass (e.g. organics, leachates, nutrients)	**Sig.**	**U.Li.**	**9 M**	Likelihood of contamination is inherently low. Glass stored in shed / walled bays, processed RAP generalled in covered bays; all runoff treated by the sites stormwater treatment system (e.g. triple interceptor), material spills cleaned up ASAP	**Sig.**	**Rare**	**6 L**
Stockpiling of raw materials (aggregates)	Sediment laden water entering stormwater system and/or local waterways	**Sig.**	**U.Li.**	**9 M**	Materials stored within walled bays, all runoff treated by the sites stormwater treatment system (e.g. triple interceptor), material spills cleaned up ASAP	**Sig.**	**Rare**	**6 L**
Waste and Resource Management								
Purchasing	Depletion of a finite resource, social procurement impacts	**Sig.**	**Pos.**	**13 M**	Sustainable purchasing goals when purchasing products, materials and services	**Sig.**	**U.Li.**	**9 M**
Drinking from Disposable Cups, consumption of food and smoking	Litter leaving site boundary, impact on site amenity	**Min.**	**Pos.**	**8 M**	Waste heirachy used by site, waste streams identified and bins provided, sustainable purchasing principles to be adopted where available	**Min.**	**U.Li.**	**5 L**

Fulton Hogan

Environmental Risk Assessment (ERA)

Warrnambool Asphalt Plant

Date of Assessment: 1/12/2021

This document to be read in accordance wiith the risk assessment process

ACTIVITY BEING UNDERTAKEN *(What am I doing?)*	IMPACT ON ENVIRONMENT *(What can wrong?)*	PRE-CONTROL RISK			CONTROLS *(How can we protect the environment?)*	POST-CONTROL RISK		
		CONSEQUENCE	LIKELIHOOD	RISK RATING		CONSEQUENCE	LIKELIHOOD	RISK RATING
Maintenance activities on site	Non-compliance with waste disposal methods and state waste regulations	**Min.**	**Pos.**	**8 M**	Oily rags and filters to be placed in dedicated prority waste areas, EPA accredited agents used for off-site waste disposal. Waste oil stored in bunded area/tank and disposed of as per EPA accredited agents.	**Min.**	**U.Li.**	**5 L**
Printing and Copying	Depletion of a finite resource, litter leaving site boundary	**Min.**	**Pos.**	**8 M**	Electronic forms to be used where available, paper and cardboard recycling bins provided	**Min.**	**U.Li.**	**5 L**
RAP Deliveries	RAP contaminated with other waste products brought into site	**Sig.**	**Pos.**	**13 M**	All raw material inspected to ensure it contains RAP only, contaminated loads rejected, majority of product coming to site is from internal customers (historically very low contamination)	**Sig.**	**Rare**	**6 L**
Contaminiation in Glass	Glass waste containing organics , metals , paper etc presenting fire hazard, possible odour risk.	**Sig.**	**Pos.**	**13 M**	Limit volumes of stockpiled waste, contain in dedicated bay / recptacle / area. Glass pulveriser will separate waste from glass (via blowers / magnets). Segregate glass waste stream, contain appropriately and remove from site frequently (arrangement in place with council /Cleanaway to supply glass and remove excessive contamination for appropiate disposal)	**Sig.**	**Rare**	**6 L**
Leaks and spillages	Reportable priority waste not taken from site in accordance with EPA transport and disposal requirements.	**Sig.**	**U.Li.**	**9 M**	Waste bin used for oily waste separated and contained as reportable priority waste etc , all waste disposed of from site by a licenced contractor, waste tracking certificates (waste tracker) completed for all disposal of reportable priority waste	**Sig.**	**Rare**	**6 L**
Community								
General operation of Asphalt Plant and ancillary activities	Creating a nuisance/amenity impact to neighbouring properties	**Maj.**	**Pos.**	**18 H**	Operate within consented working hours and noise limits, all community compliants to be immediately followed up with complainant and investigated, business to consider participation in community meetings/activities as they are presented. Site to maintain appropriate visual amenity standrds, landscaping will provide visual screening.	**Maj.**	**Rare**	**10 M**
Trucks entering and exiting site	Creating a nuisance/amenity impact to neighbouring properties	**Sig.**	**U.Li.**	**9 M**	Complaints immediately entered into CAMs and investigated to identify root cause	**Sig.**	**Rare**	**6 L**
Crushing and Screening	Creating a nuisance/amenity impact to neighbouring properties (Neighbours are also Industrial Zone)	**Sig.**	**U.Li.**	**9 M**	Complaints immediately entered into CAMs and investigated to identify root cause, vegetation screening and landscaping maintained around site boundary, operate plant within allowable hours	**Sig.**	**Rare**	**6 L**
Flora and Fauna								
All Activities	Damaging vegetation onsite	**Sig.**	**U.Li.**	**9 M**	Negligible vegetation present on site, trucks to park in dedicated areas	**Sig.**	**Rare**	**6 L**
	Encountering unexpected or injured fauna (e.g: snakes)	**Min.**	**Pos.**	**8 M**	Contact local wildlife rescue, do not approach or harm any wildlife on site	**Min.**	**U.Li.**	**5 L**
Land and Groundwater Management								

Fulton Hogan

Environmental Risk Assessment (ERA)

Warrnambool Asphalt Plant

Date of Assessment: 1/12/2021

This document to be read in accordance wiith the risk assessment process

ACTIVITY BEING UNDERTAKEN *(What am I doing?)*	IMPACT ON ENVIRONMENT *(What can wrong?)*	PRE-CONTROL RISK			CONTROLS *(How can we protect the environment?)*	POST-CONTROL RISK		
		CONSEQUENCE	LIKELIHOOD	RISK RATING		CONSEQUENCE	LIKELIHOOD	RISK RATING
Storage, handling and use of bituminous products, fuels, oils and chemicals (incl. use of wash bay)	Contamination of soil and/or groundwater	**Maj.**	**Pos.**	**18 H**	Above ground bitumen tanks stored within sealed bunded area, diesel tank double skinned, minor chemicals stored in bunded containers/areas, IBCs bunded, majority of site is asphalt sealed, major spills to be immediately reported and cleaned up, spill response trailer available on site. All runoff treated by the sites stormwater treatment system (e.g. triple interceptor)	**Maj.**	**U.Li.**	**14 M**
Truck and Vehicle Movements	Spread of weeds on and off site	**Min.**	**Pos.**	**8 M**	Periodic spraying of weeds in appropriate season, vehicles to be inspected and monitored to ensure no soil or seed is imported on to site.	**Min.**	**U.Li.**	**5 L**
Stockpiling of RAP and Glass	Leachate (containing metals / PAHs) into soil and groundwater	**Sig.**	**U.Li.**	**9 M**	Inherently low likelihood of significant concentrations of contaminants.; glass on sealed pad and undercover.	**Sig.**	**Rare**	**6 L**
Heritage (Aboriginal and non-Aboriginal)								
General operation of Asphalt Plant and ancillary activities	Removal or disturbance of item of significance	**Sig.**	**U.Li.**	**9 M**	Site is located in an already highly distrurbed and developed area, sightings to be reported immediately	**Sig.**	**Rare**	**6 L**
Land clearing / site alterations	Removal or disturbance of item of significance	**Sig.**	**U.Li.**	**9 M**	CHMP process as per the local Planning Scheme as required	**Sig.**	**Rare**	**6 L**

Appendix I – Noise Assessment

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27th January 2021 **Rep. No 21098.3**

Title: **Environmental Noise Assessment of a proposed Fulton Hogan asphalt batching operation located at 58 – 58A Dales Road, Warrnambool as per the Noise Protocol, VIC EPA Publication 1826.4, July 2021**

Brief: **Assess environmental noise impact of a proposed asphalt batching operation which includes determination of background noise, noise limits and predicted effective noise levels at noise sensitive receivers as per the EPA's Noise Protocol**

Client: **Sustainable Project Management**

Contact: **Mr Jeremy Clifford**
Phone: 0406 696 202
Email: jeremy@sustainablepm.com.au

Executive summary

Audiometric & Acoustic Services were commissioned to undertake a verification of compliance with the VIC EPA Publication 1826.4, Noise limit and assessment protocol for the control of noise from commercial, industrial and trade premises and entertainment venues, also known as the Noise Protocol with respect to possible noise from a proposed asphalt batch plant at Lot 58 Mason Street, Warrnambool.

Warrnambool is within a major urban area outside of Melbourne metropolitan area as per the Noise Protocol determination.

The Protocol's noise limits are applicable to the nearest noise sensitive receivers, 140 Boiling Down Road, at nominal north-west, approximately 650m off the proposed development, and 21 Veal Rd at nominal north-east approximately 700m from the proposed development are presented in the table below:

NSR 1 – 140 Boiling Down Road	**Time period**	**Noise limit, dB(A)**
Day period	07:00 – 18:00	56 dB(A)
Evening period	18:00 – 22:00	49 dB(A)
Night period	22:00 – 07:00	44 dB(A)
NSR 2 – 21 Veal Road	**Time period**	**Noise limit, dB(A)**
Day period	07:00 – 18:00	54 dB(A)
Evening period	18:00 – 22:00	48 dB(A)
Night period	22:00 – 07:00	43 dB(A)

The predicted effective noise levels of the proposed asphalt batching plant operation have been calculated at the noise sensitive receivers at 140 Boiling Down Road, and 21 Veal Rd, and compared with the Protocol's noise limit for the day, evening and night period.

We have understood that proposed operation consists of the following:

- Crushing operation twice per week from 07:00 am until 15:00 pm
    - Glass and Reclaimed Asphalt Pavement (RAP) crushing operations once a week (on average) each from 07:00 am until 18:00 pm
- Asphalt manufacturing and deliveries (trucks movements) 24 hours seven days per week

As per proposed operation schedule we have calculated predicted noise levels and compared with the Protocol's noise limits.

Crusher, asphalt manufacturing and deliveries

In the following table the crusher, asphalt manufacturing and deliveries operation predicted noise levels are compared with the Protocol's noise limits at nearest noise sensitive receivers:

NSR 1	Period of FH operation / crushing operation	Predicted Effective noise level, dB(A)	Noise limit, dB(A)	Compliance Yes /No
Day period	07:00 – 18:00	54	56	**Yes**
Evening period	N/A	43	49	**N/A**
Night period	N/A	54	44	**N/A**

NSR 2	Period of FH operation / crushing operation	Predicted Effective noise level, dB(A)	Noise limit, dB(A)	Compliance Yes /No
Day period	07:00 – 18:00	48	54	**Yes**
Evening period	N/A	43	48	**N/A**
Night period	N/A	48	43	**N/A**

The crushing operations do not start before 07:00 am and should finish by 18:00 pm, Monday to Friday.

We understand from the proposed operations schedule that the crushing operations will not operate on Sundays.

Asphalt manufacturing and deliveries – no crusher operation

In the table below the predicted effective noise levels are compared with the Protocol's noise limits for asphalt manufacturing and deliveries only operation at noise sensitive receivers.

NSR 1 / NSR 2	Time period	Predicted Effective noise level, dB(A)	Noise limit, dB(A)		Compliance Yes /No
			NSR 1	NSR 2	
Day period	07:00 – 18:00	44	56	54	**Yes**
Evening period	18:00 – 22:00	44	49	48	**Yes**
Night period	22:00 – 07:00	44	44	43	**Marginal**

Noise generated by the proposed asphalt batching plant for asphalt manufacturing and deliveries operation is expected to be compliant at noise sensitive receivers with the Protocol's noise limits for the day, evening periods and marginal for the night period.

We recommend that a noise assessment of the proposed operation be undertaken after six months of operation to confirm compliance with noise limits outlined in this document and any relevant considerations and/or exemptions in the approvals for the development.

However, we do suggest that this assessment only be undertaken if the occupants of the two nearest NSRs believe there is any concern for night period operations.

Table of Contents

1.0 Introduction

Audiometric & Acoustic Services were commissioned to undertake a verification of compliance with the VIC EPA Publication 1824.6, also known as Noise Protocol in respect to possible noise from a proposed Fulton Hogan asphalt batching operation at Lot 58 Mason Street.

Details of the proposed plant are supplied in supporting documentations for environmental noise assessment listed in the Reference section of this report.

The site is in the Industrial 3 Zone (IN3Z) of Warrnambool planning scheme. Warrnambool is a major urban area as per the Noise Protocol.

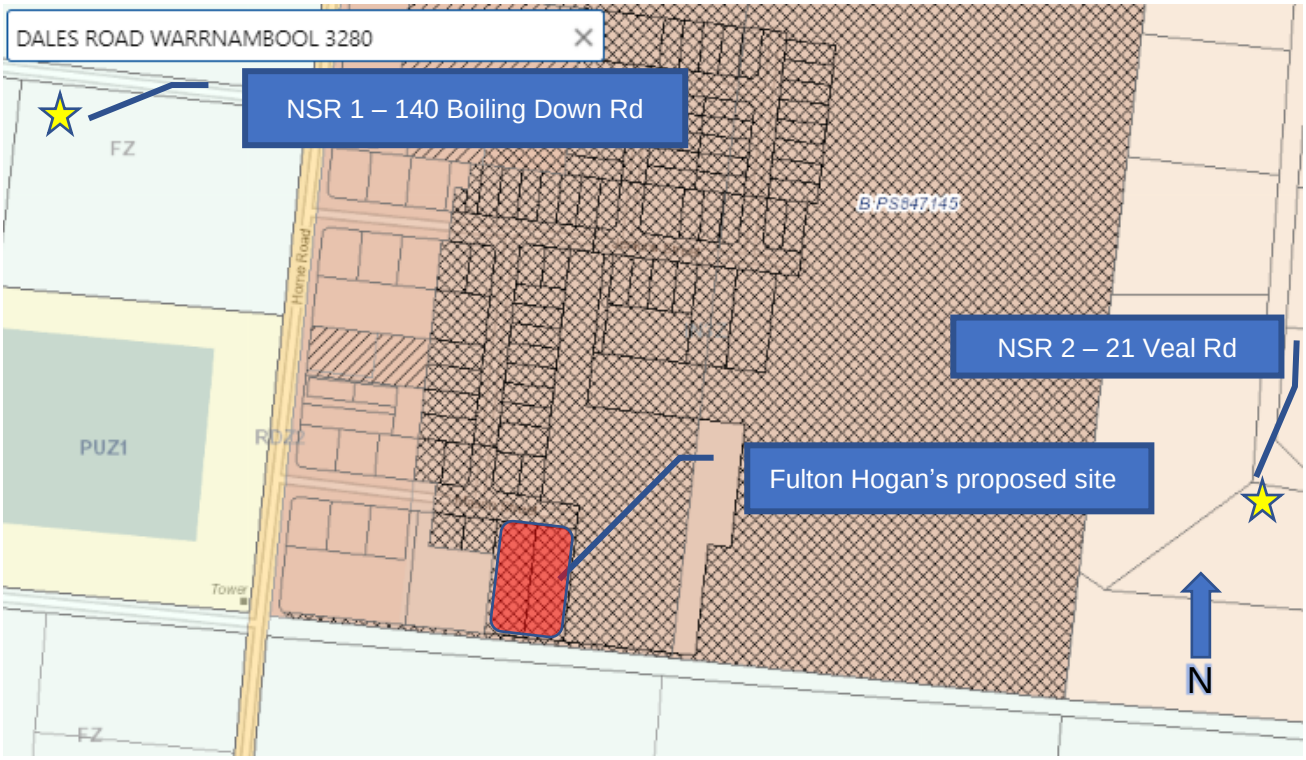
Part I, A1 of the Noise Protocol requires that the appropriate method for setting noise limits in a major urban area is the Urban area method.

The aim of the assessment is to establish noise limits for the proposed asphalt batching plant at the nearest noise sensitive receivers, determine predicted effective noise levels at those receivers and compare them with the Noise Protocol limits.

2.0 Existing Environment

The proposed site is in the Industrial 3 Zone (IN3Z) of the Warrnambool planning scheme with the sensitive nearest noise receivers identified in the Farming Zone (FZ) at 140 Boiling Down Road, Warrnambool, approximately 650 m, and in the Rural Living Zone at 21 Veal Road, Warrnambool, approximately 700 m from the proposed site as per Figure 1 below.

Figure 1: Fulton Hogan's proposed site, surrounding zone types and noise sensitive receivers (NSRs)



There are no activities in the Industrial 3 Zone in proximity of the development site during the night except occasional traffic movements on Horne Road and Boiling Down Road.

The Warrnambool Caravans Repairs sales and repair shop which is approximately 200 m north west of the site is occupied during the day hours between 7am and 6pm, Monday to Friday.

The area is affected by the operation of the light industry such as the above-mentioned caravan repairs shop, timber and door sales and similar shops / manufacturers.

3.0 Noise Protocol – Fulton Hogan Warrnambool asphalt batching plant operational hours

The document that is applicable is the Noise Protocol, VIC EPA Publication 1826.4, July 2021; Part I, section A, Noise Limits – Urban area method.

3.1 Noise Protocol

The Noise Protocol prescribes noise limits for commercial, industrial and trade premises. The goal is to protect people from commercial, industrial or trade noise that may affect the beneficial uses made of noise sensitive areas.

The Protocol prescribes different levels for different times of the day and can be defined as follows:

Monday to Saturday:

Day	0700 – 1800 hours
Evening	1800 – 2200 hours
Night	2200 – 0700 hours

The Protocol also prescribes different levels for different times of day for Sunday and Public Holiday:

Evening	0700 – 2200 hours (Sunday and Public Holidays)
Night	2200 – 0700 hours (Sunday and Public Holidays)

3.2 Proposed Operational Hours of the asphalt batching plant - Warrnambool

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We have taken that the following operation hours would apply to the proposed operation:

Crusher operation

- any day of the week, except Sunday, on average twice a week 07:00 am to 18:00 pm

Asphalt manufacturing and deliveries (trucks movement) (i.e. all activities except crushing)

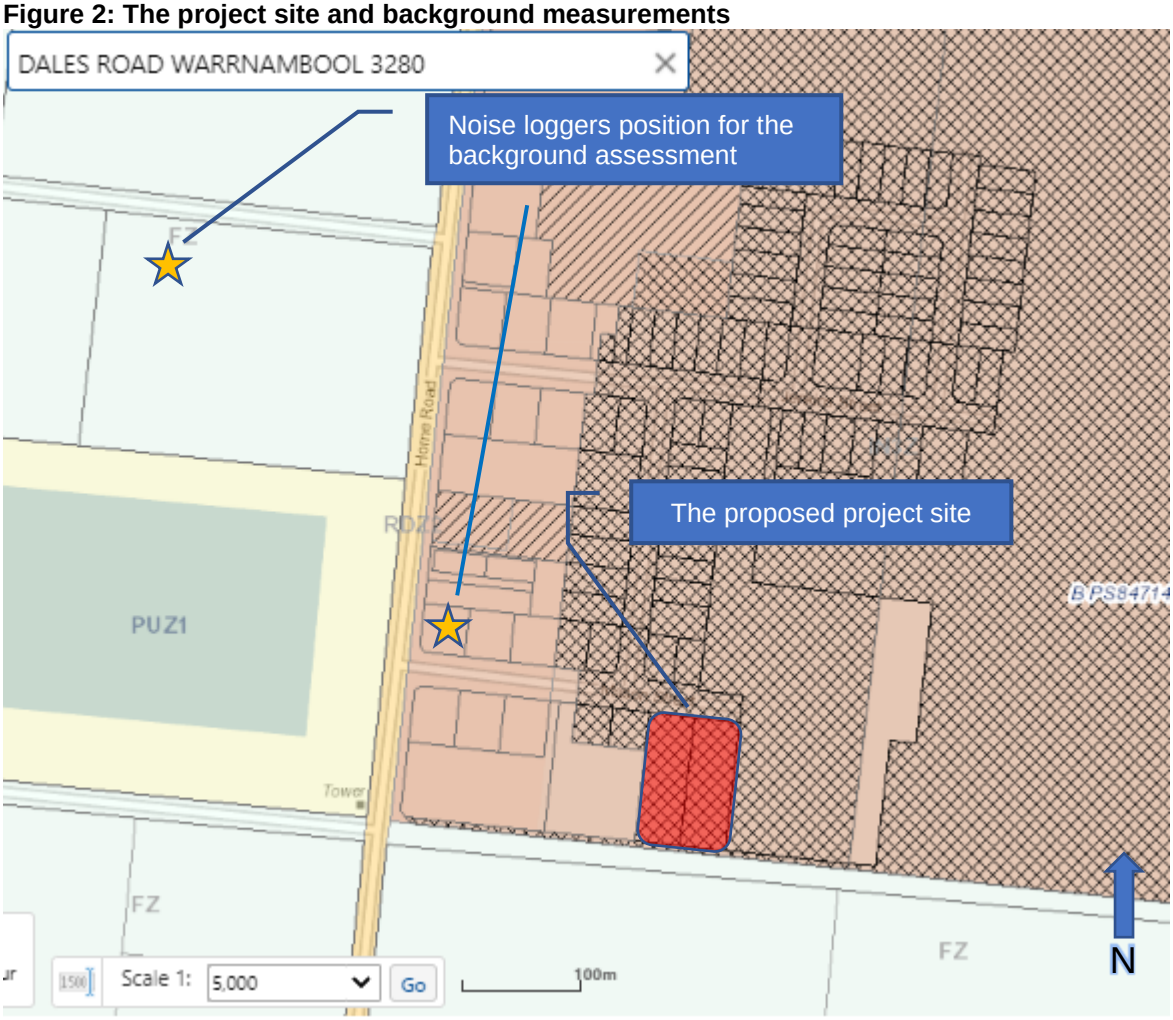
- a 24 hours operation seven days per week

4.0 Assessment of noise limits as per Noise Protocol – Urban Area Method

4.1 Site Assessment

The assessment has been undertaken with a noise logger, Type 1 from Wednesday, 29th September to Monday, 11th October 2021.

Figure 2: The project site and background measurements



Unfavourable weather conditions prevailed throughout of the assessment period; however, the weather on the 6th October was suitable for background determination.

Please refer to Appendix III for weather conditions.

4.2 Assessment method – Noise Protocol – Noise Limit – Urban area method

The Warrnambool area falls under the major urban area outside of Melbourne and therefore the determination of noise limits should be undertaken as per the Protocol's Urban area method.

4.2.1 Zoning level

Determination of zoning level for the noise receiver in the Farming Zone (Noise Sensitive Receiver 1 NSR 1), the residential premise at 140 Boiling Down Road is presented in the Figure 3, below.

Figure 3: NSR 1 - Farming Zone – type 2 category for calculation of zoning level

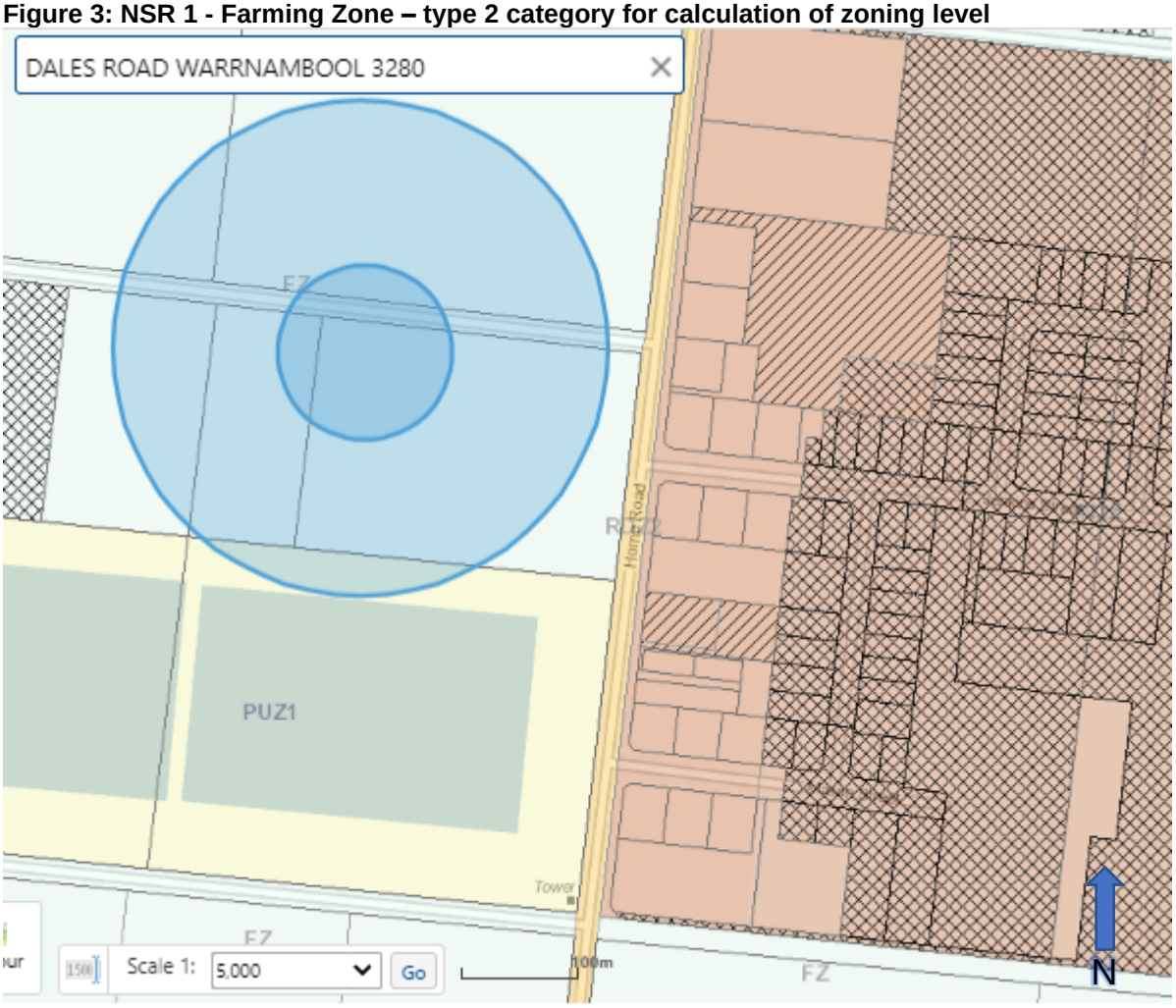


Table 1: Calculation of zoning levels – NSR 1

140 Boiling Down Road - NSR 1		IF	Zoning level
Day period	07:00 - 18:00	0.50	**59**
Evening period	18:00 - 22:00	0.50	**53**
Saturday	07:00 - 18:00	0.50	**59**
Sunday	07:00 - 22:00	0.50	**48**
Night period	22:00 - 07:00	0.50	**48**

Area	400 m		Total
Type 1	Type 2	Type 3	
0	125581	0	125581
Area	140 m		Total
Type 1	Type 2	Type 3	
0	15364	0	15364
IF	**0.50**		

The Table 1 above presents calculation of influencing factor (IF) of zoning levels for the NSR 1. Since the Farming Zone is the type 2 category, and there is no other overlapping zone, the whole area of both circles is calculated producing the influencing factor which is IF = 0.50 for NSR 1.

Determination of zoning level for the noise sensitive receiver identified in the Rural Living Zone, the residential premise at 21 Veal Road (NSR 2) is outlined in the Figure 4 below.

Figure 4: NSR 2 - Rural Living Zone – type 1 category for calculation of zoning level

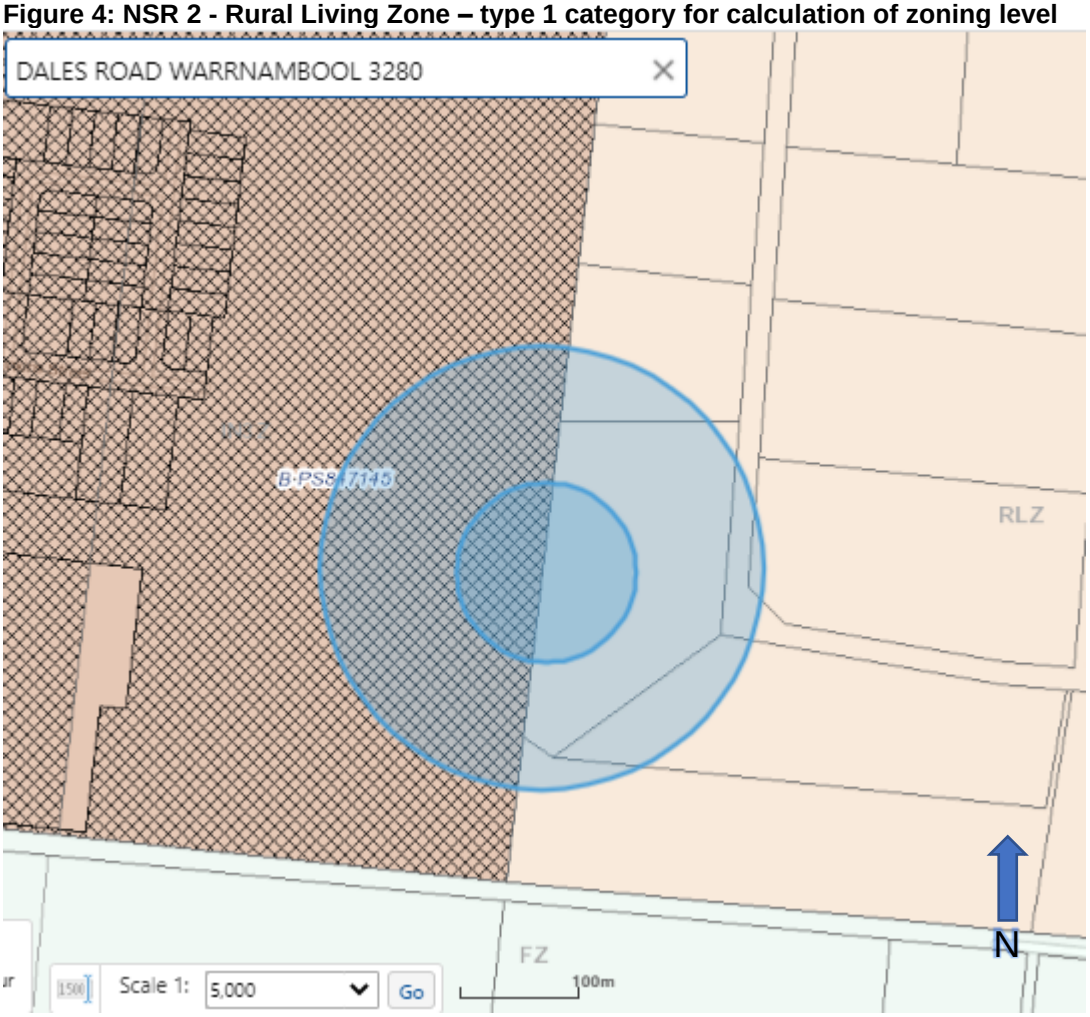


Table 2: Calculation of zoning levels - NSR 2

21 Veal Road - NSR 2		IF	Zoning level
Day period	07:00 - 18:00	0.23	**54**
Evening period	18:00 - 22:00	0.23	**48**
Saturday	07:00 - 18:00	0.23	**54**
Sunday	07:00 - 22:00	0.23	**43**
Night period	22:00 - 07:00	0.23	**43**

Area	400 m		Total
Type 1	Type 2	Type 3	
0	62790	0	125581
Area	140 m		Total
Type 1	Type 2	Type 3	
0	6700	0	15364
IF	**0.23**		

The Rural Living Zone is a type 1 zone category, and Industrial 3 Zone, the shaded area in the Figure 4 above is type 2 zone category.

Only type 2 and type 3 zone categories are used for calculation of influencing factor. Since the shaded area is Industrial 3 Zone (IN3Z) type 2 category, the area of IN3Z is used for calculation.

The influencing factor is 0.23 for NSR 2.

4.2.2 Determination of noise limits

The determination of noise limits is influenced by background level which can be neutral, high or low.

The Protocol states that the background is:

a. for the day period the background level is –
   i. neutral when it is at least 6 dB, and no more than 12 dB, below the zoning level;
   ii. high when the background level plus 6 dB exceeds its respective zoning level; and
   iii. low when the background level is 13 dB or more below the zoning level.
b. for the evening and night periods the background level is –
   i. neutral when it is at least 3 dB and no more than 9 dB below the zoning level;
   ii. high when the background level plus 3 dB exceeds the zoning level; and
   iii. low when the background level is 10 dB or more below the zoning level.

For the noise sensitive receiver at 140 Boiling Down Road, (NSR 1) the background is classified as per Table 2 below.

Table 3: Background level classification – NSR 1

Period	Zone level	Background	Classification
Day	59	43	Low
Evening	53	38	Low
Night	48	33	Low

For the noise sensitive receiver at 21 Veal Rd, (NSR 2) the background is classified as per Table 3 below.

Table 4: Background level classification – NSR 2

Period	Zone level	Background	Classification
Day	54	44	Neutral
Evening	48	39	Neutral
Night	43	37	Neutral

The background noise level is low for the day, evening and night periods at NSR 1, and neutral for the day, evening periods and night period at NSR 2.

Therefore, the noise limits are calculated as per the Protocol's methodology as follows:

Noise Limits – Urban area method – NSR 1

Day period = ½ (zoning level + background level) + 4.5 = ½ (59 + 43) + 4.5 = 56 dB(A)
Evening period = ½ (zoning level + background level) + 3 = ½ (53 + 38) + 3 = 49 dB(A)
Night period = ½ (zoning level + background level) + 3 = ½ (48 + 33) + 3 = 44 dB(A)

Noise Limits – Urban area method – NSR 2

Day period = zoning level since the background is neutral = 54 dB(A)
Evening period = zoning level since the background is neutral = 48 dB(A)
Night period = zoning level since the background is neutral = 43 dB(A)

4.3 Noise limits at nearest noise sensitive receivers

The noise limits are outlined in the Table 4, below for NSR 1 and NSR 2 locations.

Table 5: Noise limits

NSR 1 – 140 Boiling Down Road	Time period	Noise limit, dB(A)
Day period	07:00 – 18:00	56 dB(A)
Evening period	18:00 – 22:00	49 dB(A)
Night period	22:00 – 07:00	44 dB(A)

NSR 2 – 21 Veal Road	Time period	Noise limit, dB(A)
Day period	07:00 – 18:00	54 dB(A)
Evening period	18:00 – 22:00	48 dB(A)
Night period	22:00 – 07:00	43 dB(A)

5.0 Predicted effective noise levels of the proposed asphalt operation – noise modelling

The proposed asphalt batch plant includes the following noise generating equipment and activities with sound power levels.

- Drum Kiln – corresponds to sound power of 101 dB
- Stack exhaust – corresponds to sound power 110 dB
- Vibrating screen – corresponds to sound power of 100 dB
- Truck loading under silos – corresponds to sound power of 90 dB
- Tower sources – combined sound power level corresponds to 113 dB
- Crusher – combined sound power level corresponds to 116 dB
- Truck exiting site (accelerating) – corresponds to sound power of 86 dB

The total sound power level of the plant is 119 dB.

The terrain at the proposed sound propagation site is relatively flat, so minor adjustments to the terrain elevation has been made, which is approximately 2 m difference between the nearest noise sensitive receivers and the proposed development site.

The sound pressure prediction model, MAS Environmental 2021 (version 3.6 – professional) was used to predict sound pressure levels generated from the proposal. The model uses ISO 9613-1:1996 (barrier and air absorption), and ISO 9613-2:1996 (ground reflection and absorption) Standards for the calculation.

Assumptions used in modelling of sound pressure levels at noise sensitive receivers are as follows:

1. At a distance, the operation is assumed as one continuous source.
2. Ground is assumed half hard / half soft (asphalt / grass surface)'
3. Terrain is flat – adjustment +/- 2m elevation
4. Air temperature 20^0C
5. Humidity 70%
6. Octave band frequency analysis of sound power levels for noise modelling has been used from field measurements at Fulton Hogan site, Dandenong South on 7th October 2021 and supplied documentation, Fulton Hogan - BF1800 Facility sound data; please see Appendix V for more details.
7. Distances to the nearest noise sensitive receivers have been estimated as follows:
    a. NSR 1 – 140 Boiling Down Rd (Farming Zone) – approximately 650 m
    b. NSR 2 – 21 Veal Rd (Rural Living Zone) – approximately 700 m
8. Model adjustment for the distance is +/-3dB

Average height of source and receiver	Distance between source and receiver	
	0 - 100m	100m - 1km
0 - 5m	+-3dB	+-3dB
5 - 30m	+-1dB	+-3dB

A cross check of the model has been done at Fulton Hogan asphalt batching plant at 10-30 Dana Court, Dandenong South, particularly for entering and exiting traffic, in the Appendix VI.

5.1 – Noise modelling of the proposed asphalt batch plant at Lot 58 Mason Street, Warrnambool

The predicted sound pressure levels without any model adjustment are calculated at nearest noise sensitive receivers NSR 1 and NSR 2 at nominal north-west and north-east respectively of the proposed operation are presented in the Figures 5 and 6 overleaf.

Figure 5: Predicted noise levels at nearest noise sensitive receivers – crusher, asphalt manufacturing and deliveries operation

Figure 6: Predicted noise levels – no crusher operation, asphalt manufacturing and deliveries

Figure 5 above and Table 6 underneath, show predicted noise levels at nearest sensitive receivers as calculated without model adjustments when the crushing, asphalt manufacturing and deliveries are in operation.

Table 6: Predicted noise levels at nearest noise sensitive receivers when all activities are in operation

Noise Sensitive location	Predicted sound pressure level, as per model calculation dB(A)
NSR 1	49 dB(A)
NSR 2	43 dB(A)

Figure 6 above and Table 7 below, show noise levels at the two nearest noise sensitive receivers as calculated without model adjustments when the crusher is not in operation while asphalt manufacturing and deliveries are in operation.

Table 7: Predicted noise levels when the crusher is not in operation

Noise Sensitive location	Predicted sound pressure level, as per model calculation dB(A)
NSR 1	39 dB(A)
NSR 2	39 dB(A)

5.2 – Predicted effective noise levels

The predicted effective noise level from the proposed facility at nearest noise sensitive receivers is calculated as per the Noise Protocol methodology.

The Protocol dictates a cumulative adjustment to the L_{Aeq} shall be made, when required, for noise character, duration, and measurement position to determine the effective noise level according to the following formula:

Effective noise level = $L_{Aeq} + A_{tone} + A_{dur} + A_{int} + A_{ref} + A_{ind} + A_{imp}$

The Table 8 below presents predicted effective noise level when all activities are considered, such as crushing, asphalt manufacturing and deliveries.

Table 8: Predicted effective noise level at nearest noise sensitive receivers when the crusher is in operation

NSR 1 – 140 Boiling Down Rd		**Adjustment**	**Effective noise level, dB(A)**
Predicted (L_{Aeq})	49 dB(A)	49	
Tonality (A_{tone})	Operation	2	
Duration (A_{dur})	Continuous	0	
Intermittency (A_{int})	None	0	
Reflection (A_{ref})	>3 m	0	
Indoor (A_{ind})	Outside	0	
Model adjustment	<1000 m	3	
Predicted effective noise level (L_{Aeq})			**54**

NSR 2 – 21 Veal Road		**Adjustment**	**Effective noise level, dB(A)**
Predicted (L_{Aeq})	43 dB(A)	43	
Tonality (A_{tone})	Operation	2	
Duration (A_{dur})	Continuous	0	
Intermittency (A_{int})	None	0	
Reflection (A_{ref})	>3 m	0	
Indoor (A_{ind})	Outside	0	
Model adjustment	<1000m	3	
Predicted effective noise level (L_{Aeq})			**48**

We have added 2dB to the calculated noise levels to compensate for a tonal character and 3dB for distance adjustment and come up with the predicted effective noise levels at NSR 1 as 54 dB(A) and at NSR 2 as 48 dB(A) respectively.

For a full list of identified noise sensitive receivers and predicted effective noise levels at each receptor please see Appendix VII.

Table 9 below present predicted effective noise level when the crusher is not in operation, but asphalt manufacturing and deliveries are.

Table 9: Predicted effective noise level when glass crusher is not in operation

NSR 1 – 140 Boiling Down Rd		Adjustment	Effective noise level, dB(A)
Predicted (L_{Aeq})	39 dB(A)	39	
Tonality (A_{tone})	Operation	2	
Duration (A_{dur})	Continuous	0	
Intermittency (A_{int})	None	0	
Reflection (A_{ref})	>3 m	0	
Indoor (A_{ind})	Outside	0	
Model adjustment	<1000m	3	
Predicted effective noise level (L_{Aeq})			**44**

NSR 2 – 21 Veal Rd		Adjustment	Effective noise level, dB(A)
Predicted (L_{Aeq})	39 dB(A)	39	
Tonality (A_{tone})	Operation	2	
Duration (A_{dur})	Continuous	0	
Intermittency (A_{int})	None	0	
Reflection (A_{ref})	>3 m	0	
Indoor (A_{ind})	Outside	0	
Model adjustment	<1000m	3	
Predicted effective noise level (L_{Aeq})			**44**

We have applied the same principle as above by adding 5 dB to the calculated noise levels and come up with predicted noise levels of 44 dB(A) at NSR 1 and NSR 2 when all other activities are present at the asphalt batching plant, exempt crusher operation.

5.3 – Compliance with Noise Protocol

We have compared the predicted effective noise levels with the Protocol's limits for the day, evening, and night period of the proposed operation for different operation times for the crusher, asphalt manufacturing and deliveries.

Crusher, asphalt manufacturing and deliveries

Table 10: Compliance with the Noise Protocol's noise limit when the crusher is in operation

NSR 1	Period of FH operation / glass crusher	Predicted Effective noise level, dB(A)	Noise limit, dB(A)	Compliance Yes /No
Day period*	07:00 – 18:00	54	56	**Yes**
Evening period	N/A	N/A	49	**N/A**
Night period*	N/A	N/A	44	**N/A**

NSR 2	Period of FH operation / glass crusher	Predicted Effective noise level, dB(A)	Noise limit, dB(A)	Compliance Yes /No
Day period*	07:00 – 18:00	48	54	**Yes**
Evening period	N/A	N/A	48	**N/A**
Night period*	N/A	N/A	43	**N/A**

*The crusher operation is from 07:00 am unit 18:00 pm hours Monday to Saturday.

The crusher operation will be compliant for the day period.

Asphalt manufacturing and deliveries – no crusher operation

In the Table 11 the predicted effective noise levels are compared with the Protocol's noise limits when the crusher is not in operation, but asphalt manufacturing and deliveries are.

Table 11: Fulton Hogan proposed asphalt batching plant without the glass crusher operation

NSR 1 / NSR 2	Time period	Predicted Effective noise level, dB(A)	Noise limit, dB(A)		Compliance Yes /No
			NSR 1	NSR 2	
Day period	07:00 – 18:00	44	56	5 4	**Yes**
Evening period	18:00 – 22:00	44	49	48	**Yes**
Night period	22:00 – 07:00	44	44	43	**Marginal**

We consider that the asphalt manufacturing operation complies with the day, evening period limits. The operation under continuous operation is marginal with the night period noise limits. As this is marginal under conditions of full production and normal neutral weather conditions, we suggest that a verification be undertaken some 6 months after the plant is fully operational. However, we suggest that prior to any assessment being undertaken the occupants of the 2 NSAs be interviewed and only undertake the assessment if the occupants feel there is any concern on their behalf.

6.0 Discussion and recommendations

Audiometric & Acoustic Services has undertaken an environmental noise assessment including background measurements from Wednesday, 29th September to Monday, 11th October 2021 at the nearest residential noise sensitive receiver of the proposed development at 58 Mason Street, Warrnambool.

The site is surrounded by Farming Land and Rural Living Zone at nominal north-west and north-east respectively.

The proposed operation of the facility is 24 hours, seven days per week while a crusher operation have been proposed to run on average twice a week from 07:00am to 18:00pm.

The modelled sound power levels have been used from the supplied documentations as listed in the Reference section of this document, along with filed noise measurements at the Fulton Hogan, 10-30 Dana Court, Dandenong South site.

We have calculated predicted sound pressure levels at the nearest noise sensitive receivers, identified at 140 Boiling Down Road, a residential premise on the zoned Farming Land, a type 2 category at nominal north-west approximately 650m from the proposed development and 21 Veal Rd situated in the Rural Living Zone, a type 1 category land, approximately 700m from the development.

We have used MAS Environmental 2021 (version 3.6 – professional) to predict sound pressure levels generated from the proposed operation. The noise prediction model uses ISO 9613-1:1996 (barrier and air absorption), and ISO 9613-2:1996 (ground reflection and absorption) Standards for calculation.

We have added 2dB to predicted noise levels to compensate for a tonal character of the proposed operation of the crushing facility which would be received at nearest noise sensitive receivers, and 3 dB for noise prediction model adjustment.

We have calculated the proposed operation as follows:

a. Crusher, asphalt manufacturing and deliveries – full production
b. Asphalt manufacturing and deliveries – no crushing

Based on the calculations and field measurements the proposed asphalt plant at 58 Mason Street, Warrnambool will comply with Noise Protocol's noise limits at the nearest noise sensitive receivers

We recommend that the crushing operations do not start before 07:00 am, Monday to Saturday.

We understand that the crushing operations are not proposed on Sundays.

We consider that predicted effective noise levels at noise sensitive receivers are results of the worst-case scenario when the proposed asphalt plant will be in full production.

In addition to above we recommend that the Regulator contemplate that the noise assessment of the facility should be undertaken after six months of its operation to confirm compliance with a permit's noise limits, which shall be based on the Noise Protocol recommended noise limits outlined in this document and the Regulatory considerations and exemptions that have been applied to the permit.

However, we do suggest that this assessment only be undertaken if the occupants of the two NSRs believe there is any concern for night period operations.

Please feel free to contact us should any additional detail be required. This applies to any parties that have legitimate access to this report.

Respectfully,

Svetimir Ristic, BEng (Env), GradDiplEnvSc, Acoustic Consultant

Proof read by Scott Henderson, M.A.A.S on 27th January 2022

Attachments

Technical Appendix I
Technical Appendix II
Appendix III - Weather for Warrnambool
Appendix IV - Background noise data
Appendix V - Noise modelling input
Appendix VI - Noise assessment: Futon Hogan – Dandenong South site, No.10-30 Dana Court
Appendix VII – Noise impact at surrounding noise sensitive receivers

Reference:

VIC EPA Publication 1826.4 (the Protocol) – Noise limit and assessment protocol for the control of noise from commercial, industrial and trade premises and entertainment venues (1st July 2021)

A&AS noise measurement, Wednesday, 29th September to Monday, 18th October 2021 – file 21098

A&AS noise measurement at Fulton Hogan Dandenong South site, Wednesday, 6th to Monday, 11th October 2021 – file 21098 Dandenong

Fulton Hogan documentation used for the environmental noise assessment as supplied:

31403 Fulton Hogan Koroit glass crusher 2020 dust noise report
BG1800 XL _Fulton Hogan Warambool
Plant data
FH62513-001-002 - Proposed Plant Components Map (for Noise Assessment)
FH62513-001-0013 - Warrnambool Depot - Proposed Site Layout 3_RevE
Fulton Hogan - BG1800 Facility sound data

TECHNICAL APPENDIX I

Definitions of Terminology

A-weighted	means frequency weighted as specified in Australian Standard 1259-1982 - Sound Level Meters, published by the Standards Association of Australia.
Authority	means the Environment Protection Authority constituted under the Act.
Background level	for a day, evening or night period means the arithmetic average of the L_{A90} levels for each hour of that period for which the commercial, industrial or trade premises under investigation normally operates. The background level shall include all noise sources except noise from commercial, industrial or trade premises which appear to be intrusive at the point where the background level is measured.
Beneficial use	means a use of the environment or any element or segment of the environment which is conducive to public benefit, welfare, safety or health and which requires protection from the effects of the emission of noise.
Commercial, industrial or trade premises	means any premises except: (a) residential premises as defined in section 48A of the Act; (b) a street or road, including every carriageway, footpath, reservation and traffic island on any street or road; (c) a tram, light rail or railway line not being a siding, marshalling yard or maintenance depot of any tram, light rail or railway line; and (d) the premises situated at Lower Esplanade, St Kilda and known as “Luna Park” and being the whole of the land more particularly described in Certificate of Title Volume 1204 Folio 109.
Derived noise limit	means the maximum effective noise level allowed at a derived point and is determined using the method set out in Schedule D.
Derived point	means a point used as a substitute measurement point to facilitate the assessment of noise from commercial, industrial or trade premises.
Effective noise level	means the level of noise emitted from the commercial, industrial or trade premises and adjusted if appropriate for character and duration.
Extraneous noise	means any noise which is not part of the noise being measured from the premises under consideration. Extraneous noise includes the effect of wind on any vegetation and on the microphone diaphragm and noise from aircraft and trains. Noise from animals shall be classified as extraneous noise unless their presence on the premises is directly associated with the trade or business conducted on the premises.
Fast F	means the time-weighting characteristic of a sound level meter as specified in Australian Standard 1259-1982 - Sound Level Meters, published by the Standards Association of Australia.
Habitable room	means any room other than a kitchen, storage area, bathroom, laundry, toilet or pantry.

Impulse I	mean the time-weighting characteristic of a sound level meter as specified in Australian Standard 1259-1982 - Sound Level Meters, published by the Standards Association of Australia.
L_{Aeq}	means equivalent continuous A-weighted sound pressure level and is the value of the A-weighted sound pressure level of a continuous steady sound that has the same acoustic energy as a given time-varying A-weighted sound pressure level when determined over the same measurement time interval.
L_{A90}	means the A-weighted sound pressure level which is exceeded for 90 per cent of the time interval considered.
Major premises	means commercial, industrial or trade premises that are prescribed as schedule three premises by the Environment Protection (Scheduled Premises and Exemptions) Regulations 1996.
Measurement point	means a point at which the microphone is located to measure the effective noise level or the background level.
Minor premises	means commercial, industrial or trade premises not being a major premises.
Noise limit	means the maximum effective noise level allowed at a measurement point in a noise sensitive area.
Noise sensitive area	means: (a) that part of the land within the apparent boundaries of any piece of land which is within a distance of 10 metres outside the external walls of any of the following buildings - Dwelling (except Caretaker's House) Residential Building (b) that part of the land within the apparent boundaries of any piece of land on which is situated any of the following buildings which is within a distance of 10 meters outside the external walls of any dormitory, ward or bedroom of such buildings - Caretaker's House Hospital Hotel
Slow S	means the time-weighting characteristic of a sound level meter as specified in Australian Standard 1259-1982 - Sound Level Meters, published by the Standards Association of Australia.
$L_{A, max}$:	The A-weighted maximum sound pressure level, measured using the 'F' time response. The $L_{A, max}$ should not be confused with the 'recommended maximum noise levels' in this document, which are an adjusted LAeq (an energy average measurement).

Recommended level/Recommended maximum noise level:
The noise levels that should not be exceeded at noise-sensitive areas.

Noise-sensitive area: These are mainly homes, but can include, for example, motels and tourist establishments. They do not include schools. The noise is assessed in outdoor locations at these premises.

Metropolitan region: The SEPP N-1 area of application, as defined in SEPP N-1. It covers much of, but not all of the current greater Melbourne area. See map in Figure 2.

Background level: is the sound of the normal quiet state of the area without the presence of intrusive, man-made noise sources. Distant traffic is included in the background because it is so widespread. Background level assessments may need to be conducted early in project planning to determine the recommended levels. They are required in major urban areas, and may be applied in 'background-relevant areas'.

Octave-band levels: The pitch or frequency of sound, divided into octave bands for the purposes of design and assessment. Each octave band represents a frequency range, from low to high. A design based on octave-band criteria enables more targeted control of low-frequency noise.

TECHNICAL APPENDIX II

Equipment Used

SVAN 957	Type 1 Sound Analyser Serial No. 14578
Aco Pacific	Type 7052H Microphone Serial No. 40821
SVAN	Windshield

NATA Laboratory calibration due 22nd September 2021

Bruel & Kjaer	Acoustic Calibrator Serial No. 1441408 Type 4230; 94dB @ 1000Hz

NATA Laboratory calibration due 22nd September 2020

NOISE LOGGERS

Warrnambool site

140 Boiling Down Road

Data logging –
from 29th September to 4th October

Noise Sentry Type 1 Sound Analyser

Serial No. CnLcr%…8hRmD

from 4th October to 11th October

Noise Sentry Type 1 Sound Analyser

Serial No.CPFcr… yjxID

1 Mason Street

Data logging –
from 29th September to 4th October

Noise Sentry Type 1 Sound Analyser

Serial No. ANjW…8DZND

from 4th October to 11th October

Noise Sentry Type 1 Sound Analyser

Serial No.Cnh8…8JRFD

Fulton Hogan, 10-30 Dana Court, Dandenong South

Data logging –
from 6th October to 11th October

Logger 1

Noise Sentry Type 1 Sound Analyser

Serial No. CnLcr….8hRnD

Logger 2

Noise Sentry Type 1 Sound Analyser

Serial No. ANjW…8DZND

Logger 3

Noise Sentry Type 1 Sound Analyser

Serial No. CFt2…6jxnD

Field calibrated

29th September 2021 – offset – none

11th October 2021 – offset – 0.3dB

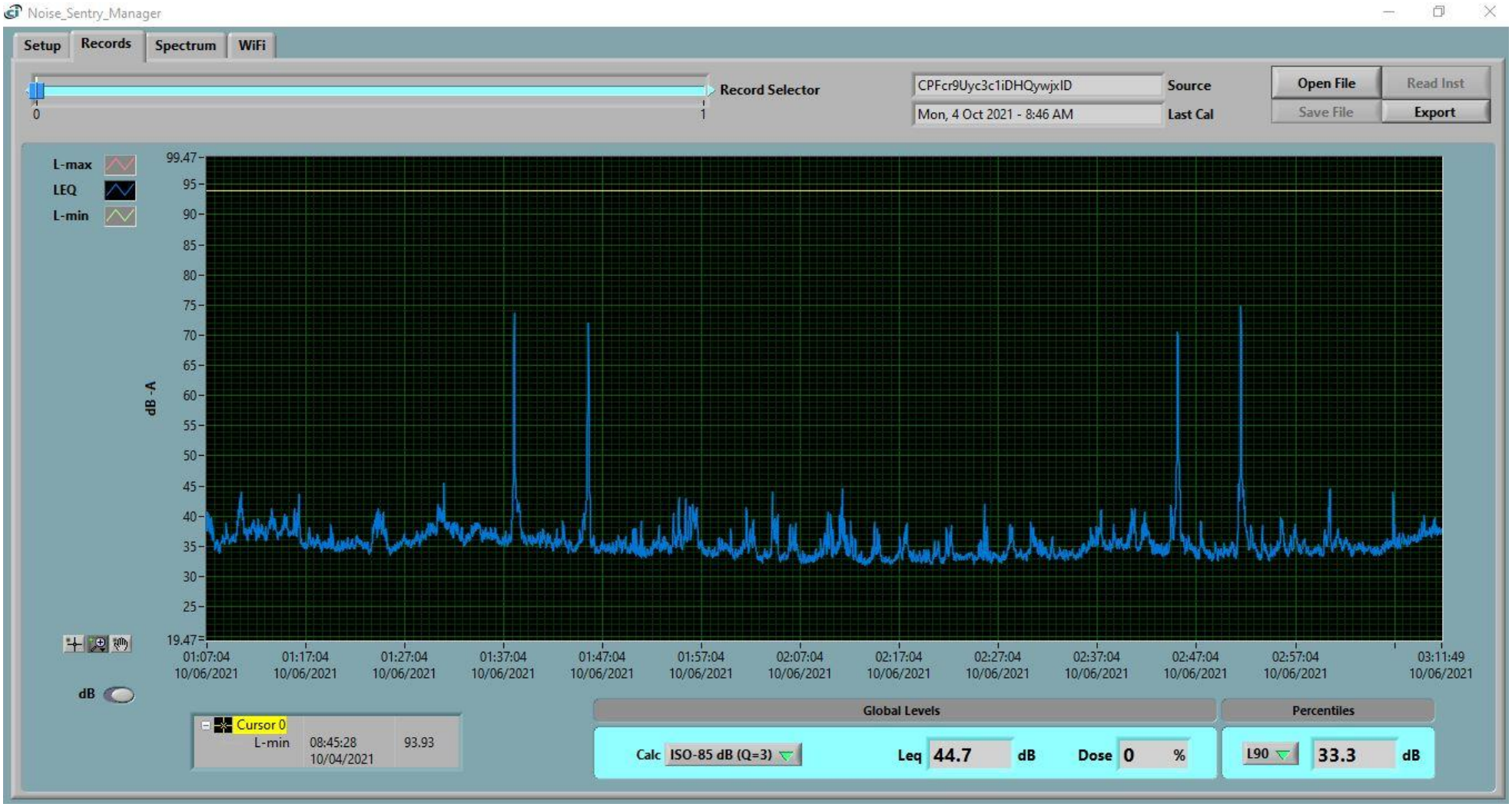
The sound level meter and loggers were calibrated before and after the measurements. No significant change was found to have occurred.

APPENDIX III – Warrnambool weather - October 2021

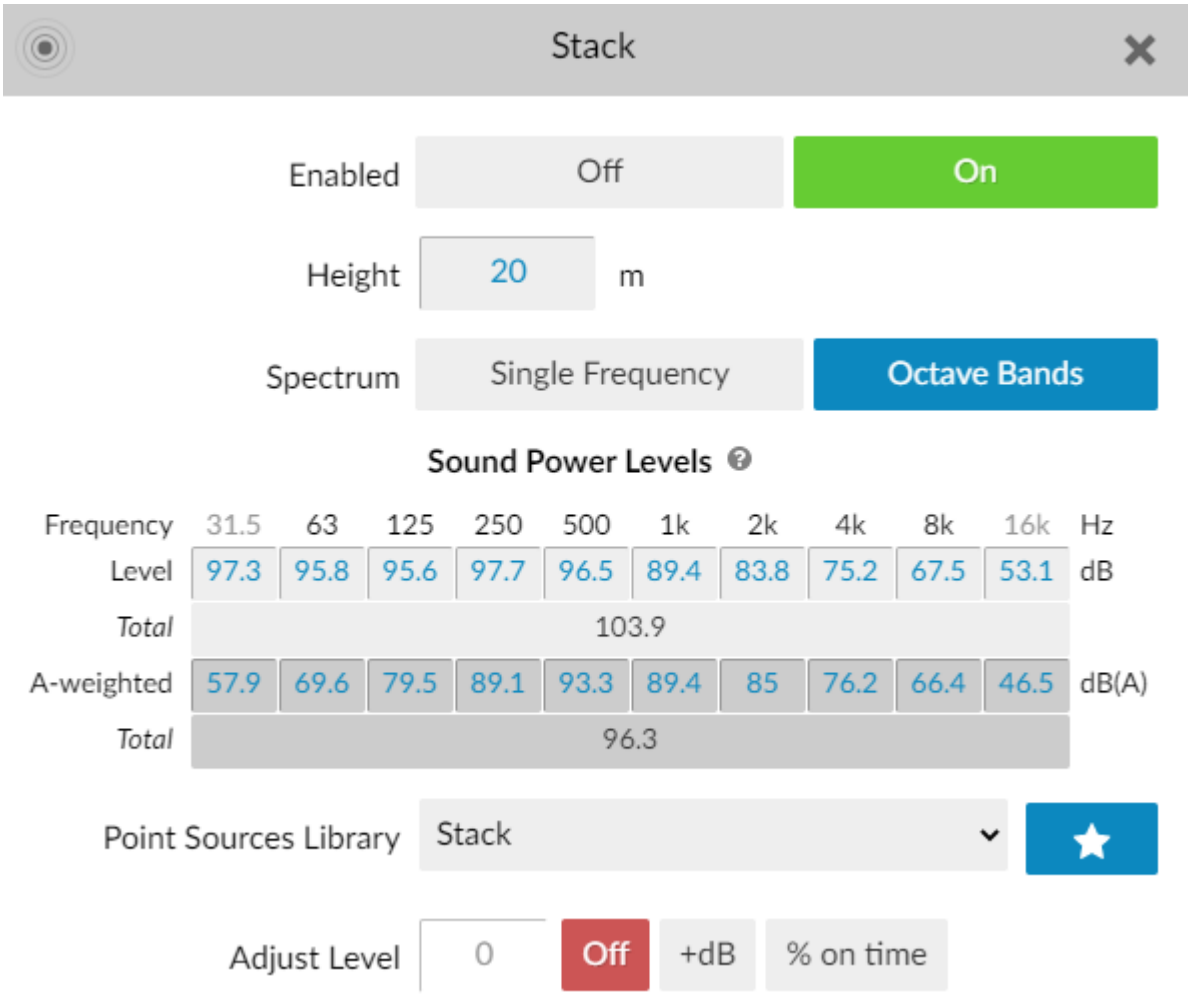
Warrnambool, Victoria
October 2021 Daily Weather Observations

Date	Day	Temps		Rain	Evap	Sun	Max wind gust			9 am						3 pm					
		Min	Max				Dir	Spd	Time	Temp	RH	Cld	Dir	Spd	MSLP	Temp	RH	Cld	Dir	Spd	MSLP
		°C	°C	mm	mm	hours		km/h	local	°C	%	8th		km/h	hPa	°C	%	8th		km/h	hPa
1	Fr	12.2	16.9	4.6			SSE	52	00:48	13.8	100		SSE	24	1005.3	15.4	100		S	22	1004.8
2	Sa	11.9	16.3	0			SW	30	06:06	12.7	100		SSW	17	1008.8	14.3	100		SSW	24	1007.1
3	Su	9.9	17.8	0			NNW	54	11:48	10.7	100		NE	19	1003.2	15.9	100		N	20	999.3
4	Mo	9.0	14.4	2.4			NW	67	10:10	12.2	92		NW	37	996.9	10.2	96		WNW	39	997.8
5	Tu	8.7	15.1	10.0			W	67	01:45	11.2	77		W	37	1009.1	13.6	75		W	35	1012.6
6	We	3.4	18.2	0			WSW	61	22:04	10.1	98		N	20	1013.1	16.2	76		NW	11	1008.7
7	Th	6.3	14.6	4.6			WSW	50	11:44	10.4	92		WNW	17	1012.9	12.9	73		WSW	31	1015.0
8	Fr	5.8	18.4	0			NW	48	14:21	10.4	100		N	24	1015.8	17.8	63		NNW	31	1012.2
9	Sa	6.3	19.1	0			WSW	44	16:26	12.5	76		NNW	15	1011.3	15.2	87		SW	33	1010.3
10	Su	4.7	13.9	2.4			SW	48	14:20	10.7	82		SSW	19	1015.9	12.3	74		SW	30	1015.2
11	Mo	3.6	13.4	2.2			S	43	14:16	8.5	89		SSW	15	1021.0	12.7	70		S	20	1020.3
12	Tu	0.5	19.5	0			NNE	41	13:02	8.9	88		ESE	13	1017.8	18.2	55		NE	24	1012.6

APPENDIX IV – background data – L_{A90} dB(A) for the night of 6th October 2021 at NSR 1



APPENDIX V – noise modelling input



Drum Kiln

Enabled: Off | On

Height: 2 m

Spectrum: Single Frequency | Octave Bands

Sound Power Levels

Frequency	31.5	63	125	250	500	1k	2k	4k	8k	16k	Hz
Level	95.4	96.2	92	89.4	84.6	81.6	82.1	81.6	74.8	63.6	dB
Total	100.4										
A-weighted	56	70	75.9	80.8	81.4	81.6	83.3	82.6	73.7	57	dB(A)
Total	89.4										

Point Sources Library: Drum Kiln

Adjust Level: 0 | Off | +dB | % on time

Vibrating screen

Enabled: Off | On

Height: 1 m

Spectrum: Single Frequency | Octave Bands

Sound Power Levels

Frequency	31.5	63	125	250	500	1k	2k	4k	8k	16k	Hz
Level	87.8	87.9	84.9	83.7	84.3	82	80.7	78.5	79.7	77.1	dB
Total	94										
A-weighted	48.4	61.7	68.8	75.1	81.1	82	81.9	79.5	78.6	70.5	dB(A)
Total	88.2										

Point Sources Library: Vibrating screen

Adjust Level: 0 | Off | +dB | % on time

Truck Silo

Enabled: Off | On

Height: 2 m

Spectrum: Single Frequency | Octave Bands

Sound Power Levels

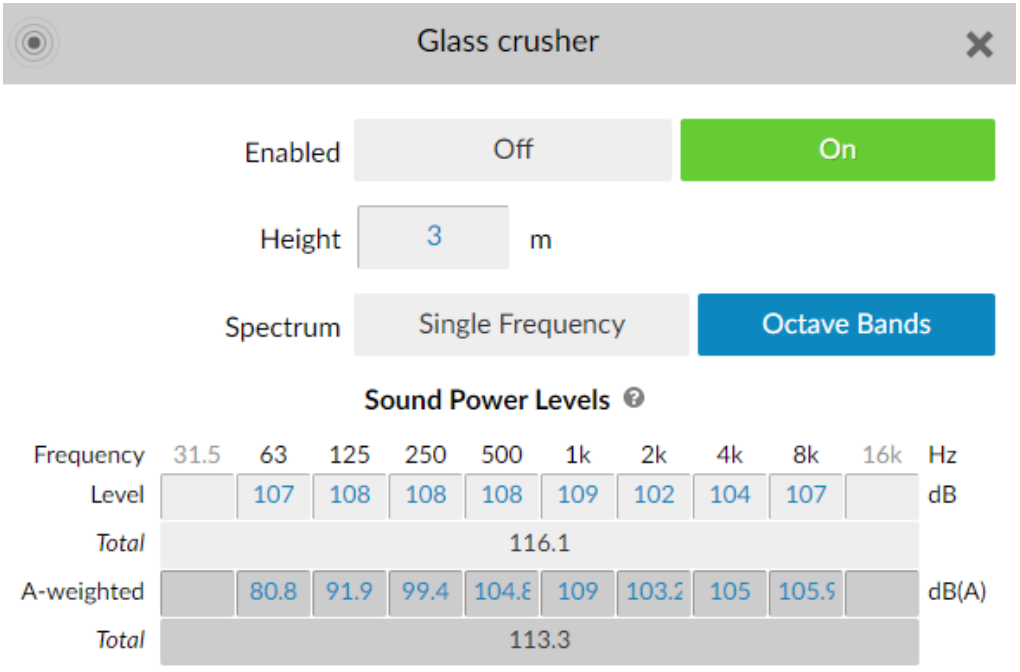
Frequency	31.5	63	125	250	500	1k	2k	4k	8k	16k	Hz
Level	87	83.4	74.7	72.5	72.7	73.6	74.8	71.2	68.4	63.3	dB
Total	89.4										
A-weighted	47.6	57.2	58.6	63.9	69.5	73.6	76	72.2	67.3	56.7	dB(A)
Total	79.9										

Point Sources Library: Truck Silo

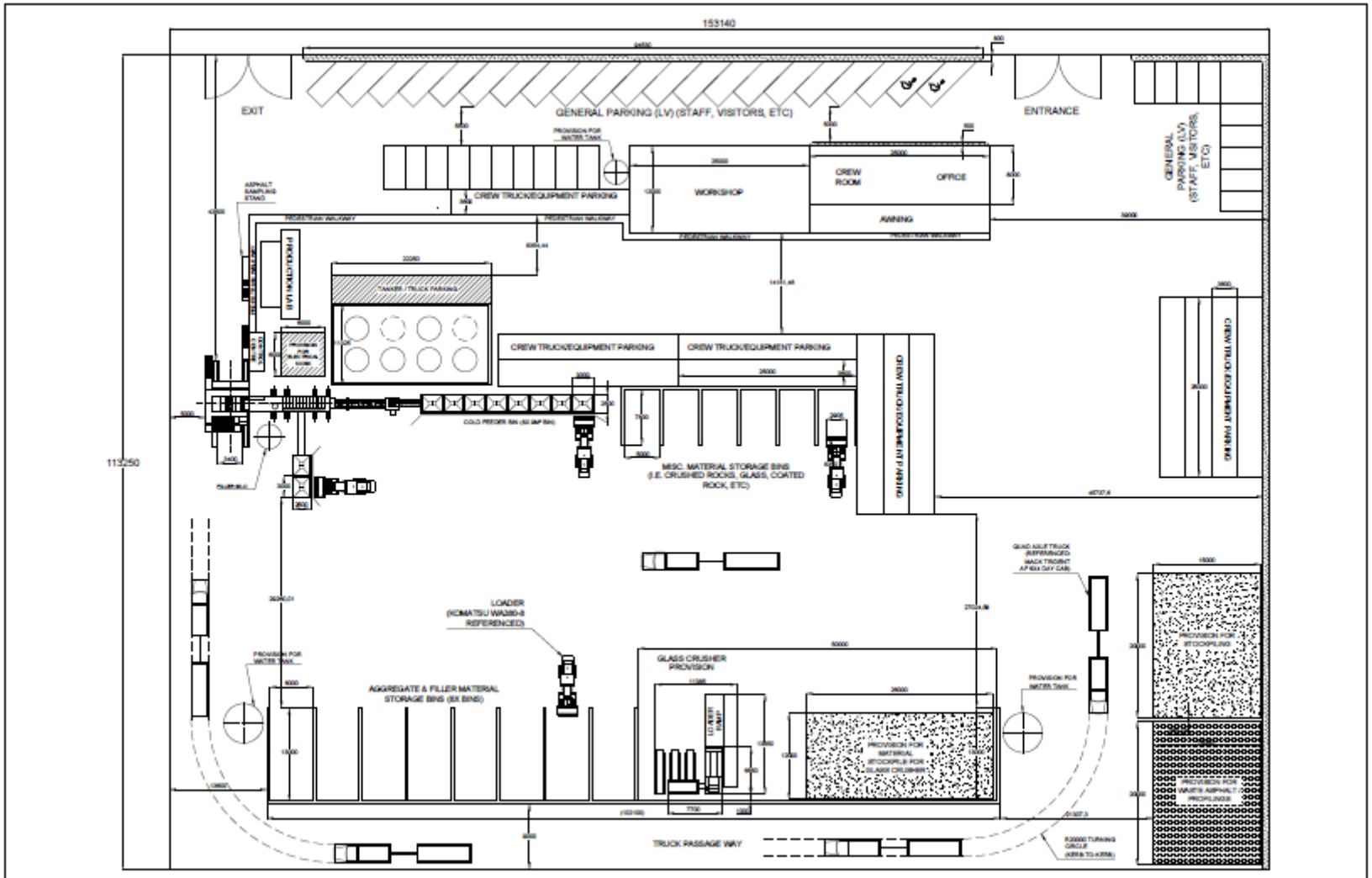
Adjust Level: 0 | Off | +dB | % on time

Octave Band Hz	Tower Sources: Elevator Drive dB	Pugmill Drive dB	Tower Screen dB
31.5			110
63	77	78	104
125	81	82	102
250	85	86	103
500	89	90	101
1000	89	90	99
2000	84	85	97
4000	81	82	94
8000	77	78	92
Overall dB	94	95	113
Overall dB(A)	92	93	104
Height (m)			
Item Quantity			1

Octave Band Hz	Recycle Feed System Sources: RAP Bin Drive dB	Collecting Tail Pulley dB	Collecting Head Pulley dB	Incl Conv Tail Pulley dB	Incl Conv Head Pulley dB	RAP Screen dB
31.5	89	93	84	93	84	62
63	87	91	77	91	77	65
125	86	88	81	88	81	68
250	87	96	79	96	79	71
500	84	91	78	91	78	77
1000	80	86	75	86	75	90
2000	79	80	72	80	72	91
4000	75	73	68	73	68	90
8000	71	63	65	63	65	91
Overall dB	94	100	88	100	88	98
Overall dB(A)	87	92	80	92	80	97
Height (m)						
Item Quantity	2	1	1	1	1	1



Site layout for Warrnambool site as supplied by the Fulton Hogan, ref. FH62513-001-0013 - Warrnambool Depot - Proposed Site Layout 3_RevD



Fulton Hogan

REVISION	DESCRIPTION	DATE
A	UPDATED PLANT LAYOUT, SITE LAYOU UPDATED TO SUIT NEW PLANT LAYOUT	19/08/2021
B	STORAGE BINS RE-ARRANGED TO SUIT PLANT LAYOUT AND TRAFFIC FLOW	25/08/2021
C	ADDED PROVISION FOR WATER TANKS, ADDED GARDEN BEDS	25/08/2021
D	ADDED 20M PROVISIONAL LAND AND UPDATED LAYOUT, UPDATED GLASS CRUSHER LAYOUT	25/08/2021

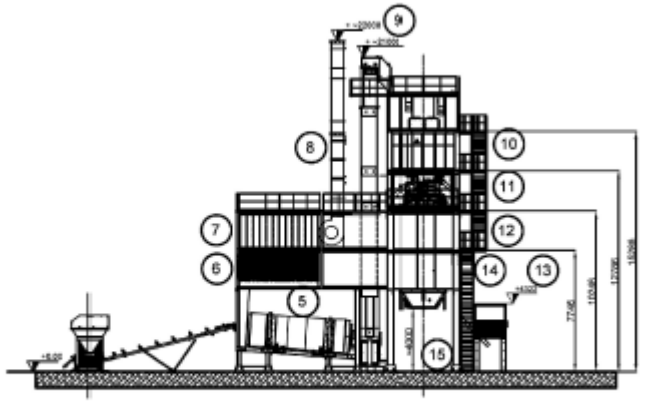
TITLE: NEW WARRNAMBOOL DEPOT PROPOSAL 3

MASON ST, WARRNAMBOOL VIC 3280

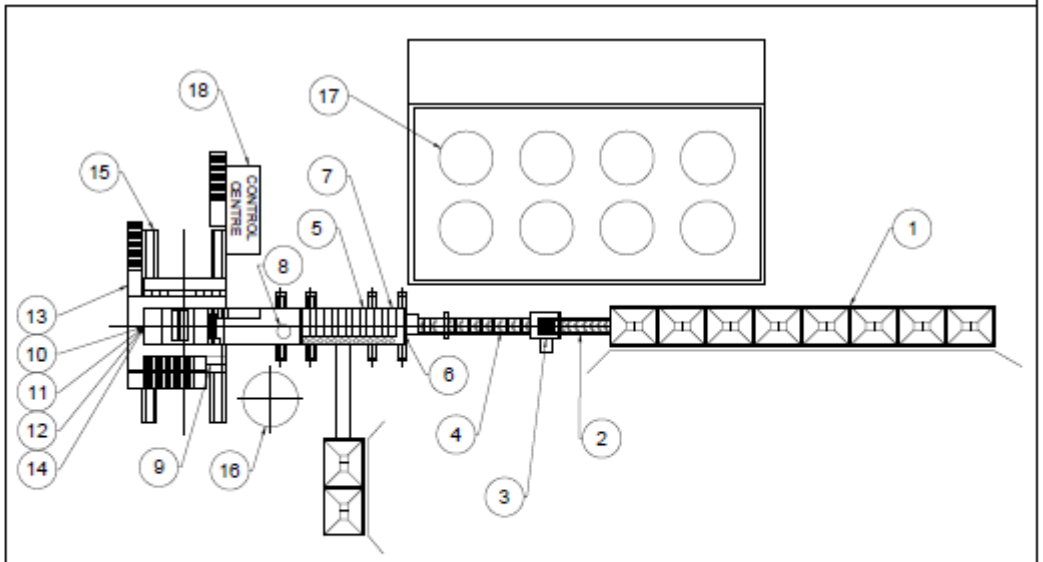
DRAWN: R. HA	SCALE: NTS	DATE: 17/08/2021
CHECKED: N. PATIL/S. OLIVA	SHEET NO: 1 OF 1	DWG NO: FH62513-001-0013

NOTE:

1. PLANT CONFIGURATION SUBJECT TO CHANGES AS PER MANUFACTURER'S REQUIREMENTS
2. SIDE ELEVATION VIEW AS PER MANUFACTURER'S STANDARD DRAWING. SIDE ELEVATION VIEW SUBJECT TO CHANGES AS PER MANUFACTURER'S REQUIREMENTS



ITEM	DESCRIPTION
1	COLD FEEDER
2	COLLECTING CONVEYOR
3	GRIZZLY FEEDER
4	CHARGING CONVEYOR
5	DRYER DRUM UNIT
6	HOPPER UNDER FILTER
7	BAG FILTER
8	CHIMNEY
9	HOT ELEVATOR
10	VIBRATING SCREEN
11	HOT MINERAL BIN
12	MIXING UNIT
13	ACCESS & PLATFORM
14	IN-LINE SILO
15	STEEL BASES
16	FILLER SILO
17	BITUMEN TANK FARM
18	CONTROL ROOM



Fulton Hogan

REVISION	DESCRIPTION	DATE
0	ORIGINAL ISSUE	01/10/2021

TITLE: PROPOSED PLANT COMPONENTS MAP

WARRNAMBOOL ASPHALT PLANT - MASON STREET, WARRNAMBOOL VIC 3280

DRAWN: R. HA	SCALE: NTS	DATE: 01/10/2021
CHECKED: N. PATIL/S. OLIVA	SHEET NO: 1 OF 1	DWG NO: FH525I3-001-002

APPENDIX VI – noise assessment

Futon Hogan – 10-30 Dana Court, Dandenong South

The assessment of noise emissions at South Dandenong site has been carried out from 4th to 9th October 2021.

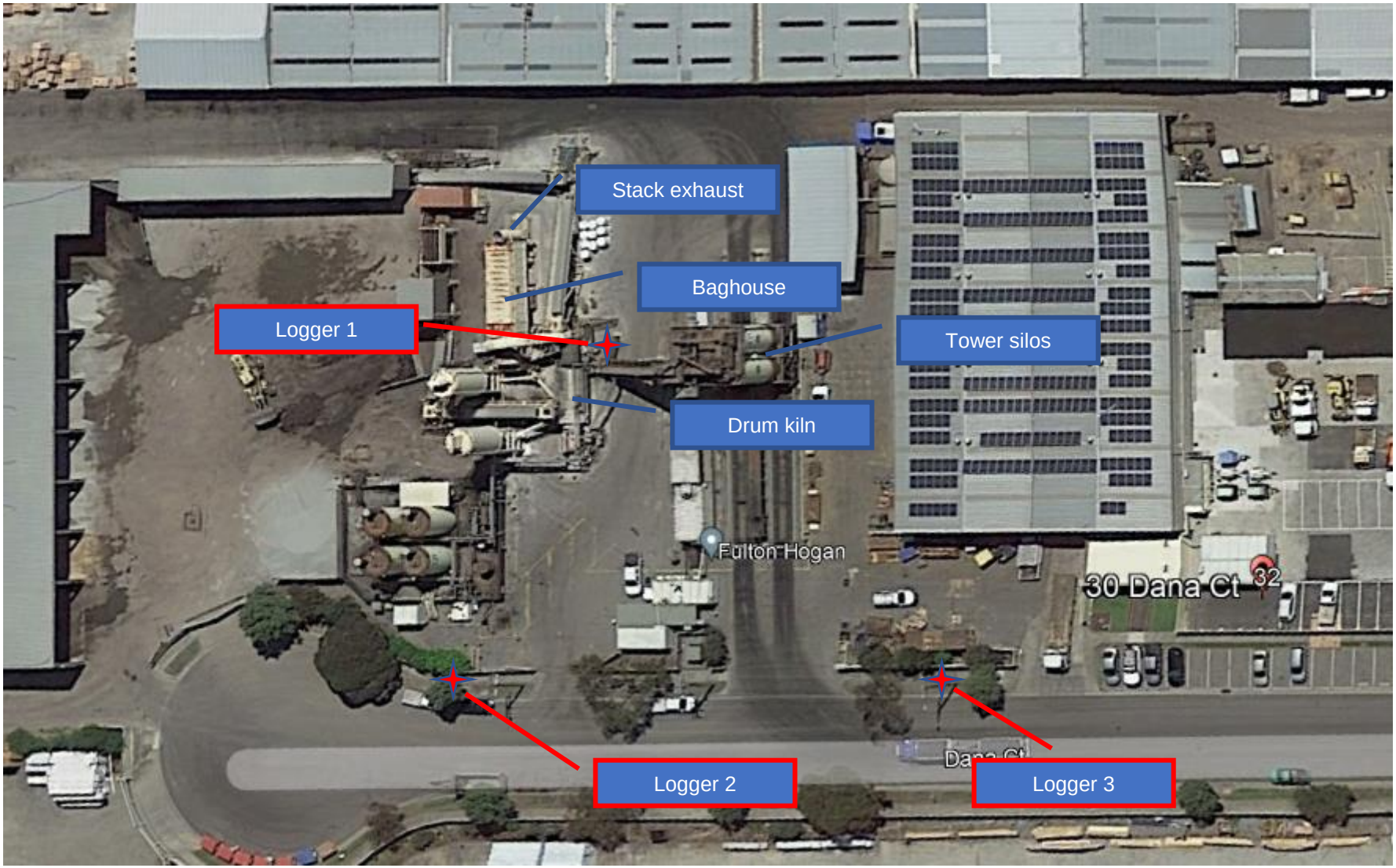
We have set three noise loggers as follows:

a. Logger 1 – inside of the asphalt plant –
b. Logger 2 – west boundary fence – trucks movement – entrance to the asphalt plant
c. Logger 3 – east boundary fence – trucks movement – exit of the asphalt plant

Position of the noise loggers is outlined in the Figure 6 overleaf.

We have considered Fulton Hogan asphalt batching plant at South Dandenong which is similar to the proposed Warrnambool plant with an exemption of the glass crusher.

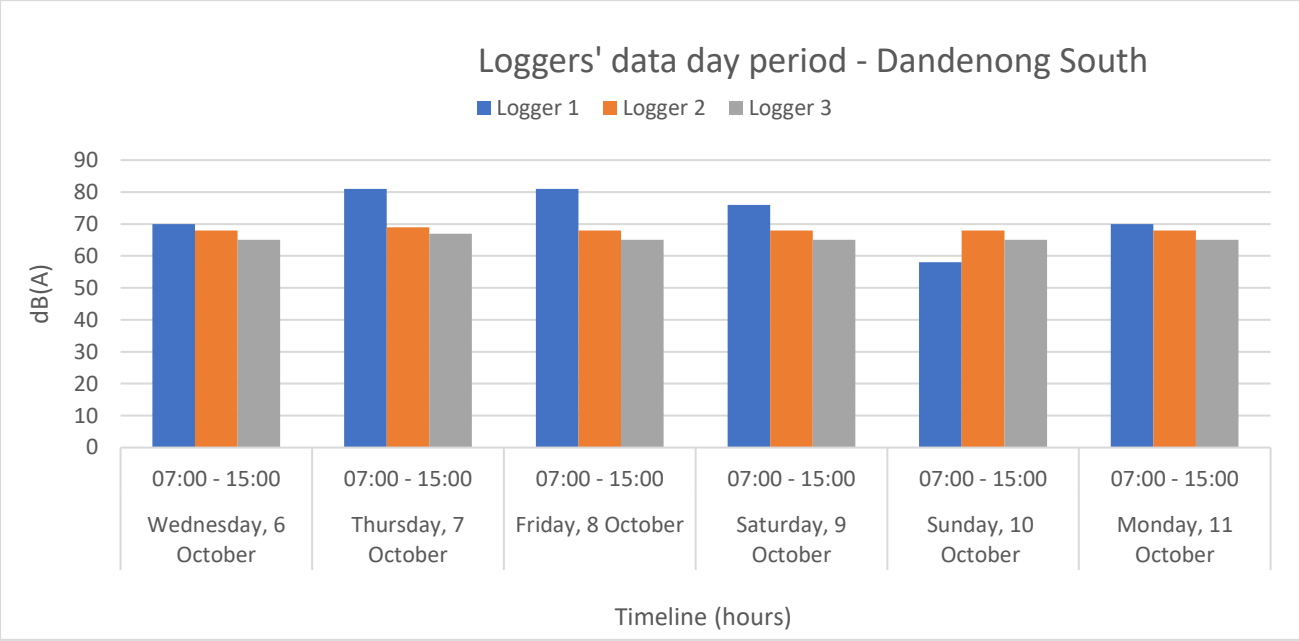
We have used this assessment as a cross check of our noise modelling, variation in the asphalt production process, and to examine truck noise impact at local environment when entering and exiting the plant.


Stack exhaust
Baghouse
Logger 1
Tower silos
Drum kiln
Fulton Hogan
30 Dana Ct
32
Logger 2
Logger 3

The following diagrams show variation in the asphalt batching process of a typical seven days period as recorded on noise loggers for day, evening and night periods.

Noise Protocol's Day period, $L_{A,eq}$

Record	Hours	Logger 1	Logger 2	Logger 3
Wednesday, 6 October	07:00 - 15:00	**70**	**68**	**65**
Thursday, 7 October	07:00 - 15:00	**81**	**69**	**67**
Friday, 8 October	07:00 - 15:00	**81**	**68**	**65**
Saturday, 9 October	07:00 - 15:00	**76**	**68**	**65**
Sunday, 10 October	07:00 - 15:00	**58**	**68**	**65**
Monday, 11 October	07:00 - 15:00	**70**	**68**	**65**
Average for the day, dB(A)		**71**	**68**	**65**

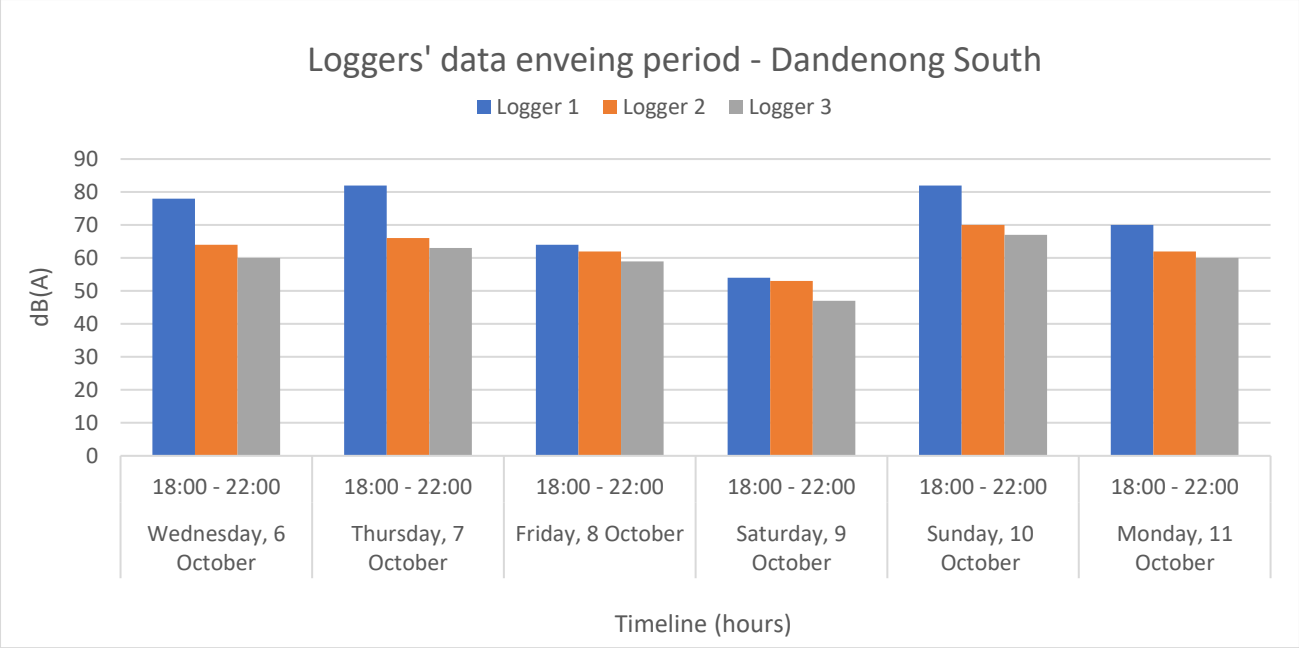


The asphalt plant was in full production on the 7th and 8th October 2021. The recorded sound pressure level was 81 dB(A) inside the premise, while Logger 2 and Logger 3 locations the sound pressure level was in the region $L_{A,eq}$ 68 dB(A) and $L_{A,eq}$ 65 dB(A) respectively, please see Table 12, above.

Logger 2 and Logger 3 were measuring sound pressure levels of trucks movements entering and exiting the premise.

Noise Protocol's Evening period, $L_{A,eq}$

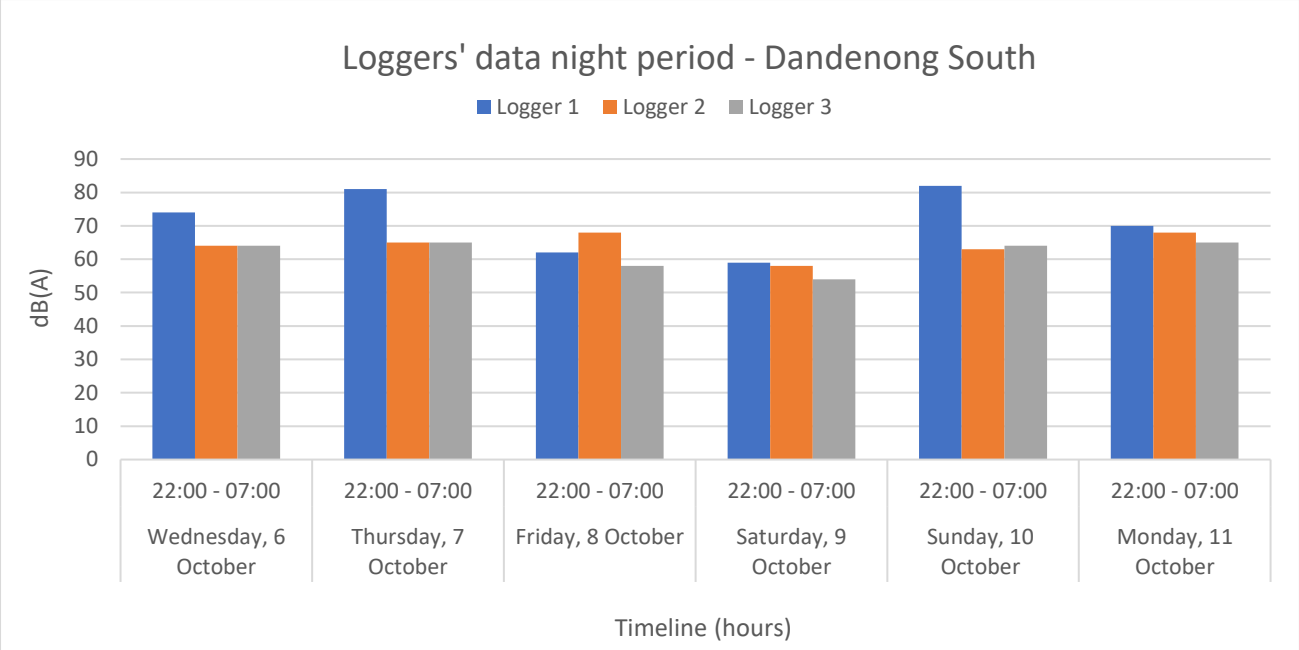
Record	Hours	Logger 1	Logger 2	Logger 3
Wednesday, 6 October	18:00 - 22:00	**78**	**64**	**60**
Thursday, 7 October	18:00 - 22:00	**82**	**66**	**63**
Friday, 8 October	18:00 - 22:00	**64**	**62**	**59**
Saturday, 9 October	18:00 - 22:00	**54**	**53**	**47**
Sunday, 10 October	18:00 - 22:00	**82**	**70**	**67**
Monday, 11 October	18:00 - 22:00	**70**	**62**	**60**
Average for the evening, dB(A)		**72**	**63**	**59**



During the evening period there was less activity at the asphalt plant when compared to during the day.

Noise Protocol's night period, $L_{A,eq}$

Record	Hours	Logger 1	Logger 2	Logger 3
Wednesday, 6 October	22:00 - 07:00	**74**	**64**	**64**
Thursday, 7 October	22:00 - 07:00	**81**	**65**	**65**
Friday, 8 October	22:00 - 07:00	**62**	**68**	**58**
Saturday, 9 October	22:00 - 07:00	**59**	**58**	**54**
Sunday, 10 October	22:00 - 07:00	**82**	**63**	**64**
Monday, 11 October	22:00 - 07:00	**70**	**68**	**65**
Average for the night, dB(A)		**68**	**64**	**60**



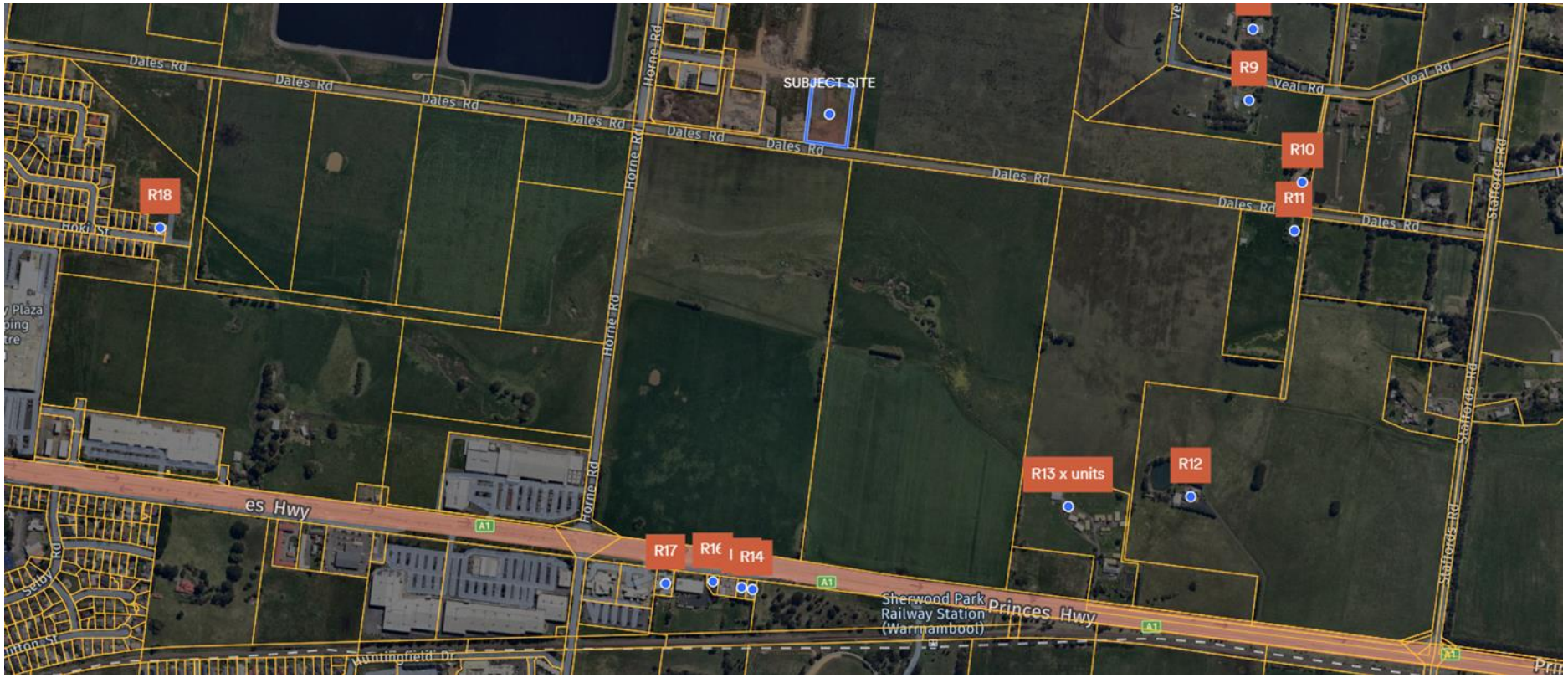
The main reason for noise assessment of the Dandenong Site was measurement of the asphalt manufacturing operation to produce a cross check of the obtained data with the noise prediction model for the Warrnambool plant, and detail of a noise impact of truck movements.

The loggers' data show similar results with the predicted noise levels please see Table 9, below, for details.

Loggers' position	**Nosie loggers, dB(A)**	**Predicted, dB(A)**
Entrance (Logger 2)	69 dB(A) at 2m	69 dB(A) at 2m
Exit (Logger 3)	67 dB(A) at 2m	69 dB(A) at 2m
Premise (Logger 1)	82 dB(A)	81 dB(A)

We can assume that trucks exiting or entering the Warrnambool plant will not increase noise impact at nearest noise sensitive receivers above the acceptable levels. Regardless of the above data the sound power of the trucks being less than the operational plant confirms that trucks will have no effect at the two NSAs due to the distances involved.
The measurement at Dandenong South plant clearly shows that is the case.

APPENDIX VII – Noise impact of the proposed FH plant at surrounding residential noise sensitive receivers, $L_{A,eq}$


SUBJECT SITE
R9
R10
R11
R12
R13 x units
R14
R16
R17
R18
Dales Rd
Horne Rd
Veal Rd
Stafford Rd
Princes Hwy
Sherwood Park
Railway Station
(Warrnambool)
Huntingfield Dr

Sensitive land use	Approx. distance from site boundary	Predicted effective sound pressure level, full production, dB(A)	Noise limit day period, dB(A)
Residence – R1	798m	50 dB(A)	54 dB(A)
Residence – R2	840m	49 dB(A)	54 dB(A)
Residence – R3	823m	49 dB(A)	54 dB(A)
Residence – R4	947m	46 dB(A)	50 dB(A)
Residence – R5	1000m	46 dB(A)	50 dB(A)
Residence – R6	1018m	46 dB(A)	50 dB(A)
Residence – R7	922m	46 dB(A)	50 dB(A)
Residence – R8	767m	46 dB(A)	50 dB(A)
Residence – R9	751m	46 dB(A)	50 dB(A)
Residence – R10	861m	46 dB(A)	50 dB(A)
Residence – R11	856m	46 dB(A)	50 dB(A)
Residence – R12	932m	44 dB(A)	56 dB(A)
Residence – R13 Country Life Rental Accommodation Units	813m	46 dB(A)	56 dB(A)
Residence – R14	867m	44 dB(A)	56 dB(A)
Residence – R15	867m	44 dB(A)	56 dB(A)
Residence – R16	877m	44 dB(A)	56 dB(A)
Residence – R17	907m	44 dB(A)	56 dB(A)
Residence – R18	1240m	39 dB(A)	56 dB (A)
Residence – R19	647m	54 dB(A)	56 dB(A)
Residence – R20	768m	52 dB(A)	56 dB(A)
Residence – R21	795m	50 dB(A)	56 dB(A)
Residence – R22	1085m	46 dB(A)	56 dB(A)