ENVIRONMENTAL IMPACT STATEMENT

Hazell Bros Civil Contracting Pty Ltd

New Asphalt Batch Plant, Bridgewater

SEPTEMBER 2025

43 Formby Road, Devonport, Tasmania 7310

Phone: 1300 746 466

www.pinionadvisory.com

PO Box 430 Derwent Park, TAS 7009

Phone: (03) 6277 7888

www.hazellbros.com.au

Authors
Cameron Everard, Stuart Smith, Jemma Lawrence and Ryan Francis

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02/07/2025	Version 1.3	Client review	IS	IS
03/09/2025	Version 1.4	Include EPA comments	IS	CE

Cover image: Current property boundary including 1 Crooked Billet Drive (blue line) and 13 Crooked Billet Drive, Bridgewater (red line).

Executive Summary

Introduction

Hazell Bros Civil Contracting Pty Ltd (Hazell Bros) is proposing to construct and operate a new asphalt plant and reclaimed asphalt pavement (RAP) processing facility, located at 1 Crooked Billet Drive and 13 Crooked Billet Drive, Bridgewater, Tasmania. It is proposed that 50,000 tonnes per annum (tpa) of asphalt will be produced and approximately 5,000tpa of RAP will be received and processed onsite.

Based on the proposed annual production volume exceeding 1,000 tonnes, the project is deemed a level 2 activity as defined under Schedule 2, clause 7 (d) of the *Environmental Management and Pollution Control Act 1994* (EMPC Act). The Board of the Environment Protection Authority, Tasmania (EPA) will assess the environmental impact of the project as a class 2B assessment under the EMPC Act.

This environmental impact statement (EIS) has been prepared to address the requirements of the project specific guidelines (Environmental Impact Statement Guidelines - Hazell Bros Civil Contracting Pty Ltd Asphalt and Reclaimed Asphalt Pavement Processing Plant, July 2024). A new planning permit application for the proposed asphalt plant will be submitted to the Brighton Council (as the planning authority) in due course.

Project description

The project site is located on (and surrounded by) land zoned as 'general industrial'. The area is highly disturbed and modified from historical agricultural and industrial activities.

The proposed asphalt plant has been designed on the best available technologies for asphalt production and recycling and will cater for current and future volumes of asphalt mixing and storage capacity. The plant is capable of recycling up to 30% RAP (based on available data). However, it is expected that up to 10% RAP could be included in the asphalt production leading to less waste sent to landfill. The plant will also have the capacity to integrate other recycled products such as crumbed rubber and crushed glass.

The plant will be primarily powered by natural gas but will also have the capability to use diesel fuel when required. A natural gas connection will be installed from the TAS Gas Networks underground line. Natural gas will be the main fuel source for the rotary dryer and will be used to dry and heat the aggregate material. Diesel would only be used as a backup fuel source in the event of a gas shortage, outage or if natural gas became cost prohibitive. Electricity will also be used to power all electrical motors and heating the bitumen tank. Power for the site will be supplied from the local electricity grid, with no offsite upgrades required.

The plant will have the capacity to operate 24 hours a day, seven days a week, depending on specific project requirements. Due to the site location in a heavily industrialised area, this is not expected to disturb local amenity. Normal operating hours include Monday to Friday (7.00am to 5.00pm), with weekends, night shifts and/or public holidays as required, depending on customer demand.

Potential impacts and management

Targeted environmental studies and investigations have been conducted to assess the potential environmental impact from the project:

- The results of the predictive air quality modelling (prepared by Assured Environmental) demonstrate compliance with the assessment criteria presented in the NEPM standards and the EPP 2004 at and beyond both the current and potential future site boundaries for all pollutants. As a result, the risk of adverse impacts is expected to be low.

- The noise assessment (prepared by Assured Environmental) concluded that the potential noise impacts from construction activities both inside and outside of standard work hours were below the adopted criteria. During operations, predicted adverse amenity impacts are considered unlikely and compliance with applicable criterion is generally achieved where the proposed mitigation measures are implemented. A minor exceedance was predicted at three sensitive (residential) receptors (R01, R03 and R04), though it is noted that the ambient noise environment at these receptors is elevated compared to the monitoring location used to determine the assessment criteria. Therefore, noise emissions from the project are deemed acceptable.

- A surface water assessment and stormwater management plan (prepared by Flussig Engineers) were developed for the project. Runoff from plant will be channelled into three Atlan Stormsacks, a stormwater detention pond and then a bioretention swale, before being discharged offsite via an existing stormwater culvert drain to the east of the site. Under the stormwater management plan (and proposed management measures) the project will meet current specified standards for both quantity and quality control.

- Potential contaminants such as petroleum products and bitumen will be contained in bunded storages which meet the relevant regulatory requirements, ensuring spillages are contained. Spill response procedures will ensure that contaminants are not washed into the stormwater system.

- A natural values assessment (including three field surveys) was conducted by Pinion Advisory. Initial surveys conducted on 13 August and 7 November 2024 revealed significant natural values within the southern area of 1 Crooked Billet Drive. This included a population of Basalt guineaflower (*Hibbertia basaltica*) and a patch of native grassland that could serve as habitat for native fauna including the tussock skink (*Pseudemoia pagenstecheri*) and Eastern barred bandicoot (*Paremeles gunnii*). A small patch of Lowland *Themeda triandra* (Kangaroo grass) grassland (GTL) was identified in the southeastern corner of the property. The GTL community covers approximately 0.5ha, which at <1ha does not qualify for the EPBC Act listed for the GTL ecological community.

- To avoid impacting natural values, Hazell Bros relocated and redesigned the asphalt plant footprint to the north of the 1 Crooked Billet Drive property, which also occupies a small area of the southern boundary of 13 Crooked Billet Drive. An additional natural values survey conducted on 12 February 2025, for the new project footprint, identified that no threatened native vegetation communities, threatened flora or threatened fauna occur within the proposed footprint area.

- A traffic impact statement (prepared by Traffic and Civil Services) found that the project will not create any traffic issues.

The proposed commitments documented within this EIS demonstrate that appropriate management measures can be implemented to avoid and/or minimise potential impacts or risks to public health and the environment. As a result, environmental impacts are expected to be low.

Monitoring and review

All environmental monitoring programs (e.g. air quality, noise, surface water quality and weeds) will be regularly reviewed and updated on an as needs basis. Results and recommendations from the monitoring programs will be reported to the EPA as a part of an Annual Environmental Report.

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Abbreviations

AHD	Australian Height Datum
CRS	Cationic rapid set (referring to bitumen emulsion)
EIS	Environmental impact statement
EMPC Act	*Environmental Management and Pollution Control Act 1994*
EPA	Environment Protection Authority, Tasmania
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Cth)
kL	kilolitres
L	Litres
LUPA Act	*Land Use Planning and Approvals Act 1993*
NC Act	*Nature Conservation Act 2002*
NEPM	National Environment Protection (Ambient Air Quality) Measure
$PM_{2.5}$	Particulate matter 2.5 micrometres or less in diameter
PM_{10}	Particulate matter 10 micrometres or less in diameter
RAP	Reclaimed asphalt pavement
tpa	tonnes per annum
TSP Act	*Threatened Species Protection Act 1995*

1 Introduction

1.1 PROPONENT INFORMATION

Hazell Bros Civil Contracting Pty Ltd (Hazell Bros, the proponent) is part of the Hazell Bros group of companies. Hazell Bros is a family-owned business which has operated for 80 years. The core business functions are civil construction, quarries, concrete, construction material testing, plant hire, transport, asset servicing and industrial services. Hazell Bros employs more than 800 people at various locations across Tasmania and Queensland. The company has a longstanding reputation for reliability in providing service solutions and the supply of quality products. Proponent information is presented in Table 1.

Table 1. Proponent information

Name of proponent (legal entity)	Hazell Bros Civil Contracting Pty Ltd
Name of proponent (trading name)	As above
Registered address	14 Farley St, Derwent Park TAS 7009
Postal address of proponent	As above
ABN	27 088 345 804
ACN	088 345 804
Contact person for the operation	Name: Isaac Standaloft Position: Health and Environment Advisor Email: Isaac.Standaloft@hazellbros.com.au

1.2 PROJECT BACKGROUND

The proposed project site is located in an existing industrial area approximately 19 kilometres (km) north of Hobart and three km south of Brighton. Hazell Bros own and operate an existing dry and wet concrete batching plant at the industrial site, located at 1 Crooked Billet Drive, Bridgewater, Tasmania 7030. The existing concrete batching plant was commissioned on 1 February 2023 (dry plant) and 31 March 2023 (wet plant). The plant supplied concrete for the construction of the Bridgewater Bridge project which has now been completed.

Hazell Bros is proposing to construct and operate a new asphalt plant and reclaimed asphalt pavement (RAP) processing facility at 1 Crooked Billet Drive, Bridgewater. A small part of the plant will also overlap the southern boundary of 13 Crooked Billet Drive (Figure 1). A development application has been submitted to Brighton Council to realign this boundary and capture the entire footprint on one lot (refer to Section 1.3.3).

The wet concrete batching plant is proposed to be decommissioned and removed from the site in late 2025. The dry concrete batching plant will be relocated to the west of the site (next to the proposed asphalt plant) to improve site access, plant operations and safety. It is proposed to operate the dry concrete batch plant and new asphalt plant simultaneously.

All proposed works will be contained within:

- 1 Crooked Billet Drive, Bridgewater (Property ID: 3017836, title reference: 158010/1, area: 7.86ha)
- 13 Crooked Billet Drive, Bridgewater (Property ID: 3017801, title reference: 158009/7, area: 2.5ha)
- Total land area of 1 and 13 Crooked Billet Drive: 10.36ha (Figure 2).

Note, the proponent is not seeking approval to continue (or change) operations at the concrete batch plant, only approval of the proposed asphalt plant and RAP processing facility. The dry concrete batch plant currently operates under a Level 1 permit administered by the Brighton Council under the *Land Use Planning and Approvals Act 1993* (LUPA Act). It is anticipated that this will continue once the concrete batch plant has been relocated. No other changes to the operation of the concrete plant are proposed.

A development application (DA2025/00095) has been submitted to the Brighton Council for the removal of the dry concrete plant.

It is proposed that 50,000 tonnes per annum (tpa) of asphalt will be produced and approximately 5,000tpa of RAP will be received and processed onsite. The plant has been designed on the best available technologies for asphalt production and recycling and will cater for current and future volumes of asphalt mixing and storage capacity. The plant is capable of recycling up to 30% RAP (based on available data). However, it is expected that up to 10% RAP could be included in the asphalt production. The plant will also have the capacity to integrate other recycled products such as crumbed rubber and crushed glass.

Figure 1. Regional location of the proposed asphalt plant, current property boundary indicated by blue line

1.3 APPLICABLE ENVIRONMENTAL LEGISLATION, STANDARDS AND GUIDELINES

Industrial activities in Tasmania are managed by the State's integrated Resource Management and Planning System.

Industrial activities in Tasmania are required to comply with the following legislation:

- *Aboriginal Heritage Act 1975*
- *Biosecurity Act 2019 (*formerly *Weed Management Act 1999)*
- *Environmental Management and Pollution Control Act 1994*
- *Environment Protection and Biodiversity Conservation Act 1999* (Cth)
- *Land Use Planning and Approvals Act 1993*
- *Nature Conservation Act 2002*
- *Threatened Species Protection Act 1995*
- *Water Management Act 1999*
- *Work Health and Safety Act 2012.*

Applicable regulations, policies and codes include:

- Environment Protection Policy (Air Quality) 2004
- Environment Protection Policy (Noise) 2009
- Environmental Management and Pollution Control (General) Regulations 2017
- Environmental Management and Pollution Control (Noise) Regulations 2016
- Environmental Management and Pollution Control (Waste Management) Regulations 2020
- EPA Bunding and Spill Management Guidelines 2015
- State Policy on Water Quality Management 1997
- Tasmanian Planning Scheme
- Work Health and Safety Regulations 2022.

1.3.1 State environmental approvals

Based on an annual production volume of more than 1,000 tonnes, the project is deemed a level 2 activity as defined under Schedule 2, clause 7 (d) of the *Environmental Management and Pollution Control Act 1994* (EMPC Act).

The Board of the Environment Protection Authority, Tasmania (EPA) will assess the environmental impact of the project as a class 2B assessment under the EMPC Act.

This environmental impact statement (EIS) has been prepared to address the requirements of the project specific guidelines (Environmental Impact Statement Guidelines - Hazell Bros Civil Contracting Pty Ltd Asphalt and Reclaimed Asphalt Pavement Processing Plant, July 2024).

A first draft of the EIS was submitted to the EPA for review in October 2024, with comments received in December 2024. A second draft (addressing the EPA's comments) was submitted in July 2025 with comments received from the EPA in August 2025.

This EIS and all supporting technical studies (including air, noise, surface water, traffic and natural values) have been reviewed and updated to address the EPA comments, including a realignment of the proposed asphalt plant north to avoid impacting identified natural values (i.e. listed threatened flora and a vegetation community). This is discussed in more detail in Section 1.3.2.

1.3.2 Commonwealth environmental approvals

A natural values assessment (NVA) was conducted by Pinion Advisory in August 2024 (presented in Section 5.7). The NVA identified a small patch (approximately 0.5ha) of Lowland *Themeda triandra* (Kangaroo grass) grassland (GTL) at the southeastern corner of the property (1 Crooked Billet Drive). Although GTL grassland is listed as a threatened ecological community under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), due to its small size (<1ha) it does not qualify for the EPBC Act listed ecological community. The patch also has no connectivity to other GTL patches present outside of the property boundary, with maintained fence lines, a rail corridor, and zoned industrial land surrounding the patch.

Following the initial survey in August 2024, an additional targeted survey was conducted in November 2024 to coincide with the peak flowering period. This survey identified significant natural values within the southern area of the project area, including a population of Basalt guineaflower (*Hibbertia basaltica*) and a patch of native grassland that could serve as habitat for native fauna including the tussock skink (*Pseudemoia pagenstecheri*) and Eastern barred bandicoot (*Paremeles gunnii*).

To minimise potential impacts to the Basalt guineaflower and other potential threatened fauna species, Hazell Bros relocated and redesigned the asphalt plant footprint to the north of the 1 Crooked Billet Drive property. The relocated plant footprint also occupies a small area of the southern boundary to 13 Crooked Billet Drive.

A third survey was conducted in February 2025 which focused on the new asphalt plant footprint location. No threatened flora, fauna or vegetation communities were identified in the new plant location and therefore avoids the significant natural values identified in initial surveys.

As a result, it is unlikely that the project will impact any matters of national environmental significance (MNES) and does not take place on Commonwealth Land. Therefore, no approvals under the EPBC Act will be required.

Results and recommendations from the three natural values assessments are provided in Section 5.7.

1.3.3 Brighton Council planning approvals

In order to avoid significant natural values identified in the southern area of 1 Crooked Billet Drive, the proposed asphalt plant was moved north. In November 2024, Hazell Bros submitted a planning permit application (SA 2024/007) to the Brighton Council to conduct a boundary adjustment to 1 Crooked Billet Drive Bridgewater (CT 158010/1) and 13 Crooked Billet Drive Bridgewater (CT 158009/7) (Figure 2).

The boundary between the two land parcels (1 and 13 Crooked Billet Drive) will create two lots:

- Lot 1 - 2.0177ha
- Lot 2 – 8.347ha

Lot 2 (only) will contain the entire proposed asphalt plant. Refer to Figure 3. At the time of writing, the subdivision application was being processed by the Brighton Council planning department.

For the purposes of clarity, the following terms (and explanations) are used throughout the EIS:

- **Current project boundary**: includes the existing boundaries of 1 Crooked Billet Drive and 13 Crooked Billet Drive (Figure 2)

- **Future potential boundary**: pending council approval, the future potential boundary will be defined by the proposed Lot 2 subdivision (Figure 3).

Technical assessments such as air, noise, surface water, traffic and natural values have been updated to accommodate both the current and future potential boundaries. This is particularly important when assessing distances from the project boundary to sensitive receptors (e.g. air and noise emissions).

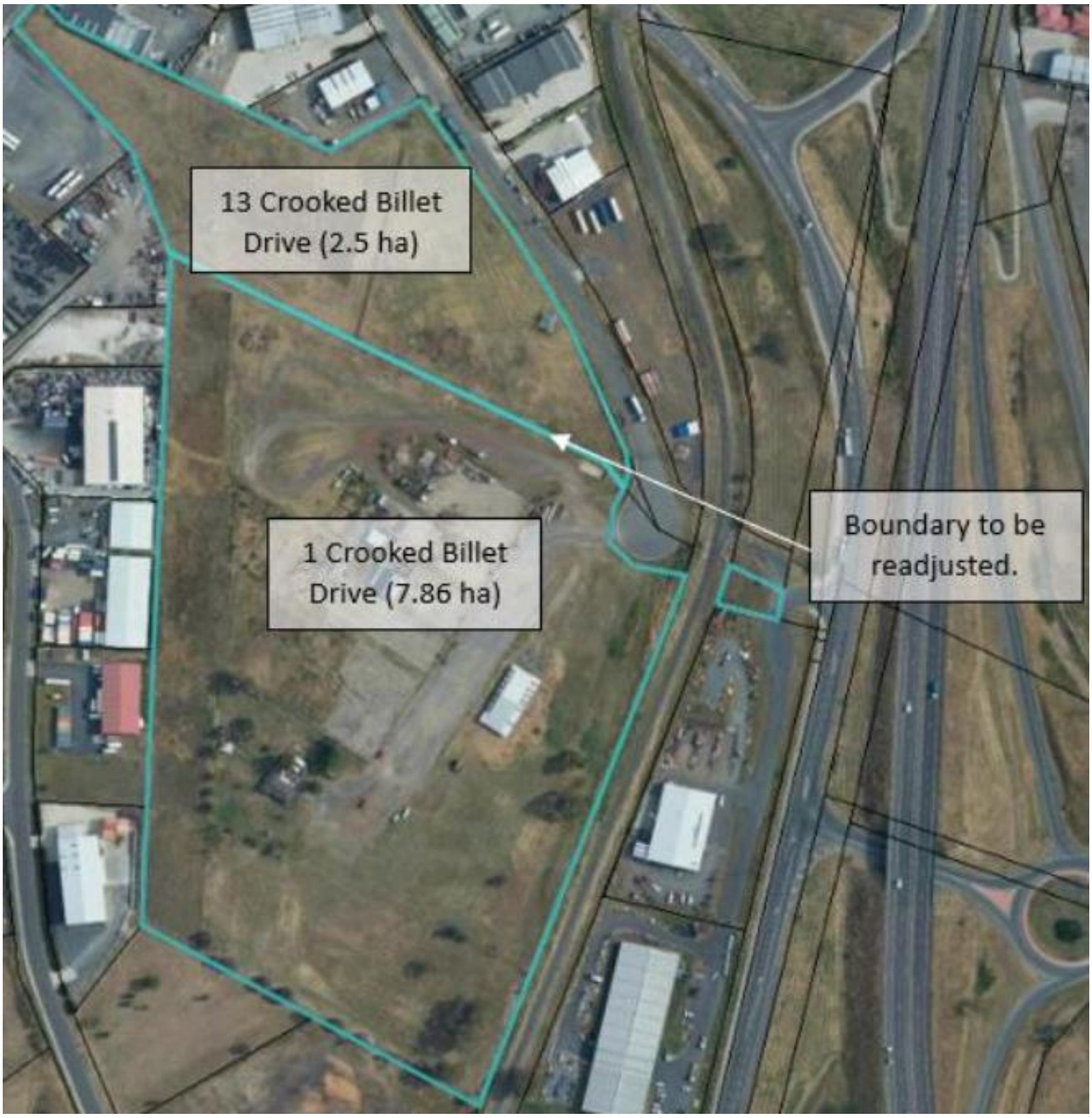

Figure 2. Boundary readjustment showing 1 Crooked Billet Drive and 13 Crooked Billet Drive (Source: PDA Surveyors, 2024)

Figure 3. Proposed lot readjustment into Lot 1 and Lot 2 (Source: PDA Surveyors, 2024)

1.4 HAZELL BROS ENVIRONMENTAL POLICY

Hazell Bros is committed to ensuring the protection of the environment in all areas of their operations. This will be achieved by:

- Maintaining an environmental management system that conforms with ISO 14001 and is appropriate to the purpose and context of our business
- Establishing environmental objectives and targets aimed at minimising the risk of environmental harm
- Taking all practical steps to protect the natural environment and prevent pollution
- Developing strategies to encourage the sustainable use of resources, climate change mitigation and adaptation and the protection of biodiversity and ecosystems
- Complying with all legal and other environmental compliance obligations Continually improving the environmental management system to enhance our environmental performance.

2 Proposal Description

The proposed project is located at 1 Crooked Billet Drive (7.86ha) and 13 Crooked Billet Drive (2.5ha), in Bridgewater, Tasmania 7030. The asphalt plant footprint and two land parcels are in an area zoned as 'general industrial'.

The land surrounding the property is used for industrial and commercial purposes, with five EPA regulated premises within one km of the site. An electricity transmission line runs through the 13 Crooked Billet Drive land parcel, while a railway line borders the eastern boundary of 1 Crooked Billet Drive. The Midland Highway is located approximately 120m east of the two properties (Figure 4 and Figure 5).

The proposed asphalt plant will be situated next to the relocated concrete batching plant which is owned and operated by Hazell Bros (refer to Figure 5 and Figure 6).

Figure 4. Location of property boundary, project footprint and other EPA regulated sites

Figure 5. Proposed site footprint showing the proposed asphalt plant (orange line) and relocated concrete plant (pink line)

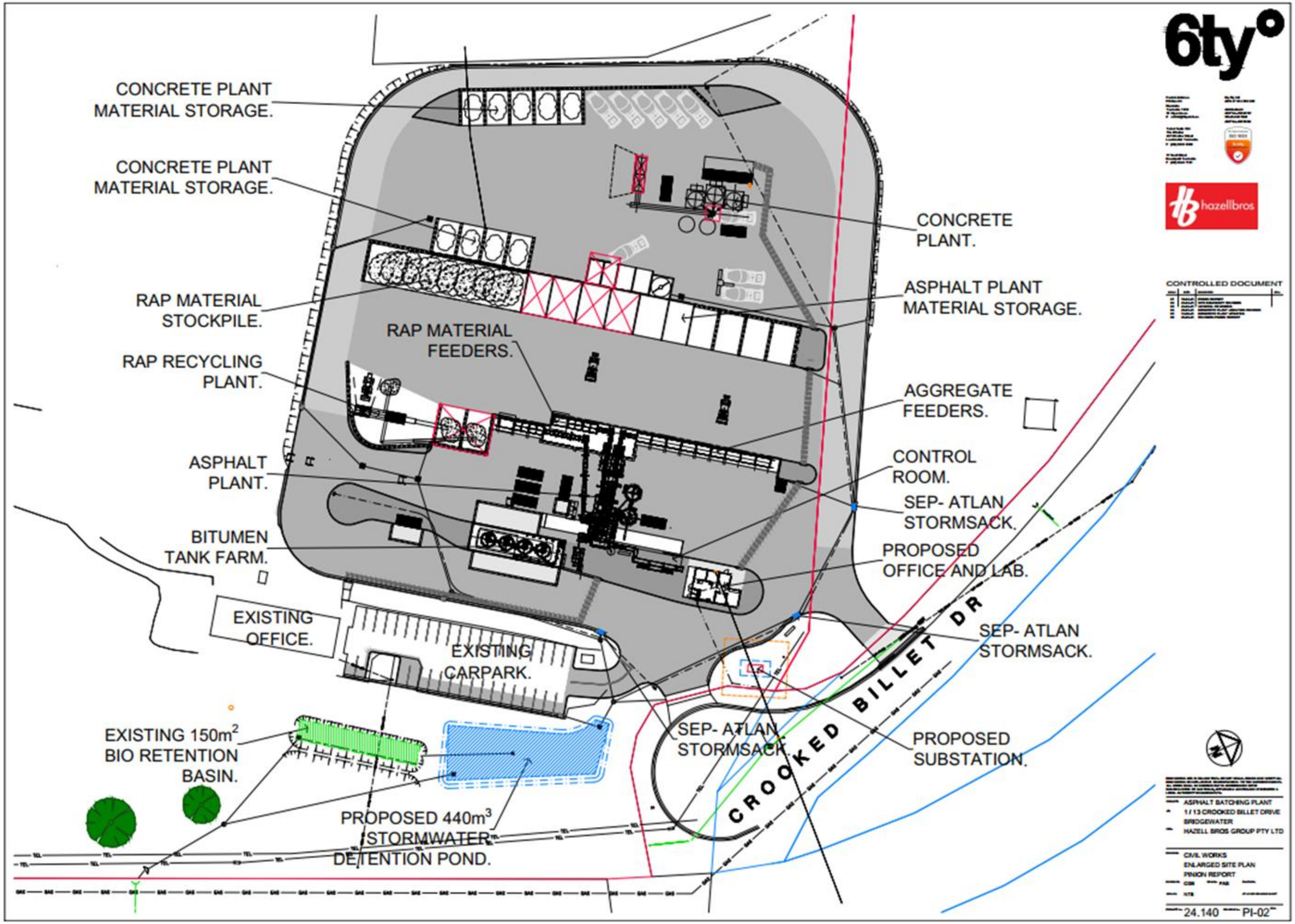

Figure 6. Site layout of proposed asphalt plant and relocated concrete batch plant to the west (Source: 6ty)

2.1 GENERAL PROJECT OVERVIEW

Key characteristics of the project are summarised in Table 2.

Table 2. Project description

Location and planning context	
Address 1	**1 Crooked Billet Drive, Bridgewater TAS 7030**
Postal Address	C/- Hazell Bros 14 Farley St Derwent Park TAS 7009
Property owner	327 Midlands Highway Pty Ltd
Property ID	3017836
Title Reference	158010/1
Tenure	Private freehold land
Land zoning	General industrial (Zone 19) under the Tasmanian Planning Scheme. Rezoning is not required
Activity use	'Manufacturing and processing' is a 'permitted' use class under the Tasmanian Planning Scheme.
Address 2	**13 Crooked Billet Drive, Bridgewater TAS 7030**
Postal Address	C/- Hazell Bros 14 Farley St Derwent Park TAS 7009
Property owner	327 Midlands Highway Pty Ltd
Property ID	3017801
Title Reference	158009/7
Tenure	Private freehold land
Land zoning	General industrial (Zone 19) under the Tasmanian Planning Scheme. Rezoning is not required.
Existing environment	
Land use	Industrial processing (manufacturing of concrete) located on industrial zoned land. The site is situated in an industrial area and bordered by industrial land in every direction. The area is highly modified from historical clearing and industrial development. A wet and dry concrete batching plant is currently located on the site (1 Crooked Billet Drive). The wet concrete batching plant is proposed to be decommissioned and removed in late 2025. Approval from the Brighton Council for the demolition and removal of the wet concrete batch plant was obtained in June 2025. The dry concrete batching plant will be relocated within the same site at the end of 2025 (pending council approvals). The concrete plant will be relocated next to the proposed asphalt plant. The closest residential receptor is located approximately 263m east of the project site (project site boundary to resident boundary). The actual dwelling at this receptor is located approximately 375m from the project site boundary. The project is not located within or adjacent to an existing reserved area (e.g. National Park, State Reserve, Regional Reserve, Nature Reserve, Forest Reserve or Conservation Area).
Topography	The topography of the site ranges from 62m to 47m Australian Height Datum (AHD) from the north west to south east.
Geomorphology	The geomorphology of the regional area consists of alluvial plains formed from deposition of sediments from the Jordan River overlying a basalt bedrock formed from remnants of ancient volcanic activity.

Geology	The geology of the site consists of Tertiary-aged deposits consisting of Tholeiite basalt on undifferentiated Cenozoic sequences.
Soils	Soils consist of dark brown clayey sand (topsoil) over dark sandy clay. Soils are moderate to imperfectly drained and developed on moderately to slightly weathered tertiary basalt bedrock and colluvium on low undulating (3-10%) plateaus. The likelihood of potentially acid forming (PAF) material is very low. Soil vulnerability and hillslope erosivity hazard are very low (Land Tasmania, 2025).
Groundwater	Groundwater in the area is likely to consist of aquifers sitting within fractured rock. There are no groundwater bores located within the site. Groundwater was not encountered during the excavation of soil pits (dug to a depth of 2.5m). Historical bores records identified groundwater levels at between 34 and 89 metres below ground level. No groundwater dependant ecosystems (GDEs) were identified within 15kms of the site.
Hydrology/surface drainage	There are no waterways within the boundary of the site. Runoff from the project site would be collected and treated in three Atlan Stormsacks, a detention pond and bioretention swale prior to discharge from the eastern boundary of the site.
Natural values	The vegetation community group within the proposed project footprint is classed as urban areas (FUR) under TasVEG 4.0.
Listed species (flora)	Verified records of seven threatened flora species recorded within 500m of the project site. Initial surveys revealed significant natural values within the southern part of the project area, including a population of Basalt guineaflower (*Hibbertia basaltica*) and a patch of native grassland that could serve as habitat for native fauna. The plant footprint has been redesigned and relocated to the northern end of the property to avoid potential impacts to these species.
Listed species (fauna)	Verified records of one threatened fauna species recorded within 500m of the project site, with an additional 13 species that could be found onsite based on range boundaries. The natural values survey recorded a carcass of an Eastern barred bandicoot (*Paremeles gunnii*) near an internal paddock fence south of the existing operations and proposed new project footprint. A small area (<1ha) of potential low-quality foraging habitat was recorded within the proposed project footprint.
Listed ecological communities	A small (0.5ha) patch of Lowland *Themeda triandra* grassland (GTL) was identified in initial surveys at the southeastern corner of the property. The plant has been relocated to the north to avoid impacts to this community.
Weeds and pathogens	The natural values report identified twelve declared weed species within 500m of the project area: • *Amelichloa caudata* (espartillo) • *Carduus nutans* (nodding thistle) • *Carduus pycnocephalus* (slender thistle) • *Carduus tenuiflorus* (winged thistle) • *Eragrostis curvula* (African lovegrass) • *Foeniculum vulgare* (fennel) • *Lepidium draba* (hoary cress) • *Lycium ferocissimum* (African boxthorn) • *Marrubium vulgare* (white horehound) • *Nassella trichotoma* (serrated tussock) • *Rubus fruticosus* (blackberry) • *Ulex europaeus* (gorse). The site survey identified seven declared weed species: • *Amsinckia calycina* (hairy fiddle-neck)

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<tr><td></td><td colspan="2">

- *Foeniculum vulgare* (fennel)
- *Salix sp.* (willow tree)
- *Lycium ferocissimum* (African boxthorn)
- *Chrysanthemoides monilifera ssp. Monilifera* (boneseed)
- *Rubus fruticosus* (blackberry)
- *Marrubium vulgare* (white horehound).

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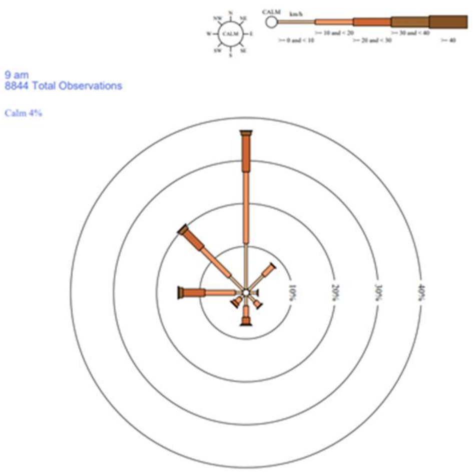
<tr><td>Climate</td><td colspan="2">The region is characterised by mild/warm summers and cold winters. Rainfall is reasonably consistent throughout the year, if slightly wetter in the second half of the year, however the mean number of rain days increases during the winter months. Climate data obtained from Campania (Kincora) BoM Weather Station (No. 94212):
Mean annual rainfall: 481.8mm
Mean monthly rainfall ranges: 29.8mm (February) to 52.5mm (August)
Mean max. temperature: 24.5C (January)
Mean min. temperature: 3.5C (July)
Wind roses for 9am and 3pm from Campania (Kincora) are provided below.
Prevailing wind at 9am is predominately northerly and less frequently north westerly and westerly.
Prevailing wind at 3pm shows predominately westerly, north westerly, northerly and southerly.</td></tr>
<tr><td></td><td>9am



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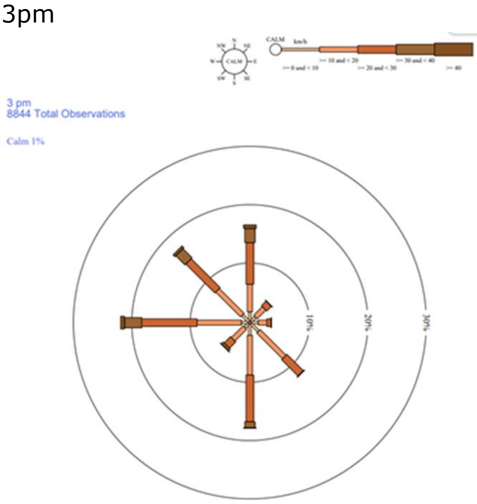

</td></tr>
<tr><td>Surrounding land use</td><td colspan="2">Industrial and commercial enterprises, with five EPA regulated premises within one km of the site.</td></tr>
<tr><th colspan="3">Existing and proposed infrastructure</th></tr>
<tr><td>Existing infrastructure</td><td colspan="2">Wet and dry concrete batch plant. Includes:

- Raw material stockpiles
- Front end loaders
- In-feed bins
- Belt conveyors
- Storage silos (with attached dust filters)
- Mixing chambers
- Loading areas
- Washing areas.

The wet concrete batching plant is proposed to be decommissioned and removed in late 2025. The dry concrete batching plant will be relocated within the same site.</td></tr>
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Other infrastructure (existing)	• Front end loader • Forklift • Material storage • Site office, carpark, amenities.
Proposed new infrastructure	Asphalt batch plant (Astec BG2200XL). Includes: • Raw material stockpiles • RAP stockpiles/screening area • Front end loader (FEL) • In-feed bins • Belt conveyors • Rotary Dryer • Bucket elevators • Vibrator • Pug mill • Storage silos/tanks • Baghouse (including fan and exhaust stack) • Loading areas. RAP mobile processing plant (Astec GT205MF mobile screen).
Other infrastructure (proposed)	• Front end loader (Hyundai 760-9) • Forklift • Material storage (e.g. bitumen, hydrated lime, diesel, bitumen emulsion) • Site office, carpark, amenities, laboratory.
Inputs	
Water	Up to 2,000L per week of potable water for toilets, showers, and washdown hoses. If dust suppression is required, water will be sourced from the mains supply.
Energy	• Natural gas (main energy source to dry and heat aggregate materials): up to 375,000m^3 per annum (pa) • Electricity (to power electrical motors and heat the bitumen tank): 490,000kWh/pa • XLS Diesel: 60,000L/pa for onsite machinery only. The plant will be powered primarily by natural gas. If natural gas is not available, then the plant will be powered by diesel. This will result in an additional 450,000L/pa of diesel (Total: 510,000L/pa). XLS diesel is a low-sulphur fuel which provides a cleaner combustion and lower sulphur emissions.
Other raw materials	Hydrated lime, aggregate, sand, bitumen, RAP and bitumen emulsion.
Wastes and emissions	
Wastewater	No wastewater is generated from the production of asphalt. No trade waste connection to sewer is required. Mains connection to potable supply. Minor volumes from toilets, site office and washdown. Stormwater runoff from the site will be managed with three Atlan stormsacks a newly constructed 440m^3 detention pond and an existing 150m^2 bioretention swale.
Atmospheric	Asphalt plant emissions: • Combustion gases: nitrogen oxides (NOx), carbon monoxide (CO) and sulphur dioxide (SO_2) • Volatile Organic Compounds (VOCs) • Particulate matter ($PM_{2.5}$ and PM_{10}) • Polycyclic Aromatic Hydrocarbons (PAHs)

	• Heavy metals • Odour. Dust emissions from vehicle movements and wind.
Solid	Minor general waste and recyclables from office and plant. No solid waste generated from RAP processing.
Controlled wastes	Solvent waste from laboratory testing, collected by licensed contractor. No workshop or vehicle servicing onsite.
Noise	Major construction sources: • Civil works: includes site clearing/levelling, and establishment of foundations • Asphalt plant erection: includes construction of structural frame and asphalt plant. Road traffic sources: • Light and heavy vehicle traffic to and from the site. Major operation sources: • Concrete batch plant (existing) includes motors, belt conveyors, loader and truck movements, mixing, loading, excavator. • Asphalt plant (proposed): bucket elevators, burner fan, exhaust stack, dryer drum, vibrator, pug mill, RAP mobile plant, loader and truck movements.
Greenhouse gases	Plant will generate carbon dioxide, nitrous oxide and methane. Approximately 2889.75 tonnes CO_2-e per annum will be generated from the operation of the asphalt plant.
Project timetable	
Project timeline	Submit final EIS to EPA – September 2025 Finalise EIS for public release – October 2025 Public consultation/advertising period – October 2025 EPA assessment – November 2025 Council assessment – December 2025 Permit issued – January 2026 Commence civil construction – January 2026 (6 months to complete) Commence plant construction – February 2026 Plant commissioning – June/July 2026 Commence plant operations – July 2026
Construction, commissioning and operations	
Construction hours	Approximately six-month construction/commissioning period 7.00am to 4.00pm – weekdays 7.00am to 3.00pm – Saturdays No work Sundays and public holidays.
Construction vehicle movements	Light vehicles: 8-12 per day Heavy vehicles: six per day Other onsite heavy machinery includes a dozer, excavator, concrete pump truck, crane and roller.
Commissioning	Asphalt plant commissioning will include: 1. Pre-energise commissioning checks 2. Live commissioning checks 3. Wet commissioning 4. Burner commissioning 5. Enter mix designs into control system 6. Produce asphalt mix trials and operator training 7. Plant Handover.

Operating hours (ongoing)	Relocated concrete batch plant (20,000m^3pa): • Capacity to operate 24 hours a day, seven days a week Proposed asphalt plant (50,000tpa): • Capacity to operate 24 hours a day, seven days a week • Normal operating hours include 7.00am to 5.00pm on weekdays • Weekends, night shifts and/or public holidays as required, depending on customer demand.
Operating vehicle movements (ongoing)	Relocated concrete batch plant (20,000m^3pa or 83m^3day, based on 6m^3 avg load): • Raw materials truck traffic: nine trucks/day • Concrete truck traffic: 28 agitator trucks/day • Light traffic: 24 cars/day • Based on a 6m^3 avg load - total 61 vehicles per day (vpd) and eight vehicles per hour (vph). • Based on a smaller 1m^3 avg load - total 199 vpd and 28 vph, Proposed asphalt plant: • Raw materials truck traffic: 2,956 truck movements pa (12vpd) • Asphalt truck traffic: 3,333 asphalt truck movements pa (14vpd) • Light traffic: 10 cars/day • Total 36vpd or 5vph. Total site traffic (concrete batch plant and asphalt plant combined) is estimated to generate 97vpd with a peak hour rate of 13vph.
Production capacity	50,000tpa of asphalt will be produced and 5,000tpa of RAP will be received and processed onsite.
Site personnel	Relocated concrete batch plant: • Construction: Up to eight construction personnel will be required for the site civil works and up to six personnel to erect the plant • Operations: Two plant operators and five delivery drivers. Proposed asphalt plant: • Construction: 12 construction personnel will be required for the site civil works and 15 personnel to erect the plant • Operations: Four personnel (day shift), three personnel (night shift).

2.1.1 Project components

The major items of equipment required for the asphalt plant are summarised in Table 3.

Table 3. Major items of equipment required for plant operations

Equipment	Machine name	Specifications and use
Asphalt Batch Plant	Astec BG2200XL	Rated at 160 tonnes per hour (tph) with a nominal 5% moisture content. Will have capacity to incorporate up to 30% recycled materials within the finished asphalt products.
RAP processing mobile plant	Astec GT205MF mobile screen	Screening of RAP materials.
Front end loader	Hyundai 760-9	Loading raw materials (e.g. aggregate and sand) into the feeders and hoppers.

Equipment	Machine name	Specifications and use
Forklift	N/A	For unloading of consumables and maintenance activities. Average two hours use per week.
Delivery trucks	N/A	For delivering raw materials and RAP to the plant.

Schematic drawings of the asphalt plant are presented in Figure 7, Figure 8 and Figure 9.

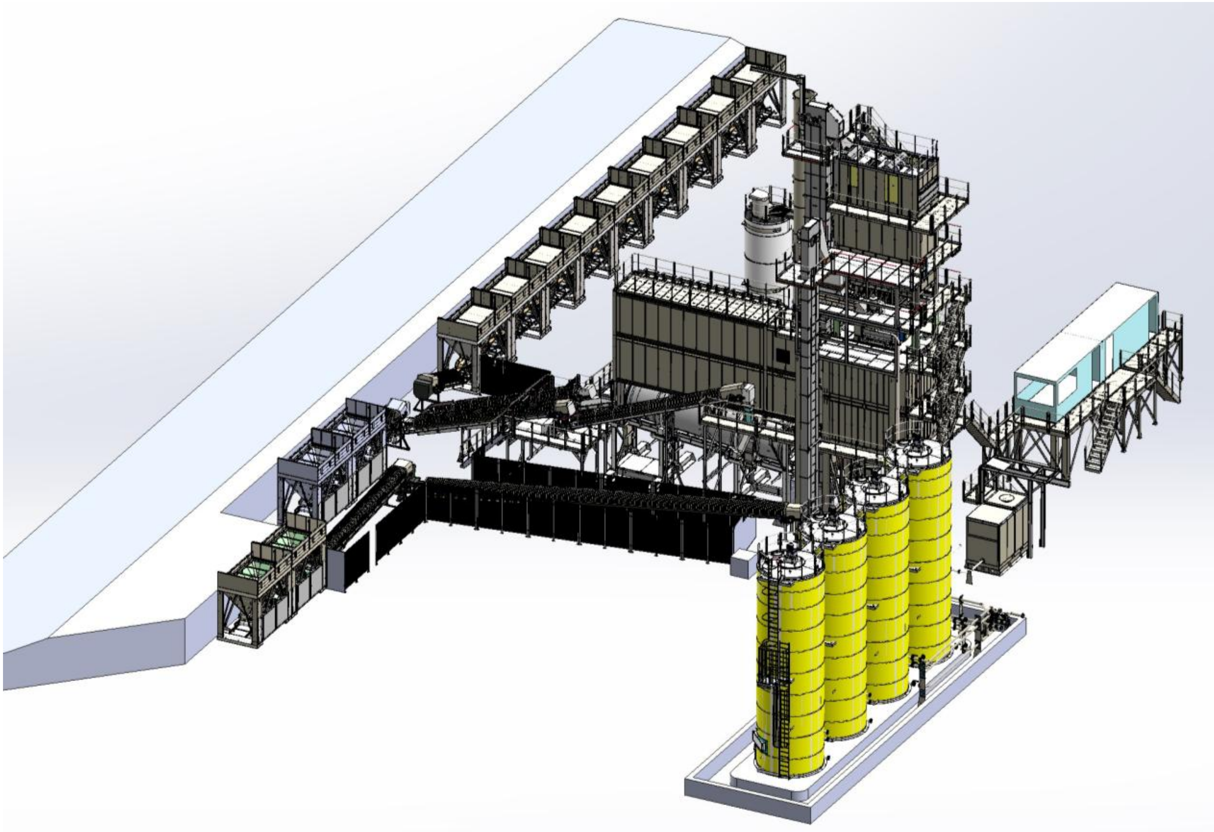


Figure 7. Schematic design of the asphalt plant (Source: Hazell Bros)

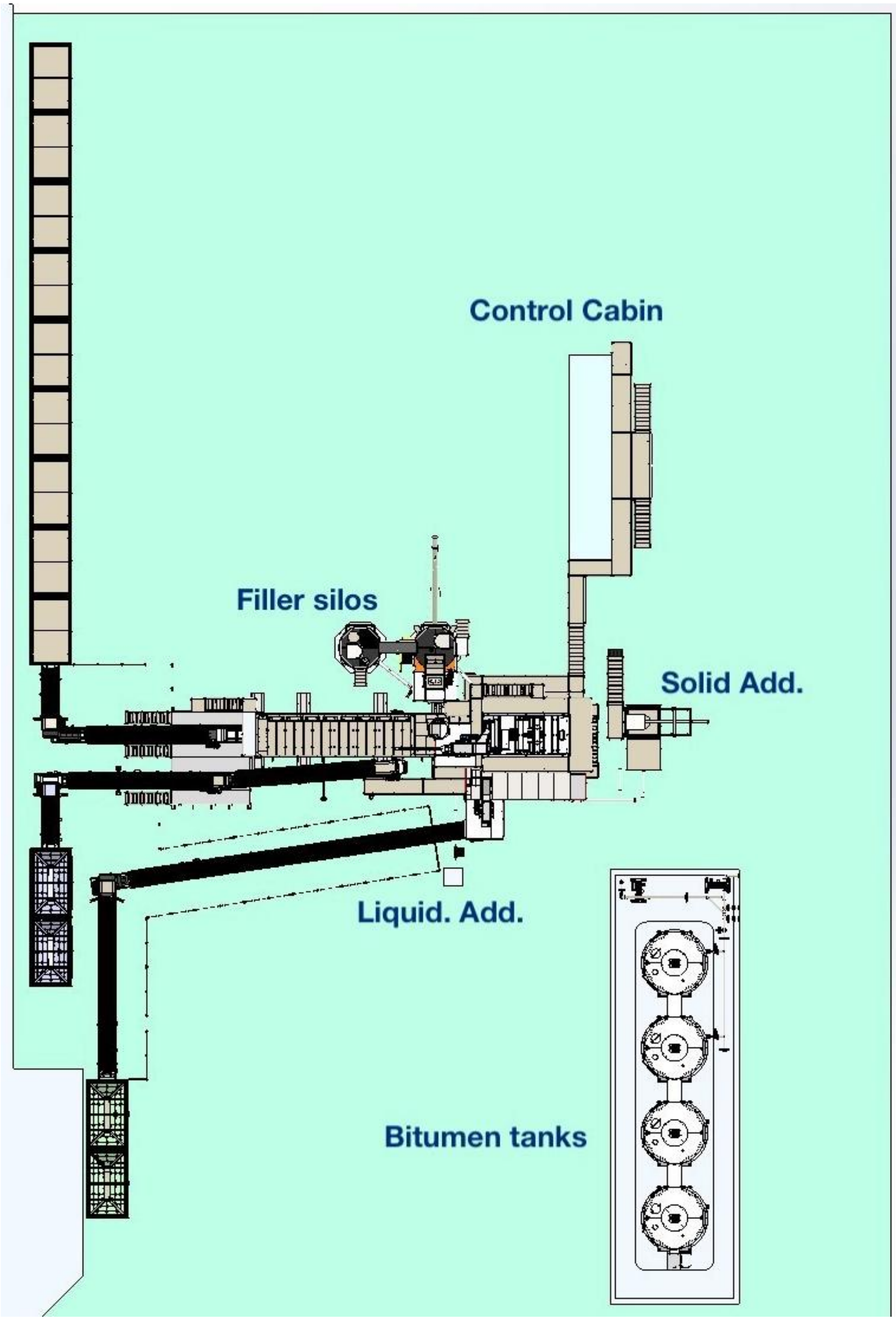
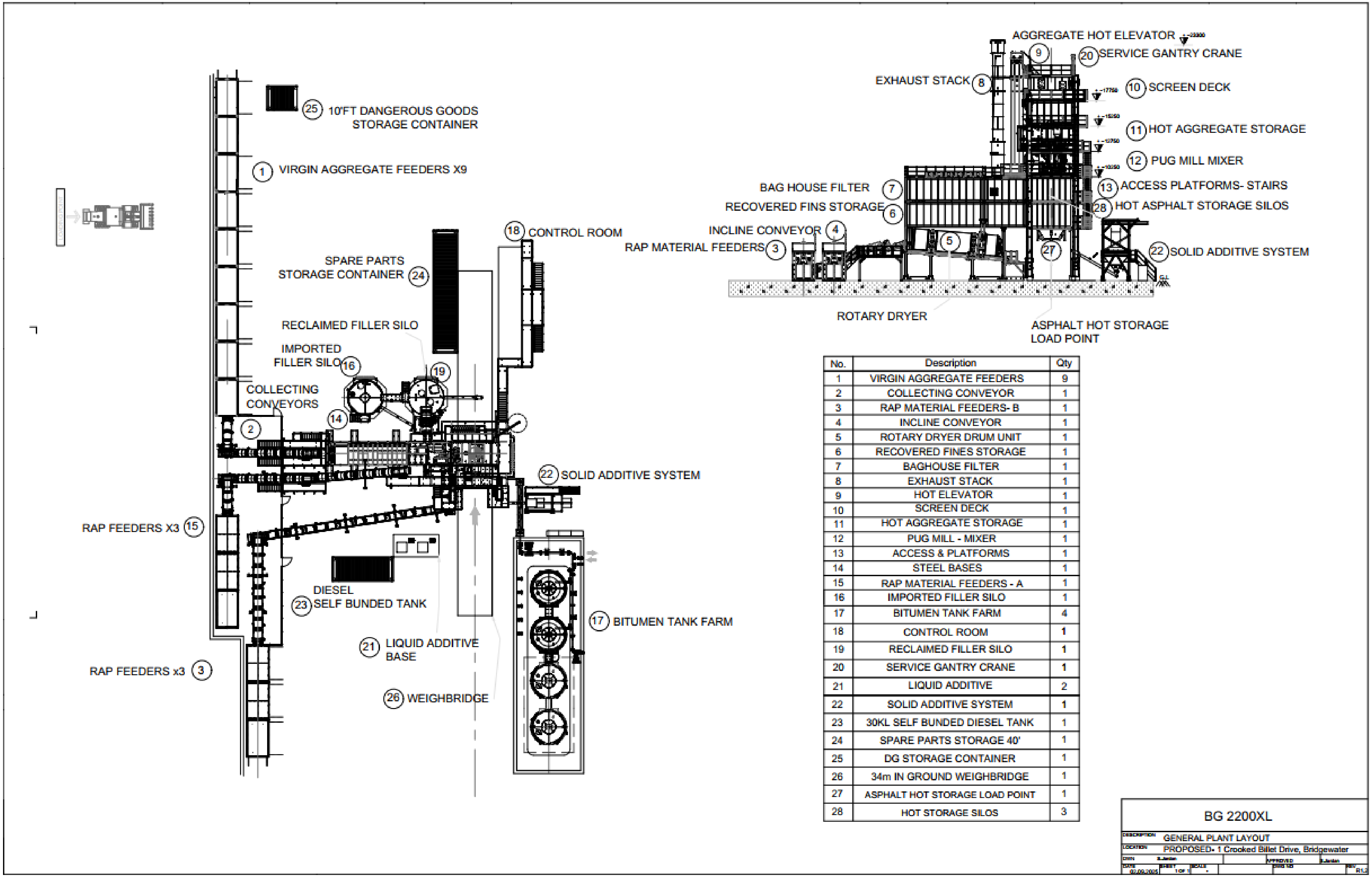


Figure 8. Plant layout and key components (Source: Hazell Bros)



No.	Description	Qty
1	VIRGIN AGGREGATE FEEDERS	9
2	COLLECTING CONVEYOR	1
3	RAP MATERIAL FEEDERS- B	1
4	INCLINE CONVEYOR	1
5	ROTARY DRYER DRUM UNIT	1
6	RECOVERED FINES STORAGE	1
7	BAGHOUSE FILTER	1
8	EXHAUST STACK	1
9	HOT ELEVATOR	1
10	SCREEN DECK	1
11	HOT AGGREGATE STORAGE	1
12	PUG MILL - MIXER	1
13	ACCESS & PLATFORMS	1
14	STEEL BASES	1
15	RAP MATERIAL FEEDERS - A	1
16	IMPORTED FILLER SILO	1
17	BITUMEN TANK FARM	4
18	CONTROL ROOM	1
19	RECLAIMED FILLER SILO	1
20	SERVICE GANTRY CRANE	1
21	LIQUID ADDITIVE	2
22	SOLID ADDITIVE SYSTEM	1
23	30KL SELF BUNDED DIESEL TANK	1
24	SPARE PARTS STORAGE 40'	1
25	DG STORAGE CONTAINER	1
26	34m IN GROUND WEIGHBRIDGE	1
27	ASPHALT HOT STORAGE LOAD POINT	1
28	HOT STORAGE SILOS	3

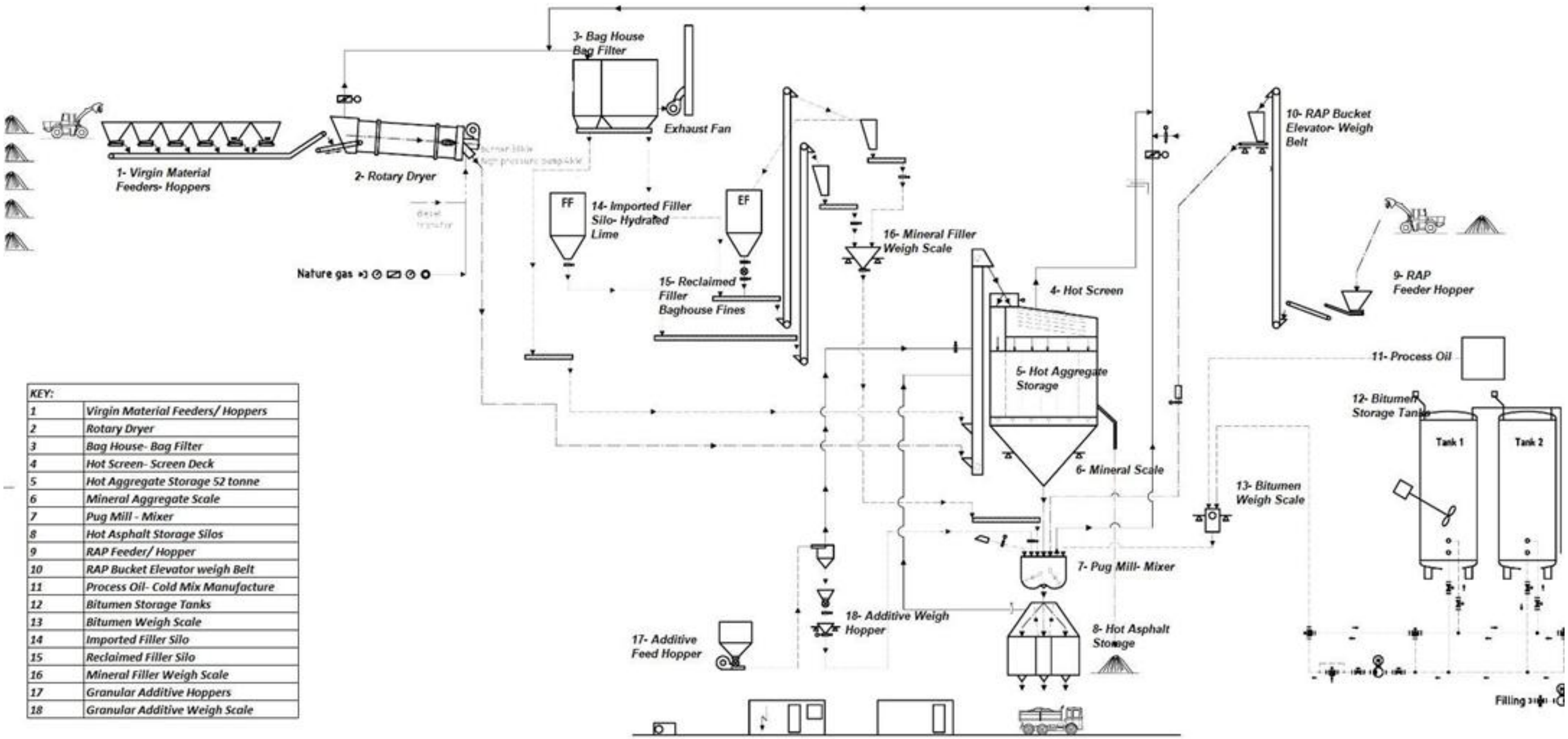
Figure 9. Location of the asphalt plant components (Source: Hazell Bros)

2.1.2 The asphalt batch process

The asphalt batch plant consists of the following key components and processes:

1. Virgin material feeders/hoppers
2. Rotary dryer
3. Bag house - dust extractor
4. Hot screen
5. Hot aggregate storage silo
6. Mineral scale
7. Pug mill mixer
8. Hot asphalt storage – load out
9. RAP feeder/hopper
10. RAP bucket elevator weigh belt
11. Process oil – cold mix manufacture
12. Bitumen storage tanks
13. Bitumen weigh scale
14. Imported filler silo
15. Reclaimed filler silo
16. Mineral filler weigh scale
17. Granular additives addition hopper
18. Granular additive weigh scale.

A flow diagram showing the key components and plant processes listed above is provided in Figure 10.



KEY:	
1	Virgin Material Feeders/ Hoppers
2	Rotary Dryer
3	Bag House- Bag Filter
4	Hot Screen- Screen Deck
5	Hot Aggregate Storage 52 tonne
6	Mineral Aggregate Scale
7	Pug Mill - Mixer
8	Hot Asphalt Storage Silos
9	RAP Feeder/ Hopper
10	RAP Bucket Elevator weigh Belt
11	Process Oil- Cold Mix Manufacture
12	Bitumen Storage Tanks
13	Bitumen Weigh Scale
14	Imported Filler Silo
15	Reclaimed Filler Silo
16	Mineral Filler Weigh Scale
17	Granular Additive Hoppers
18	Granular Additive Weigh Scale

Figure 10. Asphalt plant process flow diagram (Source: Hazell Bros)

Each step of the industrial process for manufacturing asphalt is summarised below. Numbering below refers to Figure 10.

It should be noted that hot mixed asphalt will make up the majority (99%) of the asphalt produced at the plant. Cold mixed asphalt will only be produced very occasionally for road maintenance crews on an as needs basis, and only at small quantities (~two tonnes at a time).

The asphalt plant will be equipped with a dual fuel burner that can run on either natural gas or XLS diesel (low-sulphur diesel). The preferred fuel source for the plant is natural gas. The Tas Gas Network main line runs through the site at Crooked Billet Drive.

Natural gas is preferred as it is generally the cleaner more efficient option. Furthermore, there is generally less repairs and maintenance associated with running natural gas. Natural gas will be the main fuel source for the plant, however the burner will be commissioned and connected to run on diesel. Diesel would only be used as a backup fuel source in the event of a gas shortage, outage or if natural gas became cost prohibitive. Therefore, the plant will be commissioned on both fuel sources, and post commissioning stack testing for air emissions will be performed and data obtained for both sources.

1.Virgin material feeders/hoppers

Aggregate and sand material from the stockpile or storage bunker are fed into the cold feeders and hoppers using a front-end loader. The hoppers are maintained above half capacity as the asphalt plant is running. Each hopper will independently feed the plant at a different rate depending on the asphalt recipe, which is governed by the mix design.

Materials stored within the hoppers include:

- Natural washed sand
- 5mm minus aggregate
- 7mm minus aggregate
- 10mm minus aggregate
- 14mm minus aggregate
- 20mm minus aggregate.

Each hopper has its own conveyor belt that is calibrated to the density and moisture of the material, the conveyor belt will then run at a desired speed in line with the mix design. Each conveyor then discharges the material continuously running onto another main collecting conveyor belt where all the materials are combined as they are then transferred to the rotary dryer in zone 2.

2.Rotary dryer

The rotary dryer is a rotating inclined counterflow drying drum with internal flights and lifters that lift the incoming virgin materials as they travel down the incline of the dryer. A controlled burner flame dries both the moisture that is contained within the materials and superheats the materials to between 160 and 240 degrees Celsius dependant on the asphalt product being produced. The burner unit of the rotary dryer can be powered by natural gas or XLS diesel.

The material then exits the rotary dryer at the bottom end and enters the virgin bucket elevator which transports the material to the top of the plant. Material is discharged as the buckets pass over the head sprocket and discharges the material into a discharge chute and into the screen deck.

3.Baghouse dust extractor

The Baghouse dust extractor filters exhaust air from the rotary dryer. Suction from an exhaust air fan provides oxygen for combustion while extracting fine particles from the drying process. The air passes through high-temperature meta-aramid bags, capturing particulates before clean air and steam are released through the plant exhaust stack. The captured particulates are stored in a sealed silo and metered back into the asphalt mix as part of the recipe.

4.Hot screen

Once the heated materials have been transferred to the top of the asphalt plant, they are rescreened back into more refined fractions, then held in the hot aggregate storage silos (5). The material that passes over the screens is screened out into the following fractions:

- Fines: 0-3.5mm
- 7mm: 3.6mm-7mm
- 10mm: 7mm- 10mm
- 14mm: 10mm-14mm
- 20mm: 14mm-20mm
- Oversize: any foreign or oversize material is rejected into a separate holding chute for disposal.

5.Hot aggregate storage silo

The hot aggregate storage silos are individual holding silos where the hot and dry material is stored awaiting the next stage of the process. Importantly, up until this point every part of the process is continuous. Material is constantly being fed, conveyed, dried, elevated and stored.

6.Mineral scale

The mineral scale is a calibrated weigh hopper used to weigh hot stored materials according to the selected mix design. The hot stored material is weighed individually to generate a batch.

A full batch, typically two to three tonnes is created by weighing materials such as fines, 7mm, and 10mm aggregates until the desired weights are achieved. In parallel, other materials are weighed, including:

- Bitumen weigh scale (13)
- Mineral filler weigh scale (16)
- RAP weigh belt scale (10)
- Granular additive weigh scale (18).

Once all these components have been weighed, they are discharged into the pug mill mixer (7).

7.Pug mill mixer

The pug mixer is a twin shaft counter rotating mixing chamber where all the materials are mixed until a homogenous finished asphalt product is produced. The mixing cycle typically lasts between 45 to 60 seconds. Once mixed, the finished asphalt is discharged into one of three designated hot asphalt storage silos where the asphalt is stored ready for loading.

8.Hot asphalt storage - load out

The hot asphalt storage silos consist of two x 45 tonne insulated hot storage silos and one 6-tonne silo allowing different mixes or quantities can be stored in the individual silos ready for transport.

The two large silos are designed to hold enough capacity to fully load a truck and trailer with asphalt. The asphalt can be mixed in advance and stored for several hours without loss in temperature.

Upon truck arrival, it is weighed on an inground weighbridge. The truck is then inspected and temperature checked at the laboratory sampling stand before departure.

12.Bitumen storage tanks

The bitumen storage tanks consist of four x 60m^3 vertical tanks that are insulated and cladded with electrical base heating, the tanks are located within a suitably sized concrete bund area. The liquid bitumen is received into the tanks via road tanker, generally 25,000 litres per load. The design of the plant allows for four bitumen storage tanks, with no future expansion planned.

The bitumen is then transferred into the tanks via a pump, where the bitumen is stored at 165 degrees Celsius. The bitumen is then fed to the batching plant as required through electrically heated and insulated bitumen pipework. The bitumen is weighed in the bitumen weigh scale (13) and forms part of the asphalt recipe. Bitumen is only pumpable above 150 degrees Celsius.

With bitumen being stored at elevated temperature, the tanks have a co-joined breather pipe which allows the tanks to vent to air, which is an emission point. The vent is plumbed into a suitable activated carbon filter to capture any vapours or odours before being vented to atmosphere.

14.Imported filler silo

Imported filler is typically hydrated lime, which is received at the plant via road pneumatic tanker. Filler is pumped into 60m^3 vertical silo for storage. The filler is then elevated via an enclosed bucket elevator up to a small and enclosed holding hopper ready for batching. The filler is transferred across to the filler weigh scale (16) and forms part of the asphalt recipe.

15.Reclaimed filler silo

Reclaimed filler consists of fine particulates captured by the baghouse filter system. These fines are elevated via an enclosed bucket elevator and into a small and enclosed holding hopper where they too are transferred across to the filler weigh scale (16), as and when required for the asphalt recipe.

17.Granular additives addition hopper

A variety of granular additives can be used, including:

- Cellulous fibre: Paper fibre granules used in stone mastic asphalts (SMA) to prevent bitumen draining within the open grade of asphalt added at 0.3% of total asphalt mix
- Crumb rubber: Granulated recycled truck tyres added to crumb rubber specific asphalt mixes.

These materials are elevated by an enclosed bucket elevator to small holding or surge hopper, where they are transferred and weighed via the additive weigh scale (18).

Typically, only one of these materials is incorporated into a mix as they are each unique to specific mix designs or recipes. These materials are introduced into the pug mill mixer cold (7), as part of the wet mix process. The heated virgin materials are transferred and mixed within the pugmill with a small quantity of additives.

9.RAP feeder/hopper

Reclaimed asphalt pavement (RAP) is produced from old asphalt pavements and any waste asphalt. These materials are stockpiled and rescreened to generate controllable fractionated RAP with a known particle size distribution and known residual binder content.

The processed RAP is fed into a feeder hopper with a front-end loader. The RAP is also metered via a conveyor belt and elevated to a small holding hopper using a bucket elevator (10). When required, the RAP material is metered directly into the pugmill mixer via a weigh belt, to achieve the required weight for the recipe. The plant can handle up to 30% RAP in the asphalt mix.

11.Process oil – cold mixture manufacture

The process oil system consists of a liquid dosing pump that adds an oxidizing agent (Recosol 185) liquid additive to the bitumen weigh scale when manufacturing cold mixed asphalt.

Cold mix asphalt is an asphalt that is produced at lower temperatures than standard hot mixed asphalt. Additives are added to the binder to slow down the oxidizing properties of the finished asphalt, allowing the asphalt to be used for longer, and in smaller quantities, for works such as potholes and temporary trench reinstatements.

Reclaimed asphalt pavement process

The reclaimed asphalt pavement (RAP) process will receive road profilings or millings from various job sites across Tasmania. In this process material is transported to the asphalt plant, where the material will be stored in a designated storage bay area. Material will be pushed up and stockpiled by a front end loader.

The ASTEC GT205MF mobile screening plant will be set up adjacent to the stockpile. The screening plant is a mobile hydraulic diesel driven vibratory screen with conveyor belts and a receiving hopper. The front end loader will collect and transfer unprocessed RAP material from the stockpile and feed it into the receiving hopper, where the material is fed onto a vibratory screen that separates the RAP material into three sizes:

1. Fine fraction normally 7mm minus, referred to as fine RAP
2. Larger 14-20mm fraction, referred to as coarse RAP
3. Oversize material >20mm in size, referred to as oversize RAP

The oversize material is fed back through the screen until the particles separate as they are bound in bitumen, and pass through the screening media. The two finished fractions being the fine and coarse RAP are then stockpiled into designated storage bays, until they are required to be fed into the asphalt plant feeder bins, where the RAP material will be incorporated as a raw component of new asphalt.

The area designated for RAP stockpiles allows for up to 5,000 tonnes of material, with an average stockpile height of 3m and a material density of 2.4 tonnes per m^3. The stockpiling area includes a boundary buffer to manage site constraints and ensure compliance with environmental regulations.

It should be noted that RAP material is bound in bitumen which creates an outer non-permeable crust on the stockpile. This results in no wind-drift dust emissions and water shedding off the stockpile. RAP stockpiles are not contaminated and are essentially no different from water shedding off a road surface.

RAP processing will be conducted onsite with two processing campaigns per year totalling approximately 50 hours (or 1.5 weeks) annually, however, there is no set RAP time periods. The intention is as the unprocessed RAP stockpile builds up to around 2-3,000 tpa, the mobile screener will be mobilised and the available material will be processed using the asphalt plant front end loader, the finished two fractions being fine and coarse, are then stockpiled in the designated storage bays ready to be tested and then used within the new asphalt, as the RAP material is consumed and the unprocessed stockpile builds, the process will be repeated again as necessary.

Once the unprocessed RAP material has been screened into the two refined fractions, the screening plant will be packed up and taken offsite. It is estimated that approximately 5,000tpa of RAP will be received and processed onsite.

2.1.3 Raw input materials

The raw input materials required to manufacture 50,000tpa of asphalt are:

- Hard rock aggregates (5mm-20mm): 29,000tpa
- Washed natural sand: 10,500tpa
- Reclaimed asphalt pavement (RAP): 5,000tpa
- Hard rock (high friction aggregates, 7mm-20mm): 2,500tpa
- Bitumen: 2,500tpa
- Crushed glass: 310tpa
- Hydrated lime: 150tpa
- Crumb rubber: 10tpa.

Other material inputs required to operate the plant are outlined in Table 4.

Table 4. Material inputs required for plant operations

Material	Storage quantity
Acetylene	Standard size cylinders. Minimal usage, up to five cylinders of each per annum. Stored as per WorkSafe Tasmania requirements. Used for maintenance activities only.
Oxy	
LPG	
Argo shield	
Bitumen	Storage capacity of 220,000L in 4 x 60m^3 vertical tanks. Vertical tanks contained within concrete foundation and concrete bund wall. Approximately 48 tonnes per week.
Bitumen	Above ground tanktainers (2 x 25m^3) within a self-bunded tank, heated at any one time. Tanktainers will be vented and can be fitted with carbon filters if required.
Hydrated lime	Approximately 150 tonnes per annum stored in 60m^3 / 140 tonne lime storage silo. Approximately five truckloads per annum.
Natural gas	Supplied from Tas Gas Networks supply line, located near the eastern boundary of the site.
Diesel	Stored in a 30kL self-bunded container fuel tank.
Recosol 185	Stored in a IBC 1,000L tote on portable IBC bund. Approximately 4,000L per annum.
Slipway release agent	Stored in a IBC 1,000L tote on portable IBC bund. Up to 4,000L per annum.

The additional information presented below has been included to address EPA feedback on the draft EIS (received July 2025) and to provide greater clarification of the asphalt process and material inputs listed in Table 4.

Bitumen will be stored in four x 60m^3 vertical permanent long term storage tanks which will be electrically heated and supply bitumen directly to the asphalt plant.

The bitumen in the temporary horizontal tank containers will arrive at the site in a cold and solid state from the supplier, the tank elements are then connected to mains electricity, and the tanks are elevated in temperature overnight until the bitumen reaches 150 degrees Celsius. The bitumen is then fluid enough to pump into the long-term storage tanks, as bitumen is not being pumped into the horizontal storage tanks onsite displacing a large volume of air it is not deemed necessary for an activated carbon filter to be used whilst only heating the tanks.

The activated carbon filter will be connected to the permanent four x 60m^3 vertical bitumen storage tanks to filter the displaced breather air of the tanks, as fresh bitumen is pumped into the permanent tanks from either road delivery tanks or the temporary tank containers, as the bitumen is pumped into the tanks from the bottom of the tank the vacant airspace in the tanks is pushed out and through the tank breather system and through the activated carbon system.

Slipway release agent

Slipway will be used as a release agent and applied to the truck bodies prior to the trucks driving onto the weighbridge for loading. A designated hardstand will be constructed where the trucks will be stationed, with roll over type bunding on the hardstand.

Slipway will be stored in 1,000 litre IBC totes and a portable IBC bund. The slipway IBC will be connected to a pneumatic pump and hose. A designated elevated work platform and a spray wand applicator will be installed for truck drivers to apply the slipway product. The pump will be set up with a run timer and a delay timer to prevent over application of the product.

More information regarding the location and management of slipway is provided in Section 5.6 Dangerous goods and environmentally hazardous materials.

2.1.4 Annual production rates

The annual production is expected to be a maximum of 50,000tpa of asphalt production based on a peak production of 160tph with a nominal 5% moisture rate. A maximum of 30% RAP material could be incorporated into the final asphalt product, however it is expected that 5,000tpa (10%) of RAP is likely to be received and processed onsite.

2.1.5 Operational hours

The plant will have the capacity to operate 24 hours a day, seven days a week, depending on specific project requirements. Due to the site location in a heavily industrialised area, this is not expected to disturb local amenity.

Normal operating hours include Monday to Friday (7.00am to 5.00pm), with weekends, night shifts and/or public holidays as required, depending on customer demand.

2.1.6 Energy inputs

A 2,000 kilo-volt-amperes (kVA) electrical substation will be installed on the site. Approximately 950 kilowatts (kW) will be required for the asphalt plant, with the balance used for the existing office and redundancy for future upgrades to the site. Energy consumption will be approximately 490,000kWh per annum (based on 9.8kWh per tonne of asphalt at 50,000tpa).

The asphalt plant drying process, will be primarily powered by natural gas but will also have the capability to use diesel fuel when required. A natural gas connection will be installed from the TAS Gas Networks line that runs parallel to the Bridgewater railway line on the eastern boundary.

If natural gas is used as the main dryer fuel source (as planned), then approximately 5,000L of diesel will be used per month (60,000L per annum). Diesel would primarily be used for the front-end loader and forklift. In the event that the plant was powered entirely with diesel fuel, then an additional 450,000L of diesel per annum would be required to power the plant (total 510,000L per annum).

2.1.7 Traffic movements

A traffic impact statement was completed for the project by Traffic and Civil Services (TCS, 2025) (Appendix 1). Key traffic data and findings from the assessment are summarised below.

Imported materials to the plant and heavy vehicles routes are presented in Table 5.

Table 5. Imported/exported materials and heavy vehicle routes

Product type	Delivered from	Tonnes per annum	Litres per annum	Truckloads per annum*
Proposed asphalt plant (50,000tpa)				
Imported materials				
Raw materials (e.g. hard rock aggregates)	Trucks travel via- Hazell Bros Leslie Vale Quarry - Southern Outlet and Brooker Highway	29,000	-	886
Fine washed sand	Trucks travel via East Derwent Highway - Males Sand, South Arm	10,500	-	318
High PAFV aggregate	Trucks travel via Midland Highway - Boral Quarry, Flowery Gully	2,500	-	60
Hydrated lime	Trucks travel south via Midlands Highway from Sibelco Mole Creek to Bridgewater	150	-	5
Bitumen	Trucks travel from BP Self's Point in Hobart, Brooker Highway and Bridgewater Bridge	2,500	-	86
Emulsion	Imported from interstate by road tanker	-	120,000	5
Diesel – mobile plant – front end loader	Main fuel suppliers Tasmania	-	Up to 60kL (5kL p/m)	Up to 3.2
Diesel – asphalt plant dryer	Main fuel suppliers Tasmania	-	Up to 450kL.	18

Product type	Delivered from	Tonnes per annum	Litres per annum	Truckloads per annum*
powered by diesel fuel			50kL if plant powered by gas	
Exported materials				
Asphalt	Asphalt plant to various job sites across Tasmania	50,000	-	1,666
Proposed reclaimed asphalt pavement facility (5,000tpa)				
RAP material - import	Various job sites and projects across Tasmania	5,000	-	100
Relocated concrete batch plant (20,000m³pa)				
Imported materials				
Raw materials	Raw material truck traffic to the site (e.g. aggregate/sand (82%) and cement (12%))	37,896	-	1,061
Exported materials				
Concrete	Concrete truck traffic from the site	20,000m³/pa (47,000tpa)	-	3,374**

*Truckloads per annum consist of one-way trips. **Calculation based on 14 one-way loads/day, 241 days/yr with an average load of 6m³ (TCS, 2025).

Light vehicles movements from employees are presented in Table 6.

Table 6. Light vehicle movements (Source: TCS, 2025)

Plant/sift type	Movement
Proposed asphalt plant	
Day shift (7:00am to 5:00pm)	Four employees (e.g. plant operator, lab technician, loader operator and production manager) to and from the site
Nightshift (6:00pm to 6:00am)	Three employees (e.g. plant operator, lab technician and loader operator) to and from the site
Proposed reclaimed asphalt pavement facility	
	RAP processing will be conducted onsite with two processing campaigns per year. Approximately 50 hours (or 1.5 weeks) of processing will be conducted per year
Relocated concrete batch plant	
Day shift (7:00am to 5:00pm)	12 employees (e.g. batch plant operators and truck drivers) to and from the site
Nightshift (6:00pm to 6:00am)	10 employees (e.g. batch plant operators and truck drivers) to and from the site

2.1.8 Dry concrete batch plant

The existing dry concrete batch plant will be dismantled and relocated within the same site (next to the proposed asphalt plant) at the end of 2025 (pending council approvals).

The location of the concrete plant is provided in Figure 6.

The dry concrete plant currently operates under a Level 1 permit administered through the Brighton Council under the *Land Use Planning and Approvals Act 1993* (LUPA Act). A development application (DA2025/00095) has been submitted to the Brighton Council for the removal of the dry concrete plant.

The relocated concrete plant will continue to produce 20,000m^3 per year and be permitted as a level 1 activity through the Brighton Council, as is currently conducted.

2.1.8.1 Overview

To provide some context, a brief description of the concrete batch process is presented below.

The dry concrete batch plant consists of the following key components:

1. Aggregate and sand storage bays
2. Aggregate loading weigh bins
3. Collecting conveyor
4. Load point to agitator truck
5. Cementitious storage silos
6. Liquid additives storage container
7. Potable and recycled water storage
8. Slumping stand area
9. Water management system for recycled water capture and re-use.

The dry concrete batching process consists of loading aggregate into a weigh scale load bin with a front-end loader. The desired fraction of material from the aggregate storage bays is placed into the weigh load bin to a design weight that is in line with the mix design recipe.

Once the components have been weighed in the bin, the bin discharges onto a collecting conveyor and into a rotating agitator truck mixing bowl.

Cement from the adjacent storage silos is metered to a desired weight and fed into the agitator bowl via enclosed auger screws. Recycled or fresh potable water is also added to the agitator mixing bowl. The weighed raw components of the concrete recipe are combined inside the agitator truck. Once loaded, the truck departs the loading bay area for the slumping stand area for inspection and to assess the mix consistency before the truck departs to the job site.

Raw materials used in the production of concrete include:

- Portland cement
- Recycled flyash
- Washed natural sand
- Graded aggregates, 7, 10, 14 and 20mm aperture
- Recycled and fresh potable water
- Liquid additive mixtures.

The concrete plant utilises seven additive mixtures within the concrete mix. The mixtures are stored within bulk liquid tanks of both 1,000L and 2,000L capacities. The storage tanks are contained inside a modified 40-foot shipping container that has a 3mm steel plate bund installed internally to house all the tanks inside, the bund is designed to contain a minimum of 110% of the largest holding tank, including the displacement of the other tanks within the bunded area.

2.2 CONSTRUCTION

2.2.1 Construction description

The expected duration to construct the asphalt plant and RAP processing facility is six months. The construction of the plant will involve two key activities undertaken in conjunction with each other. These are divided into:

1. Civil works
2. Asphalt plant erection.

Civil works include site preparation and levelling and establishing site facilities, services and infrastructure. Civil works include:

- Initial site works (cut and fill of the site)
- Install services such as water, power and natural gas
- Install lighting and stormwater infrastructure (gutters, drains and kerbs)
- Erect site buildings, amenities, office, equipment, sheds, etc
- Prepare and pour foundations.

Site civil works are estimated to take 11 weeks.

Asphalt plant erection includes construction of structural frame and asphalt plant. The asphalt plant will be shipped into the Burnie Wharf and transported to Bridgewater by truck. Triaxle semi flat top trailers will transport the 12 x 40ft shipping containers and 10 semi flat top trailers over 6 days (approximately 4 semi-trailers per day).

The plant will be assembled and erected onsite and is estimated to take 15 weeks.

2.2.2 Pre-construction and clearance surveys

Several pre-construction surveys and assessments have been completed for the project by suitably qualified consultants. These include:

1. Air quality impact assessment (Assured Environmental, 2025a)
2. Noise impact assessment (Assured Environmental, 2025b)
3. Traffic impact statement (TCS, 2025)
4. Stormwater modelling, design and management (Flussig, 2025)
5. Natural values assessment (Pinion Advisory, 2025)
6. Geotechnical site assessment (GES, 2024).

2.2.3 Construction materials and equipment

Approximately 9,000m^3 of crushed rock (Class 2, 3 and 4 material) will be transported from Hazel Bros Leslie Vale and Mangalore hard rock quarries for construction purposes.

No temporary infrastructure will be required during the construction phase as existing facilities are available onsite.

2.2.4 Vehicle movements and workers

During the construction phase, vehicle movements to and from the site are likely to include eight to twelve light vehicles and six heavy vehicles. Other heavy machinery (on a temporary basis and as required) will include a dozer, excavator, concrete pump truck, crane and roller.

Heavy vehicles routes delivering imported fill, concrete and other general construction materials will use Crooked Billet Drive to access the site.

Approximately 12 construction personnel will be required for the site civil works and 15 personnel to erect the asphalt plant.

2.2.5 Construction hours

Construction is proposed to occur between 7.00am and 4.00pm, Monday to Friday and 7.00am to 3.00pm on Saturdays. No work will occur on Sundays and public holidays.

2.3 COMMISSIONING

A commissioning plan for the Astec asphalt plant has been supplied by the manufacturer and is summarised below.

The primary objective of the commissioning plan is to provide a structured approach to ensure the plant is installed correctly and able to function safely and in accordance with relevant legislative requirements.

Commissioning of the Astec BG Series asphalt plant will be undertaken by a suitably qualified specialist team consisting of trained and experienced Astec technicians supported by licenced electrical contractors, licenced combustion engineers and certified calibration technicians.

Commissioning commences with pre-energised testing and checks to satisfy electrical CoC requirements which are signed off by the licenced electrical contractor to provide confirmation that the electrical installation complies with all local requirements and relevant standards.

Commissioning conducted by Astec technicians consist of electrical and operational checks on all process control systems and safety mechanisms along with the designed operational functions of all process components.

Certified scale calibration technicians will be engaged to undertake the calibration of all weighing equipment contained within the plant.

The licenced combustion engineer will oversee and ensure the installation, setup and operation of the Type B combustion appliance and provide certification against the relevant standards. Commissioning is complete once the plant is fully operational and in production including the training of a customer operator.

The following schedule will be employed to commission the plant:

1. Pre-energise commissioning checks
2. Live commissioning checks
3. Wet commissioning
4. Burner commissioning
5. Enter mix designs into control system
6. Produce asphalt mix trials and operator training

7. Plant handover.

The plant will have a commissioning and proof of performance period of at least 46 days (approximately nine weeks).

2.4 PLANNING ASPECTS

Preliminary consultation with the Brighton Council has determined that a single development application will be required under Division 2 of the *Land Use Planning and Approvals Act 1993* (LUPA Act).

'Manufacturing and processing' is a 'permitted' use class under the Tasmanian Planning Scheme.

Figure 11 shows the Tasmanian Planning Scheme zones for Bridgewater. The general (red) and inner (brown) residential zones are close to the river, with open space on the riparian fringe of the Derwent River (green) and the Jordan River (tributary to the east of Figure 11).

The purple area to the north of the residential area is zoned general industrial, although most development is still on the western side of the Midland Highway. The project is situated within the general industrial zone. Rezoning of the land is not required.

The project site is surrounded by land zoned as 'general industrial' on all sides with land zoned 'rural living' located south of the industrial area (Figure 11).

The blue zone, for general business, borders the East Derwent Highway and provides for the needs of the resident population and the activity in this zone is quite separate from that of the industrial zone to the north. The Midlands Highway, East Derwent Highway and access roads within the Brighton transport hub are zoned utilities (yellow).

The majority of the land tenure surrounding the project site is classified as private freehold (yellow), with casement (Midland Highway and other road infrastructure) shown in pink (Figure 12). A large area of public reserve (green) occurs to the north of the site. A conservation covenant is situated to the west of the site (brown).

Figure 11. Tasmanian Planning Scheme zones

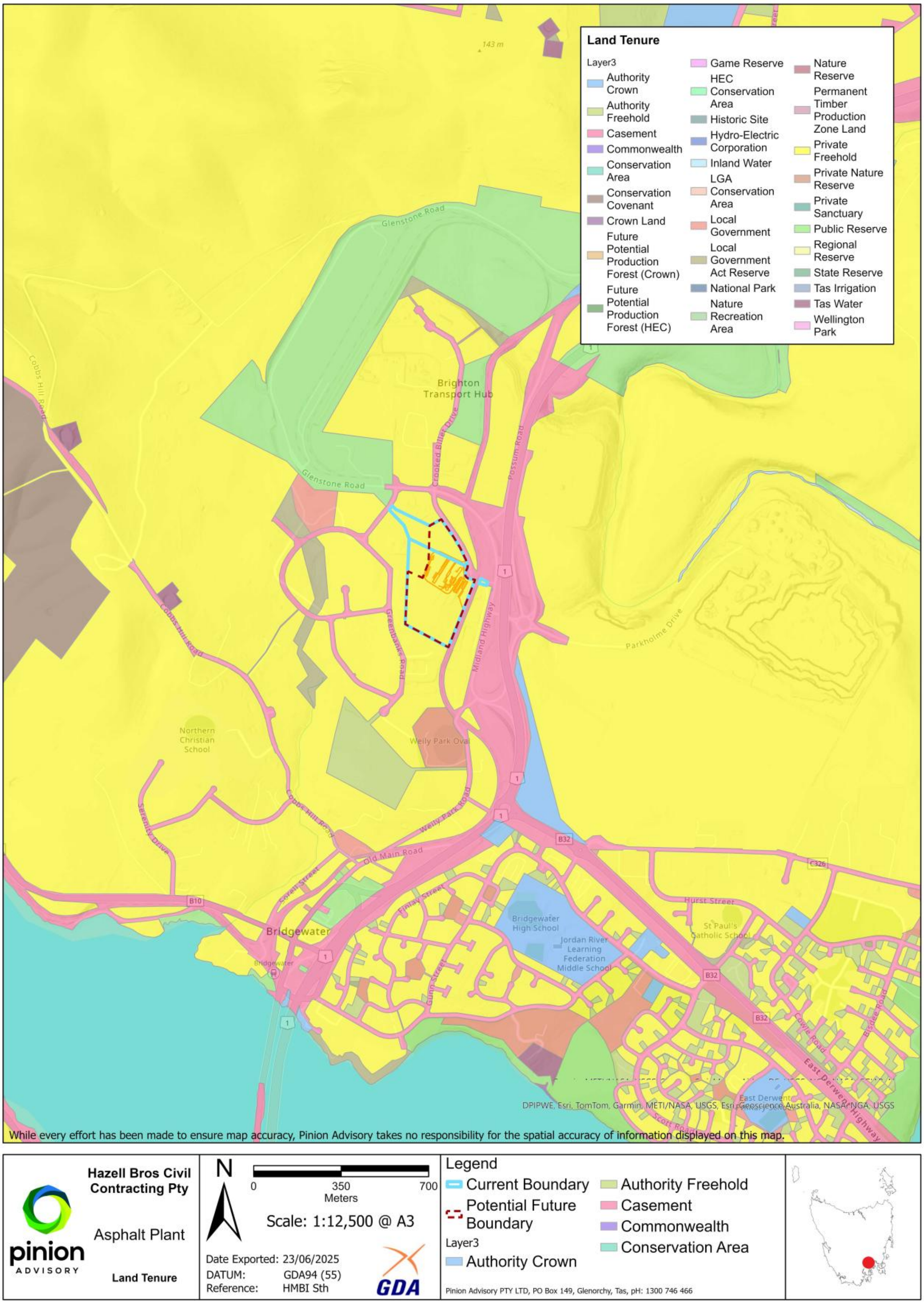


Figure 12. Land tenure (yellow shading indicates private freehold land)

Relevant code provisions under the Tasmanian Planning Scheme (State Planning Provisions and Brighton Local Provisions Schedule) that overlay the site include:

- Attenuation code (attenuation area for Bridgewater Quarry) (9)
- Bushfire-prone area code (13)
- Brighton industrial hub specific area plan
- Bridgewater Quarry specific area plan
- Electricity transmission infrastructure protection code (includes both the inner protection area and the electricity transmission corridor).

Easements identified around the project site are presented in Figure 13 and include:

1. A transmission line easement (and two transmission towers) are situated in 13 Crooked Billet Drive and just north of the proposed plant footprint area.
2. An NRE easement is located in 13 Crooked Billet Drive and just north of the proposed plant footprint area.
3. A right of carriageway near the eastern boundary of the property. The right of carriageway is situated outside the property boundary.
4. A right of carriageway is located inside the western boundary of 13 Crooked Billet Drive.

A development application addressing all the codes and standards for the relocated concrete batch plant was submitted to Brighton Council in June 2025. A development application for the asphalt plant will be submitted to Brighton Council in due course.

Nearest sensitive receptors are identified in Section 5.4 Noise emissions (Figure 31). In summary, the assessment identified 28 sensitive receptors (27 residential receptors and one school), ranging from approximately 263m (R01 – residential) to 766m (R28 – School) from the project site boundary to the receptor boundary. Receptor R01 is owned by Boral Construction but was observed to be used as a residential dwelling during the survey in July 2024 (Assured Environmental, 2025b). No health facilities or other sensitive receptors were identified near the project site.

Hazell Bros is not aware of any historical contamination issues at the site.

The proposed asphalt plant (and relocated concrete batch plant) will be owned and operated by the proponent. However, the land upon which the activity will take place (1 and 13 Crooked Billet Drive, Bridgewater) is privately owned by 327 Midlands Highway Pty Ltd. Hazell Bros has received a letter of consent from the landowner to lease the site and operate the asphalt plant on the land. Changes to the property boundary at 1 and 13 Crooked Billet Drive and the status of Brighton Council approvals are presented in Section 1.3.3.

The dry concrete plant currently operates under a Level 1 permit administered through the Brighton Council under the LUPA Act. It is anticipated that this will continue once the concrete plant has been relocated.

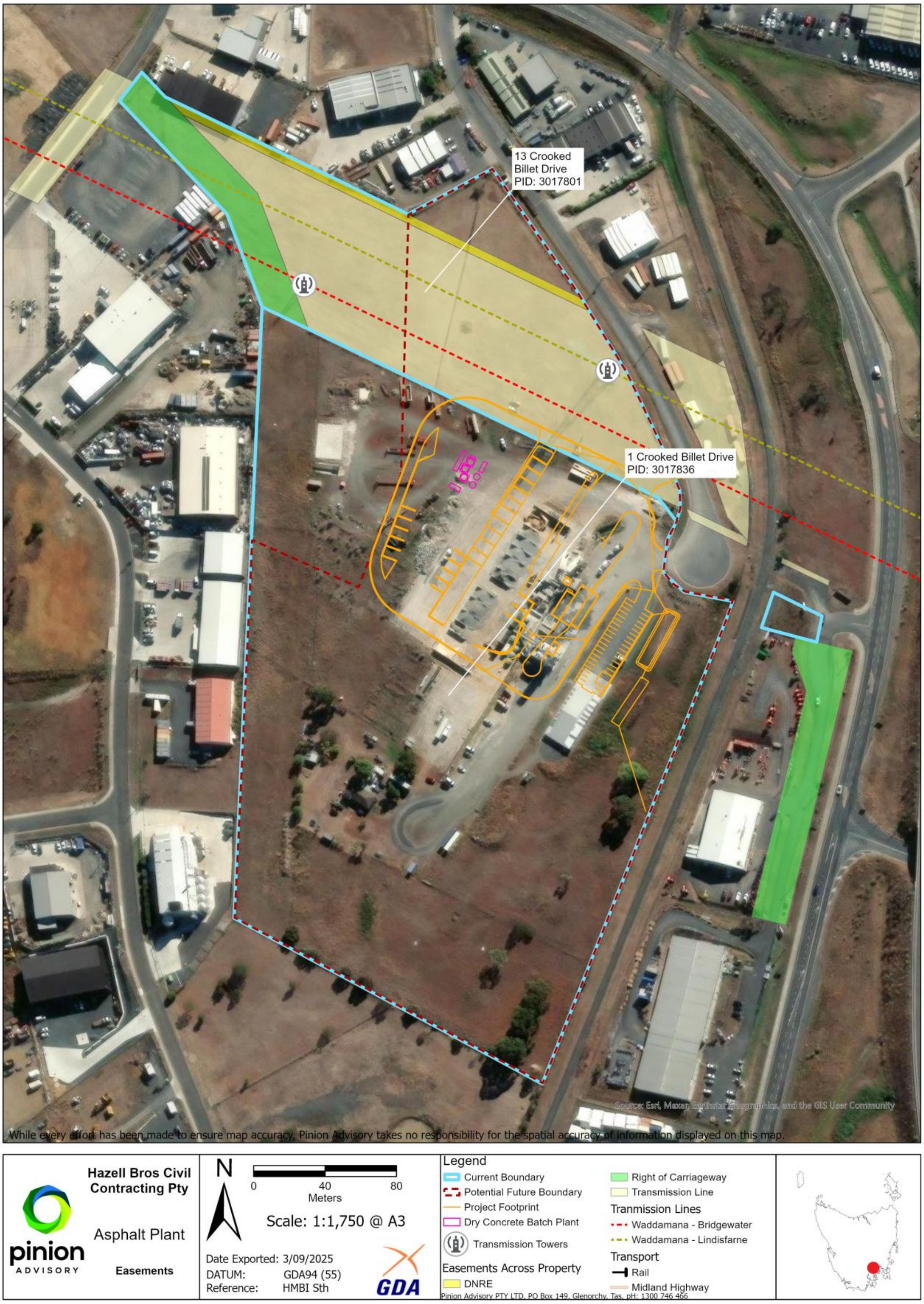


Figure 13. Identified easements near the project boundary and footprint

2.5 SOCIO-ECONOMIC CONTEXT

2.5.1 Location

Bridgewater is a town in the Brighton Municipality (Figure 14 and Figure 15) on the north eastern bank of the Derwent River approximately 20km north of Hobart's Central Business District. Nearby towns are Brighton to the north and Gagebrook to the south east.

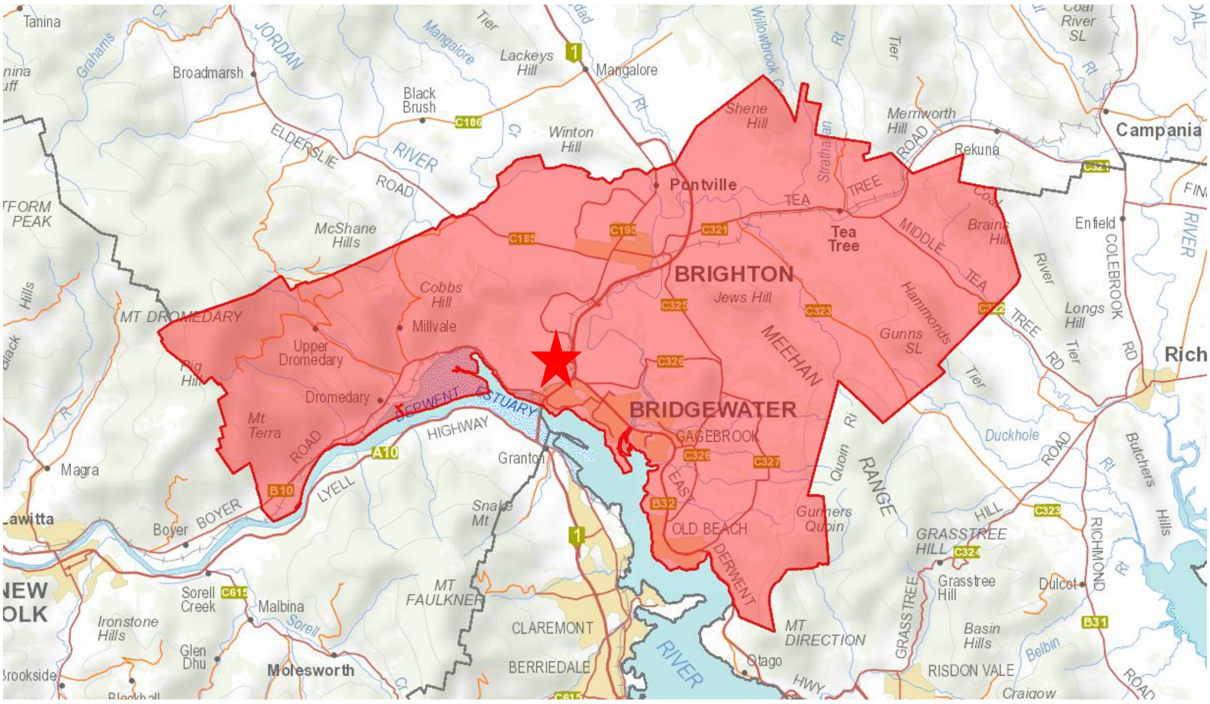


Figure 14. Extent of Brighton Municipality (Source: Land Tasmania, 2025)

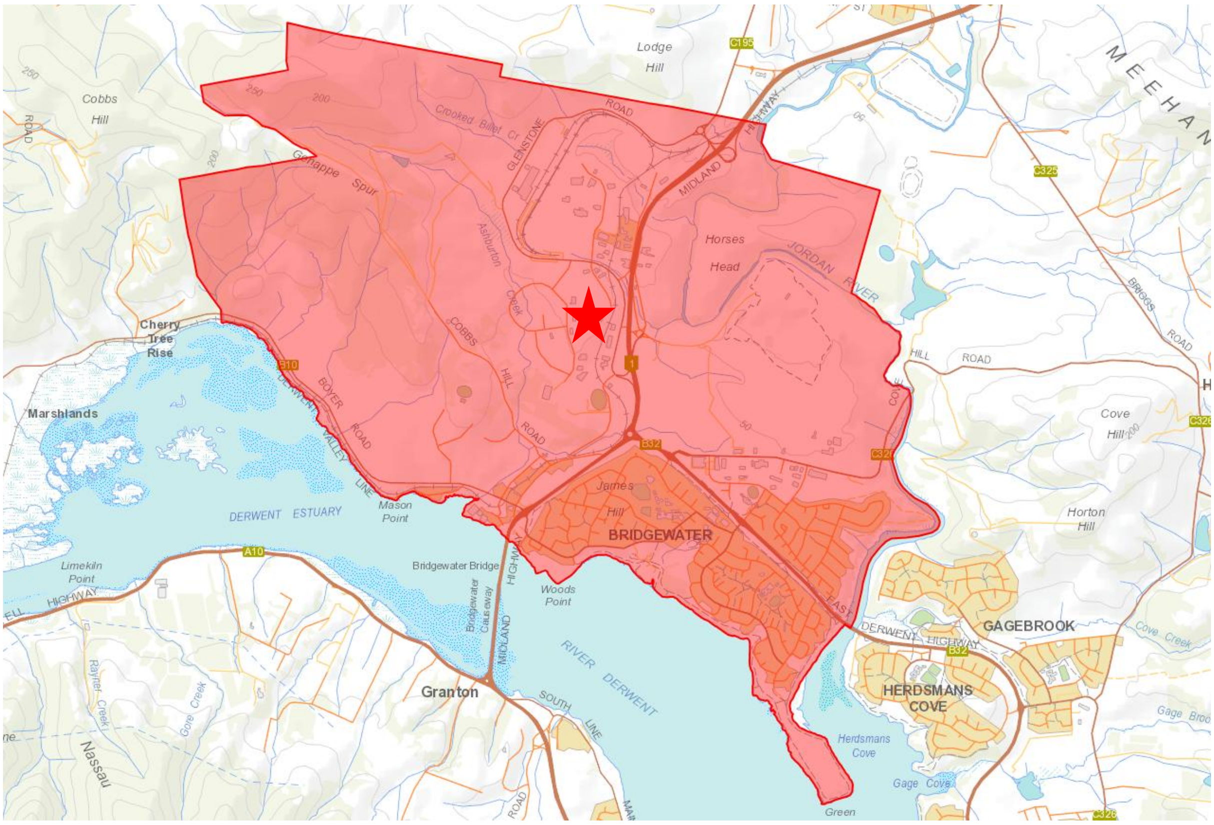


Figure 15. Extent of Bridgewater (Source: Land Tasmania, 2025)

The usual resident population of Bridgewater according to the 2021 census was 4,592 (ABS, 2021), up from 4,045 in 2016 (ABS, 2016).

Bridgewater has a relatively young population, with a median age of 31 years, compared to Tasmania (42 years) and Australia (38 years) and with a higher percentage proportion of the population in all demographic age ranges from 0-34 years compared to Tasmania and Australia (Table 7). The median age in 2021 (31 years) is slightly lower than 2016 (33 years) (ABS, 2016; 2021).

Table 7. Proportion of people (%) in median age ranges for Bridgewater compared to Tasmania and Australia, 2021

Age (years)	Bridgewater (%)	Tasmania (%)	Australia (%)
0-4	7.5	5.1	5.8
5-9	9.0	5.6	6.2
10-14	8.2	6.0	6.2
15-19	6.6	5.4	5.7
20-24	7.5	5.6	6.2
25-29	7.6	7.0	7.0
30-34	7.3	6.8	7.3

The population of Bridgewater is characterised by low rates of marriage, educational attainment, tertiary education and cultural diversity, although the level of Aboriginal and/or Torres Strait Islander people is high (17.2%) compared to Tasmania (5.4%) and Australia (3.2%) (ABS, 2021).

2.5.2 Employment

Bridgewater has 11.9% unemployment, compared to Tasmania (5.9%) and Australia (5.1%). "Labourer" is the occupation with the top response from the Census, with 20% of employed people over 15 years old, compared to Tasmania with 11.3% and Australia with 9%. Conversely, Bridgewater had lower proportions of "Managers" and "Professionals" in its working population compared to Tasmania and Australia (Table 8). Other occupations with high responses are found in Table 8 (ABS, 2021).

Table 8. Top responses for occupation in Bridgewater – proportion of employed people aged 15 and over

Occupation	Bridgewater (%)	Tasmania (%)	Australia (%)
Labourer	20.0	11.3	9.0
Community and personal service workers	18.8	13.6	11.5
Technician and trades workers	13.4	13.9	12.9
Sales workers	12.5	8.6	8.2
Machinery operators and drivers	11.8	6.4	6.3
Clerical and administrative workers	10.1	11.7	12.7
Managers	5.4	12.7	13.7
Professionals	5.4	20.0	24.0

Overall, the occupations held by residents of Bridgewater are mostly lower skilled or manual occupations.

2.5.3 Housing and income

Most of the dwellings in Bridgewater are 3-bedroom houses (Australian Bureau of Statistics, 2021). The median price for a three-bedroom house in Bridgewater increased from $258,000 in 2020 to $485,000 in 2023 and has dropped 13.4% to $420,000 in 2024. Median price for three-bedroom rentals is $440 per week. Owner occupied dwellings in Bridgewater account for 46% of the housing stock with rental dwellings comprising 54% (Domain, 2024).

In Bridgewater, separate houses make up 88.2% (1,480) of dwellings. Flats or apartments make up 8.3% (139) of dwellings and semi-detached houses comprise the rest; 3.3% or 56 dwellings (ABS, 2021).

The proportion of dwellings with household income less than $650 per week is 31.1% for Bridgewater, compared to Tasmania (21.1%) and Australia (16.5%). Conversely, the proportion with household income more than $3,000 per week is 4.8% for Bridgewater, 15% for Tasmania and 24.3% for Australia.

2.5.4 Economic aspects

The economy of the Brighton Municipality, of which Bridgewater is a part, has grown considerably in recent years due to growth in the transport, postal and warehousing, and health care and social assistance industries (Brighton Council, 2019).

Brighton's Gross Regional Product (GRP) reached almost $400 million in 2017-2018. The average growth from 2006-7 to 2017-18 was 2.1% per annum. The largest industry in Brighton in 2016 was transport, postal and warehousing, followed by construction and then health care and social assistance (Brighton Council, 2019). In 2016, most of the people employed in transport, postal and warehousing (50.7%) worked in the Bridgewater Industrial Estate, and 21.3% worked in the Bridgewater Retail and Services Hub.

Tourism is a small contributor to the Brighton economy, with a visitation of 84,000 people in 2018, with approximately 2,000 from outside Tasmania and 82,000 within Tasmania. Because of low tourism numbers, accommodation and food services is a small part of the economy.

The Brighton Hub, located in the Bridgewater general industrial area, is a major economic asset for the area. It opened in 2014 and is critical to road, rail and shipping for Southern Tasmania (Brighton Council, 2019). The Hub has allowed the easy transfer of freight between road and rail which has improved efficiencies of freight movement between Tasmania's southern and northern ports. The proposed development is proximal to the Hub.

To demonstrate the specialisation of the economy, location quotients based on employment were calculated to demonstrate the degree to which the Brighton economy has competitive advantages is certain areas of employment (Brighton Council, 2019). Local quotients above 1 demonstrate a specialisation of labour and therefore an area of potential competitive advantage. Relevant to asphalt production, Brighton had a location quotient of 1.2 for non-metallic mineral product manufacturing, suggesting a possible labour specialisation in this area (Brighton Council, 2019).

2.6 OFFSITE INFRASTRUCTURE

The following services and connections are required for the project:

- Natural gas: supplied from a below ground pipeline from Tas Gas Networks located on the eastern boundary of the project
- Electricity: via connection to an onsite 2,000kVA electrical substation
- Water: potable supply from TasWater
- Sewer: standard sewer only, no trade waste connection required.

3 Project alternatives

3.1 JUSTIFICATION FOR THE PROPOSED SITE

The site was selected over other alternative locations due to the following factors:

- Location to customer base
- Access to excellent road networks
- Proximity to quarry supplies (e.g. Leslie Vale Quarry) and other raw materials
- Availability of natural gas (and other services) at the site
- Small, highly modified brownfields site located within an existing industrial estate (zoned 'general industrial')
- Distance to sensitive receptors.

No alternative locations with such favourable site conditions were identified.

3.2 CHOICE OF AVAILABLE TECHNOLOGIES

The Astec BG2200XL asphalt plant was selected as the most suitable plant for the site based on:

- Capacity to meet 50,000 tonnes per annum and customer demand

- Rated at 160tph with a nominal 5% moisture content
- Capacity to incorporate up to 30% recycled materials into the finished asphalt product, leading to less waste sent to landfill
- Bitumen product can be stored in four 60m^3 vertical tanks
- Ability to accommodate current and future demand scenarios
- Plant life expectancy of 30 years
- Energy efficiency, plant can be powered by natural gas or diesel
- Plant has been designed to the latest environmental technologies to minimise emissions and energy usage.

3.3 BEST PRACTICE ENVIRONMENTAL MANAGEMENT

Hazell Bros is committed to avoiding and minimising environmental impacts from their operations. To achieve this, Hazell Bros is continually improving their environmental performance through the implementation of best practice technologies, environmental management procedures and compliance with all Commonwealth and State environmental regulations.

Hazell Bros maintains an environmental management system that is consistent with their ISO 14001 certification and guides their efforts to achieve best practice environmental management in all their operations. The plant will have the capacity to recycle RAP material (and other recycled materials) by up to 30% in the asphalt product, preventing this material from being disposed to landfill.

4 Public consultation

4.1 STAKEHOLDER CONSULTATION

The key regulatory stakeholders are Brighton Council (BC), Environment Protection Authority Tasmania (EPA) and the Department of State Growth (DSG).

No specific consultation is planned, as the advertising and consultation process as part of the development application and regulatory approvals process should be sufficient to hear any concerns and take any questions from the community.

A summary of the regulatory authorities that have been consulted as a part of the approvals process is presented in Table 9.

Table 9. Summary of stakeholder consultations

Stakeholder	Timing	Method	Comment
EPA Tasmania (Assessment branch)	Early 2024 - ongoing	Site meeting and personal communication	Initial project briefing, Notice of Intent (NOI) and EPA assessment process
Brighton Council	Early 2024 - ongoing	Site meeting and personal communication	Project briefing with BC and submission of application for planning permit
Department of State Growth	Early 2024	Personal communication	Project briefing with DSG

Hazell Bros will continue to consult with key regulatory authorities (identified in Table 9) throughout the life of the project. Other stakeholders will be consulted as required.

5 Potential impacts and their management

5.1 KEY ISSUE 1: AIR QUALITY

5.1.1 Existing environment

An air quality impact assessment was conducted for the project by Assured Environmental (2025a). The assessment report is presented in Appendix 2 with key findings summarised below.

A site visit was conducted by Assured Environmental personnel on 23 July 2024 to the proposed project site and surrounding area.

The air quality assessment report was reviewed and updated in June 2025 to address EPA feedback on the draft EIS (received December 2024) and to update the modelling results based on the new location of the asphalt plant and the current and future proposed site boundaries. The report was also updated in August 2025 to address EPA comments (received July 2025).

The air quality assessment identified 24 sensitive receptors (23 residential receptors and one school). The closest sensitive receptor was identified approximately 375m from the project site boundary to the actual dwelling of the receptor (Figure 16).

The surrounding land uses primarily comprise of industrial activities with both recreation area to the south and residential (rural living) to the south and southwest of the project (Figure 16). No health facilities were identified near the project site.

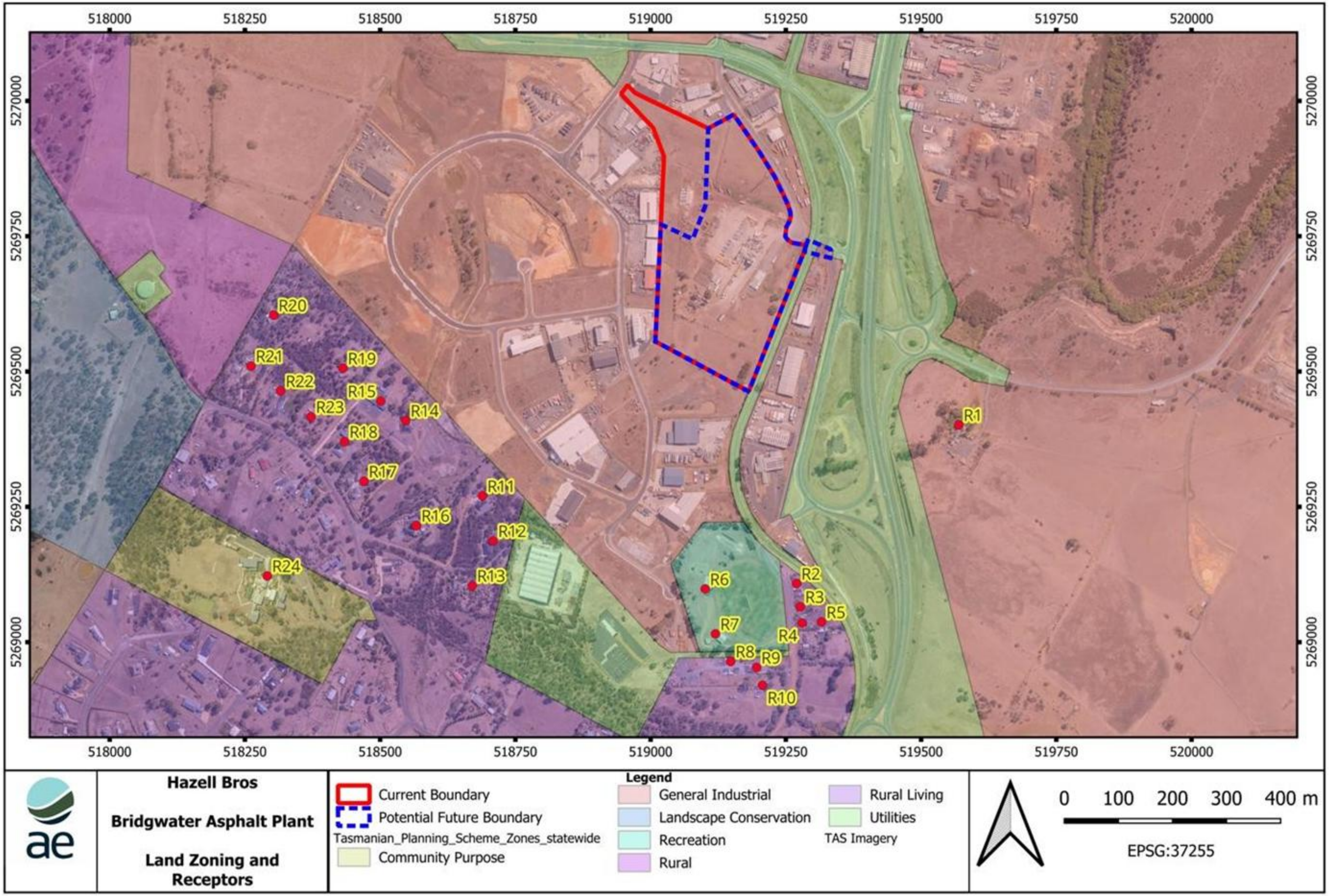


Figure 16. Sensitive receptors identified in the air quality assessment (Source: Assured Environmental, 2025a)

5.1.1.1 Background ambient data

Background air quality data specific to Brighton Council is not available. The nearest reference station for ambient air monitoring is located in Hobart (New Town), which provides data solely for PM_{10} and $PM_{2.5}$. To assess cumulative impacts, background air quality data from this station was obtained from the annual National Environment Protection (Ambient Air Quality) Measure (NEPM) reports, covering a period of three years, as presented in Table 10. Note, recent background air quality data for this station are not available.

Table 10. Summary of background concentrations

Compound	Averaging period	Parameter	Concentration (ug/m^3)			Modelled
			2015	2016	2017	
PM_{10}	24 hours	70th percentile	14.8	13.7	14.3	14.8 (max)
	1 year	Average	NA	10.6	11.1	11.1 (max)
$PM_{2.5}$	24 hours	70th percentile	7.1	6.5	6.9	7.1 (max)
	1 year	Average	5.8	5.5	5.7	5.7 (max)

5.1.1.2 Surrounding industry

A range of businesses and industries operate within a 500m radius of the project site. These include a fast-food outlet 100m to the north, warehouses, self-service fuel facility to the northwest, and metal recyclers to the north and west of the site.

Businesses identified in the surrounding area which may have an impact on the local air environment are summarised in Table 11.

Only one facility was identified in the National Pollution Inventory (NPI) (Tasmanian Gas Pipeline Pty Ltd) however, this facility is located 800m from the project site and therefore was not included in the assessment. Industries surrounding the project site are presented in Figure 17.

Table 11. Summary of surrounding businesses in the area

Business	Location	Comment
Supagas	28 Crooked Billet Dr Bridgewater TAS 7030	• Supplier of LPG, industrial, medical, specialty and helium gases • VOCs and NOx are expected to be released. However, the quantities are considered insignificant based on the site visit as they are not reported to the NPI and therefore not included in the assessment.
Greenbanks Distilling Co	25 Greenbanks Rd Bridgewater TAS 7030	• Distillery • Ethanol is expected to be released. Not included in the assessment as this pollutant is not being released from the project site.
Hobart Scrap Car Removals & Cash for Scrap Cars	17 Greenbanks Rd Bridgewater TAS 7030	• Recycling of all ferrous and non-ferrous scrap metals • Dust emissions are not included in the assessment, as no visible dust was observed during the site visit conducted on 23 July 2024.
Tassie Wrecker & Auto Removal	19 Greenbanks Rd Bridgewater TAS 7030	
Bullock Recycling Services	Bridgewater TAS 7030	
Real Metal Recyclers	49/5 Crooked Billet Dr Bridgewater TAS 7030	

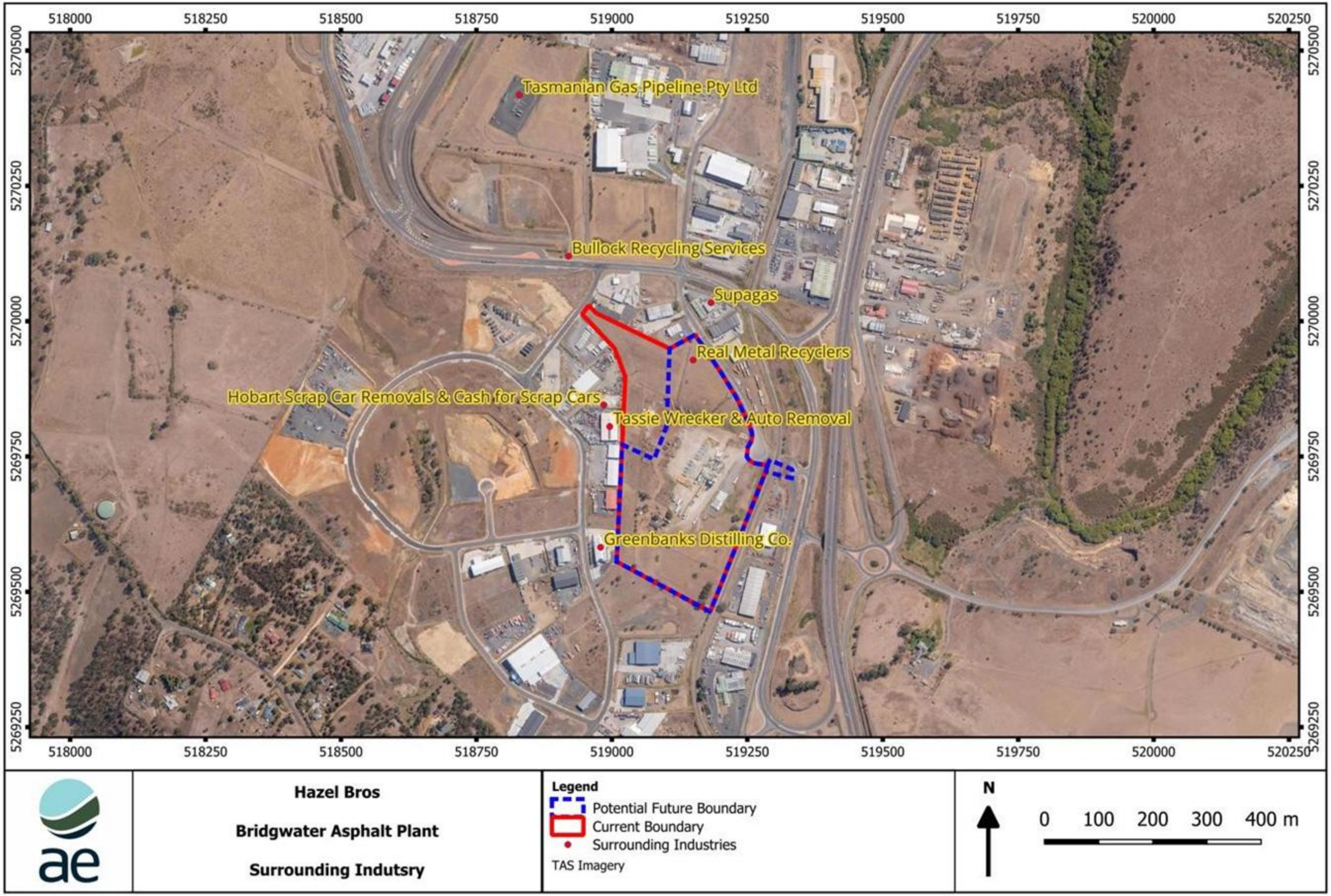


Figure 17. Surrounding industry to the project site (Source: Assured Environmental, 2025a)

5.1.2 Methodology

The air quality impact assessment was undertaken in accordance with the following guidance documents and regulatory requirements:

- Tasmanian Planning Scheme – attenuation distances
- Ambient Air Quality NEPM – Air NEPM Standards 1998
- Environmental Protection Policy (EPP) (Air Quality) 2004
- Update to Air Pollutant Design Criteria used in the Environmental Impact Assessment Process 2022 (produced by the Board of the EPA)
- Environmental Impact Statement Guidelines - Hazell Bros Civil Contracting Pty Ltd. Asphalt and Reclaimed Asphalt Pavement (RAP) Processing Plant.

Specific air quality criteria are provided in Appendix 2.

5.1.2.1 Meteorological modelling

Meteorological modelling was undertaken using TAPM (The Air Pollution Model) and CALMET to predict localised meteorological conditions. The meteorological data derived from these models was used as an input for the CALPUFF dispersion modelling.

A site-specific meteorological dataset has been determined using the prognostic model TAPM. Prognostic models, such as TAPM, permit the development of localised meteorological datasets, based on synoptic weather conditions. The model predicts the regional flows important to dispersion, such as sea breezes and terrain induced flows, against a background of larger-scale meteorology provided by synoptic analyses.

The output of the model, when used with a diagnostic meteorological model, such as CALMET, provides a meteorological dataset suitable for introduction into the wind field results. This methodology is the recommended approach for the modelling of contaminant concentrations using CALMET (TRC Environmental Corporation, 2011).

A summary of the meteorological parameters used in TAPM and CALMET models are provided in Table 29 of Appendix 2.

5.1.2.2 Dispersion modelling methodology

The CALPUFF modelling system treats emissions as a series of puffs. These puffs are then dispersed throughout the modelling area and allowed to grow and bend with spatial variations in meteorology. In doing so, the model can retain a memory of the plume's movement throughout a single hour and from one hour to the next while continuing to better approximate the effects of complex air flows.

CALPUFF utilises the meteorological processing and prediction model CALMET to provide three-dimensional wind field predictions for the area of interest. The final wind field developed by the model (for consideration by CALPUFF) includes an approximation of the effects of local topography, the effects of varying surface temperatures (as is observed in land and sea bodies) and surface roughness (resulting from varied land uses and vegetation cover in an area). The CALPUFF model can resolve complex terrain influences on local wind fields including consideration of katabatic flows and terrain blocking.

Post processing of modelled emissions is undertaken using the CALPOST package. This allows the rigorous analysis of pollutant predictions generated by the CALPUFF system. CALPOST is able to provide an analysis of predicted pollutant concentrations for a range of averaging periods from one hour to one year.

Further background information on the CALPUFF modelling methodology (e.g. receptors, buildings, conversions and other settings) is presented in Section 10 of Appendix 2.

5.1.3 Assessment

5.1.3.1 Construction phase – asphalt plant

The expected duration to construct the asphalt plant is six months, with construction to occur between 7:00am-4:00pm Monday to Friday and Saturday 7:00am-3:00pm. Construction details are also provided in Section 2.2.

Particulate matter is the primary pollutant generated from construction activities, particularly those involving earthworks, as well as from traffic movement. During the construction of the asphalt plant, temporary and localised adverse impacts on air quality are anticipated. These impacts will vary daily, depending on the type and intensity of the construction activities.

Dust emissions from construction are generally managed by implementing good site practices. The relatively short duration of construction activities further simplifies dust management compared to ongoing operational emissions. Furthermore, the air quality assessment found that potential impacts to nearby sensitive receptors would be unlikely due to the distance between the construction site and receptors. Therefore, dust modelling would not provide significant additional insight into the management of these emissions. Instead, effective onsite dust control measures (e.g. deploying a water cart to reduce dust emissions) and regular monitoring will ensure that emissions are kept within acceptable limits and managed appropriately throughout the construction phase.

There are no national standards or regulations specifically governing air emissions from construction activities. However, the ACT Government refers to the UK Institute of Air Quality Management (IAQM) 2014 guidelines for assessing potential dust impacts during construction. This guidance outlines a qualitative risk assessment process for the potential unmitigated impacts of dust from demolition, earthworks, and construction activities. The IAQM guidance consists of a four-step, risk-based assessment as follows:

- Step 1: Screening assessment
- Step 2: Dust risk assessment
- Step 3: Site-specific mitigation
- Step 4: Reassessment.

According to Step 1 of the IAQM guidance, a detailed risk assessment (Steps 2 to 4) is required if sensitive receptors are located within 350m of the project site boundary, within 50m of routes used by construction vehicles, or within 500m of the site entrance.

The closest sensitive receptor is approximately 375m from the site boundary, which is beyond the IAQM's 350m screening distance. Moreover, no sensitive receptors are located within 50m of the routes used by the construction vehicles or within 500m of the site entrance. As a result, a detailed risk assessment is not required.

Despite this, dust mitigation measures should be implemented as part of good site practice and are listed in section 5.1.4.

5.1.3.2 Operational phase – asphalt plant

The operation of the asphalt plant has the potential to contribute to air emissions from the following plant components (E references refer to Figure 18 and Figure 19 below):

- Material feeders and hoppers

- Exhaust stack (E1)
- Imported filler silo baghouse filter (E2)
- Hot screen
- Hot aggregate storage silo
- Mineral scale
- Pug mill mixer
- Hot asphalt storage - load out (E4)
- Bitumen storage tanks and breather tank (E3).

Potential other emissions sources during operations include:

- Odour
- Dust / particulates
- Gaseous pollutants from combustion (e.g. sulphur dioxide (SO_2), carbon monoxide (CO) and nitrogen oxides (NOx))
- Heavy metals
- Polycyclic aromatic hydrocarbons (PAHs)
- Volatile organic compounds (VOCs).

A summary of the potential emissions from the asphalt plant is presented in Table 12.

Table 12. Potential emissions from the asphalt plant

Source	Activity	Potential emissions	Mitigation measures
Exhaust stack (E1), filler silo-bag house filter (E2) screening process	Fine particles from aggregates, fillers and RAP	Particulate matter	Bag house will filter most of the particles.
Bitumen tanks carbon filter (E3), process oil system, exhaust stack (E1)	VOCs may be released from bitumen evaporation and the addition of oxidising agents during cold mix asphalt production	Volatile Organic Compounds (VOCs)	Activated carbon filter will be installed at the vents of the bitumen tanks
Exhaust stack (E1)	Formed during combustion in the rotary dryer	Combustion gases (Nitrogen Oxides (NO_x), Carbon Monoxide (CO) and Sulphur Dioxide (SO_2))	Low-sulphur diesel and natural gas will be used. Both fuel types will contribute to a reduction in air emissions, particularly sulphur dioxide, particulate matter and nitrogen oxides (NO_x), compared to conventional diesel
Material transfer points (conveyors, feeders, elevators, and hoppers)	Particulate can be emitted during the handling, transfer, and loading/unloading of virgin materials, aggregates and RAP	Particulate matter	All conveyors are enclosed
Vehicle movement on paved roads	Particulate can be generated when vehicles and equipment move over paved roads	Particulate matter	All roads will be paved

Source	Activity	Potential emissions	Mitigation measures
Wind erosion from stockpiles	Particulate can be blown off the stockpiles during windy conditions	Particulate matter	Bunkers will be used to reduce wind erosion from stockpiles

A process air flow diagram of the asphalt plant is provided in Figure 18.

It should be highlighted that the feeder hoppers are not connected to exhaust system or bag house, they are standalone feed bins that will be fed via a front-end loader. Material will be discharged onto the collecting conveyor belt at a designated rate, which is managed via the asphalt recipe in the batching control system. The aggregate feed bins are covered over the top of the loading feed point. The main collecting conveyor will also be covered.

The rotary dryer, hot screen house, hot aggregate storage, mineral scale and pugmill mixer will all be connected to the exhaust system via a series of scavenge duct works systems and all pass through the baghouse filter prior to discharging through the exhaust stack.

Dust particulates are captured within the baghouse filter and are auger screw fed back into the reclaimed dust vertical storage silo (Figure 18). The dust is weighed back into the finished asphalt product via the mineral weighing level.

The exhaust fan on the asphalt plant is variable speed also known as variable frequency drive (VFD), this allows the automated batching system to speed up or slow down the exhaust fan to adjust the exact amount of air flow and pressure required for the rotary dryer and scavenge duct system to operate at its optimum.

A failsafe mechanism will be included in the operating system. If there is no rotation detected on the exhaust fan drive shaft, the asphalt plant will not start, therefore if the exhaust fan is not running the rotary dryer or aggregate feeders cannot start. This results in no uncontrolled discharge of emissions.

Pressure and temperature sensors will be fitted in the exhaust stack and rotary dryer inlet, for the automated operating system to manage the correct operating conditions within the drying and exhaust system. If the sensors detect over or under pressure or temperature from the nominated set points, then the burner device will shut down automatically.

The imported filler silo has its own standalone small bag house filter on top of the silo. As the silo is filled with hydrated lime via a pneumatic road tanker, the filter allows filtration of the displacement air exiting the silo as product is filling the silo.

The process oil system discharges via a closed pipe system to the bitumen weigh scale, where it is added into the pug mill mixer. As a result, any emissions are captured via the pug mill mixer scavenge duct system and are directed back through the bag house and out via E1 the exhaust stack, the process oil is minimal, as it is added at less than 1% of bitumen volume, therefore if bitumen content of a standard mix is 5% of total mix, for a one tonne batch 5% of 1000kg is 50kg of bitumen, and 1% 0f 50kg is 0.5kg or 500ml of process oil per batch.

The location of potential air emission sources from plant components are provided in Figure 20.

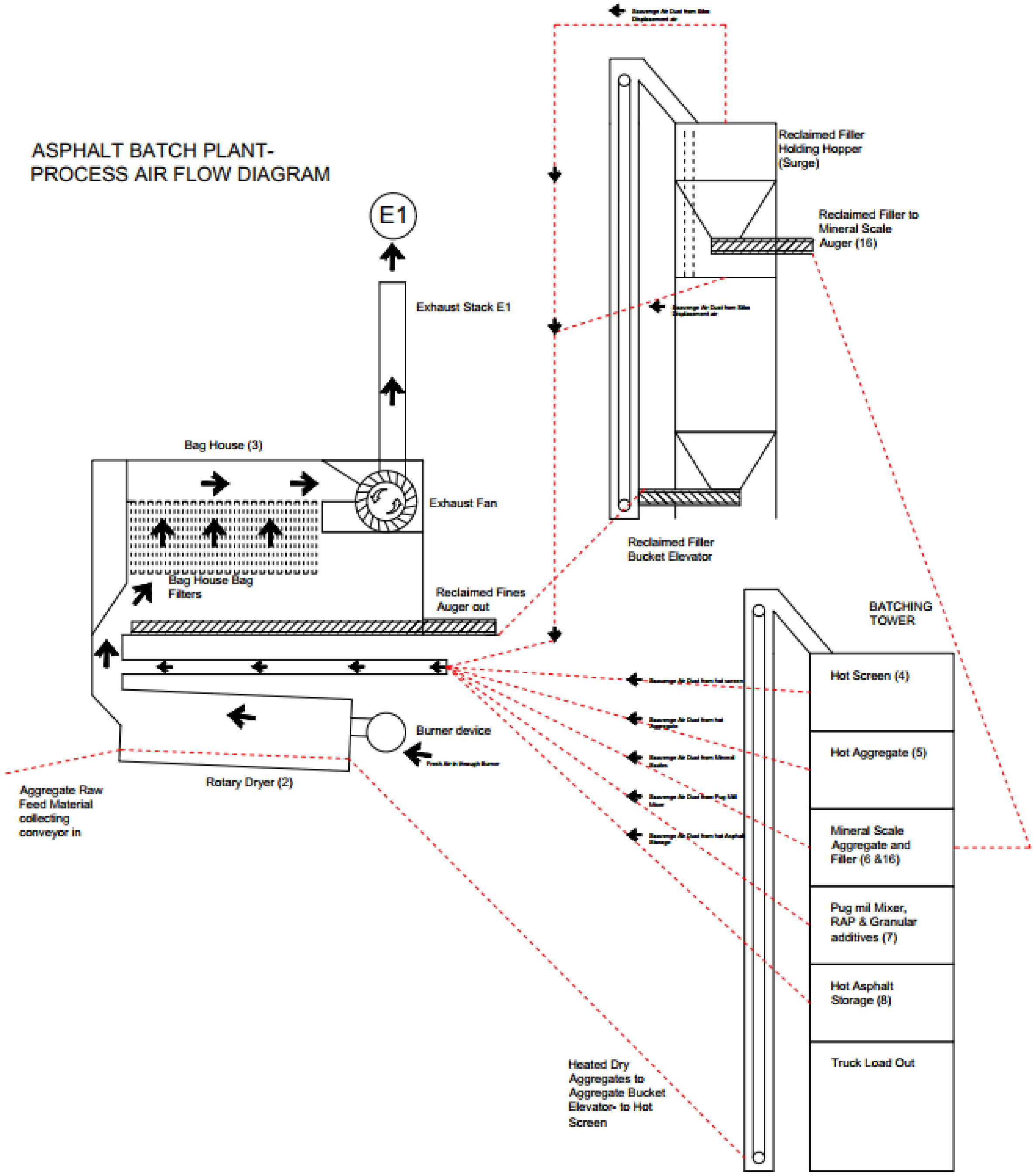


Figure 18. Process air flow diagram (Source: Hazell Bros)

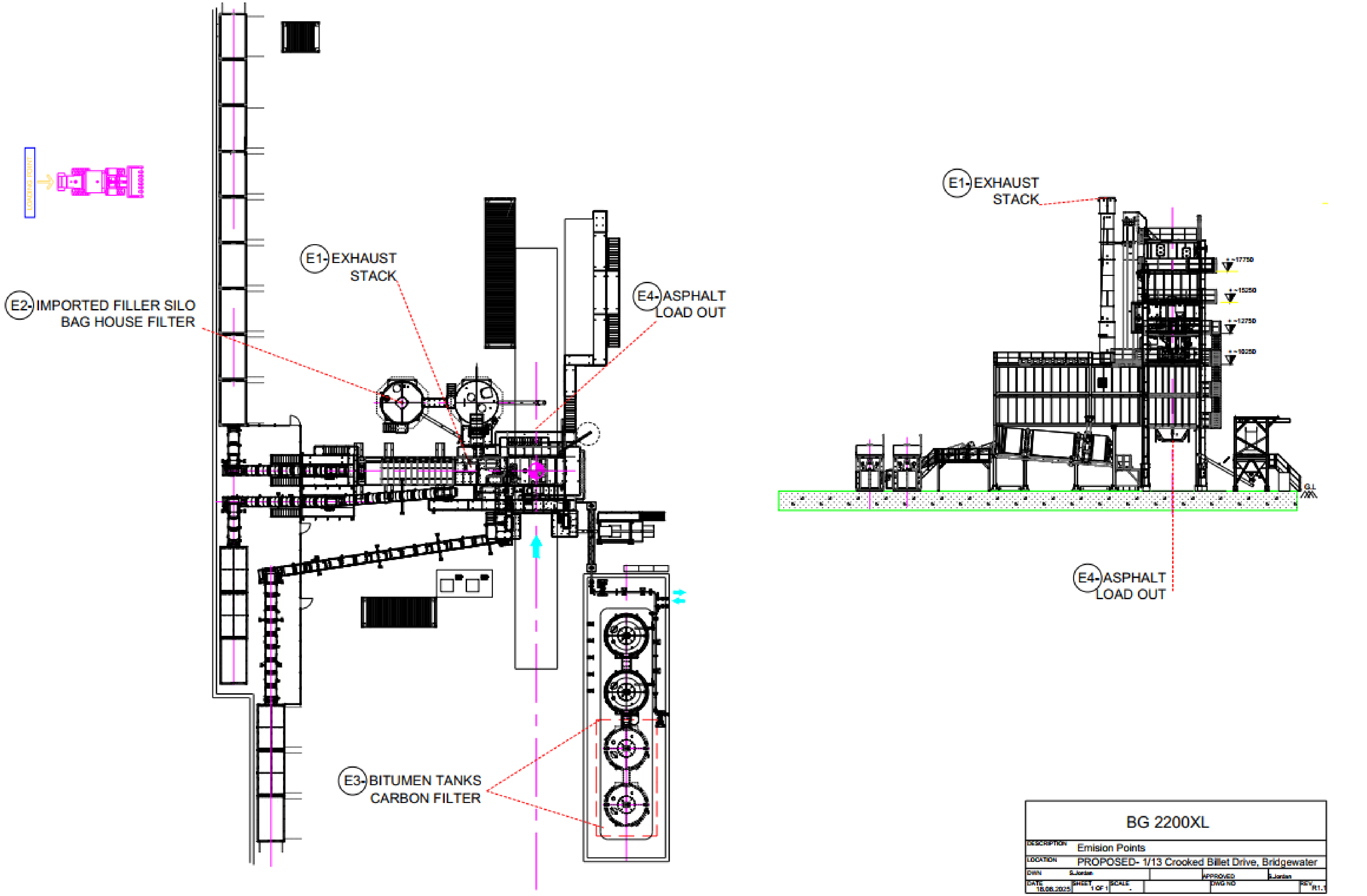


Figure 19. Location of emission points (Source: Hazell Bros)

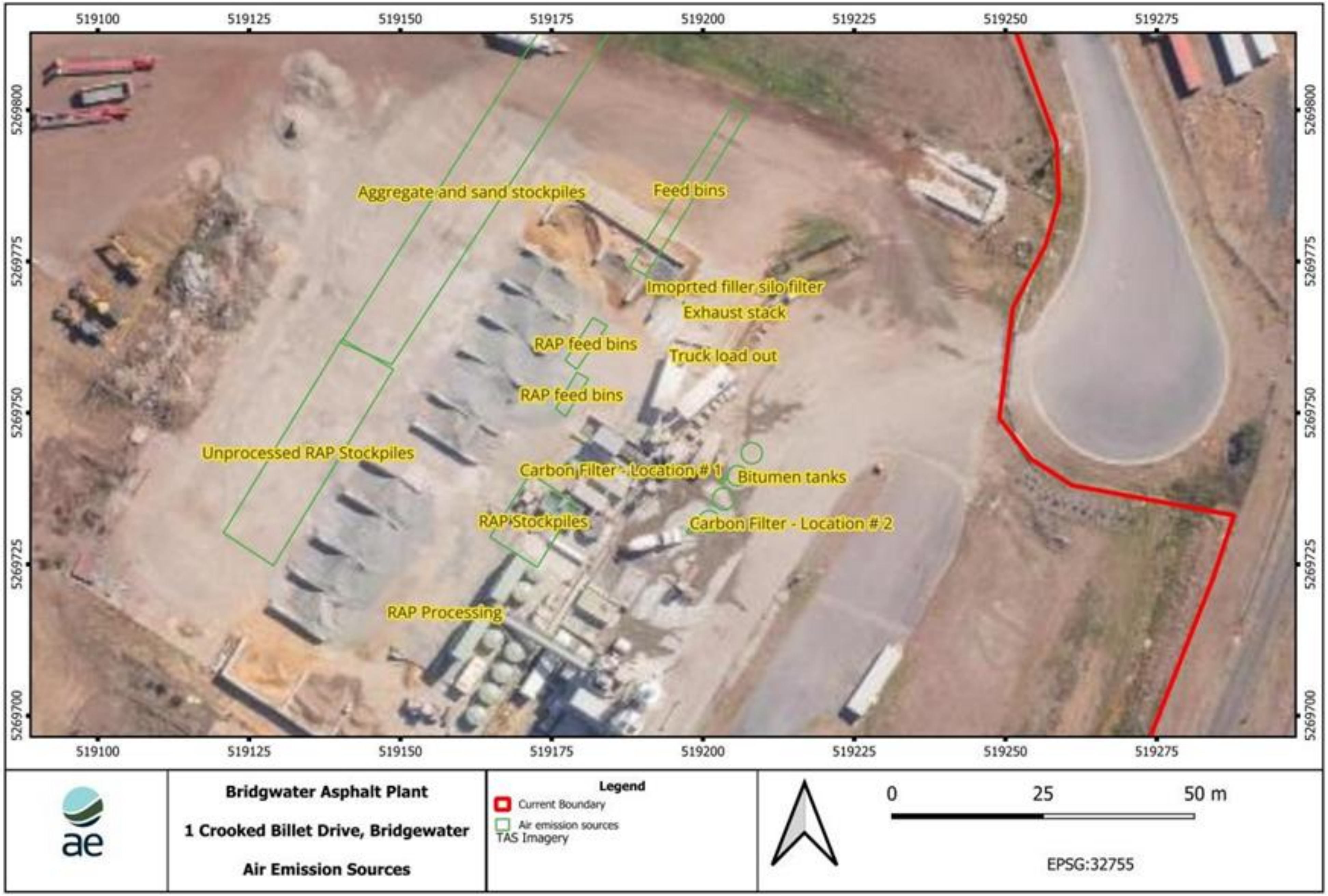


Figure 20. Location of potential air emission sources from plant components (Source: Assured Environmental, 2025a)

Odour emissions

The primary sources of odour emissions identified are:

- Aggregate drying system, including the plant's exhaust stack
- Recycled asphalt additions
- Mixing
- Loading of trucks with asphalt from the storage silos
- Bitumen storage tanks.

The most significant point source of odour emissions is the main stack whilst heating asphalt that contains RAP material and other recycled additives. Emissions from the bitumen storage tanks' vents are acknowledged but are minor by comparison with those discharged from the main stack.

Fugitive odour emission sources are primarily associated with bitumen tanks and the loading of asphalt product into transport vehicles. Most of the fugitive emissions are minor in nature. However, the process of loading hot mix asphalt onto transport trucks, which occurs periodically, has the potential to result in a transient, but noticeable odour emission, as is also the case when asphalt is applied to road surfaces.

Dust

Dust emissions from the project can be generated from several major activities, these include:

- Drying and heating of the aggregates in the drum dryer. To manage this, Hazell Bros will install a baghouse after the burner/dryer drum and before the main exhaust fan and stack to control dust emissions. Dust emissions could also be generated due to the combustion of fuel in the burner.
- Loading of raw aggregate onto conveyor belts, hot elevators, storage bins and the loading of asphalt mix to the silos. These elements and activities will be conducted in an enclosed environment, leading to a significant reduction in dust emissions. Furthermore, the asphalt batching tower is held under negative air pressure by the exhaust fan and scavenge ducts. This results in the dust being drawn back through the bag house filter and prevents dust from escaping the batching tower. Dust could also arise from wind erosion and mechanical disturbance of aggregate stockpiles. All scavenge ducts capturing negative pressure will be directed through the bag house filter and exit via the exhaust stack E1 and E2.

Gaseous pollutants

Combustion gases, including sulphur dioxide (SO_2), carbon monoxide (CO), nitrogen oxides (NO_x) and small amounts of organic compounds of various species could be emitted during the combustion of the fuel in the burner. CO and organic compounds could be emitted due to incomplete combustion of the fuel. While NO_x is generated from high temperature combustion processes. These pollutants could also be released during the transfer of hot asphalt mix to storage silos and loading trucks. The plant dryer will operate on natural gas, with the option to run on diesel in certain situations.

Potential other emissions

Potential other emissions released from the manufacturing process include:

- Heavy metals (e.g. arsenic, cadmium, chromium, copper, lead, mercury, nickel, zinc, etc)
- Polycyclic aromatic hydrocarbons (PAHs) (e.g. benzo(a)pyrene)
- Volatile organic compounds (VOCs) (e.g. benzene, formaldehyde, toluene and xylene, etc).

Emission rates

The major air emissions from the asphalt plant are from the exhaust stack as well as fugitive emissions. A detailed assessment of the emission rates and assumptions from the following activities are provided in Appendix 2. These include:

- Exhaust stack
- Bitumen tank
- Filler silo
- Truck load out
- Raw material handling and transfer
- Truck movements
- Wind erosion.

5.1.3.3 Operational phase –dry concrete batch plant

Air emissions from the dry concrete batch plant primarily arise from dust generated during various stages of the operation. The sources of emissions from the existing operations include:

- Material transfer
- Truck loading
- Vehicle movement on paved roads
- Wind erosion from stockpiles.

The above sources all have the potential to produce particulate matter and fugitive dust.

The locations of air emission sources from the dry concrete batch plant are presented in Figure 21.

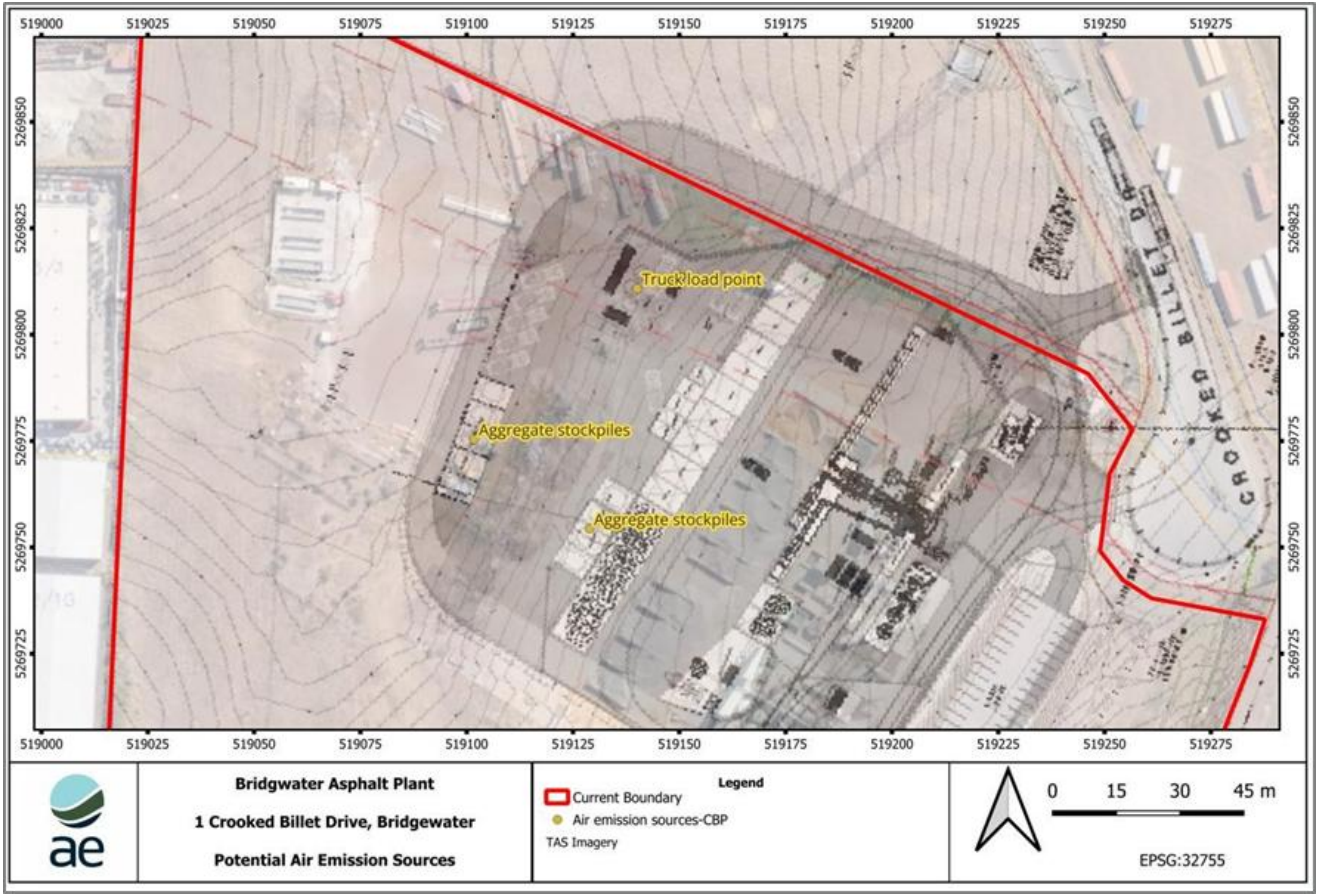


Figure 21. Air emissions from the dry concrete batch plant (Source: Assured Environmental, 2025a)

5.1.3.4 Predicted emissions

Predicted ground level concentrations (GLC) of the potential air pollutants were assessed at both the current plant boundary (solid red line) and the potential future boundary (dotted blue line) as shown in Figure 16.

Particulate matter emissions from all activities at the project site (for both asphalt plant and concrete batching plant) as well as background concentrations are included in this section.

Combustion gases and other potential pollutants from asphalt exhaust stack operating on natural gas and diesel. Background concentrations for combustion gases and other pollutants are not available, therefore these predicted concentrations are in isolation.

Predicted GLC isopleths for each pollutant are presented in the air assessment report (Appendix 2).

The modelling results provided below represent emissions from both natural gas and diesel. If the emission rates for both fuels, as indicated in Table 8 of Appendix 2, are similar, only a single model was run. Also, a single model run was performed for PAHs using the diesel emission rate, as the emission rates from both fuels are very low.

Odour

The predicted odour concentrations emitted from the plant were calculated for the exhaust stack, truck load out and bitumen tanks (breathing operations and deliveries).

Odour concentrations for the exhaust stack were not provided by the manufacturer and therefore were based on AE's odour monitoring at asphalt plants around Australia (Assured Environmental, 2025a). Adopted concentrations and emissions factors used in the modelling are presented in Appendix 2.

Odour concentrations and emission rates were reported for two cases, including:

- 0% RAP (virgin asphalt) fired on natural gas or diesel
- 30% RAP which represents RAP using regardless of fuel type.

An activated carbon filter is proposed to be installed at either location #1 (in the middle of the four tanks), or at location #2 (at the end of the four tanks) as indicated in Figure 22. Based on these two different locations, six scenarios have been modelled and presented in Table 13.

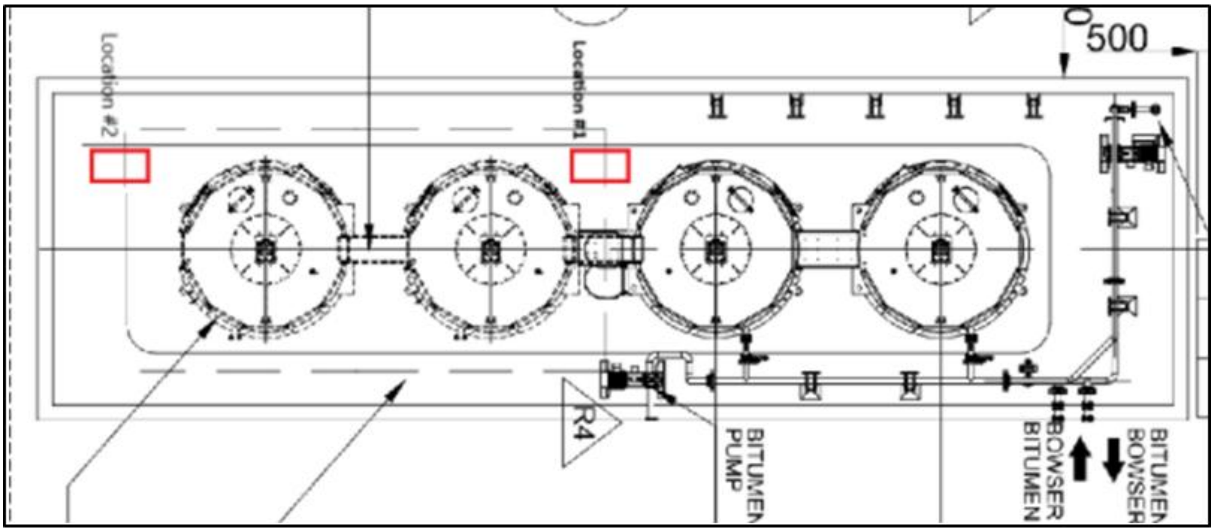


Figure 22. Proposed locations of the activated carbon filter (Source: Assured Environmental 2025a)

Table 13. Odour modelling scenarios

Scenario	Stack	Activated carbon filter location	Carbon filter vent type
Scenario 1	Diesel	Location # 1	Horizontal
Scenario 2	Diesel	Location # 2	Horizontal
Scenario 3	Natural Gas	Location # 1	Horizontal
Scenario 4	Natural Gas	Location # 2	Horizontal
Scenario 5	30% RAP	Location # 1	Horizontal
Scenario 6	30% RAP	Location # 2	Horizontal

Predicted odour concentrations for each scenario at or beyond the current and potential future site boundary is presented in Table 14. The results show that the predicted odour concentrations comply with the applicable criteria at and beyond both the current and potential future boundaries.

Table 14. Predicted 1-hour average, 99.5th percentile odour concentrations at the site boundary

Scenario	Predicted odour concentration (OU, 1-hour average, 99.5th percentile)			Criteria (OU)	Compliant?
	Current boundary	Potential future boundary	Offsite receptors		
Scenario 1	1.33	1.32	0.54	2	Y / Y / Y
Scenario 2	1.28	1.28	0.54	2	Y / Y / Y
Scenario 3	1.29	1.32	0.54	2	Y / Y / Y
Scenario 4	1.28	1.28	0.54	2	Y / Y / Y
Scenario 5	1.57	1.60	0.77	2	Y / Y / Y
Scenario 6	1.54	1.58	0.77	2	Y / Y / Y

Particulates

Predicted particulate concentrations were assessed from the following project activities:

- All operations at the asphalt plant, including points sources (exhaust stack), and fugitive emissions (wind erosion, vehicle movements on paved roads, material transfer and filler silo filling)
- Operations at the existing concrete batch plant in isolation, including dust generated from wind erosion and vehicle movements on paved roads

- Cumulative emissions associated with the background concentrations as detailed in Table 10.

The predicted cumulative 24-hours and annual average PM_{10} emissions from the project are presented in Table 15 and Table 17. The results show that predicted cumulative concentrations for PM_{10} comply with the assessment criteria at and beyond the current and potential future boundaries.

The predicted cumulative 24-hours and annual average $PM_{2.5}$ emissions from the project are presented in Table 16 and Table 17. The results show that predicted cumulative concentrations for $PM_{2.5}$ comply with the assessment criteria at and beyond the current and potential future boundaries.

Table 15. Predicted maximum PM_{10} concentrations at the site boundary (in µg/m³)

Activity	Current boundary		Potential future boundary	
	24-hour	Annual	24-hour	Annual
Asphalt plant in isolation	17	2.7	18	2.8
Concrete batch plant in isolation	10	0.55	26	1.0
Cumulative (asphalt plant, concrete batch plant and background)	38	14	47	14
PM_{10} Criteria	50	25	50	25
Compliant	Y	Y	Y	Y

Table 16. Predicted maximum $PM_{2.5}$ concentrations at the site boundary (in µg/m³)

Activity	Current boundary		Potential future boundary	
	24-hour	Annual	24-hour	Annual
Asphalt plant in isolation	6.2	0.78	6.2	0.81
Concrete batch plant in isolation	1.6	0.07	3.9	0.16
Cumulative (asphalt plant, concrete batch plant and background)	15	6.5	15	6.6
$PM_{2.5}$ Criteria	20	7	20	7
Compliant	Y	Y	Y	Y

Table 17. Predicted maximum PM_{10} and $PM_{2.5}$ concentrations beyond the site boundary (in µg/m³)

Activity	PM_{10}		$PM_{2.5}$	
	24-hour	Annual	24-hour	Annual
Asphalt plant in isolation	7.7	0.67	2.4	0.34
Concrete batch plant in isolation	3.2	0.45	0.48	0.07
Cumulative (asphalt plant, concrete batch plant and background)	26	12	10	6.1
Criteria	50	25	20	7
Compliant	Y	Y	Y	Y

Combustion gases

The maximum predicted concentrations of air emissions from the exhaust stack combustion gases at the project site boundary is presented in Table 18 (from a natural gas-powered burner) and Table 19 (from a diesel-powered burner). It should be noted that the modelling of NO_2 has been implemented based on a conservative assumption of 100% conversion of nitrogen oxide to nitrogen dioxide.

The predicted concentration results indicate that compliance with the assessment criteria is achieved at and beyond both the current and potential future boundaries for both fuel types.

Note, background concentrations for combustion gases are not available, therefore the predicted concentrations are calculated in isolation.

Table 18. Predicted maximum pollutant concentrations at or beyond the site boundary (in µg/m³) - natural gas

Pollutant	Averaging period	Current boundary	Future potential boundary	Offsite receptors	Criteria (µg/m³)	Compliant?
NO_2 (as 100% NO_x)	1-hour	19	19	8.84	151	Y / Y / Y
	Annual	2.2	2.2	1.30	28	Y / Y / Y
CO	8-hours	82	81	42	10,310	Y / Y / Y
SO_2	1-hour	4.0	4.0	4.2	197	Y / Y / Y
	24-hours	1.4	1.4	0.86	52	Y / Y / Y

Table 19. Predicted maximum pollutant concentrations at or beyond the site boundary (in µg/m³) - diesel

Pollutant	Averaging period	Current boundary	Future potential boundary	Offsite receptors	Criteria (µg/m³)	Compliant?
NO_2 (as 100% NO_x)	1-hour	40	40	18.6	151	Y / Y / Y
	Annual	4.6	4.6	2.73	28	Y / Y / Y
CO	8-hours	82	81	42	10,310	Y / Y / Y
SO_2	1-hour	32	31	33	197	Y / Y / Y
	24-hours	11	11	6.76	52	Y / Y / Y

Potential other emissions

Heavy metals, polycyclic aromatic hydrocarbons (PAHs) and volatile organic compounds (VOCs) are expected to be released from the operation of the exhaust stack and the bitumen tank.

The maximum predicted contaminant concentrations from the project site at or beyond the site boundary are presented in Table 20.

The results show that predicted concentrations comply with the assessment criteria at and beyond both the current and potential future boundaries.

It should be noted that the presented predicted concentrations are for 3-minute averaging period are 99.9th percentile, whilst other time periods are maximum concentrations.

Table 20. Maximum predicted ground level concentration (GLC) of heavy metals and PAHs at or beyond the site boundary

Pollutant	Averaging period	Maximum predicted GLC (µg/m³)			Criteria (µg/m³)	Compliant?
		Current boundary	Future potential boundary	Offsite receptors		
Heavy metals						
Arsenic and compounds	3 minute	5.9E-04	5.9E-04	2.7E-04	0.17	Y / Y / Y
Barium	3 minute	0.002	0.002	9.3E-04	17	Y / Y / Y
Beryllium	3 minute	2.0E-04	2.0E-04	9.3E-05	0.07	Y / Y / Y
Cadmium and compounds	3 minute	8.3E-04	8.3E-04	3.8E-04	0.033	Y / Y / Y
Chromium (total)	3 minute	7.7E-04	7.7E-04	3.5E-04	17	Y / Y / Y
Copper fume	3 minute	6.5E-05	6.5E-05	3.0E-05	6.7	Y / Y / Y
Lead	90 days	1.1E-04	1.1E-04	5.7E-0	1.5	Y / Y / Y
	Annual	7.5E-05	7.5E-05	4.4E-05	0.5	Y / Y / Y

Pollutant	Averaging period	Maximum predicted GLC (µg/m³) Current boundary	Future potential boundary	Offsite receptors	Criteria (µg/m³)	Compliant?
Manganese and compounds	3 minute	0.009	0.009	0.004	330	Y / Y / Y
Mercury (inorganic)	3 minute	5.5E-04	5.5E-04	2.5E-04	17	Y / Y / Y
Nickel and compounds	3 minute	0.004	0.004	0.002	0.33	Y / Y / Y
Zinc oxide fume	3 minute	0.009	0.009	4.1E-03	170	Y / Y / Y
PAHs						
Benzo(a)pyrene	3 minute	1.3E-05	1.3E-05	7.1E-04	0.73	Y / Y / Y

The activated carbon filter is proposed to be in location #1 in the middle of the four tanks or at location #2 at the end of the four tanks as indicated in Figure 22. Therefore, two different scenarios have been assessed:

- Scenario 1: Stack emissions and activated carbon filter at Location #1
- Scenario 2: Stack emissions and activated carbon filter at Location #2.

The predicted concentrations of VOCs at or beyond the site boundary are provided in Table 21 and Table 22. It can be noted that all modelled VOC species comply with the assessment criteria, with no significant differences in the predicted GLCs between the proposed two locations of the activated carbon filter.

Table 21. Maximum predicted ground level concentration (GLC) of VOCs at the site boundary (µg/m³) – Scenario 1

Pollutant	Averaging period	Maximum predicted GLC (µg/m³) Current boundary	Future potential boundary	Offsite receptors	Criteria (µg/m³)	Compliant?
Acetaldehyde	3 minute	0.41	0.41	0.19	76	Y / Y / Y
Benzene	3 minute	8.3	8.3	2.92	100	Y / Y / Y
Ethylbenzene	3 minute	8.1	8.1	2.85	50	Y / Y / Y
Formaldehyde	3 minute	1.0	1.0	0.46	650	Y / Y / Y
Toluene	3 minute	23	23	8.17	350	Y / Y / Y
Trimethylbenzene	3 minute	2.1	2.1	0.75	14,500	Y / Y / Y
Xylenes	3 minute	3.9	3.9	1.66	4,000	Y / Y / Y

Table 22. Maximum predicted ground level concentration (GLC) of VOCs at the site boundary (µg/m³) – Scenario 2

Pollutant	Averaging period	Maximum predicted GLC (µg/m³) Current boundary	Future potential boundary	Offsite receptors	Criteria (µg/m³)	Compliant?
Acetaldehyde	3 minute	0.41	0.41	0.19	76	Y / Y / Y
Benzene	3 minute	7.2	7.5	2.84	100	Y / Y / Y
Ethylbenzene	3 minute	7.0	7.3	2.77	50	Y / Y / Y
Formaldehyde	3 minute	1.0	1.0	0.46	650	Y / Y / Y
Toluene	3 minute	20	21	7.95	350	Y / Y / Y
Trimethylbenzene	3 minute	1.8	1.9	0.73	14,500	Y / Y / Y
Xylenes	3 minute	3.7	3.8	1.66	4,000	Y / Y / Y

5.1.3.5 Assessment conclusions

The results of the predictive modelling demonstrate compliance with the assessment criteria presented in the NEPM standards and the EPP 2004 at and beyond both the current and potential future site boundaries for all pollutants. As a result, the risk of adverse impacts from the project is expected to be low (Assured Environmental, 2025a).

5.1.4 Avoidance and mitigation measures

5.1.4.1 Construction - dust management

Dust mitigation measures should be implemented as part of good site practice. The following measures will be implemented to control particulate matter emissions. Measures are based on NSW Module 3: Guidance note—construction sites:

- Use water or water-based surfactants on construction sites and access roads to control dust emissions
- Washing vehicles' wheels before they leave the site to control dust
- Install physical barriers such as fence with fine shade cloth to reduce wind-blown dust from exiting the site
- Cover material stockpiles with plastic sheets or tarpaulins
- Set and enforce low-speed limits for construction vehicles and equipment to minimise dust generation from vehicle movement
- Ensure that construction equipment and vehicles are well-maintained and serviced to reduce unnecessary emissions
- Use gravel, concrete or bitumen to seal main trafficable areas
- Regularly sweep and clean paved areas to remove accumulated dust and debris.

5.1.4.2 Operation – asphalt plant dust and odour management

Hazell Bros will install the following filters at the asphalt plant to minimise dust and odour emissions:

- **Bag house filter** (emission point reference E1 and E2, Figure 19). The main primary bag house filter for the plant directly runs via the main exhaust fan and discharges via the exhaust stack (E1). The imported filler silo has its own stand-alone small bag house filter (E2) on top of the silo. As the silo is filled with hydrated lime via a pneumatic road tanker, the filter allows filtration of the displacement air exiting the silo as product is filling the silo.

  The baghouse utilises two-stage filtration with a primary collector which separates coarse material from the gas stream and protects the bags from abrasion. The dust-laden gas then enters the baghouse where the dust collects on the heat-resistant meta-aramid bags. Pneumatically operated cylinders will clean bags a row at a time. Collected dust will be stored or returned to the mix.

- **Activated carbon filter** (emission point reference E3, Figure 19) is a highly effective method for removing odorous compounds from exhaust gases. This technology utilises activated carbon to adsorb volatile organic compounds (VOCs) and other odorous substances released during the breathing operations from the bitumen tanks.

  Four bitumen tanks with capacity of 60m^3 each will be installed. All tanks will be connected to a single carbon filter. The four tanks have an interconnected breather system that feeds through to the activated carbon filter as a single point of discharge. The activated carbon filter has 2 x 4-inch outlets to prevent the system from being pressurised. The exit vents are designed to be horseshoe type. The design of the activated carbon filter is provided in Figure 4 of the air quality impact assessment report (refer to Appendix 2).

5.1.4.3 Operation – existing dry concrete batch plant dust management

To minimise dust emissions from the concrete batch plant, Hazell Bros have installed the following mitigation measures:

- Dust filters on the storage silos
- Enclosed material storages, conveyors and transfer points to move aggregate to hoppers
- Installation of water misting systems over the plant conveyor
- Sealed hardstands with regular road sweeping of debris
- Stockpile storage bays fitted with automatic sprinkler systems and mobile water cart as required.

Management commitments

Commitment	Details	Timeframe/due	Responsibility
1	During the construction phase, Hazell Bros will implement dust management measures to reduce dust emissions	Construction	Site/construction manager
2	A baghouse filter will be installed over the dryer to reduce dust emissions	Prior to operation	Site/operations manager
3	An activated carbon filter will be installed to remove odorous compounds and VOCs from venting the bitumen tanks	Prior to operation	Site/operations manager
4	To reduce particulate matter emissions the following measures will implemented: • All conveyors will be enclosed • All roads will be paved • Bunkers will be installed to reduce wind erosion from stockpiles	Prior to operation	Site/operations manager

5.2 KEY ISSUE 2: WATER QUALITY – SURFACE

5.2.1 Existing environment

A wet and dry concrete batching plant is currently located on the site (1 Crooked Billet Drive). The wet concrete batching plant is proposed to be decommissioned and removed in late 2025. The dry concrete batching plant will be relocated within the same site at the end of 2025 (pending council approvals). The dry concrete plant will be relocated next to the proposed asphalt plant and operate at a production capacity of 400m^3/day (20,000m^3/yr). The location of the relocated concrete plant is presented in Figure 6. It is anticipated that the relocated dry concrete plant will continue to be permitted as a Level 1 activity through the Brighton Council, as is currently conducted.

There are no water resources or major drainage lines on the site, with all water supplies sourced from the TasWater mains supply. The site is connected to the TasWater sewer network but no trade waste will be discharged to sewer.

The majority of the site slopes gently from the west to east, until approximately 50m from the eastern boundary where it drops off from the existing site office to the east.

Runoff from the site infrastructure is currently captured by bunds and drains, which direct stormwater to a retention swale. Runoff from the current entrance access road and site office is directed to the eastern boundary which flows into an existing stormwater culvert located near the railway line.

Runoff is transported by a series of culverts, railside and roadside drains located east of the site, before discharging to an unnamed watercourse which enters the Jordan River, approximately 570m to the east of the site.

The nearest mapped conservation of freshwater ecosystem value (CFEV) waterway is the unnamed watercourse 570m away (River section ID: 236209). The waterway is a highly modified system, mainly consisting of man-made drains and culverts. The waterway has a low naturalness category, a moderate conservation management priority potential and is in poor condition. Further downstream the Jordan River has a very high conservation management priority and a high conservation value due to the presence of platypus (*Ornithorynchus anatinus*).

The preferential surface water flow and stormwater drainage is presented in Figure 23.

Figure 23. Preferential flow and stormwater drainage from the site

5.2.2 Methodology

The development was assessed against the:

- *Environmental Management and Pollution Control Act 1994* (EMPC Act)
- State Policy on Water Quality Management 1997 (SPWQM)
- Environmental Management Goals for Tasmanian Surface Waters, Derwent Estuary catchment (Department of Primary Industries, Parks, Water and Environment, 2003)
- Default Guideline Values (DGVs) for Aquatic Ecosystems of the Derwent Estuary-Bruny Catchment (EPA 2021).
- Brighton Council Stormwater Policy 2021
- Tasmanian Planning Scheme
- State Stormwater Strategy 2010.

It is an offence to cause serious or material environmental harm under section 50 of the EMPC Act. This may include the release of pollutants into natural water resources, past levels that are naturally occurring in the receiving environment.

The SPWQM establishes water quality objectives for inland waters. The Environmental Management Goals for Tasmanian Surface Waters, Derwent Estuary catchment (Department of Primary Industries, Parks, Water and Environment, 2003) detail that surface waters within private land, including forests on private land, must be managed to conserve protected environmental values (PEVs).

The PEVs relevant to the site include:

A. Protection of Aquatic Ecosystems

(ii) Protection of modified ecosystems

  a. from which edible fish, crustacea and shellfish are harvested
  b. from which edible fish, crustacea and shellfish are not harvested

(iii) Recreational Water Quality & Aesthetics

  (i) Primary contact water quality (specify sites)
  (ii) Secondary contact water quality
  (iii) Aesthetic water quality.

5.2.3 Assessment

Changes to the existing environment caused by the proposed asphalt plant may include additional stormwater runoff due to an increase in sealed surfaces and changes to surface hydrology from the installation of drains and bunding to isolate rainwater captured from controlled areas.

The potential impact to surface waters may include the release of residual concentrations from the following substances from the asphalt plant :

- Petroleum hydrocarbons (e.g. diesel)
- Bitumen
- RAP
- Bitumen emulsion
- Slipway release agent
- Hydrated lime
- Metals
- Sediment.

If not managed appropriately, these substances have the potential to runoff into receiving waters, Jordan River and its unnamed tributaries. A list of all dangerous and non-dangerous goods (and storage and bunding type) for the asphalt plant is presented in Table 39. All dangerous goods will be stored in a self-bunded container tank or containment bund to capture and prevent release into the surface and groundwater environment.

The slipway release agent will be stored in a covered 1,000L IBC tote and portable IBC bund. Slipway is not classified as a dangerous good but is hazardous if ingested and is an eye irritant. Slipway is biodegradable and based on a blend of highly refined vegetable and paraffin-derived oils. Degradation takes place through the natural processes of light, oxidation and bacterial metabolism (VCC, 2020). Therefore, it is unlikely to pose a risk to surface water or groundwater values.

Stockpiled RAP material is bound in bitumen which creates an outer non-permeable crust and allows water to flow off the stockpile. RAP stockpiles are not contaminated and are essentially no different from water shedding off a road surface. Runoff from the RAP stockpiles will be channelled into the stormwater management system and treated onsite.

More significant impacts may include the release of larger concentrations of the same contaminants because of spill events. Implementation of procedures for the storage of dangerous goods, refuelling and spill management will be essential to ensuring that chemicals and dangerous goods are not discharged to stormwater. Management and mitigation measures for dangerous goods are discussed in detail in Section 5.6.

In addition to the asphalt plant, seven Sika additive mixtures will be stored and used at the relocated dry concrete plant, including:

1. Sika ECO-WR
2. Sika ECO-3W
3. Sika Air-LS
4. Sika Visco HRF2
5. Sika Rapid-AF
6. Sika Retarder-N
7. Sika Viscoflow-21

To prevent release into the environment, the mixtures will be stored within bulk liquid tanks of both 1,000L and 2,000L capacities dependant on the additive mixture. The storage tanks will be contained inside a modified 40-foot shipping container with a steel plate bund installed internally to house all the tanks inside.

Further information and assessment (e.g. location, storage and bunding types) of the additive mixtures are provided in Section 5.6.3 and Table 40.

5.2.3.1 Stormwater management plan

A stormwater management plan was completed for the project by Flussig Engineers (2025). The management plan is presented in Appendix 3 with the key findings summarised below. The plan will also be submitted to Brighton Council as supporting information for the planning permit application.

As per Brighton Council requirements, the proposed stormwater management system for the site has been designed for a 1% annual exceedance probability (AEP) storm event. A 1% AEP storm event must be able to drain through the site and not cause additional impedance on the neighbouring lots or future residents

The treatment system has been modelled using Model for Urban Stormwater Improvement Conceptualisation (MUSIC) software, with an aim to reduce pollutant loads to meet the Brighton Council Stormwater guidelines, Tasmanian Planning Scheme and the State Stormwater Strategy.

Runoff from the proposed asphalt plant and office roofs will be channelled into three Atlan stormsacks (or similar) to filter out foreign material and then discharged into a newly constructed 440m^3 stormwater detention pond. A DN150mm pipe located at the bottom of the detention pond will discharge water (by gravity) from the pond to a 150m^2 bioretention swale.

From the bioretention swale, stormwater will be discharged offsite via a DN450mm pipe to an existing stormwater culvert drain to the east of the site in the TasRail corridor.

Treated stormwater will be channelled by a series of culverts, railside and roadside drains to the east of the site, before discharging to an unnamed watercourse which enters the Jordan River, approximately 570m to the east of the site.

The proposed stormwater collection and treatment system is presented in Figure 24, Figure 25 and Figure 26.

The following conclusions were derived from the Flussig (2025) report:

1. A comparison of the post-development peak flows for the 1% AEP storm event were undertaken against the pre-development flows and found to increase site discharge.
2. A minimum of 440m^3 detention is required for the proposed asphalt plant.
3. DN150 pipe outlet from the new detention pond into the existing bioretention swale.
4. DN300 pipe outlet from the new detention pond serving as a high-flow bypass to the existing stormwater culvert.
5. A minimum of 150m^2, 500mm deep bioretention swale provides sufficient capacity to manage the site's stormwater quality treatment requirements.
6. The 1% overland flow path (OFP) was assessed through the site and shown that any changes in flow can directed away from neighbouring properties and critical infrastructure onsite.
7. Stormwater Quality Improvement Devices (SQIDs) designed and sized using MUSIC can achieve required pollutant removal through the installation of passive treatment devices (e.g. bioretention swale).

Frequency and continuity of discharge

It should be highlighted that the stormwater management system for the whole site has been designed as outflow or discharge system, which is based on detention, rather than retention. For example, a retention system would include 'storage' of runoff in tanks or dams. Therefore, all stormwater collected in the detention pond will be slowly and continually released under gravity to the bioretention swale (for filtering) until empty. Modelling undertaken with MUSIC suggests that up to 8.65ML/yr may runoff the site and into the treatment system.

In low rainfall events, discharge will be low and continuous (due to an open pipe). In high rainfall events, flow into the bioretention swale will be greater (due to back pressure in the pond) but flow will be restricted by the DN150mm pipe. The capacity of the detention pond has been modelled and designed by Flussig (2025) to prevent overflow or spill events during a 1% AEP storm event.

The discharge from the bioretention swale will be gradual, allowing for controlled release of treated water. The continuity of discharge is event dependent and designed to ensure efficient treatment and slow release to minimise the impact on downstream systems.

Pollutant removal

Pollutant removal, against required State stormwater strategy target load reductions, is presented in Table 23. The proposed stormwater treatment system ensures that all targets either meet or exceed State reduction targets.

Table 23. Pollutant removal achieved versus State target reductions

Parameter (kg/year)	Target load reduction (%)	MUSIC results	SW targets achieved (Y/N)
Total Suspended Solids (TSS)	80.0	97.2	Y
Total Phosphorous (TP)	45.0	56.8	Y
Total Nitrogen (TN)	45.0	65.9	Y
Total Pollutants (GP)	90.0	100.0	Y

Under the stormwater management plan (Appendix 3), the project site will meet current specified standards for both quantity and quality control.

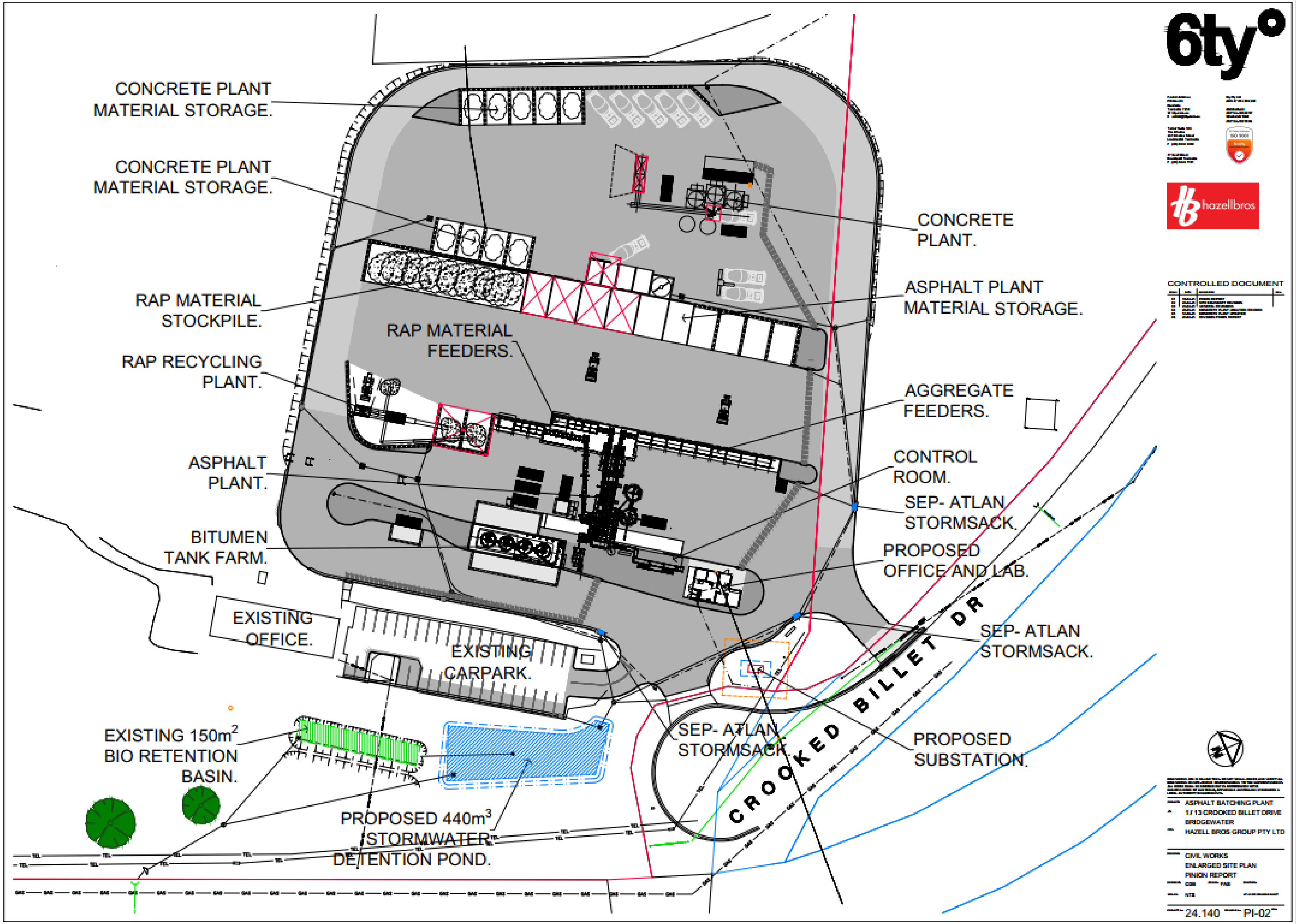
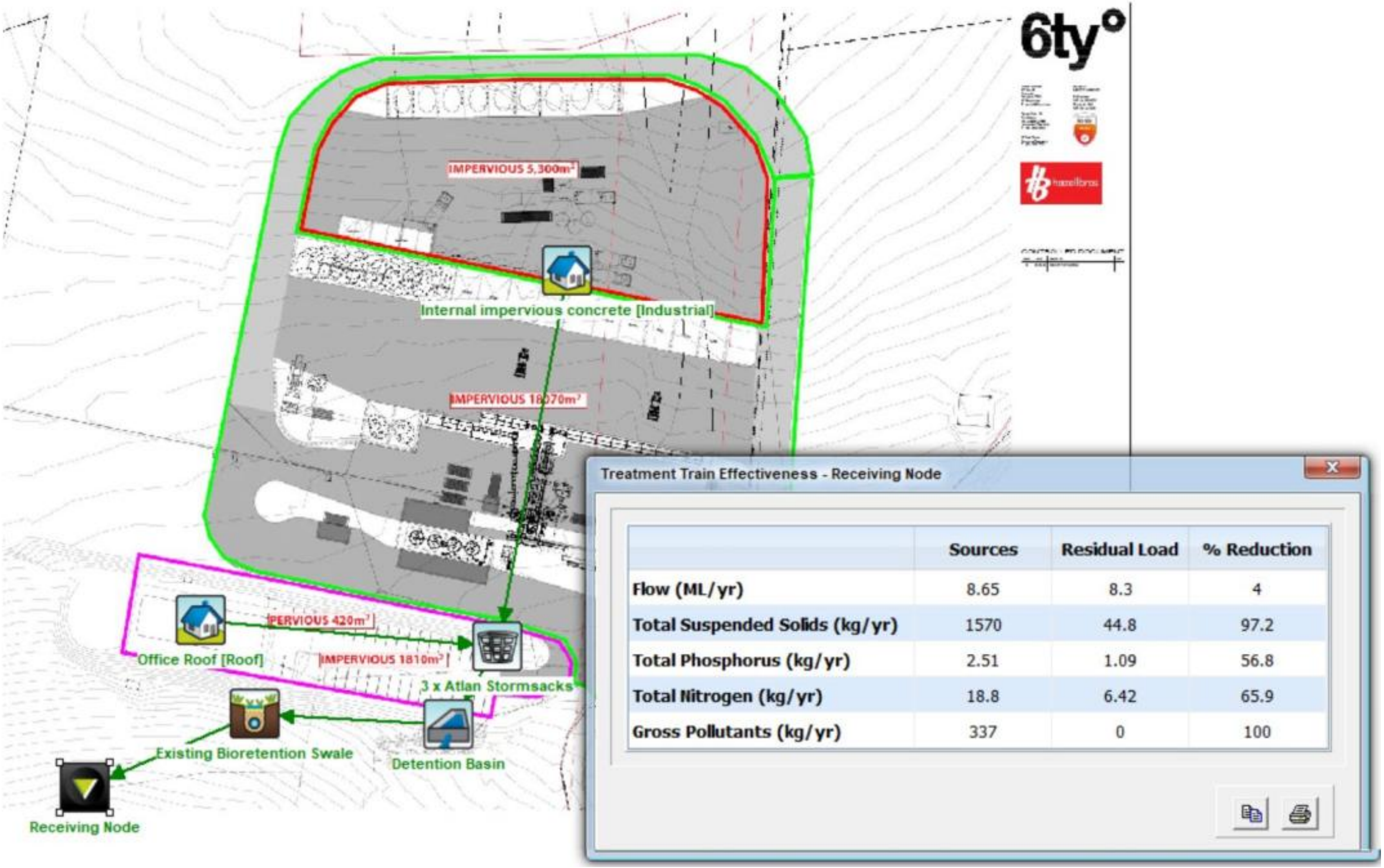


Figure 24. Site layout showing the location of three Atlan stormsacks, proposed detention pond and existing bioretention basin (Source: 6ty)



	Sources	Residual Load	% Reduction
Flow (ML/yr)	8.65	8.3	4
Total Suspended Solids (kg/yr)	1570	44.8	97.2
Total Phosphorus (kg/yr)	2.51	1.09	56.8
Total Nitrogen (kg/yr)	18.8	6.42	65.9
Gross Pollutants (kg/yr)	337	0	100

Figure 25. Stormwater treatment direction, infrastructure and MUSIC treatment train effectiveness results (Source: Flussig, 2025)

Figure 26 shows a cross-section of a stormwater biofiltration system. The system is designed to treat stormwater runoff by filtering it through multiple layers of media. The system ensures effective removal of contaminants before discharging treated water.

Key components of the system include:

1. Pond (Surface layer)
    - Captures incoming stormwater before it infiltrates the filter media
    - Supports vegetation that enhances nutrient uptake and biological treatment
    - Includes an overflow system to manage excess stormwater during high rainfall events.
2. Filter media (Loamy sand layer)
    - Provides primary filtration by removing suspended solids, pollutants, and organic matter
    - Supports plant growth, which aids in further pollutant breakdown through root interactions
3. Submerged zone (Sand and carbon source)
    - Contains a mix of sand and carbon to promote biological activity
    - Facilitates denitrification, helping remove excess nitrogen from the water.
4. Transition layer (Coarse sand)
    - Prevents clogging and ensures smooth water percolation
    - Acts as an intermediate filter between the fine filter media and the drainage layer.
5. Drainage layer (Gravel)
    - Provides structural stability and allows free drainage of treated water
    - Ensures consistent water movement towards the collection system.
6. Collection pipe
    - Captures treated stormwater and directs it towards an outflow for safe discharge
    - Prevents prolonged water retention, reducing the risk of clogging or stagnation.

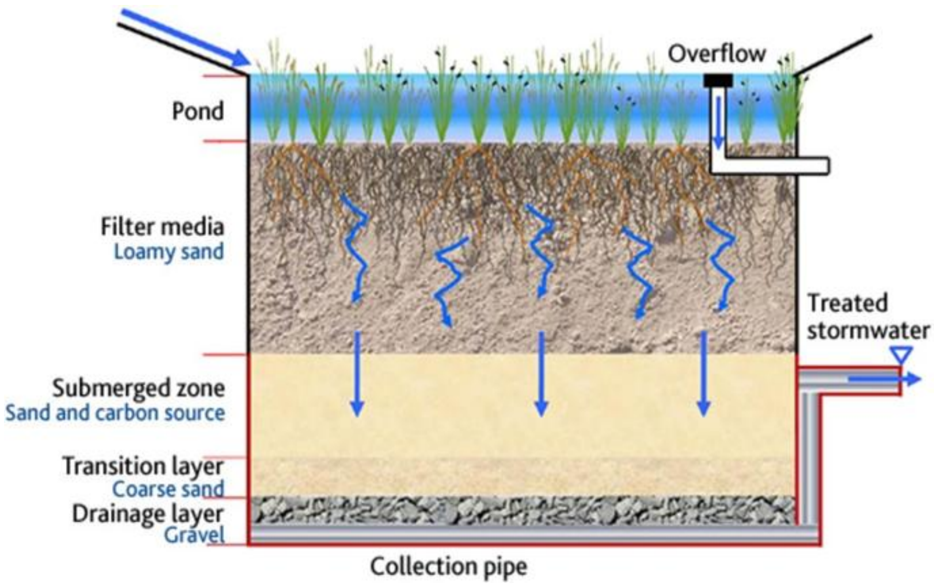


Figure 26. Bioretention swale cross-section (Source: Flussig, 2025)

The design depths for the bioretention swale are provided in Table 24.

Table 24. Depth of swale components

Swale component	Depth (mm)
Filter media	250
Submerged zone	150
Drainage layer	100

5.2.4 Avoidance and mitigation measures

5.2.4.1 Asphalt plant

Surface disturbance during construction will include stripping of grass and topsoil, placement of subgrade gravels and sealing with concrete and/or asphalt. Surface runoff will continue to flow from west to east, being directed to the stormwater management system.

Sediment control measures are proposed to be implemented prior to the commencement of construction. The site slopes to the east, with 10m of fall over the 250m width of the property, resulting in a slope of approximately 4%.

Erosion and sediment control measures implemented during construction include:

- Establish a stabilised entry/exit point to the site
- Construct diversion cut off drains downslope of works where required
- Construct sediment fences and sediment weirs, if required, at appropriate locations on site
- Silt traps will be erected using geotextile filter fabric in accordance with the manufacturer's instructions, if required
- Divert upslope water around the site where required and, if necessary, stabilise the channels and outlet
- Provide appropriate locations and protection for stockpiles to reduce runoff
- Capture on-site runoff that may contain pollutants
- Maintain control measures
- Stabilise site after disturbance, where required (e.g. revegetation).

A construction environmental management plan (CEMP) will be prepared for the site which addresses stormwater management during construction.

During operations, surface water flows will be controlled to prevent pooling of water on the site and to prevent the transport of contaminants into stormwater discharge and offsite. Stormwater will be treated via a newly constructed 440m^3 detention pond and existing 150m^2 bioretention swale to reduce nutrient and sediment loadings.

Potential contaminants such as petroleum products, bitumen and slipway release agent will be contained in bunded storages which meet the relevant regulatory requirements, ensuring spillages are contained. Spill procedures will ensure liquids are dry soaked with sand or similar and not washed into the stormwater management system.

To ensure contaminants do not enter the stormwater management system, the following measures will be implemented at the site:

- All sealed surfaces within the plant areas will be diverted to the detention pond and bioretention swale through drains and bunds

- A road sweeper will be contracted as required to clean all sealed surfaces
- Chemicals and other potential contaminants are to be stored in bunded areas
- Diesel will not be used as a final finishing product during asphalt production
- The asphalt load out area will be cleaned daily to remove solid waste
- Surface flows will direct away from material stockpiles and the asphalt load out areas
- Spill procedures will ensure spillages are contained without delay and are dry soaked and not washed into the stormwater management system
- Installation of a new detention pond prior to discharge into the bioretention swale.

Regular inspection of the operational area and stormwater management system will include the following:

- Quarterly water monitoring from the discharge point
- Monthly inspection of the stormwater system
- If issues are identified during regular inspections, follow up maintenance or cleaning of the stormwater system will be conducted.

A surface water risk assessment in provided in Table 25.

Table 25. Asphalt plant surface water risk assessment

Risk	Potential causes	Potential impacts	Mitigation measures	Monitoring
Disturbance during construction	Soil disturbance during construction activities	Release of sediments to environment	Minimise disturbance. Manage and control sediment during construction	Monitoring of erosion and sediment controls
Asphalt batching activities - contaminate surface water	Site runoff during high rainfall events	Release of contaminants to unnamed creek	Runoff directed to detention pond and bioretention swale for treatment (system sized to a 1% Annual Exceedance Probability (AEP) event). Chemicals will be stored in appropriate self-bunded tanks	Regular inspection of the stormwater management system (e.g. stormsacks, detention pond and bioretention swale)
Stormwater detention pond and bioretention swale - overflow	Pond and swale overflows during high rainfall event	Release of contaminants to the environment	Stormwater system (pond and swale) designed with an of 1% AEP (i.e. 1 in a 100 year flood event)	Inspection of stormwater system prior to and during high rainfall events

The water quality monitoring program (including recommended sampling analytes, frequency and performance criteria) is discussed in Section 6.2.

5.2.4.2 Dry concrete plant

Proposed infrastructure and strategies to manage surface water at the dry concrete plant are summarised below.

Water management infrastructure at the concrete plant will consist of:

- Two concrete wash out bays

- Two wedge pits
- Recycled water stirrer tank.

Concrete wash out bays will be used for the cleaning of agitators and the retention of waste concrete and other sediments, to prevent these materials from leaving site (refer to Figure 27).

Wash out bay volumes will be visually monitored daily by the site supervisor and checked weekly as part of the formal site inspection checklist.

Wash out bays will be cleaned of concrete and other sediment materials once weekly or more frequently if required. Concrete and sediment materials will be removed and transported to the Leslie Vale Resource Recovery Centre to be recycled.

Wedge pits will be located next to the wash out bays and collect surface water runoff and draining water from the adjoining wash out bays (see Figure 28).

The wedge pits allow suspended particulates or solids to be captured and settle to the base of the pits, and the clean surface water to free drain through cut outs in the adjoining walls to feed the reclaimed water into the adjoining recycled water stirrer pit.

The recycled water pit will consist of a 5m x 5m x 4m deep concrete watertight pit, with a holding capacity of 87,500L. A mechanical stirrer will be installed to keep any sedimentation suspended in circular motion, for re-use as recycled water within the finished concrete products. The recycled water will be pumped, to an above ground poly water holding tank next to the batch plant, where the water will be metered into the batching process.

Figure 27. Example of covered wash out bays from Hazell Bros Lampton Avenue Batch Plant

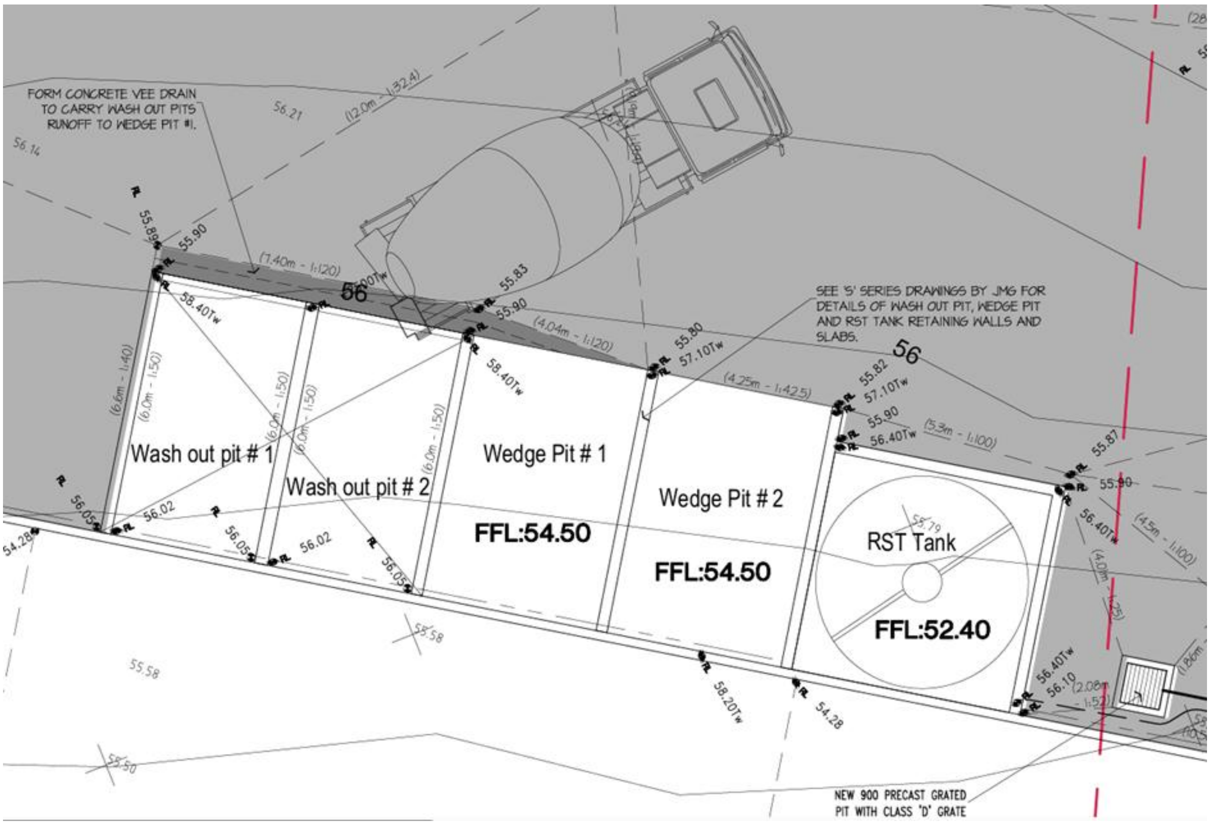


Figure 28. Proposed wash out bays, wedge pits and recycled water tank system for the dry concrete plant

As a result, the closed system will prevent the discharge of water from the dry concrete plant. Furthermore, surface water runoff from around the concrete plant will be directed into the concrete wash out bays and will not contribute to the surface water runoff entering the asphalt plant surface water management infrastructure.

Management commitments

Commitment	Details	Timeframe/due	Responsibility
5	A construction environmental management plan (CEMP) will be prepared for the site which addresses stormwater management during the construction phase	Prior to construction	Site/construction manager
6	Monitoring of erosion and sediment controls	Daily during construction	Site/construction manager
7	Monitor stormwater downslope of the bioretention swale	Quarterly	Site/operations manager
8	Regular inspection of bunds, drains, storm sacks, detention pond and bioretention swale	Monthly	Site/operations manager

5.3 KEY ISSUE 3: GROUNDWATER

5.3.1 Existing environment

The Mineral Resources Tasmania (MRT) Digital Geological Atlas 1:250,000 Series, indicates that 1 and 13 Crooked Billet Drive is mapped on Tholeiite basalt. Groundwater in the area is likely to consist of aquifers sitting within fractured rock.

There are currently no groundwater bores located within the site. The nearest two bores are located approximately 700m south and downslope from the centre of the site, with a third bore approximately 680m northeast of the site.

Bore details include:

- Bore 1 (ID: 17344): Drilled 28/11/1995 by KMR Drilling to a depth of 39m. Main aquifer geology – Triassic (GDA94: 519150E, 5269100N). Bore status – no water detected.
- Bore 2 (ID: 17345): Drilled 29/11/1995 by KMR Drilling to a depth of 36m. Main aquifer geology – Triassic (GDA94: 519130E, 5269080N). Bore status – functioning, groundwater at 34mbgl.
- Bore 3 (ID: 41494): Drilled 21/11/2014 by Geralds Spaulding Drillers to a depth 95m. Main aquifer geology – Tertiary sediments (519586E, 5270260N). Bore status – Capped – Groundwater at 89mbgl.

A search of LISTmap identified no Groundwater Dependant Ecosystems (GDEs) within 15kms of the site.

5.3.2 Methodology

The conceptual hydrogeological model (Figure 30) describes the site near Bridgewater. The model aims to assess the risks to local groundwater aquifers from the operations.

The conceptual model is based on fundamental hydrogeological principles, and a desktop review of:

- Published geological maps and reports of the area
- Summary logs and groundwater data from 135 recorded bores within approximately five km of the site.

5.3.3 Assessment

5.3.3.1 Hydrogeology

Table 26 summarises the records of 135 water bores drilled within five km of the site since 1924. Regional bore locations are shown in Figure 29. Bore depths range from 8m to 185m.

Water tables vary, with water table depths of 0 – 26mbgl (metres below ground level), Only 34 of the 135 bores have a standing water level recorded. Reported bore yields are in the 0.06 – 15.15L/s range, with 48 bores having no record of yield, showing a large range of variability in depth to groundwater and low or no yield.

Table 26. Summary of groundwater bores with five km of the project site

Bore ID	Easting	Northing	Depth (mBGL)	Initial yield (L/sec)	SWL (mBGL)	Lithology	Date drilled
2654	514253	5271343	56			Triassic	15/02/1963
2658	516613	5273958	22		0	Triassic	12/02/1968
2669	518661	5272893	24			Tertiary Basalt	1/03/1979
2670	518803	5273375	52	0.25	6	Triassic	2/03/1979
2671	518748	5273173	29	1.26	9	Tertiary Basalt	3/03/1979

Bore ID	Easting	Northing	Depth (mBGL)	Initial yield (L/sec)	SWL (mBGL)	Lithology	Date drilled
2672	518943	5272853	29			Tertiary Basalt	1/01/1979
2673	518553	5272463	31	15.15		Triassic	20/03/1979
2674	518568	5273161	24	0.76		Tertiary Basalt	22/03/1979
2675	522314	5272083	61	0.25	6	Triassic	9/04/1981
2676	518753	5272885	42	0.00	26	Tertiary Basalt	10/11/1981
2677	518713	5272883	22	0.00		Tertiary Basalt	1/01/1981
2678	518668	5272890	49	0.76	18	Tertiary Basalt	11/11/1981
2682	514863	5274383	34	1.89		Triassic	1/01/1924
2683	515193	5274133	43	0.13		Triassic	1/01/1924
2704	519813	5272983	40	0.00	12	Tertiary Basalt	15/12/1981
2709	517738	5272708	61	8.21		Triassic	17/03/1979
2710	517833	5272683	61	1.26		Triassic	17/03/1979
2712	514613	5272683	53	0.76	24	Triassic	26/11/1980
2737	519538	5273533	64	8.84	18	Tertiary Basalt	1/01/1959
2739	519863	5272583	34		9	Tertiary Basalt	25/05/1984
3273	517113	5267083	85	8.84		Permian	9/02/1989
3502	518513	5272883	60		21	Tertiary Basalt	21/07/1987
3504	519363	5273233	52	0.00		Tertiary Basalt	1/10/1986
3509	522984	5270108	79	0.51		Triassic	1/01/1988
3510	523094	5270058	43	0.00	12	Triassic	1/01/1988
3515	522164	5271283	61	0.00		Triassic	30/03/1990
3524	514338	5268833	49	8.84	6	Jurassic Dolerite	21/04/1990
3529	514560	5274555	37	0.00		Triassic	8/09/1992
3532	518138	5274158	31	0.38		Triassic	24/01/1991
3533	518188	5274108	39	0.00		Triassic	1/10/1993
3537	517113	5272333	49	0.00		Triassic	23/07/1991
3538	517163	5272333	37	0.00		Tertiary Basalt	23/07/1991
3539	517463	5272383	63	1.26		Triassic	31/05/1992
3542	522889	5270733	55			Triassic	18/12/1990
3543	522614	5271033	61			Triassic	19/12/1990
3544	523014	5273308	39	0.00		Tertiary Basalt	16/02/1994
3559	518113	5273858	33	0.45		Triassic	27/09/1993
3562	518263	5273858	36	0.63	6	Triassic	17/11/1992
3576	518323	5274133	24	0.00		Triassic	9/01/1992
3583	521513	5273383	18	3.79		Tertiary Basalt	11/03/1992
3587	523864	5267683	27	0.00		Triassic	8/11/1993
3588	523864	5267733	15	0.00		Triassic	9/11/1993
14820	522190	5271583	90	1.26		Triassic	28/08/1994
17338	521213	5272983	21	1.01		Tertiary Basalt	19/09/1996
17339	521313	5273983	60	0.76		Triassic	7/03/1995
17340	521363	5273983	39	0.32		Triassic	8/03/1995
17341	521413	5273983	66	0.51		Triassic	10/03/1995
17342	523964	5273383	36	0.38		Tertiary Basalt	27/11/1995
17343	520513	5269583	15	1.25		Tertiary Basalt	27/11/1995
17344	519150	5269100	39			Jurassic Dolerite	28/11/1995
17345	519130	5269080	36	0.32		Jurassic Dolerite	29/11/1995
17346	516113	5273933	43	0.63	3	Triassic	18/10/1998
17347	516163	5273933	61		3	Triassic	26/10/1998
17349	514533	5268403	12	2.27		Quaternary Alluvium	29/11/1995
17352	518763	5272433	34			Tertiary Basalt	10/09/1997
17353	521063	5271833	73	0.00		Tertiary Basalt	19/01/1998
17395	523514	5273183	21	0.38		Tertiary Sediments	22/02/1996
17396	523514	5273233	39	8.84		Triassic	23/02/1996
17397	518065	5273907	31	0.00		Triassic	31/03/1995
17399	523414	5273483	30	0.51		Tertiary Basalt	12/01/1995
17400	514543	5268763	54	3.16		Permian	17/01/1997
17401	514593	5268733	21	3.79		Jurassic Dolerite	17/01/1997
17402	514643	5268683	39	1.01		Tertiary Sediments	20/01/1997
17404	517113	5269283	37	0.00		Jurassic Dolerite	23/03/1998
17405	517113	5269333	22	0.38		Jurassic Dolerite	24/09/1998
17406	517113	5269383	55			Jurassic Dolerite	1/10/1998
17407	521714	5273783	67	0.76		Triassic	24/02/1998
17408	521764	5273783	36			Triassic	24/02/1998

Bore ID	Easting	Northing	Depth (mBGL)	Initial yield (L/sec)	SWL (mBGL)	Lithology	Date drilled
17409	521013	5273883	48			Triassic	22/01/1997
17410	521033	5273883	27	2.90		Triassic	23/01/1997
17412	518713	5273883	49	0.91	18	Triassic	16/10/1998
17413	523264	5273333	38	1.26	4	Tertiary Basalt	23/11/1998
17414	514633	5268613	33	0.00		Permian	12/09/1995
17415	521263	5273883	55	0.91		Triassic	28/04/1998
17416	521263	5273833	61			Triassic	28/04/1998
17418	522514	5273933	27	0.00		Triassic	18/09/1996
17419	522564	5273933	27	0.10		Triassic	18/09/1996
17431	516263	5273683	36	0.45	6	Triassic	11/08/1998
17443	518380	5274000	42			Triassic	21/08/1997
17449	524114	5269133	78	0.25		Triassic	11/01/1995
17466	514563	5268913	40	3.79		Permian	20/01/1999
17472	516463	5274183	24	6.31		Triassic	21/01/1997
17669	522714	5273583	51	5.05		Triassic	16/01/1995
18738	522164	5271330	58			Triassic	28/02/2000
18739	518679	5274073	28	1.01	6	Triassic	5/06/2000
18740	517913	5273633	61	0.89	20	Triassic	13/10/2000
18745	514413	5274283	73			Triassic	20/06/2000
18746	514634	5274435	61	1.51		Jurassic Dolerite	22/06/2000
18747	514100	5274790	67	0.00		Jurassic Dolerite	23/06/2000
18748	514463	5274333	150	0.08		Triassic	28/06/2000
18749	514413	5274233	185	4.42		Triassic	6/07/2000
18750	514463	5274233	165	0.28		Triassic	11/07/2000
18758	522014	5272883	50			Triassic	1/01/1993
18763	521627	5270821	64	0.57		Triassic	10/09/1999
18764	521647	5270876	64	0.24		Triassic	10/09/1999
18767	519175	5272440	52			Tertiary Basalt	18/08/1999
18768	519213	5272383	25	1.51		Jurassic Dolerite	23/08/1999
18779	523366	5272903	46	0.76	4	Tertiary Basalt	30/10/2000
18781	520463	5272483	21	1.01		Tertiary Basalt	10/04/1994
18782	514713	5268633	82	0.63	18	Triassic	10/12/1999
18783	514663	5268523	52	12.63	17	Jurassic Dolerite	7/12/1999
18786	518113	5273783	55			Triassic	16/08/1999
18789	517563	5273133	64			Triassic	30/03/2000
18791	517923	5272463		0.38			
18792	518538	5272458		0.43			
18793	518865	5273558					
30354	523337	5273640	46	0.78	22	Triassic	1/01/2004
30371	521597	5270018	8	2.27		Triassic	21/04/2004
30373	521574	5269771	11	0.00		Jurassic Dolerite	21/04/2004
30453	520834	5271724	64	6.31	24	Tertiary Basalt	17/06/2004
30464	522110	5272200	37	0.63		Triassic	22/01/2004
30816	518913	5274463	42	0.57		Triassic	20/10/1999
30852	523367	5273348	60	1.14		Triassic	18/12/1999
30883	524014	5268348	79	0.19		Triassic	24/04/2002
31131	521023	5273748	55	0.76		Triassic	2/01/2001
31132	521093	5273748	35	0.51	6	Triassic	3/01/2001
31384	521053	5273094	76	1.01		Jurassic Dolerite	22/02/2001
31757	523384	5273213	35		8	Triassic	26/03/2003
31775	520993	5274083	61	0.13	15	Triassic	29/01/2003
32161	515390	5272045	88	0.06		Triassic	10/05/2006
40134	520226	5274849	48	0.76		Triassic	9/11/2010
40143	520396	5274858	120	5.05		Permian	9/11/2010
40538	523396	5273426	27	3.79		Tertiary Basalt	23/06/2005
40736	522550	5272100	59			Triassic	22/01/2007
40835	520621	5273433	46		17	Tertiary Basalt	18/10/2006
41194	520663	5273236	68	1.01		Tertiary Basalt	20/06/2006
41195	520663	5273286	72	1.00		Tertiary Basalt	19/06/2006
41494	519586	5270260	95	0.20		Tertiary Sediments	21/11/2014
41907	519250	5274510	72	0.00	12	Triassic	29/09/2010
42335	521666	5271674	12	2.80	3	Quaternary Alluvium	30/04/2020
42338	522885	5272106	90	0.20	15	Permian	15/05/2020

Bore ID	Easting	Northing	Depth (mBGL)	Initial yield (L/sec)	SWL (mBGL)	Lithology	Date drilled
42339	516050	5272363	90	5.00		Jurassic Dolerite	7/06/2020
42340	516523	5271793	125		17	Triassic	16/06/2020
42359	515809	5272227	120			Jurassic Dolerite	12/05/2020
42360	516120	5271967	102			Jurassic Dolerite	13/05/2020

The geology of the area comprises of basalts and dolerite, with some areas overlayed with alluvial and siliceous cobble deposits of Cenozoic sequences. The results are interpreted as indicative of fractured, hard-rock aquifers. The low average annual rainfall of the area (481.8mm) results in low rates of infiltration and groundwater recharge.

However, short term, high intensity rainfall events (one to five days) may cause some groundwater recharge, but these events are likely to be infrequent. Long-term rainfall trends are the primary driver of long-term groundwater level changes with short-term seasonal rainfall influencing annual groundwater level fluctuations. Groundwater recharge rates are likely to differ in the region according to soil type and geological conditions.

A conceptual groundwater model is summarised in Figure 30, which illustrates recharge and discharge areas and local groundwater systems.

The main components of the conceptual groundwater model are:

- Bedrock comprised of Tholeiite basalt
- There are very few aquifers, which are in the fractured basalt, at depths greater than 30m
- The yield in developed groundwater bores is low and few have a recorded standing water level, potentially indicating that groundwater is only entering the bores through intersected fractures along the entire depth of the bore casing
- Local, intermediate and regional groundwater systems are inferred in the district, with local and probably intermediate recharge and discharge areas
- At the time of drilling, the nearest bores, #17345 and #41494 encountered groundwater at levels of 34mbgl and 89mbgl respectively, while #17344 was dry.

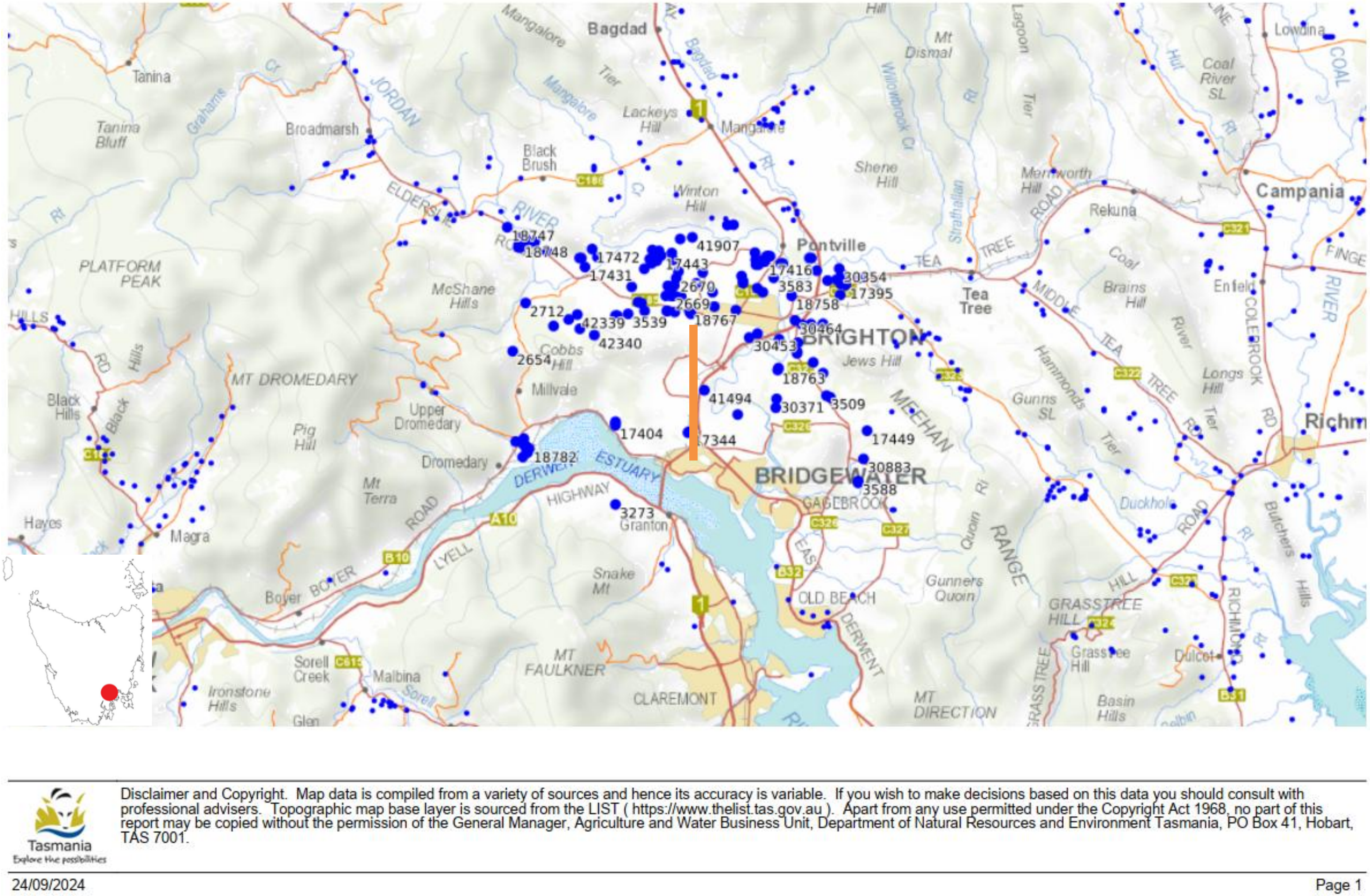


Figure 29. Groundwater bores within five km of the project site and conceptual groundwater model transect (orange line)

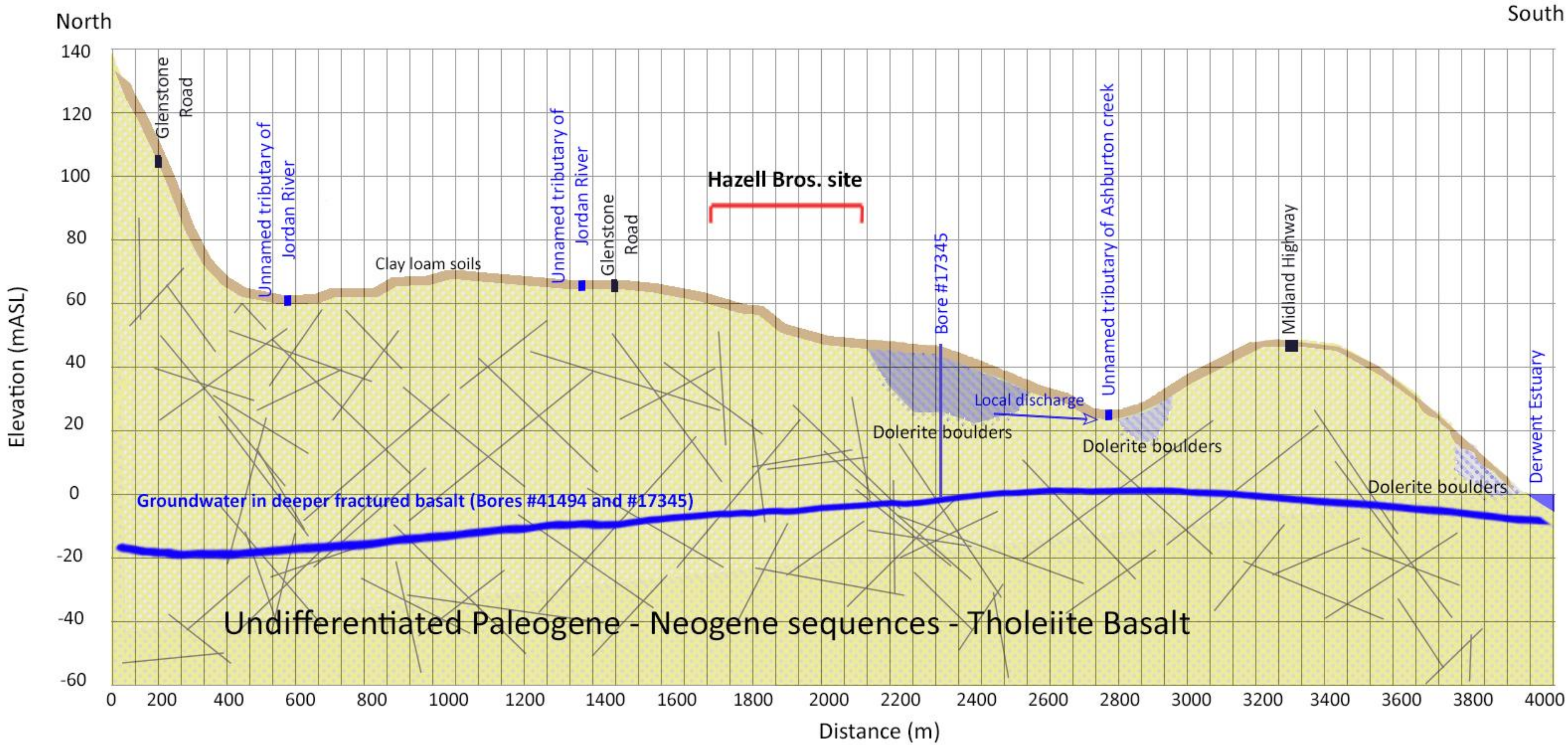


Figure 30. Site conceptual hydrogeological model

The site will consist of sealed surfaces, with all runoff captured and directed to a detention pond and bioretention swale. There is minimal risk of groundwater contamination from the site due to the sealed surfaces and proposed stormwater management system.

Risks to groundwater contamination are low due to the impervious nature of the design and the clear demarcation of clean and dirty catchments. Resulting in the detention pond and bioretention swale being the only location where contaminants could be leached to groundwater, although the likelihood is very low due to the depth to groundwater and the nature of the aquifers below the site.

Providing the detention pond and bioretention swale are designed adequately to prevent infiltration, the site presents a very low risk to groundwater aquifers. Management controls for dangerous goods that are stored on the site are provided in Section 5.6.4. Bitumen, diesel and emulsion will be stored in self-bunded tanks (refer to Table 39). Small quantities of solvents will also be stored undercover in bunded areas. Spill kits and procedures will be in place to address spillages of chemicals in a timely manner.

A groundwater risk assessment is provided in Table 27.

Table 27. Groundwater risk assessment

Risk	Potential causes	Potential impacts	Mitigation measures	Monitoring
Asphalt batching activities - contaminate groundwater	Infiltration of water on site	Release of contaminants to groundwater	The operational portion of the site will be impervious, being concrete or asphalt, with drains directing runoff to three Atlan stormsacks, a detention pond and bioretention swale. Chemicals will be stored in suitable self-bunded tanks	Monitor stormwater downslope of the bioretention swale. Regular inspection of the stormwater management system (e.g. stormsacks, detention pond and bioretention swale)
Contaminated water from bioretention swale	Leaks from the bioretention swale	Contamination of groundwater, reduction of groundwater values	Bioretention swale is engineered to standard to ensure seepage is prevented	Monitor stormwater downslope of the bioretention swale. Regular inspection of the stormwater management system

5.3.4 Avoidance and mitigation measures

While it is not anticipated that adverse impacts to groundwater are likely to occur from the project, monitoring and maintenance of the stormwater management system will ensure that impacts to groundwater are prevented.

The management commitments for groundwater are the same as those proposed for surface water quality.

5.4 KEY ISSUE 4: NOISE EMISSIONS

5.4.1 Existing environment

A noise impact assessment was completed for the project by Assured Environmental (2025b). The assessment report is provided in Appendix 4 and summarised below.

The noise impact assessment report was reviewed and updated in June 2025 to address EPA feedback on the draft EIS (received December 2024) and to update the modelling results based on the new location of the asphalt plant and the current and future proposed site boundaries.

The project is located within a general industrial zone. Surrounding land uses primarily comprise of industrial activities with a recreation area to the south and residential (rural living) to the south and south west of the site.

The topography of the project site ranges from 62m Australian Height Datum (AHD) falling from northwest to southeast to a height of 47m in the southeast corner. Beyond the site, the area features hills and gullies with elevations ranging to 81m.

The noise assessment identified 28 noise sensitive receptors from the project site, ranging from 263m (R01, residential) to 766m (R28, school). To satisfy EPA noise requirements, the distance to the sensitive receptor is measured from the project site boundary to the property boundary of the receptor. The locations of noise sensitive receptors are presented in Figure 31. Note, R01 is owned by Boral Construction but was observed to be used as a residential dwelling during the survey in July 2024 (Assured Environmental, 2025b).

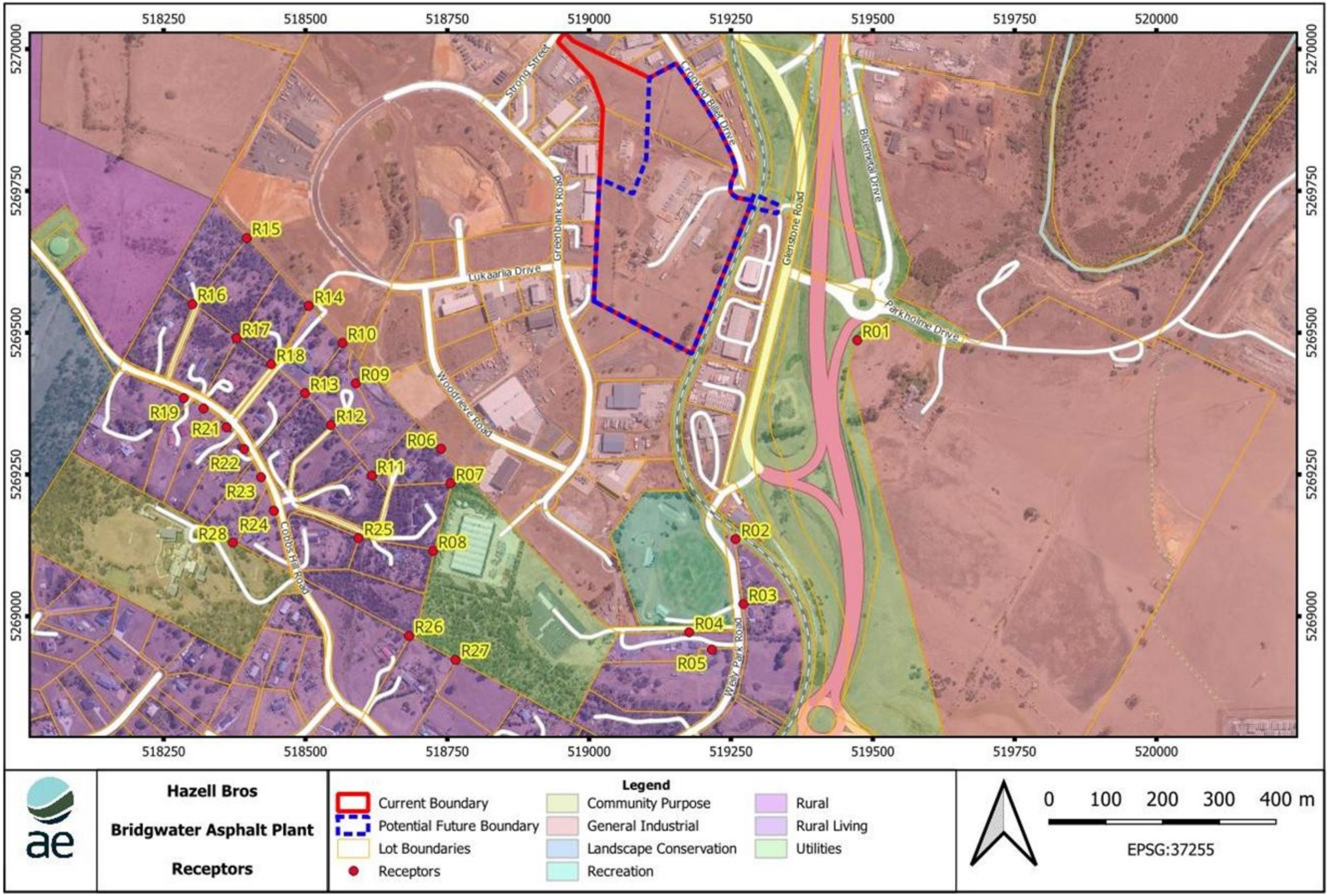


Figure 31. Sensitive receptors identified in the noise assessment (Source: Assured Environmental, 2025b)

Noise emissions generated from the project were categorised into two main activities (and noise generating sources):

1. Concrete batch plant (e.g. loader, conveyors, mixing chambers, loading, washing areas and transport), includes both wet and dry batch plants

2. Proposed asphalt plant (e.g. loader, screening, conveyors, dryers, elevators, mill, baghouse, loading and transport), includes noise emissions from the existing dry concrete batch plant, which will be retained onsite.

5.4.1.1 Unattended monitoring

Background noise monitoring was undertaken from 23 July to 1 August 2024 to quantify the background noise levels receptors in the vicinity of surrounding receptors. The noise logger location was selected based on gaining access to a similar noise environment to the majority of surrounding receptors. Supplementary attended measurements were also conducted at locations representative of residential receptors.

Unattended monitoring location 1 (UML1) (Figure 32), located within the grounds of Northern Christian School, was used to establish representative long-term background noise levels. Noise measurements were undertaken in accordance with the requirements of Australian Standard AS 1055-2018 *Acoustics – Description and measurement of environmental noise* using a Norsonic Nor139 Type 1 environmental noise logger.

A summary of noise levels of each period for a variety of statistical noise parameters is presented in Table 28.

Table 28. Summary of noise monitoring results

Location	Period	Noise level (dB(A))					
		L_{Amax}	L_{A1}	L_{A10}	L_{A90}	L_{Aeq}	RBL
UML1	Day (07:00-18:00)	85	52	46	40	46	38
	Evening (18:00-22:00)	72	48	43	38	43	35
	Night (22:00-07:00)	82	43	39	33	39	29

5.4.1.2 Attended monitoring

UML1 was located within a noise environment of similar characteristics to the majority of surrounding receptors (i.e. where traffic noise from the Midland Highway tends to set the underlying background noise level). However, the specific noise levels at surrounding receptors may not necessarily be identical to those recorded by the logger given that receptors are located at different distances to sources of environmental noise. The measured noise levels in other surrounding areas are therefore valuable in developing a deeper understanding of the noise environment surrounding the project site.

Supplementary attended measurements were also conducted during the day, evening, and night at three critical locations deemed representative of surrounding residential receptors, and a further one location within the boundary of the project site. Each survey was conducted for 10 minutes and was conducted simultaneously with the unattended survey so the results could be directly compared over each 10-minute period. From this, the relative difference between the attended and unattended locations could be understood.

The four attended monitoring locations (AMLs) are:

- AML1: Kerb in front of 4 Weily Park Road
- AML2: Rear of lots along Woodrieve Road, near the dwelling at 34 Cobbs Hill Road
- AML3: At the driveway of the 'Parkholm' estate along Parkholm Drive
- AML4: On the southern portion of the project site near the turning circle.

Monitoring locations are presented in Figure 32.

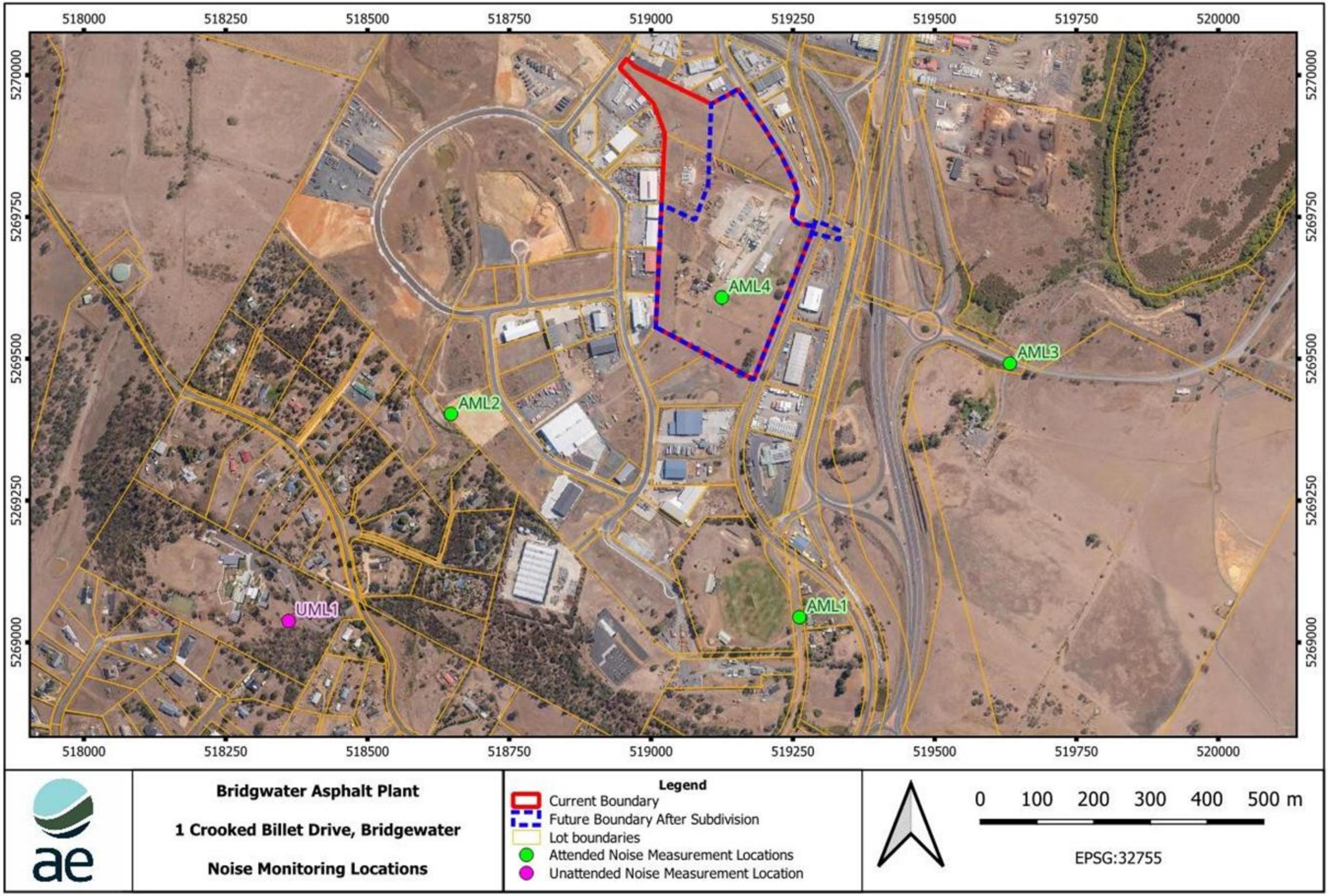


Figure 32. Noise monitoring locations (Source: Assured Environmental, 2025b)

The attended noise monitoring survey results are presented in Table 29.

Table 29. Summary of the attended noise monitoring survey results

Location	Period	Start time	Measured noise levels (10 minutes, dB(A))						
			L_{Aeq}	L_{Amax}	L_{A1}	L_{A10}	L_{A50}	L_{A90}	L_{A99}	L_{Amin}
AML1	Day	12:20	57.5	90.5	66.2	54.8	51.3	48.6	47.0	45.2
	Evening	20:36	48.8	69.2	57.8	49.3	45.5	40.9	37.3	35.9
	Night	22:20	42.5	54.1	50.1	45.9	40.4	34.2	32.5	31.8
AML2	Day	12:43	44.6	67.2	50.9	47.0	42.9	40.4	39.6	38.4
	Evening	21:18	36.6	52.8	46.5	38.9	33.8	31.0	29.1	27.7
	Night	22:57	34.3	58.3	43.2	32.7	30.2	28.9	28.2	27.3
AML3	Day	15:03	66.1	90.8	74.4	64.0	61.1	58.4	56.7	55.3
	Evening	20:20	56.2	69.7	63.9	59.3	54.6	47.3	42.6	41.3
	Night	22:05	51.0	70.9	58.7	54.2	47.8	37.2	33.9	32.9
AML4	Day	13:50	56.0	66.0	63.4	59.0	53.8	51.8	51.0	50.1
	Evening	20:55	47.2	59.1	56.7	49.3	44.7	40.7	38.4	37.4
	Night	22:37	41.9	60.1	50.0	45.2	39.3	36.1	35.1	34.2

The above $L_{A90,10min}$ measurement data was compared to the noise logger $L_{A90,10min}$ data during matching periods. The differences in background noise levels between each measurement location and the noise logger location are presented in Table 30, to quantify the typical difference in noise levels at the two locations.

Table 30. Summary of relative differences in background noise levels

Location	Period	Start time	Measured $L_{A90,10mins}$		Difference
			At location	At logger (UML1)	
AML1	Day	12:20	48.6	40.2	+8.4
	Evening	20:36	40.9	31.6	+9.3
	Night	22:20	34.2	29.2	+5.0
AML2	Day	12:43	40.4	42.8	-2.4
	Evening	21:18	31.0	30.8	+0.2
	Night	22:57	28.9	28.4	+0.5
AML3	Day	15:03	58.4	42.0	+16.4
	Evening	20:20	47.3	32.0	+15.3
	Night	22:05	37.2	29.4	+7.8
AML4	Day	13:50	51.8	41.4	+10.4
	Evening	20:55	40.7	32.1	+8.6
	Night	22:37	36.1	30.7	+5.4

Whilst the final project noise criteria derived from the existing background levels must rely on the long-terms RBLs established at UML1, the above comparisons help contextualise the relative noise levels in other locations exposed to different levels of noise.

From these, it is apparent that AML1, AML3, and AML4 were environments exposed to a higher level of noise (at least 5 dB) through all periods. This corresponds to an increased exposure to the Midland Highway and the industrial precinct.

In contrast, AML2 was shown to have relatively similar background noise levels to UML1 during the same periods, even being slightly lower during the day. This is a result of it being in a more shielded location and further from the Midland Highway.

5.4.2 Methodology

The noise impact assessment was conducted in accordance with the following guidance documents and regulatory requirements:

- Tasmanian Planning Scheme
- Environmental Protection Policy (Noise) 2009
- Draft Construction Noise Guideline 2020, NSW EPA
- Environmental Management and Pollution Control (Noise) Regulations 2016
- Tasmanian Noise Measurement Procedures Manual 2nd Edition 2008
- Environmental Impact Statement Guidelines - Hazell Bros Civil Contracting Pty Ltd. Asphalt and Reclaimed Asphalt Pavement (RAP) Processing Plant.

Predictive noise modelling was undertaken using the proprietary software CadnaA (version 2024 build 203.5403) developed by DataKustik.

CadnaA incorporates the influence of meteorology, terrain, ground type and air absorption in addition to source characteristics to predict noise impacts at receptor locations. All predictions have been undertaken in accordance with the CONCAWE method.

The model is utilised to assess the potential noise emissions from the site under a range of operating scenarios and meteorological conditions. The noise modelling also allows investigation of possible noise management solutions if non-compliance with the assessment criterion is predicted.

A detailed description of the methodology, model and assessment criteria used in the noise impact assessment is presented in Appendix 4.

Restrictions on the hours of use for mobile machinery, forklifts, trucks, and portable equipment are provided in the Environmental Management and Pollution Control (Noise) Regulations 2016 and are presented in Appendix 4.

5.4.3 Assessment

Impacts from noise emissions on nearby sensitive receptors was assessed for the following project activities:

- Construction activities (e.g. civil works and construction of the asphalt plant)
- Road traffic noise
- Operational activities.

Impacts from these project activities are discussed below.

5.4.3.1 Construction noise

The construction of the plant will involve a number of different activities undertaken in conjunction with each other. The primary stages are divided into three categories:

1. Concrete plant removal/relocation: dismantling the wet batching plant and relocating the dry batching plant
2. Civil works: including site clearing/levelling, and establishment of foundations
3. Asphalt plant erection: including construction of structural frame and asphalt plant.

The assessment has considered the potential for adverse amenity impacts associated with the above stages during both standard and outside of standard hours.

Table 31 presents predicted receptor noise levels taking into consideration the following assumptions:

- All equipment and plant in the expected work area and are assumed to be operating simultaneously. This is considered a hypothetical worst-case scenario and unlikely to occur
- The number of plant at this stage of development are estimates
- Source heights are typically set at two metres above ground level.

In summary, the predicted noise levels at all receptors comply with both the management level and the highly noise affected level during all hours (Table 31).

Table 31. Construction noise results

Receptor	Standard hours, dB(A)		Outside standard hours, dB(A)		Concrete plant removal & relocation	Civil works	Asphalt plant erection
	Management level	HNAL*	Management level	HNAL*			
R01	48	75	43	65	27	29	29
R02	48	75	43	65	20	23	21
R03	48	75	43	65	21	26	23
R04	48	75	43	65	22	27	25
R05	48	75	43	65	22	28	24
R06	48	75	43	65	16	19	17
R07	48	75	43	65	20	23	21
R08	48	75	43	65	22	26	23
R09	48	75	43	65	17	21	19
R10	48	75	43	65	18	21	19
R11	48	75	43	65	16	19	16
R12	48	75	43	65	15	19	17
R13	48	75	43	65	17	21	19
R14	48	75	43	65	17	21	19
R15	48	75	43	65	18	22	20
R16	48	75	43	65	18	23	19
R17	48	75	43	65	17	20	18
R18	48	75	43	65	17	20	18
R19	48	75	43	65	19	23	20
R20	48	75	43	65	19	22	20
R21	48	75	43	65	19	23	20
R22	48	75	43	65	18	23	20
R23	48	75	43	65	14	19	16
R24	48	75	43	65	14	18	15
R25	48	75	43	65	13	16	14
R26	48	75	43	65	7	10	9
R27	48	75	43	65	15	18	16
R28	55	75	43	65	14	18	15

*HNAL: Highly noise affected level

5.4.3.2 Road traffic noise

The EPA does not currently provide guidelines on noise limits for impacts associated with vehicle trips on public roads as a result of new developments. Reference is made to the noise criteria provided in the NSW Road Noise Policy (RNP). Based on the type of roadway, Table 32 presents the applicable road traffic noise criteria for existing residences affected by traffic on existing roadways generated by land use developments.

Table 32. Applicable road traffic noise criteria

Road category	Type of project and land use	Assessment criteria
Freeways or motorways/ arterial roads	Existing residences affected by additional traffic on existing freeways/arterial/sub-arterial roads generated by land use developments	Day: $L_{Aeq,15\ hour}$ 60 dB(A) Night: $L_{Aeq,9\ hour}$ 55 dB(A) (external)
Local roads	Existing residences affected by additional traffic on existing local roads generated by land use developments	Day: $L_{Aeq,1\ hour}$ 55 dB(A) Night: $L_{Aeq,1\ hour}$ 50 dB(A) (external)

Heavy vehicles are expected to arrive to and depart from the site via Glenstone Road to the Midland Highway. Assured Environmental (2025b) classify Glenstone Road as a local road, and the Midland Highway as a freeway/arterial road.

Existing traffic volumes were sourced from the Department of State Growth's traffic count website, and the latest data from relevant traffic stations is presented in Table 33.

Table 33. Existing traffic volumes

Location	Station ID	2023 AADT	Heavy vehicle %	AM peak hourly volume	PM peak hourly volume
Glenstone Road	A1105100	3,847	41.1	387	410
Midland Highway	A0087201	22,052	17.2	2,041	2,313

It is noted that the above counts would include vehicles associated with the existing concrete batch plant located on the site.

5.4.3.2 Vehicle trip generation

The total light and heavy vehicle trips associated with the passage of staff and the intake/offtake of material are provided in Table 34 for both the concrete batch plant and the proposed asphalt plant. It is noted that a trip includes the total path of the vehicle (i.e. arrival and departure). Volumes used by Assured Environmental (2025b) are based on information provided within the traffic impact statement (TCS, 2025) and advice from Hazell Bros.

Table 34. Net traffic volumes

Type of vehicle	Vehicles per day	
	Concrete batch plant	Proposed asphalt plant
Peak hourly volumes		
Heavy vehicle	5	4
Daily volumes		
Heavy vehicle	42	26
Light vehicle (staff movements)	8	10
Total	**50**	**36**

In summary, the traffic impact assessment (TCS, 2025) concludes that the estimated compound annual traffic growth on Crooked Billet Drive is 0%, thus no noise impacts associated with traffic flows from the project are expected.

5.4.3.3 Operational noise

Various assessment criteria and methods were used to assess operational noise. These include:

- Tasmanian Planning Scheme (e.g. attenuation distances)
- Environment Protection Policy (Noise) 2009 (Noise EPP) (e.g. acoustic environment indicator levels)
- EIS Guidelines for Hazell Bros Civil Contracting Pty Ltd Asphalt and Reclaimed Asphalt Pavement (RAP) Processing Plant, 1 Crooked Billet Drive, Bridgewater (e.g. acoustic environment indicator levels).

The relevant assessment criteria (based on the above guidelines) are consolidated in Table 35.

Table 35. Applicable noise criteria at sensitive receptors

Item	Noise metric	All surrounding sensitive receptors		
		Day	Evening	Night
Noise EPP				
External - moderate annoyance	$L_{Aeq,16hrs}$	50	50	-
External - sleep disturbance	$L_{Aeq,8hrs}$ L_{Amax}	- -	- -	45 60
Intrusive noise (RBL + 5)	$L_{Aeq,10mins}$	43	40	34
Project EIS guidelines				
Continuous sources only (RBL+0)	$L_{Aeq,10mins}$	38	35	29

The Noise EPP moderate annoyance criteria is generally higher than the other identified criteria, thus compliance with the other criteria would imply compliance with these criteria.

Assured Environmental (2025b) did not consider the moderate annoyance criteria as a strict assessment criteria, though discussion on how predicted noise levels compare to it is made in Section 9.3 of Appendix 4. A similar approach is taken for the L_{Aeq} sleep disturbance criteria. The L_{Amax} sleep disturbance criteria has also been adopted.

5.4.3.4 Noise sources

A summary of the noise sources adopted for the assessment is presented in Table 36. Sound power levels for each source were obtained based on surveys of the existing site by Assured Environmental, published literature and manufacturer information. All sources may operate at any hours of the day unless otherwise specified.

Noise source locations are shown in Figure 33 as per observations made onsite and indicative layouts for the proposed asphalt plant.

Table 36. Source sound power levels

Noise source	Type	Qty	Sound power level		Acoustical usage factor [a)]
			L_{Aeq} dB(A)	L_{Amax}	
Concrete batch plant					
Screw conveyor motor	Variable	3	95	109	10%
Belt conveyor	Variable	1	95	95	20%
Front end loader	Variable	1	94	106	40%
Truck mixing/washing	Variable	1	113	118	40%
Truck idling/loading	Variable	1	100	102	50%
Truck movement	Variable	4/hr	73/m	78/m	100%
Asphalt plant					
Bucket elevator (filler silo) - top	Continuous	1	89	89	100%
Bucket elevator (filler silo) - bottom	Continuous	1	91	91	100%
Bucket elevator (main) - top	Continuous	1	88	88	100%
Bucket elevator (main) - bottom	Continuous	1	94	94	100%
Burner fan	Continuous	1	92	92	100%
Exhaust stack	Continuous	1	97	97	100%
Dryer drum	Continuous	1	93	99	100%
Vibrator	Continuous	1	86	86	100%
Pug mill	Continuous	1	87	96	100%
RAP mobile processing plant	Continuous	1	104	109	100% (day only)
Transformer (2MVA)	Continuous	1	70	70	100%
Front end loader	Variable	2	94	106	40%
Truck idling/loading	Variable	1	100	104	50%
Truck idling	Variable	2	100	104	50%
Belt conveyor	Variable	3	81	81	20%
Truck movement	Variable	5/hr	73/m	78/m	100%

a) Acoustical usage factor represents the duration of a time period where equipment emits noise at this level. The indicated factors are based on observations onsite, discussions with equipment operators, and the table of published factors provided by the US Department of Transportation Roadway Construction Noise Model User Guide.

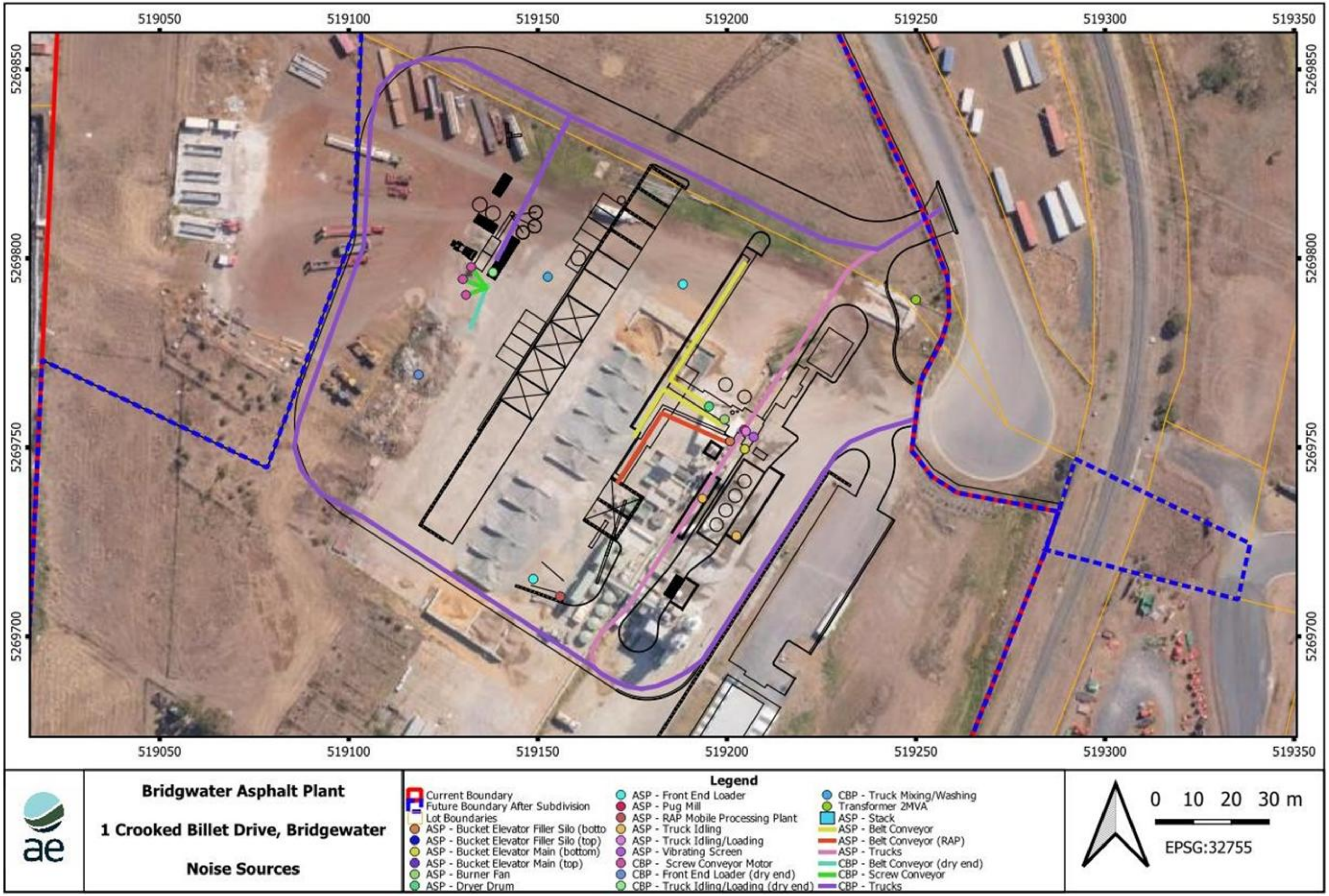


Figure 33. Modelled noise source locations (Source: Assured Environmental, 2025b)

5.4.3.5 Predicted receptor noise levels

Predicted noise levels at the 28 sensitive receptors were assessed against normal operations for day, evening and night scenarios, refer to Table 37 and Table 38. Note, compliance is dependent on the implementation of mitigation measures as detailed in Section 5.4.4.

Table 37. Predicted noise levels - continuous sources

Receptor	Intrusive / Dominant Penalties (D/E/N), dB			Predicted noise level (dB(A))			Criteria (dB(A))			Compliance
	Tonality	Low Freq. (L_{Ceq} - L_{Aeq})	Intermittent (L_{Ieq} - L_{Feq})	Day	Evening	Night	Day	Evening	Night	(D/E/N)
R01	0/0/0	0 / 5 / 0	0/0/0	30	33	28	38	35	29	Y/Y/Y
R02	0/0/0	0 / 5 / 0	0/0/0	23	21	16	38	35	29	Y/Y/Y
R03	0/0/0	0 / 0 / 0	0/0/0	28	19	19	38	35	29	Y/Y/Y
R04	0/0/0	0 / 0 / 0	0/0/0	32	20	20	38	35	29	Y/Y/Y
R05	0/0/0	0 / 0 / 0	0/0/0	34	19	19	38	35	29	Y/Y/Y
R06	0/0/0	5 / 5 / 5	0/0/0	24	20	20	38	35	29	Y/Y/Y
R07	0/0/0	0 / 5 / 0	0/0/0	24	25	20	38	35	29	Y/Y/Y
R08	0/0/0	0 / 0 / 0	0/0/0	28	22	22	38	35	29	Y/Y/Y
R09	0/0/0	0 / 5 / 0	0/0/0	24	25	20	38	35	29	Y/Y/Y
R10	0/0/0	0 / 5 / 0	0/0/0	24	25	20	38	35	29	Y/Y/Y
R11	0/0/0	5 / 5 / 0	0/0/0	24	22	17	38	35	29	Y/Y/Y
R12	0/0/0	5 / 5 / 0	0/0/0	25	23	18	38	35	29	Y/Y/Y
R13	0/0/0	0 / 0 / 0	0/0/0	24	20	20	38	35	29	Y/Y/Y
R14	0/0/0	0 / 0 / 0	0/0/0	23	21	21	38	35	29	Y/Y/Y
R15	0/0/0	0 / 0 / 0	0/0/0	24	21	21	38	35	29	Y/Y/Y
R16	0/0/0	0 / 0 / 0	0/0/0	24	19	19	38	35	29	Y/Y/Y
R17	0/0/0	0 / 5 / 0	0/0/0	21	22	17	38	35	29	Y/Y/Y
R18	0/0/0	0 / 0 / 0	0/0/0	22	20	20	38	35	29	Y/Y/Y
R19	0/0/0	0 / 0 / 0	0/0/0	24	19	19	38	35	29	Y/Y/Y
R20	0/0/0	0 / 0 / 0	0/0/0	25	19	19	38	35	29	Y/Y/Y
R21	0/0/0	0 / 0 / 0	0/0/0	26	19	19	38	35	29	Y/Y/Y
R22	0/0/0	0 / 0 / 0	0/0/0	25	20	20	38	35	29	Y/Y/Y
R23	0/0/0	0 / 5 / 0	0/0/0	20	23	18	38	35	29	Y/Y/Y
R24	0/0/0	0 / 5 / 0	0/0/0	19	21	16	38	35	29	Y/Y/Y
R25	0/0/0	5 / 5 / 5	0/0/0	22	18	18	38	35	29	Y/Y/Y
R26	0/0/0	5 / 5 / 5	0/0/0	15	10	10	38	35	29	Y/Y/Y
R27	0/0/0	5 / 5 / 0	0/0/0	24	19	14	38	35	29	Y/Y/Y
R28	0/0/0	0 / 0 / 0	0/0/0	20	16	16	38	35	29	Y/Y/Y

Table 38. Predicted noise levels - all sources

Receptor	Intrusive / Dominant Penalties (D/E/N), dB			Predicted noise level (dB(A))			Criteria (dB(A))			Compliance
	Tonality	Low Freq. (L_{Ceq} - L_{Aeq})	Intermittent (L_{Ieq} - L_{Feq})	Day	Evening	Night	Day	Evening	Night	(D/E/N)
R01	0 / 0 / 0	5 / 5 / 5	0 / 0 / 0	37	35	36	43	40	34	Y / Y / **N**
R02	1 / 2 / 3	5 / 5 / 5	0 / 0 / 0	32	31	33	43	40	34	Y / Y / Y
R03	0 / 0 / 2	5 / 5 / 5	0 / 0 / 0	35	32	35	43	40	34	Y / Y / **N**
R04	0 / 1 / 2	5 / 5 / 5	0 / 0 / 0	38	34	35	43	40	34	Y / Y / **N**
R05	0 / 0 / 0	5 / 5 / 5	0 / 0 / 0	37	32	33	43	40	34	Y / Y / Y
R06	1 / 1 / 2	5 / 5 / 5	0 / 0 / 0	30	29	30	43	40	34	Y / Y / Y
R07	0 / 0 / 0	5 / 5 / 5	0 / 0 / 0	32	31	31	43	40	34	Y / Y / Y
R08	0 / 0 / 0	5 / 5 / 5	0 / 0 / 0	35	32	33	43	40	34	Y / Y / Y
R09	1 / 2 / 2	5 / 5 / 5	0 / 0 / 0	33	32	32	43	40	34	Y / Y / Y
R10	0 / 0 / 1	5 / 5 / 5	0 / 0 / 0	32	30	31	43	40	34	Y / Y / Y
R11	1 / 1 / 2	5 / 5 / 5	0 / 0 / 0	29	29	30	43	40	34	Y / Y / Y
R12	0 / 0 / 0	5 / 5 / 5	0 / 0 / 0	29	28	29	43	40	34	Y / Y / Y
R13	0 / 0 / 0	5 / 5 / 5	0 / 0 / 0	32	30	30	43	40	34	Y / Y / Y
R14	0 / 0 / 0	5 / 5 / 5	0 / 0 / 0	32	31	31	43	40	34	Y / Y / Y
R15	0 / 0 / 0	5 / 5 / 5	0 / 0 / 0	32	31	32	43	40	34	Y / Y / Y
R16	0 / 0 / 0	5 / 5 / 5	0 / 0 / 0	32	30	31	43	40	34	Y / Y / Y
R17	0 / 0 / 0	5 / 5 / 5	0 / 0 / 0	30	29	29	43	40	34	Y / Y / Y
R18	0 / 0 / 0	5 / 5 / 5	0 / 0 / 0	30	29	30	43	40	34	Y / Y / Y
R19	0 / 0 / 0	5 / 5 / 5	0 / 0 / 0	32	30	30	43	40	34	Y / Y / Y
R20	0 / 0 / 0	5 / 5 / 5	0 / 0 / 0	33	30	30	43	40	34	Y / Y / Y
R21	0 / 0 / 0	5 / 5 / 5	0 / 0 / 0	33	30	31	43	40	34	Y / Y / Y
R22	0 / 0 / 0	5 / 5 / 5	0 / 0 / 0	33	30	31	43	40	34	Y / Y / Y
R23	0 / 0 / 0	5 / 5 / 5	0 / 0 / 0	28	27	28	43	40	34	Y / Y / Y
R24	1 / 2 / 2	5 / 5 / 5	0 / 0 / 0	27	27	27	43	40	34	Y / Y / Y
R25	0 / 0 / 0	5 / 5 / 5	0 / 0 / 0	20	19	20	43	40	34	Y / Y / Y
R26	0 / 0 / 0	5 / 5 / 5	0 / 0 / 0	28	26	27	43	40	34	Y / Y / Y
R27	0 / 0 / 0	5 / 5 / 5	0 / 0 / 0	29	28	28	43	40	34	Y / Y / Y
R28	0 / 0 / 0	5 / 5 / 5	0 / 0 / 0	28	27	28	43	40	34	Y / Y / Y

The noise assessment predicted that an exceedance of 2dB at R01 during the night only with all sources operating. It was demonstrated via attended monitoring that the background noise levels at AML3 (the location corresponding to receptor R01) during the night were elevated compared to the long-term noise logging location which was used to set the assessment criteria. The difference was measured as approximately 8dB during the attended monitoring when compared to the same period as the long-term unattended logger (UML1). This was observed to be due to increased exposure to the Midland Highway and the industrial precinct

Similarly, at R03 and R04 an exceedance of 1dB was predicted during the night only. The attended monitoring at AML1 (the location corresponding to receptor R03 and R04) during the night showed elevated background noise levels compared to the long-term noise logging location which was used to set the assessment criteria. The difference was measured to be 5dB. Again, the increased exposure to the Midland Highway and the industrial precinct was the explanation for this difference.

It is evident that the noise from the Midland Highway and the industrial precinct elevates the background noise levels at those receptors where exceeding noise levels are technically predicted. Based on the attended monitoring results and their elevated level compared to the unattended noise logger, in both cases the exceeding noise levels are expected to be below the actual background noise levels at the receptor locations.

The audibility of the project site at these receptors is in question to an extent, given its emitted noise levels at these receptors are below the measured short-term background noise levels. Importantly, these predicted noise levels are inclusive of a +5dB low frequency penalty. The penalty is intended to account for the effects one might experience when observing an unbalanced spectrum, thus it is expected that a penalty would only be warranted where the project site is actually audible above the prevailing ambient noise. As such, it is likely that the inclusion of the low frequency penalty is a conservative measure.

Furthermore, a review of the predicted noise levels shows that compliance with the 'moderate annoyance' and 'sleep disturbance' L_{Aeq} criteria from the Noise EPP is achieved at all receptors.

Based on the above assessment, Assured Environmental (2025b) state that an acceptable outcome is reached. Noise contour maps are provided in Appendix 4.

5.4.3.6 Sleep disturbance

Predictions of the L_{Amax} were also conducted in the noise modelling assessment. It was found that the predicted LA_{max} was no greater than 37dB at any receptor, which is well below the criteria of 60dB. As such, no impacts associated with sleep disturbance are expected. Predicted L_{Amax} contours are presented in Appendix 4.

5.4.4 Avoidance and mitigation measures

The assessment found that no specific mitigation measures are warranted during the construction phase. However, controls available to the construction contractor to minimise potential noise impacts during construction works include:

- Limiting the type and scale of concurrent activities undertaken close to sensitive receptors, where possible
- Using broad band reversing alarms on all mobile plant and equipment

- Examine different types of machines that perform the same function and compare the noise level data to select the least noisy machine
- Operating plant in a quiet and efficient manner, where possible
- Reduce throttle setting and turn off equipment when not being used
- Regularly inspect and maintain equipment to ensure it is in good working order including checking the condition of mufflers.

The following recommendations are made in order to achieve compliance with the applicable criteria:

- The front-end loader(s) servicing the asphalt plant should be fitted with a broadband reversing alarm
- The exhaust stack is to be fitted with an acoustic silencer achieving an insertion loss of 10dB
- The bucket elevators servicing the asphalt plant are to be attenuated such that a minimum 6dB reduction is achieved compared to the sound power level previously shown in Table 36 (Source sound power levels). This may be achieved by screening the equipment, installing motors within acoustic enclosures, or selecting quieter models.

The plant manufacturer (Astec) has confirmed that the exhaust stack and bucket elevators mitigation measures can be implemented and that the controls will reduce the noise at the site perimeter by approximately 10-20dB (Assured Environmental, 2025b).

In summary, the assessment found that potential noise impacts from construction activities both inside and outside of standard work hours were below the adopted criteria. As a result, the likelihood of adverse amenity impacts during the construction phase of the project is low. General guidance is provided on measures that can assist in managing noise during construction works to lessen the impact on surrounding receptors.

For the operational phase of the project, adverse amenity impacts are considered unlikely and compliance with applicable criterion is generally achieved where the proposed mitigation measures are implemented. A minor exceedance was predicted at R01, R03 and R04, though it is noted that the ambient noise environment at these receptors is elevated compared to the monitoring location used to determine the assessment criteria. Therefore, from a noise perspective, the project is deemed acceptable (Assured Environmental, 2025b).

Management commitments

Commitment	Details	Timeframe/due	Responsibility
9	The front-end loader servicing the asphalt plant is to be fitted with a broadband reversing alarm	Prior to operations	Site/plant manager
10	The exhaust stack is to be fitted with an acoustic silencer achieving an insertion loss of 10dB	Prior to operations	Site/plant manager
11	The bucket elevators servicing the asphalt plant are to be attenuated such that a minimum 6dB reduction is achieved compared to the sound power level previously shown in Table 36. This may be achieved by screening the equipment, installing motors within acoustic enclosures, or selecting quieter models	Prior to operations	Site/plant manager

5.5 WASTE MANAGEMENT

5.5.1 Existing environment

A wet and dry concrete batching plant is currently located on the site (1 Crooked Billet Drive). The wet concrete batching plant is proposed to be decommissioned and removed in late 2025. The dry concrete batching plant will be relocated within the same site (next to the proposed asphalt plant) at the end of 2025 (pending council approvals). The location of the dry concrete batching plant and proposed asphalt plant is provided in Figure 6.

All dry waste from the concrete plant is transported to the Hazell Bros Leslie Vale Landfill and Recovery Site for concrete recycling.

The site is connected to the TasWater sewer network but no trade waste is currently discharged to sewer.

5.5.2 Methodology

Waste is managed under the relevant waste management legislation and regulations including:

- *Environmental Management and Pollution Control Act 1994*
- Environmental Management and Pollution Control (Waste Management) Regulations 2020.

The waste assessment has been based on existing information from operating asphalt plants in the state and other Hazell Bros activities.

5.5.3 Assessment

It is not expected that the asphalt plant will produce solid waste as any secondary quality product will be stored and recycled to make more asphalt product. No trade waste connection to the sewer will be required for the project.

All leftover asphalt material from the manufacturing process and asphalt spillage will be collected and stored in the RAP storage facility for reprocessing. Raw materials that have been dried and screened prior to mixing with bitumen are returned to the appropriate virgin raw material stockpile for use as required. Any asphalt produced in excess to customer requirements can also be recycled. This means that zero product waste from the plant will be directed to landfill.

A small amount of liquid waste will be generated from the project. Solvent will be used in the testing laboratory. The waste solvent will be placed in 15 litre containers and stored in the dangerous goods self-bunded storage container and collected and disposed by a licenced contractor, as and when required.

All heavy and light vehicles will be taken offsite for regular servicing. Similarly, fixed plant will be serviced annually onsite by a contractor who will remove all waste oil and parts. As a result, no waste oil or waste from vehicle or plant servicing (e.g. filters and parts) will need to be stored onsite.

5.5.4 Avoidance and mitigation measures

Waste management will follow the hierarchy arranged in order of decreasing desirability (where practical):

- Avoidance
- Reuse

- Treatment/stabilisation for reuse
- Recycling
- Energy recovery
- Treatment stabilisation for disposal
- Disposal/permanent containment.

The asphalt plant will create minimal waste. All bitumen and raw materials from the site will be collected and reprocessed, creating a closed loop system and zero waste.

All raw material and asphalt spillages can be picked up by a front-end loader or manually with a shovel depending on the size of the spill. A road sweeper will also operate as required to clean up any material spillages. Collected aggregate material will be recycled back into the RAP process.

A small quantity of recyclable and non-recyclable waste will be produced during operations from offices and crib rooms. Standard general waste and recycling will be separated into different waste bins. Standard general waste will be stored in a $3m^3$ front lift bin, while paper will be stored in a wastepaper wheelie bin prior to transport to an approved waste transfer station by a licenced contractor.

Management commitments

Commitment	Details	Timeframe/due	Responsibility
12	Spills will be promptly contained and cleaned up using dedicated quick response spill containment equipment	Ongoing	All site personnel
13	Personnel will be trained in spill response, containment, clean up and reporting during site-specific onsite inductions and ongoing refresher course	Ongoing	All site personnel and licenced contractor
14	Recyclable materials e.g. plastic, cardboard and steel will be separated into dedicated bins before being taken to an approved waste transfer station. Front lift bins will be used to collect and store general/non-recyclable waste at the site prior to regular disposal at an approved waste transfer station by a licensed contractor	Ongoing	All site personnel and licenced contractor
15	Daily visual checks and weekly activity logs will be used to record and track clean-up activities at the site	Ongoing	All site personnel and licenced contractor

5.6 DANGEROUS GOODS AND ENVIRONMENTALLY HAZARDOUS MATERIALS

5.6.1 Existing environment

The proposed asphalt plant will be constructed in a brownfield area which consists of cleared industrial land. The plant will also be situated where part of the existing concrete batch plant is currently located (refer to Figure 5). As no dangerous goods are stored or used within the existing concrete plant, no contamination from the concrete plant is expected in the proposed project footprint area.

Hazell Bros are not aware of any historical contamination at the project site.

5.6.2 Methodology

Dangerous goods and environmentally hazardous materials are managed under the relevant legislation and regulations including:

- *Environmental Management and Pollution Control Act 1994*
- Environmental Management and Pollution Control (Waste Management) Regulations 2020
- Work Health and Safety Regulations 2022
- Managing Risks of Hazardous Chemicals in the Workplace: Code of Practice 2009
- *Dangerous Substances (Safe Handling) Act 2005.*
- Australian Code for the Transport of Dangerous Goods by Road and Rail (ADG code)

The storage and management of the dangerous goods and environmentally hazardous materials has been reviewed in accordance with the regulations, legislation and workplace code of practices.

The asphalt plant is not considered a 'Major Hazard Facility' as defined under Schedule 15 of the Work Health and Safety Regulations 2022.

5.6.3 Assessment

Dangerous goods have the potential to impact to land, water and air, if released to the environment. Release to the environment could occur due to storage failure, during transfer or during use.

Dangerous and non-dangerous goods that will be stored and used at the asphalt plant are listed in Table 39 and shown in Figure 34.

In addition to the asphalt plant, the relocated concrete plant will use seven different additive mixtures to produce concrete. A list of the additives that will be used at the concrete plant is presented in Table 40.

The mixtures are all classified as non-dangerous goods (as per the ADG code). Furthermore, the concrete plant does not constitute a hazardous use under the Bushfire-Prone Areas Code of the Tasmanian Planning Scheme. Specifically, that there are no relevant manifest quantities for the seven materials listed in Schedule 11 of the Work Health and Safety Regulations 2022.

To prevent release into the environment, concrete additives will be stored in bulk liquid tanks of both 1,000L and 2,000L capacities dependant on the additive mixture. The storage tanks will be contained inside a modified 40-foot shipping container that has a 3mm steel plate bund installed internally to house all the tanks inside. The bund is designed to contain a minimum of 110% of the largest holding tank, including the displacement of the other tanks within the bunded area. The container is also ventilated, and all operational pumps and calibration points are contained within the bunded area. The container will be locked to prevent unauthorised access.

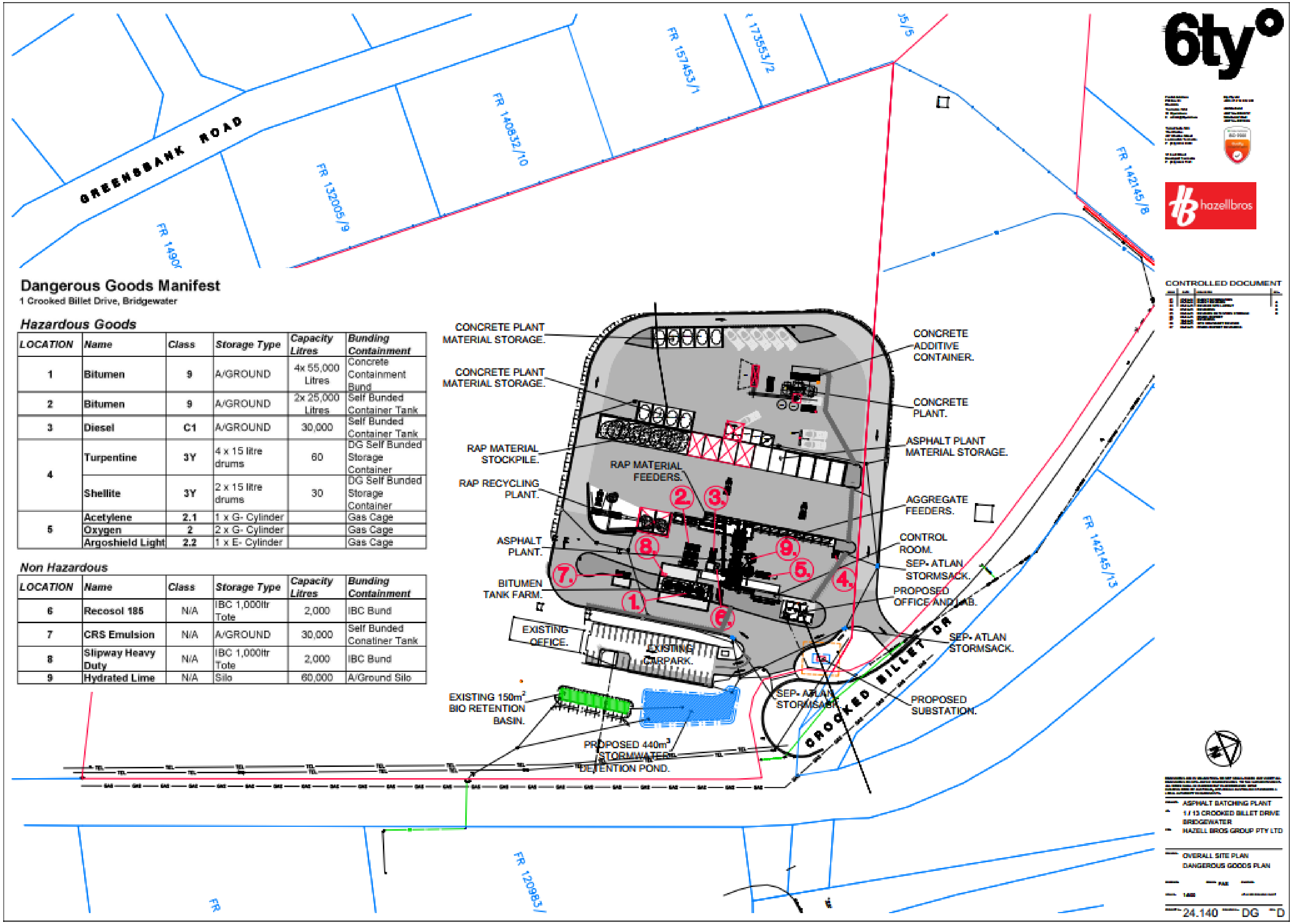
All Sika additives stored in the container will be appropriately labelled, detailed within the site Safety Data Sheet register and managed with the appropriate risk controls and PPE.

The location of the concrete additive container is presented in Figure 34.

Table 39. Dangerous and non-dangerous goods stored and used at the asphalt plant

Material	Figure 3434 No.	ADG Class	GHS Cat No.*	Storage/bunding type	Amount per annum	Use	Comments
Class 2 - Gases							
Acetylene	5	2.1	1	In cylinders inside gas cage	Two x G sized bottle. Up to five cylinders of each per annum.	Plant and equipment maintenance	Stored as per WorkSafe Tasmania requirements. Used for maintenance activities only
Oxygen	5	2.2	1	In cylinders inside gas cage	Four x G sized bottle. Up to five cylinders of each per annum.		
LPG	5	2.1	1	Forklift gas - shared plant between asphalt and concrete plant	-		
LPG	5	2.1	1	1 x 8kg inside gas cage	Four per annum		
Argo shield	5	2.2	-	In cylinders inside gas cage	Two x G sized bottle		
Class 3 - Flammable liquids							
Diesel	3	C1	4	30kL self-bunded container tank	Up to 60kL (if plant powered by natural gas).	Machinery, power generation if required	
Turpentine	4	3Y	3,1	4 x 15 litre drums in self-bunded 8ft storage container	300L per annum	Laboratory testing	-
Shellite	4	3Y	2,1	2 x 15 litre drums in self-bunded 8ft storage container	200L per annum	Laboratory testing	-
Class 9 - Miscellaneous							
Bitumen	1	9	1	Above ground vertical tanks (4 x $60m^3$) within a concrete containment bund and stormwater control. Capacity of 220,000L	2,500 tonnes (based on 48 tonnes per week, 52 weeks)	Asphalt binder	50,000 tonnes x 5% Bitumen Content= 2,500 tpa, divided by 52 Weeks = 48 tonne per week, 2 semi tanker deliveries of 29 tonne per week from Self's Point
Bitumen	*2*	*9*	1	Above ground tanktainers (2 x $25m^3$) within a self-bunded tank, heated at any one time	Alternative bitumen supply- within same quantities as above total	Asphalt binder	Imported from overseas if required
Non-dangerous goods							
Recosol 185	6	N/A	N/A	IBC 1,000L tote on portable IBC bund	4,000L per annum	Cold mix asphalt manufacturing	Oxidising agent
Cationic rapid set (CRS) bitumen emulsion	7	N/A	N/A	1 x 30kL horizontal, self-bunded container tank	Up to 120kL per annum	Bulk sale to customer	Five truckloads per annum. Purchased in bulk and re sold, not used or produced into other products onsite. Supplier unknown, most likely will be purchased from Victoria
Slipway heavy duty	8	N/A	4,2A	IBC 1,000L tote on portable IBC bund	Up to 4,000L per annum	Release agent for trucks	Designated truck hardstand with roll over type bunding on the hardstand.
Hydrated lime	9	N/A	2,1,3	Above ground silo	$60m^3$ / 140 tonne storage capacity. Approximately 150 tonnes per annum	Asphalt production	Five truckloads per annum

*GHS - Globally Harmonised System of Classification and Labelling of Chemicals.



Dangerous Goods Manifest

1 Crooked Billet Drive, Bridgewater

Hazardous Goods

LOCATION	*Name*	*Class*	*Storage Type*	*Capacity Litres*	*Bunding Containment*
1	**Bitumen**	9	A/GROUND	4x 55,000 Litres	Concrete Containment Bund
2	**Bitumen**	9	A/GROUND	2x 25,000 Litres	Self Bunded Container Tank
3	**Diesel**	C1	A/GROUND	30,000	Self Bunded Container Tank
4	**Turpentine**	3Y	4 x 15 litre drums	60	DG Self Bunded Storage Container
	Shellite	3Y	2 x 15 litre drums	30	DG Self Bunded Storage Container
5	**Acetylene**	2.1	1 x G- Cylinder		Gas Cage
	Oxygen	2	2 x G- Cylinder		Gas Cage
	Argoshield Light	2.2	1 x E- Cylinder		Gas Cage

Non Hazardous

LOCATION	*Name*	*Class*	*Storage Type*	*Capacity Litres*	*Bunding Containment*
6	**Recosol 185**	N/A	IBC 1,000ltr Tote	2,000	IBC Bund
7	**CRS Emulsion**	N/A	A/GROUND	30,000	Self Bunded Conatiner Tank
8	**Slipway Heavy Duty**	N/A	IBC 1,000ltr Tote	2,000	IBC Bund
9	**Hydrated Lime**	N/A	Silo	60,000	A/Ground Silo

Figure 34. Location of dangerous and non-dangerous goods stored at the site (Source: 6ty)

pinion ADVISORY

Table 40. Non-dangerous goods stored and used at the concrete plant

Material	ADG Class	GHS Cat No.*	SDS No.	Storage/bunding type	Storage quantity (Litres)	Use
Non-dangerous goods						
Sika ECO-WR	N/A	Non-hazardous, 3	607045	Tank located within self-bunded storage container	2000	Concrete additive
Sika ECO-3W	N/A	4,1,3,3	603276	Tank located within self-bunded storage container	2000	Concrete additive
Sika Air-LS	N/A	2A	605875	Tank located within self-bunded storage container	1000	Concrete additive
Sika Visco HRF2	N/A	2A,3,3	603684	Tank located within self-bunded storage container	1000	Concrete additive
Sika Rapid-AF	N/A	4,1	608602	Tank located within self-bunded storage container	1000	Concrete additive
Sika Retarder-N	N/A	3,3	609170	Tank located within self-bunded storage container	1000	Concrete additive
Sika Viscoflow-21	N/A	3,3	100000039592	Tank located within self-bunded storage container	2000	Concrete additive

*GHS - Globally Harmonised System of Classification and Labelling of Chemicals.

5.6.4 Avoidance and mitigation measures

During the construction phase, no significant quantities of dangerous goods will be stored. Project vehicles and equipment will be refuelled offsite.

During operations, the following mitigation measures will be implemented to prevent chemical spillage and environmental harm:

- All fuel, bitumen and emulsion will be stored in an impervious bunded area which will be designed to contain at least 110% of the total volume of material. In addition, 100mm bunded roll over kerbs will be installed at the fill points for the diesel, emulsion and bitumen tanks.
- Transfer of bitumen emulsion to delivery tankers will occur over a hardstand area with spill kits located next to the filling location.
- Small quantities of turpentine and shellite will be stored in 15L drums within a self-bunded storage container.
- All acetylene, oxygen and argo shield cylinders will be stored within a secure gas cage.
- Slipway release agent will be stored in a 1,000L IBC tote container with a portable IBC bund. A designated hardstand (with roll over type bunding) will be constructed where the trucks will be stationed (when applying the release agent) to prevent spillage.
- Recosol 185 will be stored in a 1,000L IBC tote container with a portable IBC bund.
- Provision of spill kits appropriate to materials stored.

Site personnel will be provided with appropriate training in the storage, use, management and spill containment/response of all dangerous and non-dangerous goods. These procedures are outlined in the Emergency response plan (PLA-HSE-003 - Hazardous material spill or gas leak) and will be covered in site-specific inductions.

Spill kits appropriate to the types and volumes of dangerous goods handled will be placed in an accessible location to contain a spill. Ongoing training will be provided during toolbox meetings and refresher courses where required.

All spills will be cleaned up immediately, reported to the site supervisor and recorded in Hazell Bros electronic incident reporting system. If required, material will be removed from the site by a suitably qualified waste contractor.

Spills likely to cause or having the potential to cause environmental nuisance or harm, will be reported to the EPA within 24 hours. Disposal of hazardous goods will be conducted in accordance with relevant state regulations.

Hazell Bros will control the storage and handling of dangerous wastes by keeping an accurate record of the products onsite as detailed in Table 39 and Table 40, ensuring that all materials have current Material Safety Data Sheets (MSDS) on hand to inform management of those products and by employing the controls detailed in the MSDS for each type of product.

Relevant management commitments for dangerous goods are listed in Section 5.5 Waste management.

As a result of the proposed engineering controls (e.g. storage and containment bunding), training and site management measures (e.g. spill containment/response), impacts from dangerous goods are expected to be low.

5.7 BIODIVERSITY AND NATURAL VALUES

5.7.1 Existing environment

A natural values assessment was undertaken for the project by Pinion Advisory (2025).

Field assessments were conducted by Pinion Advisory on:

- 13 August 2024
- 7 November 2024
- 12 February 2025.

The random meander search method (after Cropper, 1993) was used to target the project area and immediate surrounds. The project site was covered on foot with a focus on identifying threatened species and vegetation communities identified within 5000m in the natural values report (NVR) and EPBC Act protected matters report (presented in Appendix 5), with consideration to other threatened species with potential to be present.

Initial surveys conducted in August and November 2024 revealed significant natural values within the southern area of the project area, including a population of Basalt guineaflower (*Hibbertia basaltica*) and a patch of native grassland that could serve as habitat for native fauna including the tussock skink (*Pseudemoia pagenstecheri*) and Eastern barred bandicoot (*Paremeles gunnii*).

To avoid potential impacts to the Basalt guineaflower and potential threatened fauna species, Hazell Bros relocated and redesigned the asphalt plant footprint to the north of the 1 Crooked Billet Drive property. The plant footprint also occupies a small area of the southern boundary to 13 Crooked Billet Drive. The updated project footprint avoids the significant natural values identified in initial surveys.

The natural values assessment report is presented in Appendix 5 with key findings summarised below.

5.7.2 Methodology

The natural values assessment was undertaken in accordance with the following regulatory requirements and guidance documents:

- *Environment Protection and Biodiversity Conservation Act 1999* (Cth)
- *Threatened Species Protection Act 1995*
- *Nature Conservation Act 2002*
- *Biosecurity Act 2019* (formerly *Weed Management Act 1999*)
- *Forest Practices Act 1985*
- Guidelines for Natural Values Surveys - Terrestrial Development Proposals 2015
- Survey Guidelines and Management Advice for Development Proposals that may impact on the Tasmanian Devil (*Sarcophilus harrisii*) 2015
- Weed and Disease Planning Hygiene Guidelines 2015

5.7.3 Assessment

5.7.3.1 Desktop assessment

Vegetation communities

The property is mapped under TasVeg 4.0 vegetation mapping unit (FUR) Urban areas. The development footprint does not include any mapped native vegetation communities.

Threatened flora

Verified records of seven threatened flora species were identified within 500m of the project area. Verified records of 53 threatened flora species were identified within 5000m of the project area (Table 41). All species are listed under the Tasmanian *Threatened Species Protection Act 1995* (TSP Act), with nine species also listed federally under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

Table 41. Listed flora species with verified records within 5000m of the project area

Species	TSP Act	EPBC Act	Results of site inspection	Habitat required	Presence of suitable habitat
Prickly woodruff (*Asperula scoparia subsp. scoparia*)	r	-	Not observed	Grassy woodland and tall eucalypt forest.	No
Double jointed speargrass (*Austrostipa bigeniculata*)	r	-	Not observed (Survey period mid November- mid April)	In Tasmania the species is found mainly in the southeast and Midlands in open woodlands and grasslands, where it is often associated with *Austrostipa nodosa*.	Unlikely
Crested speargrass (*Austrostipa blackii*)	r	-	Not observed (Survey period December-March)	In Tasmania, *Austrostipa blackii* occurs in open woodlands up to an altitude of 100m.	No
Sea clubsedge (*Bolboschoenus caldwellii*)	r	-	Not observed	In Tasmania, *Bolboschoenus caldwellii* is widespread in shallow, standing, sometimes brackish water, rooted in heavy black mud.	No
Cutleaf daisy (*Brachyscome rigidula*)	v	-	Not observed	In Tasmania, *Brachyscome rigidula* is found in dry rocky hills and flats, pastures, grassland and grassy woodland in the Midlands, East Coast and in parts of the eastern Central Highlands of Tasmania.	Yes
Blacktip spider-orchid (*Caladenia anthracina*)	e	CR	Not observed (Survey period mid September-early November)	The species occurs in low rainfall areas in grassy woodland with silver wattle and bracken on well-drained sandy soil.	No
Tailed spider-orchid (*Caladenia caudata*)	v	VU	Not observed (Survey period September-early November)	The species occurs in heathy and open eucalypt forest and woodland, often with sheoaks, and in heathland on sandy and loamy soils. It is most often found on sunny north-facing sites.	No
Daddy longlegs	r	-	Not observed	The species occurs in lowland heathy and sedgy	No

Species	TSP Act	EPBC Act	Results of site inspection	Habitat required	Presence of suitable habitat
(*Caladenia filamentosa*)			(Survey period September-early November)	open eucalypt forest and woodland on sandy soils.	
Lemon beautyheads (*Calocephalus citreus*)	r	-	Not observed	*Calocephalus citreus* inhabits disturbed dry grasslands, and in Tasmania is found from a few locations in the south-east of the State.	Unlikely
Milky beautyheads (*Calocephalus lacteus*)	r	-	Not observed	In Tasmania, *Calocephalus lacteus* is found in open grassland situations.	Unlikely
Mountain sedge (*Carex gunniana*)	r	-	Not observed (Survey period November-April)	In Tasmania, *Carex gunniana* grows in wet eucalypt forest and sandy heathlands, by the sides of streams, littoral sands and shingle with seepage.	No
Grassland cupflower (*Colobanthus curtisiae*)	r	VU	Not observed	It is a grassland to grassy woodland plant, often found on rocky knolls, and can be found in areas subject to a wide variety of environmental conditions. The species responds to some disturbance.	Yes
Swamp everlasting (*Coronidium gunnianum*)	e	-	Not observed	This species generally occurs in grasslands on heavy soils, or riverine woodlands on soils that are prone to inundation. It mostly occurs at low elevations under 100 m asl, but some mainland populations occur above 700m asl.	No
Pretty pearlflower (*Cryptandra amara*)	e	-	Not observed	In Tasmania *Cryptandra amara* grows in some of the driest areas of the State and is typically associated with fertile rocky substrates, its habitat ranging from near-riparian rockplates to grasslands or grassy woodlands.	Yes
Slender ticktrefoil (*Desmodium varians*)	e	-	Not observed	In Tasmania, *Desmodium varians* occurs in the east of the State, growing in native grassland, or open grassy shrubland or woodland, *Themeda triandra* and *Poa labillardierei* being the most prominent grasses it is associated with.	No
Grassland flaxlily (*Dianella amoena*)	r	EN	Not observed (Survey period late October – January)	In Tasmania, the species occurs mainly in the Midlands, where it grows in native grasslands and grassy woodlands.	No
Swamp doubletail (*Diuris palustris*)	e	-	Not observed	In Tasmania, the species occurs in coastal areas in	No

Species	TSP Act	EPBC Act	Results of site inspection	Habitat required	Presence of suitable habitat
				grassy open eucalypt forest, sedgy grassland and heathland with tea-tree and paperbark on poorly- to moderately-drained sandy peat and loams, usually in sites that are wet in winter.	
Blue devil (*Eryngium ovinum*)	v	-	Not observed	In Tasmania, *Eryngium ovinum* occurs in gullies, roadsides, *Themeda* grassland and open grassy woodlands, often in damp clays in the south east of the State.	No
Risdon peppermint (*Eucalyptus risdonii*)	r	-	Not observed	This species is restricted to the greater Hobart area and Mangalore where it occurs on Permian mudstone from sea level to 150m. Habitat includes low open forest on very sunny ridges and north-west facing upper slopes.	No
Clover glycine (*Glycine latrobeana*)	v	VU	Not observed	In Tasmania, *Glycine latrobeana* occurs in dry sclerophyll forest, native grassland and woodland, usually on flat sites with loose, sandy soil.	No
Hairy brooklime (*Gratiola pubescens*)	r	-	Not observed	In Tasmania the species is most commonly located in permanently or seasonally damp or swampy ground, including the margins of farm dams.	No
Rough raspwort (*Haloragis aspera*)	v	-	Not observed	In Tasmania, *Haloragis aspera* occurs in wet areas in the eastern part of the State.	No
Variable raspwort (*Haloragis heterophylla*)	r	-	Not observed (Survey period October-May)	In Tasmania, *Haloragis heterophylla* is known from damp *Themeda* grassland and grassy woodland in the Midlands and across to the East Coast.	No
Basalt guineaflower (*Hibbertia basaltica*)	e	EN	Yes. Identified population at edge of native grassland patch in SE corner of 1 Crooked Billet Drive. Not present within new asphalt plant footprint.	*Hibbertia basaltica* is restricted to areas of basalt between Pontville and Bridgewater in southern Tasmania where it occurs on slopes along the lower reaches of the Jordan River and one of its tributaries in native grassland dominated by kangaroo grass (*Themeda triandra*) and spear grasses (*Austrostipa* species) with the occasional prickly box (*Bursaria spinosa*). Rock cover is high, while soils are shallow clay loams. Slopes vary from 0 to 15	Yes

Species	TSP Act	EPBC Act	Results of site inspection	Habitat required	Presence of suitable habitat
				degrees and altitude 15 to 45m above sea level.	
Grass cushion (*Isoetopsis graminifolia*)	v	-	Not observed (Survey period late August-December)	In Tasmania, *Isoetopsis graminifolia* occurs in the northern and southern Midlands in gaps between tussocks in native grasslands dominated by *Themeda triandra* (kangaroo grass) and on rockplates. It has been recorded at altitudes of 20 to 360m above sea level.	Yes, in SE corner of 1 Crooked Billet Drive. Not within new project footprint.
Tall blowngrass (*Lachnagrostis robusta*)	r	-	Not observed	In Tasmania, *Lachnagrostis robusta* is known from marshy, estuarine habitat and moist sandy flats, predominantly around the north-east and on the East Coast.	No
Soft peppercress (*Lepidium hyssopifolium*)	e	EN	Not observed	In Tasmania, the species is now found primarily under large exotic trees on roadsides and home yards on farms. It occurs in the eastern part of Tasmania at an altitude of 40-500m in dry, warm and fertile areas on flat ground on weakly acid to alkaline soils derived from a range of rock types.	Yes
Spreading watermat (*Lepilaena patentifolia*)	r	-	Not observed	In Tasmania, *Lepilaena patentifolia* inhabits coastal lagoons, creeks, inlets and estuaries and brackish inland lagoons.	No
Purple loosestrife (*Lythrum salicaria*)	v	-	Not observed	In Tasmania, *Lythrum salicaria* inhabits swamps, stream banks and rivers mainly in the north and north-east of the State. It can also occur between gaps in *Melaleuca ericifolia* forest.	No
Hotrock fern (*Pellaea calidirupium*)	r	-	Not observed	In Tasmania *Pellaea calidirupium* is found in inland, rocky habitats in areas of low to moderate rainfall. It grows in crevices and on ledges on exposed or semi-exposed rock outcrops.	No
Grassland greenhood (*Pterostylis ziegeleri*)	v	VU	Not observed (Survey period late September-November)	In coastal areas, the species occurs on the slopes of low stabilised sand dunes and in grassy dune swales, while in the Midlands it grows in native grassland or grassy woodland on well-drained clay loams derived from basalt.	Yes, in SE corner of 1 Crooked Billet Drive. Not within new project footprint.

Species	TSP Act	EPBC Act	Results of site inspection	Habitat required	Presence of suitable habitat
Silky bushpea (*Pultenaea prostrata*)	v	-	Not observed	In Tasmania the species has been recorded from the Northern and Southern Midlands, where it grows within grassy woodlands or grasslands, mostly on Tertiary basalt or Quaternary alluvium.	Yes, in SE corner of 1 Crooked Billet Drive. Not within new project footprint.
Ferny buttercup (*Ranunculus pumilio var. pumilio*)	r	-	Not observed (Survey period September-October)	In Tasmania, *Ranunculus pumilio var. pumilio* occurs mostly in wet places from sea level to altitudes of 800-900m.	No
Mud dock (*Rumex bidens*)	v	-	Not observed (Survey period November-March)	Aquatic to semi-aquatic species found in wetlands and waterways.	No
Largefruit seatassel (*Ruppia megacarpa*)	r	-	Not observed	In Tasmania it is found growing in estuaries and lagoons along the east and southeast coasts, and brackish lagoons in the Midlands; there is also an historic record from the Tamar estuary area.	No
River clubsedge (*Schoenoplectus tabernaemontani*)	r	-	Not observed	In Tasmania, *Schoenoplectus tabernaemontani* inhabits the margins of lagoons and on some riverbanks.	No
Tufted knawel (*Scleranthus diander*)	v	-	Not observed	In Tasmania, *Scleranthus diander* is found from the Central Midlands area to Hobart with most of the records from the Ross and Tunbridge areas. This species inhabits grassy woodland and is associated with dolerite and basalt substrates.	No
Spreading knawel (*Scleranthus fasciculatus*)	v	-	Not observed	In Tasmania, *Scleranthus fasciculatus* is only recorded from a few locations in the Midlands and south-east. The vegetation at most of the sites is silver tussock grassland/grassy woodland. It appears to need gaps between the tussock spaces for its survival and both fire and stock grazing maintain the openness it requires.	No
Leafy fireweed (*Senecio squarrosus*)	r	-	Not observed (Survey period October-May)	*Senecio squarrosus* occurs in a wide variety of habitats. One form occurs predominantly in lowland damp tussock grasslands. The more widespread and common form occurs mainly in dry forests (often grassy) but extends to wet forests and other vegetation types.	Unlikely

Species	TSP Act	EPBC Act	Results of site inspection	Habitat required	Presence of suitable habitat
Grassland candles (*Stackhousia subterranea*)	e	-	Not observed (Survey period September-November)	*Stackhousia subterranea* grows within *Themeda triandra* grassland, or grassy woodland dominated by *Eucalyptus pauciflora*, *Eucalyptus rodwayi* or *Eucalyptus ovata*.	Yes, in SE corner of 1 Crooked Billet Drive. Not within new project footprint.
Fennel pondweed (*Stuckenia pectinata*)	r	-	Not observed	In Tasmania, *Stuckenia pectinata* is found in fresh to brackish/saline waters in rivers, estuaries and inland lakes. It forms dense stands or mats, particularly in slow-flowing or static water. The species grows in water of various depths, from a few centimetres to 4m deep.	No
Southern toadflax (*Thesium australe*)	ex	VU	Not observed	In Tasmania, *Thesium australe* is known only from an 1804 collection from the Derwent River Valley. Suitable habitat for this species includes grassland and grassy woodland.	Yes, in SE corner of 1 Crooked Billet Drive. Not within new project footprint.
Dwarf sunray (*Triptilodiscus pygmaeus*)	v	-	Not observed (Survey period September-November)	*Triptilodiscus pygmaeus* grows within grasslands, grassy woodlands or rockplates, the underlying substrate being mostly Tertiary basalt or Jurassic dolerite. The elevation range of recorded sites in Tasmania is 30-470m above sea level, with an annual rainfall of about 450-600 mm. The species occurs within native grassland dominated by *Themeda triandra* (kangaroo grass).	Yes, in SE corner of 1 Crooked Billet Drive. Not within new project footprint.
River ribbons (*Vallisneria australis*)	r	-	Not observed	In Tasmania it is found in riparian situations in the north, northeast, midlands and southeast.	No
Spur velleia (*Velleia paradoxa*)	V*	-	Not observed (Survey period October-May)	In Tasmania, *Velleia paradoxa* is known from the Hobart and Launceston areas, the Midlands and the Derwent Valley, where it occurs in grassy woodlands or grasslands on dry sites. It has been recorded from altitudes up to 550m, at sites with an annual rainfall range of 450-750mm.	Yes, in SE corner of 1 Crooked Billet Drive. Not within new project footprint.
Smooth new-holland-daisy (*Vittadinia burbidgeae*)	r	-	Not observed	In Tasmania, this species is known from the driest and most fertile soils in the Hobart area and extending up into the Midlands.	Yes

Species	TSP Act	EPBC Act	Results of site inspection	Habitat required	Presence of suitable habitat
Fuzzy new-holland-daisy (*Vittadinia cuneata var. cuneata*)	r	-	Not observed	In Tasmania, *Vittadinia cuneata var. cuneata* occurs in areas of low precipitation on both fertile and infertile soils. Predominantly found in dry sclerophyll forest around Hobart, into the midlands and extending up into the north-east.	Yes, in SE corner of 1 Crooked Billet Drive. Not within new project footprint.
Woolly new-holland-daisy (*Vittadinia gracilis*)	r	-	Not observed	In Tasmania, *Vittadinia gracilis* is known from dry sites on dolerite and basalt. It is predominantly found in dry sclerophyll forest around Hobart, into the Midlands and extending up into the north-east.	Yes, in SE corner of 1 Crooked Billet Drive. Not within new project footprint.
Narrowleaf new-holland-daisy (*Vittadinia muelleri*)	r	-	Not observed	In Tasmania, this species is known from the driest and most fertile soils in the Hobart area and extending up into the Midlands.	Yes, in SE corner of 1 Crooked Billet Drive. Not within new project footprint.
Xanthoparmelia amphixantha	e	-	Not observed	In Tasmania, this species occurs in the Southern Midlands on stony shallow soils in native grassland.	No
Xanthoparmelia molliuscula	e	-	Not observed	In Tasmania, this species occurs on basalt in the Midlands on shallow, stony soils in native grassland.	No
Xanthoparmelia vicariella	r	-	Not observed	This species is known only from the Southern Midlands where it occurs on dolerite and basalt boulders in dry sclerophyll woodland and native grassland.	No
*r, v, e, ex – rare, vulnerable, endangered and extinct under the Tasmanian TSP Act. VU, EN, PEN – vulnerable, endangered and pending listing under the EPBC Act.					

Threatened fauna

Verified records of one threatened fauna species was identified within 500m of the project area, with an additional 13 species based on range boundaries. Verified records of 21 threatened terrestrial fauna species were identified within 5000m of the project area. All threatened species identified within 5000m are listed under the Tasmanian TSP Act, with 14 species also listed federally under the EPBC Act (Table 42).

Table 42. Listed fauna species with verified records within 5000m of the project area

Species	TSP Act	EPBC Act	Results of site inspection	Habitat required	Presence of suitable habitat
Grey goshawk (*Accipter novaehollandiae*)	e	-	Not observed	The species nests in mature wet forest, usually in the vicinity of a watercourse. However, birds can also be	No

Species	TSP Act	EPBC Act	Results of site inspection	Habitat required	Presence of suitable habitat
				seen in more open woodland and around urban fringes.	
Tasmanian azure kingfisher (*Ceyx azureus subsp. Diemenensis*)	e	EN	Not observed	The subspecies is found in shady and overhanging forest vegetation along the forested margins of major rivers on the south, west, north and northwest coasts, with other occurrences in the northeast, east, centre and Bass Strait islands.	No
Tasmanian wedge-tailed eagle (*Aquila audax subsp. fleayi*)	e	EN	Not observed	Feeds across a wide range of habitats from coastal to highlands, breeds in mature forests.	Foraging habitat only
Australasian bittern (*Botaurus poiciloptilus*)	-	EN	Not observed	Found in shallow and vegetated freshwater or brackish swamps.	No
Spotted-tail quoll (*Dasyurus maculatus subsp. Maculatus*)	r	VU	Not observed	Large patches of forest with adequate den sites and mammalian prey.	No
Eastern quoll (*Dasyurus viverrinus*)	e	EN	Not observed	Found in a range of vegetation types including open grassland (including farmland), tussock grassland, grassy woodland, dry eucalypt forest, coastal scrub and alpine heathland, but is typically absent from large tracts of wet eucalypt forest and rainforest	Foraging habitat only
Latham's snipe (*Gallinago hardwickii*)	-	VU	Not observed	Migrates to Australia for the non-breeding season (August-February), where it is generally observed in vegetation around shallow freshwater wetlands.	No
White-bellied sea-eagle (*Haliaeetus leucogaster*)	v	-	Not observed	In Tasmania, the species occurs around the coast, and inland along larger rivers, lakes and dams.	Foraging habitat only
White-throated needletail (*Hirundapus caudacutus*)	-	VU	Not observed	Mostly aerial, although they occur over most types of habitats. The species roosts in trees amongst dense foliage in the canopy or in hollows.	No
Swift parrot (*Lathamus discolor*)	e	CR	Not observed	Habitat for Swift Parrot during the breeding season broadly includes the following elements: flowering Tasmanian blue gum and black gums (foraging habitat) and any eucalypt forest containing hollow-bearing trees (nesting habitat). Hollow-bearing trees are typically large and old with dead limbs or branches and at least some visible hollows. Note that the importance of breeding habitat in any one year varies depending on its location in relation to foraging	Very minimal foraging habitat only. Six Tasmanian blue gum trees located outside of the proposed project footprint, in the south eastern corner of the property

Species	TSP Act	EPBC Act	Results of site inspection	Habitat required	Presence of suitable habitat
				habitat (i.e. blue gums or black gums in flower).	
Forty-spotted pardalote (*Pardalotus quadragintus*)	e	EN	Not observed	It now occurs in only a few small areas of dry forest that contain *Eucalyptus viminalis* (white gum) trees, on which it is exclusively dependent. Core habitat includes any White Gum forest within 3km of the east coast from St Helens to Southport. Potential habitat is any white gum forest 3-5 km from the east coast from St Helens to Southport and including the Furneaux group.	No
Blue-winged parrot (*Neophema chrystoma*)	-	VU	Not observed	A range of habitats including coastal, sub-coastal and inland areas. Tend to favour grasslands and grassy woodlands and are often found near wetlands. Habitat can include modified land including golf courses, airfields and agricultural land.	Yes
Eastern barred bandicoot (*Paremeles gunnii*)	-	VU	Yes. Single carcass identified near internal boundary fence in the southern area of 1 Crooked Billet Drive	Originally occurred in native grasslands and grassy woodlands, but habitat loss has resulting in expansion into mosaic habitats of pasture and remnant native forest, often with a significant amount of cover provided by weeds such as gorse and blackberry	Small area of potential low-quality foraging habitat within project footprint
Great crested grebe (*Podiceps cristatus*)	v	-	Not observed	The great crested grebe lives on rivers, lakes and estuaries but in Tasmania, are thought to breed only on Lake Dulverton near Oatlands.	No
Australian grayling (*Proctotes maraena*)	v	VU	Not observed	Coastal rivers and streams	No
Tussock skink (*Pseudemoia pagenstecheri*)	v	-	Not observed	In Tasmania, the Tussock Skink (*Pseudemoia pagenstecheri*), a ground-dwelling lizard, occurs in grassland and grassy woodland habitats at a range of elevations.	No
Tasmanian devil (*Sarcophilus harrisii*)	e	EN	Not observed	Habitat includes the following elements contained across an area of several square kilometres: denning habitat for daytime shelter (e.g. dense vegetation, hollow logs, burrows or caves); hunting habitat (open understorey mixed with patches of dense vegetation); breeding den habitat (areas of burrowable, well-drained soil or sheltered overhangs such as cliffs, rocky outcrops, knolls, caves and earth banks, free from	Potential foraging habitat only

Species	TSP Act	EPBC Act	Results of site inspection	Habitat required	Presence of suitable habitat
				risk of flooding; windrows and log piles may also be used).	
Chequered blue (*Theclinesthes serpentatus lavara*)	r	-	Not observed	Coastal habitats in proximity to saltbush food source.	No
Masked owl (*Tyto novaehollandiae subsp. castanops*)	e	VU	Not observed	Mature forest and woodlands below 600m asl, also in areas with a mosaic of grasslands and woodlands.	Foraging habitat only
***r, v, e, ex** – rare, vulnerable, endangered and extinct under the Tasmanian TSP Act. VU, EN, CR, PEN – vulnerable, endangered, critically endangered and pending listing under the EPBC Act.					

5.7.3.2 Field assessment

Vegetation communities

The project footprint is situated within an industrial zone developed on degraded farmland. Remnants of farming infrastructure (e.g. fencing, yards, etc.) are present at the property, but the mapped (FUR) Urban areas overlay is appropriate for the site given current land use.

A small patch of Lowland *Themeda triandra* (Kangaroo grass) grassland (GTL) was identified in initial surveys at the southeastern corner of 1 Crooked Billet Drive, which is now outside of the relocated project footprint (Figure 37).

The GTL community covers approximately 0.5ha, which at <1ha does not qualify for the EPBC Act listed ecological community Lowland *Themeda triandra* grassland. The patch has no connectivity to other GTL patches present outside of the property boundary, with maintained fence lines, a rail corridor, and industrial land surrounding the patch.

Although the patch is not large enough to qualify for federal listing, a preliminary condition assessment found the small patch of vegetation present to be in good condition, and having potential to support listed flora species found within native grassland habitat.

No native vegetation communities or threatened native vegetation communities (TNVC) are present within the relocated proposed project footprint (Figure 35 and Figure 36).

Figure 35. Weedy pasture within the project footprint. Photo looking west across the southern boundary of 13 Crooked Billet Drive

Figure 36. Weedy pasture within transmission corridor in foreground with existing industrial land use in background. Photo looking south from the southern boundary of 13 Crooked Billet Drive

Figure 37. Ground-truthed vegetation mapping including observed Basalt guineaflower population (yellow shading)

Threatened flora

No threatened flora species were observed within the new proposed project footprint. The footprint consists exclusively of modified land, either within the footprint of existing industrial operations, or modified improved pasture within a high voltage transmission corridor. Historical and current land use at the site has modified the vegetation present such that little habitat potential for threatened flora species is present within the proposed project footprint.

The majority of the new proposed footprint covers the existing concrete batching plant operating at the site, with the addition of an access road corridor along the northern property boundary, consisting of degraded modified improved pasture within the high voltage transmission line corridor. Land within the existing concrete batching plant has been extensively modified and does not provide suitable habitat for any native flora species.

Suitable habitat and threatened flora species presence were identified near the southeastern corner of 1 Crooked Billet Drive, which informed an updated the site layout to avoid potential impacts to significant natural values. Following confirmation of a Basalt guineaflower (*Hibbertia basaltica*) population in a small patch of remnant native grassland (Figure 37), the site layout was updated to the currently proposed location near the northern boundary of 1 Crooked Billet Drive and southern boundary of 13 Crooked Billet Drive. The updated project footprint consists exclusively of modified land with little potential for threatened flora species occurrence. Subsequent field surveys did not identify any threatened species or likely habitat within the new proposed footprint.

Threatened fauna

Native fauna species presence was confirmed within the southern area of 1 Crooked Billet Drive, south of the proposed new project footprint. One Eastern barred bandicoot (*Perameles gunnii*) carcass (listed as vulnerable under the EPBC Act, not listed under TSP Act) and a collection of wombat (*Vombatus ursinus tasmaniensis*) scats were identified near an internal paddock fence south of the existing operations and proposed new project footprint.

The proposed project footprint includes a small area (<1ha) of foraging habitat that may be utilised by threatened fauna species including the Eastern barred bandicoot. Evidence of species presence was recorded with an Eastern barred bandicoot carcass observed during the site survey, located south of existing operations and outside of the proposed project footprint.

The proposed project footprint provides a small area of low-quality foraging habitat, bordering existing industrial activity, with no cover provided by native vegetation or thicket-forming weeds. Proposed development impacting <1ha of transmission line easement, lacking sheltering vegetation and maintained with regular slashing, does not constitute a significant negative impact to local populations of Eastern barred bandicoot and therefore does not require referral under the EPBC Act.

Although not listed as a threatened species, wombat scats were found around a scrap pile located in the southern area of 1 Crooked Billet Drive, which may provide potential above-ground denning or day shelter habitat (Figure 38). This area will not be impacted as the plant footprint has been relocated to the north of the property.

No significant native fauna habitat was observed within the proposed project footprint.

The proposed asphalt plant footprint is located primarily within the existing cleared industrial site, surrounded by existing built infrastructure. The presence of surrounding roads, Midland Highway, railway line, fences and buildings create physical barriers that impede wildlife movements. Very few scats and minimal grazing pressure apparent in unmaintained areas suggest that native fauna abundance across the property is very low. No evidence of dasyurid or other threatened fauna species presence was observed within the proposed project footprint.

Raptor nests

No raptor nests were recorded within relevant proximity to the project area. The site and immediate surrounds do not provide potential nesting habitat, with potential low-quality foraging habitat present.

The construction and operation of the proposed asphalt plant is not expected to result in a significant negative impact to any raptor population.

Swift parrot

The project site at 1 Crooked Billet Drive and 13 Crooked Billet Drive is located within the swift parrot core range, though natural values with potential to be impacted at the site present no reasonable habitat value for the species. No native vegetation communities or significant food resources are present within the proposed project footprint. Six Tasmanian blue gum trees were identified in the south eastern corner of the property (1 Crooked Billet Drive). The trees are not located in the new project footprint and will not be impacted by the proposed project.

Figure 38. Location of potential den in scrap timber pile

5.7.3.3 Weed assessment

Several declared weed species were identified at the property, both within and adjacent to the proposed project footprint.

Weeds observed include declared weed species likely introduced to the site from historic land use or site landscaping. Signs of recent works near the existing car park area include establishment of drains, leveling uneven ground and movement of topsoil for ground cover or vegetative buffers.

Declared weed species identified within the surveyed area include:

- African boxthorn (*Lycium ferocissimum*) is a declared weed in Tasmania and was identified at multiple sites on the property. This species is a Weed of National Significance (WONS)
- Boneseed (*Chrysanthemoides monilifera ssp. Monilifera*) was observed south of the project footprint. This species is a declared weed in Tasmania, and a WONS
- Blackberry (*Rubus fruticosus agg.*) is widespread, including much of the western property boundary fence. Blackberry is a declared weed in Tasmania and a WONS
- Fennel (*Foeniculum vulgar*) is a declared weed in Tasmania and was identified near the project footprint
- Hairy fiddle-neck (*Amsinckia calycina*) is a declared weed in Tasmania and was identified within the project footprint
- One willow tree (*Salix sp*.) is present south of the project footprint. Willows are declared weeds in Tasmania and a WONS.
- White horehound (*Marrubium vulgare*) was observed at several points. This species is a declared weed in Tasmania.

Observations of declared weed species are mapped in Figure 39.

Measures should be implemented to prevent proliferation of weed species at this site and prevent transportation by machinery or vehicles. Avoidance and mitigation measures for weeds are provided in Section 5.7.4.5 and the weed management plan (Appendix 6).

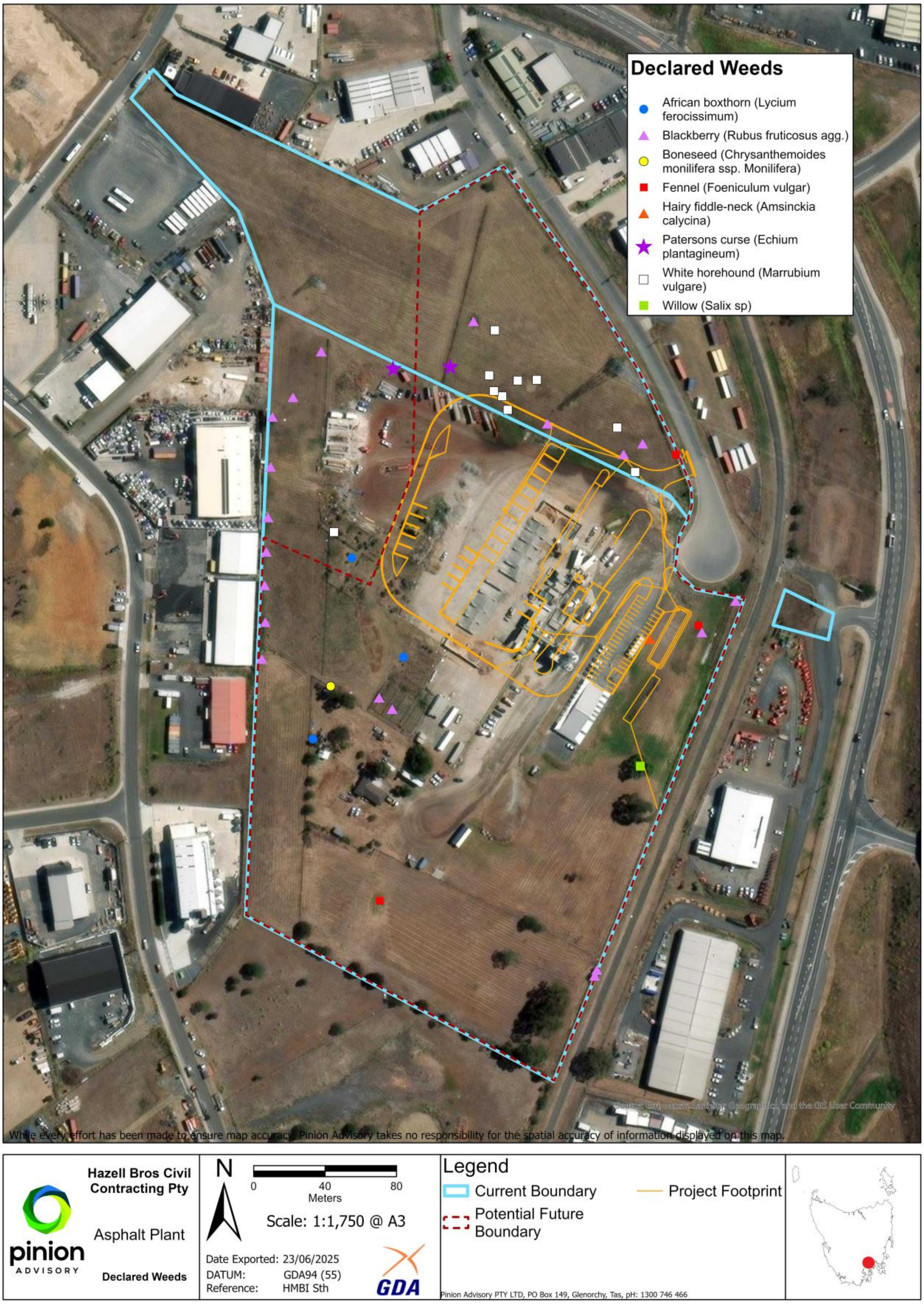


Figure 39. Declared weeds identified near the proposed project footprint

5.7.4 Avoidance and mitigation measures

5.7.4.1 Vegetation and threatened flora

The relocated project footprint was found to consist entirely of modified land, categorised under TasVeg 4.0 mapping unit Urban areas (FUR). A small (0.5ha) patch of Lowland *Themeda triandra* grassland (GTL) was identified at the southeastern corner of 1 Crooked Billet Drive but is located outside of the project footprint and therefore will not be impacted.

Identified losses to natural values from the proposed development will be minimal and will not result in a significant negative impact to any threatened flora species or native vegetation communities.

Although located outside the proposed project footprint but within the property boundary, it is recommended that an exclusion zone be established around the identified Basalt guineaflower (*Hibbertia basaltica*) population to prevent accidental damage or loss.

5.7.4.3 Threatened fauna

The modified land within the proposed project footprint presents little habitat value to native species, with degraded agricultural land or existing industrial land present across the majority of the property and surrounds. Modified land within the proposed project footprint supports a small area of potential low-quality foraging habitat only.

Degraded pasture within the maintained transmission corridor supports low-quality foraging habitat that may be utilised by native fauna, though the loss of <1ha of low-quality potential foraging habitat within an existing industrial zone will not result in a significant negative impact to any native fauna species.

5.7.4.4 Vehicle movements

Potential impacts resulting from increased vehicular movements during construction and operation of the proposed project are expected to be very low, given the existing high traffic volumes present on adjacent roads and the industrial land use of the surrounding area.

The proposed project will result in an increase in vehicle movements to and from the site, including overnight vehicle movements between dusk and dawn, though this is not expected to result in a significant increase in roadkill risk to native fauna. Road infrastructure in the immediate vicinity of the site supports a high level of vehicular activity at all hours of the day and night, with increased volumes directly resulting from the construction and operation of the proposed development insignificant in proportion to baseline traffic volumes.

The Midland Highway is situated approximately 100m east of the project footprint, separated by Glenstone Road and a rail corridor. Potential habitat is highly fragmented by existing infrastructure on all sides of the site boundary, with little habitat connectivity.

Based on the field assessment of potential habitat and roadkill records at the site and surrounds, it is expected that any native fauna potentially present would be at a low abundance and unlikely to be significantly impacted by expected increases to vehicular movements at the site.

5.7.4.5 Weed management

Declared weeds identified at the project site must be managed as required by obligations under the *Biosecurity Act 2019*. Several declared and non-declared weed species were observed within the project footprint and across the surrounding property.

Non-declared weeds were not included in the weed mapping, as presence throughout the degraded agricultural land and fence lines across the site was near ubiquitous.

The following mitigation measures will be implemented:

- A weed management plan has been developed for the site to control declared weed species and prevent the transport of weeds and diseases during construction and operation (Appendix 6). The plan has been developed in accordance with the Weed and Disease Planning and Hygiene Guidelines (DPIPWE, 2015).
- Areas where soil will be disturbed during construction should be monitored for weeds post excavation, with machinery hygiene measures designed to prevent the spread and proliferation of weed species.

Management commitments

Commitment	Details	Timeframe/due	Responsibility
16	An exclusion zone will be established around the identified Basalt guineaflower (*Hibbertia basaltica*) population to prevent accidental damage or loss.	Prior to site preparation and construction	Hazell Bros environmental manager
17	Implement the weed management plan to prevent the spread of weeds and transport of pathogens during construction and operation.	Prior to site preparation and construction	Hazell Bros environmental manager

5.8 GREENHOUSE GAS EMISSIONS, OZONE DEPLETING SUBSTANCES AND CLIMATE CHANGE

5.8.1 Existing environment

For the purposes of clarity, the following glossary is given for the terminology around greenhouse gas estimations (Table 43).

Table 43. Glossary for greenhouse gas terminology

Concept	Definition
Greenhouse gases	Gases that trap heat in the earth's atmosphere. They include: • Carbon dioxide (CO_2) • Nitrous oxide (N_2O) • Methane (CH_4) • Hydrofluorocarbons • Perfluorocarbons • Sulphur hexafluoride (SF_6) All gases are reported as CO_2-equivalents, that is, the equivalent mass of carbon dioxide that would create the same heating effect in the atmosphere. For instance, 1 tonne of nitrous oxide has the same heating effect as 198 tonnes of carbon dioxide. Only the first three gases (CO_2, N_2O and CH_4) are produced at the asphalt plant
Scope 1 emissions	These emissions are produced directly by an entity, and are the result of activities that an entity has direct control over (for example, the burning of diesel to heat bitumen in an asphalt plant)

Concept	Definition
Scope 2 emissions	These are the emissions resulting from electricity purchases and consumed by an entity within their facility
Scope 3 emissions	These are indirect emissions that result from activities of organisations other than the main entity but support the project. For instance, the greenhouse gases emitted in order to produce aggregate to supply an asphalt plant

5.8.2 Methodology

Estimations of greenhouse gas emissions for the construction phase were not completed because of the small amount of greenhouse gas emissions compared to the manufacture of asphalt product, and the difficulty of obtaining information on the carbon footprint of the materials for the Astec BG2200XL asphalt plant. Astec was contacted as a part of the assessment and asked for estimations of emissions for asphalt plant components but were unable to supply any data.

Greenhouse gas emissions were estimated for the operational phases. Because of the time frame to decommissioning, and the possibility of technological changes over that period, no estimation is made for the decommissioning phase.

The proposed asphalt plant will be primarily powered by natural gas but will also have the capability to use diesel fuel when required. Natural gas will be the main fuel source for the rotary dryer and will be used to dry and heat the aggregate material.

Note, the estimation of greenhouse gas emissions was based on the plant being powered 100% by diesel fuel (i.e. worst case scenario), instead of being powered by natural gas, which is proposed. This is considered a more conservative approach as utilising natural gas will result in overall lower greenhouse gas emissions. Electricity will also be used to power all the electrical motors and heating the bitumen tank.

5.8.2.1 Operations

To analyse the GHG emissions for the proposed asphalt plant, proposed annual inputs were provided from Hazell Bros.

Greenhouse gas emissions were then calculated by multiplying diesel, lime and electricity inputs by emissions factors from the Australian National Greenhouse Accounts Factors (Department of Climate Change, Energy, the Environment and Water (DCCEEW), 2023). This gave both Scope 1 (direct), Scope 3 (indirect) and Scope 2 (electricity) emissions. Emissions factors particular to Tasmania were used for electricity emissions, because of the unique electricity generation in Tasmania using hydro-electricity.

Emissions factors for indirect (Scope 3) emissions for aggregate, sand, RAP and bitumen were taken from Gruber and Hofko (2023).

Emissions factors used are presented in Table 44.

Table 44. Emission factors

Input	Scope 1	Scope 3	Reference
Diesel	2.71 t CO_2-e/kL	0.67 t CO_2-e/kL	DCCEEW, 2023
Natural Gas	2.03 kg CO_2-e/m^3	0.16 kg CO_2-e/m^3 (note, estimate for Victoria, Tas not available)	DCCEEW, 2023

Input	Scope 1	Scope 3	Reference
Hydrated lime	0	0.44 t CO_2-e/t	DCCEEW, 2023
Electricity	0.12 kg CO_2-e/kWh (Scope 2)	0.01 kg CO_2-e/kWh	DCCEEW, 2023
Aggregate	0	2.51 kg CO_2-e/t	Gruber and Hofko, 2023
Sand	0	2.06 kg CO_2-e/t	Gruber and Hofko, 2023
RAP	0	0.37 kg CO_2-e/t	Gruber and Hofko, 2023
Bitumen	0	365 kg CO_2-e/t	Gruber and Hofko, 2023
Emulsifying agent	Estimates unable to be sourced	-	-

Estimations of emissions from transport of materials to the asphalt production site, and transport of materials from the asphalt production site to destinations was provided by using data and estimates from transport and facility operations.

Estimated distances for transporting raw materials is summarised in Table 45.

Table 45. Estimated distance for transporting raw materials

Product and source	Volume	Volume / trip	# trips	Km/trip (return)	Total km
Aggregate (Leslie Vale)	29,000t	33t	878.78	80.8	71,006
Sand (South Arm)	10,500t	33t	318.18	91.8	29,266
Hydrated lime (Mole Creek)	150t	29t	5	480	2,400
Bitumen (Selfs Point)	2,500t	29t	86.21	37.2	3,207
Emulsion (Selfs Point)	120,000L	25,000L	5	37.2	186
Diesel (Selfs Point)*	510,000L (510kL)	25,000L	20.4	37.2	758
Total					**107,223**

*Note, calculations assume worst case scenario conditions, i.e. that diesel fuel is used to power the asphalt plant (450kL/pa) and 60kL/pa for onsite machinery, total 510kL/pa. However, it is proposed to run the plant primarily on natural gas (to dry and heat the aggregate materials), with diesel used as a backup fuel only.

It is assumed that diesel is consumed at 0.36L/km (an average of 0.4L/km loaded and 0.32L/km unloaded for return trips).

Therefore, total litres of diesel consumed will be 107,223km x 0.36L/km = 38,600L.

Results were categorised by scope and phase.

5.8.2.2 Ozone depleting substances

Ozone depleting substances are present in solvents, refrigerants or foaming agents that could contain the following:

- Chlorofluorocarbons
- Hydrochlorofluorocarbons
- Hydrobromofluorocarbons
- Methyl bromide
- Halons
- Carbon tetrachloride
- Methyl chloroform.

No ozone depleting substances will be used to manufacture asphalt. Most ozone depleting substances have been phased out in Australia. Exceptions are methyl bromide as a quarantine fumigant and halons as fire suppression in confined spaces. These will not be used at the asphalt plant.

5.8.3 Assessment

5.8.3.1 Operational phase

An estimate of the annual greenhouse gas emissions given inputs to the production process are presented in Table 46. All amounts have been provided from Hazell Bros unless otherwise indicated.

Table 46. Estimate of annual greenhouse gas emissions from operations

Input	Amount	Scope 1 emissions (t-CO2-e)	Scope 3 emissions (t CO2-e)	Total emissions (tonnes - CO2-e)
Diesel for front end loader and fork lift	60,000L (60kL)	162.6	40.2	202.8
Hydrated lime	150t	0	66	66
Aggregate	31,500t	0	79.07	79.07
Sand	10,500t	0	21.63	21.63
Reclaimed asphalt pavements	5000t	0	1.85	1.85
Bitumen (asphalt binder)	2,500t	0	912.50	912.50
Electricity (for motors and bitumen tank)	490,000 kWh	59 (Scope 2)	0	59
Emulsion	120,000L	Emissions factor estimates unavailable	-	-
Natural gas	-	-	-	-
Power generation (diesel)*	450,000L (450kL)	1,219.5	301.5	1,521
Transport of materials to site (diesel)	38,600L (38.600kL)	0	25.9	25.9
Total		**1,382.1 + 59 (Scope 2)**	**1448.65**	**2889.75**

*Note, emission estimates have been based on a worst case scenario, i.e. emissions from diesel fuel have been used instead of natural gas. This is considered a conservative approach as natural gas will be the main fuel source to dry and heat the aggregate materials at the asphalt plant. Diesel will only be used as a backup fuel.

It is probable that the plant will remain operational for approximately 30 years, and could be upgraded during that time to improve efficiencies and lower greenhouse gas emissions. Greenhouse gas emissions over a 30 year time period are presented in Table 47.

Table 47. GHG emissions estimate over a 30 year project lifespan

Operational emissions	Scope 1 (t-CO2-e)	Scope 2 (t-CO2-e)	Scope 3 (t-CO2-e)	Total (t-CO2-e)
Per annum	1,382.1	59	1448.65	**2889.75**

Operational emissions	Scope 1 (t-CO2-e)	Scope 2 (t-CO2-e)	Scope 3 (t-CO2-e)	Total (t-CO2-e)
30 year life	41,463	1,770	43,459	**86,693**

The additional information presented below has been included to address EPA feedback on the draft EIS (received December 2024).

5.8.3.2 Aggregate storage infrastructure

The facility will utilise a combination of permanent and semi-permanent storage bays for aggregate materials. Permanent storage will comprise six precast concrete bays, with walls up to three meters high and varying widths to accommodate different materials.

The bays will have concrete foundations and a 4% graded floor to facilitate drainage. Four of the permanent bays will be equipped with a roof structure and three-sided cladding to protect finer fraction materials—specifically washed sand, 5mm, 7mm aggregate, and crushed glass—from inclement weather and moisture (refer to Figure 40 and Figure 41). This design helps maintain material dryness, which is expected to reduce burner fuel consumption at the asphalt plant by up to 10% for every 1% reduction in combined raw material moisture.

Coarser aggregates, such as 10mm, 14mm, 20mm, and other high-friction aggregates, which are generally single-sized and free-draining, will be stored in open bays. Semi-permanent storage bays will have concrete floors and interlocking concrete block walls, based on current budgetary considerations. The front-end loader operating area will be sealed with asphalt and fitted with dust suppression sprinklers. Additionally, the entire site, including hardstand areas, will be regularly swept with a street sweeper to control particulate matter and maintain cleanliness.

Aggregate feeder bins for fine fraction materials will also feature roof covers to keep the material dry and is also expected to reduce burner fuel consumption (refer to Figure 42). The storage solutions are currently going through structural design and engineering.

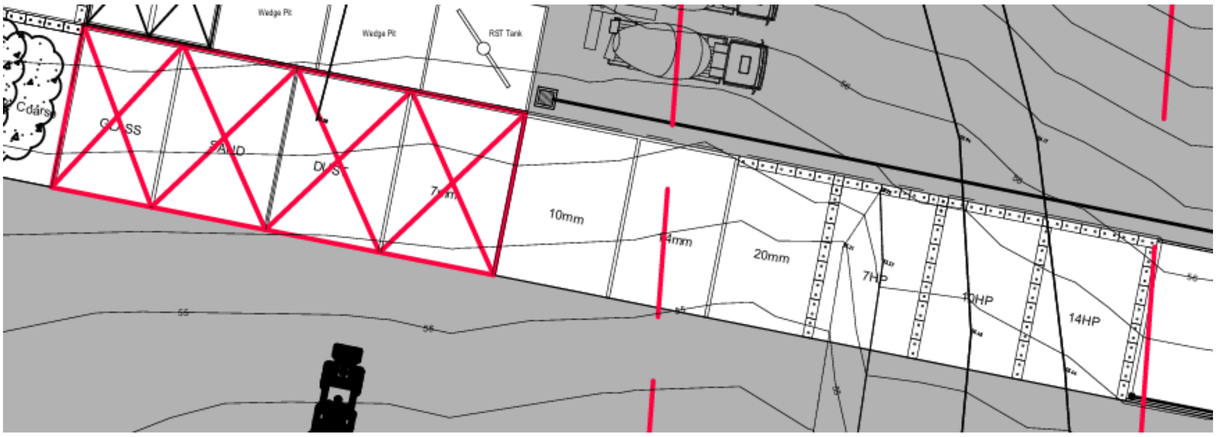


Figure 40. Aggregate feeder bins will have covered roofs to keep the material dry

Figure 41. Example of covered storage bays for fine aggregate fractions

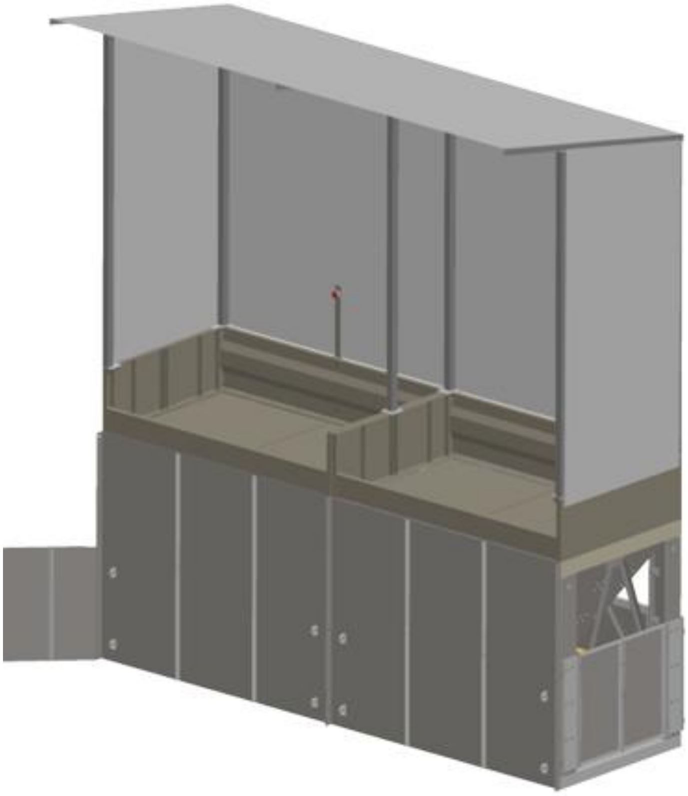


Figure 42. Example of covered roof over fine aggregate feeders

5.8.3.3 Fuel sources – diesel and gas

The primary fuel source for the asphalt plant will be natural gas, due to its ready availability onsite. Diesel will serve as a backup fuel source to ensure continuous operation. A switch to diesel may be considered in the future only if natural gas becomes uneconomical.

Tas Gas Networks is currently designing a new meter set for onsite installation to facilitate the natural gas connection. The main Tas Gas Network trunk line runs parallel to the adjacent railway corridor, providing accessible connection point. A 100mm IDPE pipe will be installed underground from the meter set to the burner device, with an above-ground connection to the burner.

Licensed contractors will handle all gas connections and installations. SRT Combustion Engineering, a national specialist in asphalt plant burner devices, will install and test the burner device. The Tasmanian Gas regulator will witness and sign off on this process. Three gas retailers are available to supply the natural gas to be consumed through the network; gas supply agreements with these retailers are commercial-in-confidence.

5.8.3.4 Long-term energy reduction strategy

The selection of the ASTEC plant reflects a commitment to energy reduction. The plant utilises the latest technology and has higher recycling capabilities than currently achievable in the Tasmanian market. For instance, it can incorporate up to 30% RAP, while the current market average is 10%. Increased RAP availability through landfill avoidance would allow for greater use of this recycled material, reducing the need for virgin materials. Additionally, the plant will use crushed glass from kerbside recycling as a natural sand replacement in certain asphalt mixes.

Looking ahead, there are emerging opportunities to further reduce energy consumption and GHG emissions over the next 30 years. The potential development of a hydrogen gas plant in Tasmania could allow for the incorporation of hydrogen gas into the natural gas network, providing a cleaner fuel source for asphalt plants. Additionally, the adoption of warm mix asphalt (WMA) technology, which lowers the typical asphalt mixing temperature from 165-170°C to 120-130°C, using warm mix additives, has the potential to significantly reduce burner carbon emissions. However, widespread adoption of WMA technology within the Tasmanian asphalt industry will be crucial to realising these benefits.

5.8.3.5 Climate change legislation and targets

The proposal is not likely to be impacted from climate change related events such as increased warming or other severe weather events.

Climate Change (State Action) Act 2008 (Tasmania)
The Act states that Tasmania's emissions reduction target is to achieve net zero greenhouse gas emissions, or lower, from 30 June 2030. The *Tasmanian Greenhouse Gas Emissions Report 2024* showed that in 2022, Tasmania's emissions were negative 4.34 Mt CO_2-e, and had decreased emissions from 1990 to 2022 by 23.88 Mt CO_2-e, mainly due to changes in the component of the account "land use, land use change and forestry" (LULUCF). Put simply, the changes in the way that Tasmania uses its forests have had a strongly positive effect on the greenhouse accounts since 1990. This development will not materially change Tasmania's emissions profile, but every attempt will be made to minimise emissions from the asphalt plant (section 5.8.4).

Tasmania's Climate Change Action Plan 2023-2025
One of the goals of this plan is the same as the legislation above, that is, to reach net zero emissions by 30 June 2030. As previously mentioned, this is well on track to be exceeded. One of the actions from the plan is "improving business resource efficiency". The approach for this is to continue to deliver the second Business Resource Efficiency Program to improve productivity and reduce waste and emissions of Tasmania's small to medium-sized businesses. Hazell Bros will endeavour to stay abreast of this program and implement where practicable. The recycling of up to 30% RAP (leading to less waste going to landfill) is also contributing to this goal.

Climate Change Act 2022 (Commonwealth)
The objective of this legislation is to reduce the net emissions of GHGs to zero by 2050 in Australia, and an annual account is prepared under the Act. This target is more

conservative than the Tasmanian one, and given Tasmania's current GHG accounting position, will likely be easily achieved. This project is not anticipated to have material effect on the target in the Commonwealth Act.

National Greenhouse and Energy Reporting Act 2007 (Commonwealth)
The Clean Energy Regulator has calculators to determine if organisations are required to report on this Act. The thresholds are 25,000 tonnes CO_2-e of GHG emissions, 100,000GJ of energy consumption or 100,000GJ of energy production per year. The proposed asphalt plant is well below these levels. It is also noted that bitumen does not require reporting for an asphalt facility because it is not combusted and not produced onsite (Clean Energy Regulator, 2023).

5.8.4 Avoidance and mitigation measures

The proposed asphalt plant will utilise cost-effective, best practice measures to minimise future greenhouse gas emissions. This includes the following:

1. Using dry aggregate to minimise fuel use for drying. This will depend on aggregate storage infrastructure onsite
2. Using natural gas instead of diesel to power the asphalt plant where possible.
3. Lowering the production temperature where possible. Depending on chemistry used, lower production temperatures may be used depending on availability of additives such as Recosol 185 to slow asphalt oxidation.
4. Increasing the use of RAP (hence less virgin materials required for production)
5. Reducing the use of virgin binder (bitumen) and replacing with bio-based binders where available.

Management commitments

Commitment	Details	Timeframe/due	Responsibility
18	Greenhouse gas emissions will be minimised by the following best practice measures: • Using dry aggregate to minimise fuel use for drying. • Using natural gas instead of diesel to power the asphalt plant where possible. • Lowering the production temperature where possible. • Increasing the use of RAP (hence less virgin materials required for production) • Reducing the use of virgin binder (bitumen) and replacing with bio-based binders where available.	Ongoing	Site/plant manager

5.9 SOCIO-ECONOMIC ISSUES

5.9.1 Existing environment

The proposed asphalt plant is located within the existing Bridgewater industrial area. The proposed plant is not out of character with surrounding development and is a strong match to the intent of the zoning as it stands.

5.9.2 Assessment

5.9.2.1 Capital investment, operational expenditure and revenue

The capital equipment is manufactured in India at Astec (a USA owned company) and will be transported to Australia in containers.

The production limit proposed is 50,000tpa, including 5,000tpa of recycled asphalt received and processed onsite.

5.9.2.2 Labour market and training opportunities

During the construction phase, approximately 12 construction personnel will be required for the site civil works and 15 personnel to erect the asphalt plant.

There will also be multiple supply streams of construction materials and people required for the project, including concrete supply, reinforcement, civil contractors, precast concrete panel supply, electricians and mechanical fitters.

There will be four staff during the operational phase, a part time production manager, plant operator, laboratory technician and loader operator. There will be four personnel on day shift and three on night shift as required.

5.9.2.3 Upstream and downstream industries

Upstream

The materials to be imported to the site include aggregate, sand, lime, RAP, emulsion and bitumen. The material type, source and amount are presented in Table 48.

Table 48. Summary of imported material, source and amount

Material imported	Source	Amount per annum
Aggregate	Hazell Bros Quarry, Leslie Vale and Boral Quarry, Flowery Gully	29,000 tonnes
Sand	Males Sand, South Arm	10,500 tonnes
Lime	Siebelco, Mole Creek	150 tonnes
Reclaimed asphalt pavements (RAP)	Various job sites and projects around Tasmania	5,000 tonnes
Bitumen	BP, Selfs Point, Hobart	2,500 tonnes
Emulsion	Supply not yet secured	Up to 120kL
Diesel	Various local suppliers	60,000L (for front end loader and forklift) + 450,000L (in the event that the plant needs to be powered by diesel fuel) =510,000L
Natural gas	Natural gas pipeline is adjacent to the boundary of the site (Tas Gas Networks)	Up to 375,000m^3

Downstream

At this stage the asphalt will be used for upcoming state and local government tendered works, private civil and driveway contractors, internal paving crews and cash sale customers. The plant will produce up to 50,000 tonnes of asphalt per annum. At an asphalt price of $150 per tonne, this would equate to revenue of $7,500,000 per annum.

5.9.2.4 Sourcing raw materials, equipment, goods and services

As per Table 48, the raw materials for asphalt production will be sourced locally.

The equipment for the asphalt plant will come from India and be transported by container to Burnie (https://www.astecindustries.com/about/about-us).

5.9.2.4 Impacts on local social amenity and community infrastructure

This proposed asphalt plant will have no impact on local social amenity and community infrastructure in either a positive or negative fashion. The proposed development helps to consolidate the standing of the industrial area, and there are adequate buffers to mitigate amenity impacts of dust or noise to the residents of Bridgewater.

There will be no material changes to the community demographics for this relatively small project.

The information and data from Section 2.5 shows that Bridgewater has a relatively young population, low levels of educational attainment, low levels of immigration and high unemployment, with most of the employed population in lower skilled occupations.

As unemployment levels in Bridgewater are higher than Tasmanian and Australian averages, maintaining and promoting local employment opportunities is important.

With the small workforce involved for the construction and operation of the plant, there may be a small demand for land and/or housing, depending on where the workers are domiciled, but nothing material at a macro level.

There will be a small addition to the gross regional product for the Brighton economy, and those economies that supply the raw materials for the plant.

There will not be any publicly funded subsidies or services to be relied upon for the construction or operation of the proposal.

At the time of writing, Hazell Bros has no information on the impact on local, state and federal government rate, taxation and royalty revenues.

5.10 FIRE RISK

5.10.1 Existing environment

There is the potential for a fire to start within the project area and escape the site, and for a fire to start away from the site and impact the project (e.g. bushfire or a fire from another industrial site).

Once constructed, the majority of the plant and project area will be dominated by hard stand and soft stand (e.g. gravel) areas. These areas are unlikely to contribute to spreading of fire on or off the site. The asphalt plant will be constructed from steel and non-combustible materials which is less likely to ignite in the event of a bushfire.

The Bridgewater Industrial Area is dominated by cleared land and therefore is likely to be a lower bushfire risk. The project is situated within the Hobart Fire Management Area which is managed under the Bushfire Risk Management Plan (2023).

5.10.2 Methodology

The project will be conducted in accordance with the following regulations:

- Work Health and Safety Regulations 2022

- Tasmanian Planning Scheme.

The project is located within the Tasmanian Planning Scheme's bushfire-prone areas overlay.

5.10.3 Assessment

Based on the types and quantities of materials stored and used onsite, the asphalt plant is not considered a 'Major Hazard Facility' as defined under Schedule 11 of the Work Health and Safety Regulations 2022. As a result, Hazell Bros is not required to implement specified fire risk controls for a Major Hazard Facility.

The rotary dryer is a drum with a controlled burner and flame which dries and heats the virgin materials to between 160 and 240 degrees Celsius dependant on the asphalt product being produced. The burner unit of the rotary dryer can be powered by natural gas or diesel. It is proposed to power the dryer with natural gas. The gas burner is located internally in the rotary dryer which is considered a controlled environment and will be certified by the relevant gas authority. The gas burner will be serviced and maintained by a licensed certified contractor.

The likelihood of a possible explosion onsite from the natural gas line is considered low. However, all safety precautions (e.g. auto shut-off/non return values) will be installed to prevent a natural gas explosion. All safety precautions and devices will be installed to relevant regulatory and Australian standards and signed off by the gas authority.

5.10.4 Avoidance and mitigation measures

Avoidance and mitigation measures to prevent and manage fire include:

- Hot works permits will be required for all hot work activities at the site. Hot work permits are a requirement at all Hazell Bros work sites
- Hazell Bros will provide all relevant firefighting equipment (e.g. fire extinguishers, hoses, etc).
- A 100mm reticulated fire main will be installed to ensure firefighting water is easily accessible onsite to extinguish fires
- A fire management plan will be developed for the asphalt plant and will consider the existing fire management plan for the concrete batch plant.
- All hazardous goods will be stored in accordance with relevant regulations, e.g. Work Health and Safety Regulation 2022
- Storage areas will be construct on hardstand material
- If required, any remaining grass vegetation around the site will be kept low to reduce potential ignition sources and fuel loads
- Hazell Bros will provide inductions and ongoing training for site personnel on fire management, as and when required.

Specific mitigation measures to prevent an explosion of the gas burner include:

- The gas-powered burner device used for heating and drying the aggregate material will be enclosed within a controlled environment.
- All components will comply with Australian Standards AS3814 and AS1375 and will be signed off by the Tasmanian gas regulator prior to operations.
- Routine maintenance and annual inspections will be conducted on the system by a suitably qualified contractor.

- Automatic shut off devices will be installed on the plant burner to shut down the burner in the event of a plant interruption, malfunction or change in pressure and/or temperature.

A bushfire hazard assessment report will be undertaken by a suitably qualified person and submitted to Brighton Council as a part of the development application for the project. The assessment will rate the bushfire attack level (BAL) and provide site-specific recommendations to be implemented at the site.

Management commitments

Commitment	Details	Timeframe/due	Responsibility
19	A fire management plan will be developed for the asphalt plant and will consider the existing fire management plan for the concrete batch plant.	Prior to operations	Site/plant manager

5.11 INFRASTRUCTURE AND OFFSITE ANCILLARY FACILITIES

All infrastructure required for the project will be contained within the site. The proposed asphalt plant is not expected to impact any existing infrastructure (e.g. roads, water or power infrastructure).

Power for the site will be supplied from the local electricity grid, with no offsite upgrades required. A 2,000 kilo-volt-amperes (kVA) electrical substation will be installed on the site.

The asphalt plant will be primarily powered by natural gas but will also have the capability to use diesel fuel when required. A natural gas connection will be installed from the TAS Gas Networks line that runs parallel to the Bridgewater railway line on the eastern boundary.

A 100mm reticulated fire main, 50mm potable supply and connection to the TasWater sewer system will be required. No trade waste will be produced and therefore connection to the sewer is not required. Stormwater runoff from the site will be collected and treated with Atlan stormsacks and a bioretention swale prior to discharge to an existing stormwater culvert drain to the east of the site.

A traffic impact assessment conducted by Traffic and Civil Services Pty Ltd (2025) (Appendix 1) determined that the project will have minimal impact on traffic safety and capacity. The existing road network will be able to cope with the estimated increase in traffic.

6 Monitoring and review

6.1 OVERVIEW

Proposed monitoring and reporting programs are summarised in Table 49.

Table 49. Proposed monitoring and reporting programs

Aspect	Frequency	Performance target
Water quality (Stormwater)	Pre-construction/baseline stormwater sampling at the proposed discharge point of the site.	ANZECC (2000) guidelines and permit conditions

Aspect	Frequency	Performance target
	Quarterly stormwater monitoring at the discharge point of the site. Sample to be collected after discharge from the bioretention swale	
Air emissions	Post commissioning air monitoring of the plant as stipulated by the EPA. Conducted post commissioning then every two years. Monitoring frequency to be determined by the EPA	Tasmanian air quality protection policy criteria and permit conditions
Noise emissions	Post commissioning noise monitoring of the plant as stipulated by the EPA. Conducted post commissioning then every two years. Monitoring frequency to be determined by the EPA	Tasmanian noise regulations criteria and permit conditions
Weed monitoring and control program	Annual (and as required)	Prevent the spread of declared weeds
Site environmental inspections (internal)	Monthly	-
Site environmental audits (independent third-party auditor)	Routine audits at a frequency determined by a risk-based approach, consistent with Hazell Bros internal audit schedule	ISO 14001/9001 requirements

All environmental monitoring programs will be regularly reviewed and updated on an as needs basis. Results and recommendations from the monitoring programs will be reported to the EPA as a part of an Annual Environmental Report.

6.2 WATER QUALITY MONITORING

The ANZECC Guidelines for Fresh and Marine Water Quality (2000) have been consulted to establish site specific trigger values for stormwater discharge quality to the receiving natural waters.

The default trigger values for 90% species protection in freshwater have been adopted as the site is in an industrial area, with ephemeral highly modified waterways which are unlikely to support life.

It is possible that some of the compounds to be tested are already present in the receiving environment at elevated concentrations, due to the presence of other industrial operations that are likely to be discharging to the same receiving waters.

In addition, trigger values are not specified for total recoverable hydrocarbon fractions, however these are considered important indicators of the presence of petroleum hydrocarbons in stormwater discharged from the site. These analytes will be included in the monitoring program to identify any potential increasing trend.

It should be noted that the proposed water quality monitoring program for the site will capture both the proposed asphalt plant and the relocated dry concrete plant.

Recommended stormwater sampling analytes, frequency and trigger values are presented in Table 50 and Table 51.

Table 50. Recommended stormwater sampling analytes and frequency

Parameter	Unit	Frequency
Total Suspended Solids (TSS)	mg/L	Quarterly
Electrical Conductivity (EC)	µS/cm	Quarterly
pH	pH units	Quarterly

Parameter	Unit	Frequency
Total Recoverable Hydrocarbons (TRH)	mg/L	Quarterly
BTEXN	mg/L	Quarterly
Total nitrogen	mg/L	Quarterly
Total phosphorus	mg/L	Quarterly
Total metals – As, B, Cd, Cr (VI), Co, Cu, Pb, Hg, Ni, Zn	mg/L	Quarterly
Dissolved metals – As, B, Cd, Cr (VI), Co, Cu, Pb, Hg, Ni, Zn	mg/L	Quarterly

Table 51. Recommended stormwater sampling analytes and ANZECC (2000) trigger values

Parameter	Unit	Trigger value for freshwater 90% species protection
Total Suspended Solids (TSS)	mg/L	40mg/L
Electrical Conductivity (EC) (Table 3.3.3)	µS/cm	125-2200
pH (Table 3.3.2)	pH units	6.5 to 8
Total Recoverable Hydrocarbons (TRH)	mg/L	Nil
BTEXN	mg/L	Nil
Total nitrogen (Table 3.3.2)	mg/L	500µg/L
Total phosphorus (Table 3.3.2)	mg/L	50µg/L
Total metals (Table 3.4.1)		
As	mg/L	94µg/L
B	mg/L	680 µg/L
Cd	mg/L	0.4µg/L
Cr (VI)	mg/L	6µg/L
Co	mg/L	No value, data deficient
Cu	mg/L	1.8µg/L
Pb	mg/L	5.6µg/L
Hg	mg/L	1.9µg/L
Ni	mg/L	13µg/L
Zn	mg/L	15µg/L

6.3 AIR AND NOISE EMISSION MONITORING

Air and noise emission testing will be conducted after plant commissioning. Testing will be conducted within a three-month period, with the results provided to the EPA in a timely manner.

Following the initial testing, air emission monitoring from the stack will be conducted every two years or as required. In addition, as part of the plant prestart procedure, daily visual inspections of the exhaust stack plume are carried out to identify any visual signs of particulate matter.

Fluorescent dust dye testing will also be conducted on a quarterly basis as part of the routine operation and maintenance program. Fluorescent powder is released into the exhaust airstream of the bag house filter, the plant is then shut down and isolated, and each chamber of the bag house filter is inspected for any signs of leakage within the bag filters. The fluorescent dust highlights any leaks within the exhaust system.

6.4 WEED MONITORING

Annual weed monitoring will be undertaken within the property boundary and project site to identify existing weed infestations, and if any follow-up controls or treatments are required. This will coincide with the period of peak weed growth (i.e. late spring) and will allow for early identification of weed species before they reach the flowering stage. Any weed infestations identified during these annual checks will be assessed and the appropriate weed control measure will be implemented.

Routine monitoring and follow-up spraying programmes will ensure that weed species are significantly minimised at the site. Weed management strategies and monitoring programs will be regularly reviewed and updated on an as needs basis (i.e. if a significant weed outbreak is identified).

Management commitments

Commitment	Details	Timeframe/due	Responsibility
20	Proposed monitoring and reporting programs for water quality, air, noise and weeds will be implemented as per Table 49 of the EIS	Prior to site preparation and ongoing	Site/plant manager

7 Decommissioning and rehabilitation

The proposed asphalt plant will have an operational life of up to 30 years. Therefore, no decommissioning or rehabilitation activities are currently planned as plant operations will be ongoing.

In the event that operations cease at the plant, Hazell Bros will be responsible for the safe and effective decommissioning of the site. If required, this may include, but not be limited to, the removal of all site infrastructure, equipment and raw materials and if required, recontouring the land to a safe and acceptable profile.

All decommissioning activities conducted at the site will comply with all relevant statutory and legal obligations.

If plant operations are discontinued, a decommissioning and rehabilitation plan would be developed for the site in consultation with the relevant regulatory authorities.

The plan would address the following key components:

- Decommissioning and rehabilitation principles
- Site clean up
- Site preparation
- Erosion and drainage control
- Site access roads
- Soil stabilisation, revegetation and weed control
- Ongoing monitoring and maintenance.

8 Management measures

A summary of the proposed management measures is presented in Table 52.

Table 52. Proposed management measures

Commitment	Details	Timeframe/due	Responsibility
1	During the construction phase, Hazell Bros will implement dust management measures to reduce dust emissions	Construction	Site/construction manager

Commitment	Details	Timeframe/due	Responsibility
2	A baghouse filter will be installed over the dryer to reduce dust emissions	Prior to operation	Site/operations manager
3	An activated carbon filter will be installed to remove odorous compounds and VOCs from venting the bitumen tanks	Prior to operation	Site/operations manager
4	To reduce particulate matter emissions the following measures will implemented: • All conveyors will be enclosed • All roads will be paved • Bunkers will be installed to reduce wind erosion from stockpiles	Prior to operation	Site/operations manager
5	A construction environmental management plan (CEMP) will be prepared for the site which addresses stormwater management during the construction phase	Prior to construction	Site/construction manager
6	Monitoring of erosion and sediment controls	Daily during construction	Site/construction manager
7	Monitor stormwater downslope of the bioretention swale	Quarterly	Site/operations manager
8	Regular inspection of bunds, drains, storm sacks, detention pond and bioretention swale	Monthly	Site/operations manager
9	The front-end loader servicing the asphalt plant is to be fitted with a broadband reversing alarm	Prior to operations	Site/plant manager
10	The exhaust stack is to be fitted with an acoustic silencer achieving an insertion loss of 10dB	Prior to operations	Site/plant manager
11	The bucket elevators servicing the asphalt plant are to be attenuated such that a minimum 6dB reduction is achieved compared to the sound power level previously shown in Table 36. This may be achieved by screening the equipment, installing motors within acoustic enclosures, or selecting quieter models	Prior to operations	Site/plant manager
12	Spills will be promptly contained and cleaned up using dedicated quick response spill containment equipment	Ongoing	All site personnel
13	Personnel will be trained in spill response, containment, clean up and reporting during site-specific onsite inductions and ongoing refresher course	Ongoing	All site personnel and licenced contractor
14	Recyclable materials e.g. plastic, cardboard and steel will be separated into dedicated bins before being taken to an approved waste transfer station. Front lift bins will be used to collect and store general/non-recyclable waste at the site prior to regular disposal at an approved waste transfer station by a licensed contractor	Ongoing	All site personnel and licenced contractor
15	Daily visual checks and weekly activity logs will be used to record and track clean-up activities at the site	Ongoing	All site personnel and licenced contractor
16	An exclusion zone will be established around the identified Basalt guineaflower (*Hibbertia basaltica*) population to prevent accidental damage or loss	Prior to site preparation and construction	Hazell Bros environmental manager
17	Implement the weed management plan to prevent the spread of weeds and transport of pathogens during construction and operation	Prior to site preparation and construction	Hazell Bros environmental manager

Commitment	Details	Timeframe/due	Responsibility
18	Greenhouse gas emissions will be minimised by the following best practice measures: • Using dry aggregate to minimise fuel use for drying. • Using natural gas instead of diesel to power the asphalt plant where possible. • Lowering the production temperature where possible. • Increasing the use of RAP (hence less virgin materials required for production) Reducing the use of virgin binder (bitumen) and replacing with bio-based binders where available	Ongoing	Site/plant manager
19	A fire management plan will be developed for the asphalt plant and will consider the existing fire management plan for the concrete batch plant	Prior to operations	Site/plant manager
20	Proposed monitoring and reporting programs for water quality, air, noise and weeds will be implemented as per Table 49 of the EIS	Prior to site preparation and ongoing	Site/plant manager

9 Conclusion

Hazell Bros is proposing to construct and operate a new asphalt plant and reclaimed asphalt pavement (RAP) processing facility at 1 and 13 Crooked Billet Drive. It is proposed that 50,000tpa of asphalt will be produced and approximately 5,000tpa of RAP will be received and processed onsite.

A wet and dry concrete batching plant is currently located on the existing site (1 Crooked Billet Drive). The wet concrete batching plant is proposed to be decommissioned and removed in late 2025.

The dry concrete batching plant will be relocated to the west of the site (next to the proposed asphalt plant) at the end of 2025 (pending council approvals) which will improve site access, plant operations and safety. It is proposed to operate the existing dry concrete batch plant and new asphalt plant simultaneously.

The proposed project site (1 and 13 Crooked Billet Drive) is located on (and surrounded by) land zoned as 'general industrial'. The area is highly disturbed and modified from historical agricultural and industrial activities.

The proposed asphalt plant has been designed on the best available technologies for asphalt production and recycling and will cater for current and future volumes of asphalt mixing and storage capacity. The plant is capable of recycling up to 30% RAP (based on available data). However, it is expected that up to 10% RAP could be included in the asphalt production leading to less waste sent to landfill. The plant will also have the capacity to integrate other recycled products such as crumbed rubber and crushed glass.

Environmental impact assessment shows that key issues for the project include air quality, water quality, noise and dust.

The proposed commitments demonstrate that appropriate management measures can be implemented to avoid and/or minimise potential impacts or risks to public health and the environment. As a result, environmental impacts are expected to be low.

In seeking to develop the asphalt plant, the company is aligning itself with future asphalt demand and will continue to support the region's future development.

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Appendix 1 Traffic impact statement

1st August 2025

1 Cooper Crescent
Riverside TAS 7250
M: 0456 535 746
P: 03 6334 1868
E: Richard.burk@trafficandcivil.com.au

Mr Simon Jordan
Project Manager

Hazell Bros Group Pty Ltd

Dear Simon,

TRAFFIC IMPACT STATEMENT FOR CONCRETE BATCH PLANT RELOCATION AND PROPOSED ASPHALT AND RECLAIMED ASPHALT PAVEMENT PLANT AT 1 & 13 CROOKED BILLET DRIVE, BRIDGEWATER

This traffic impact statement assesses the proposed access to 1 & 13 Crooked Billet Drive in terms of traffic engineering principles, the Tasmanian Planning Scheme – Brighton and Department of State Growth (DSG) guidelines:

- site inspection, review of sight distances and the speed environment,
- consideration of property access requirements,
- consideration of traffic safety for all road users.

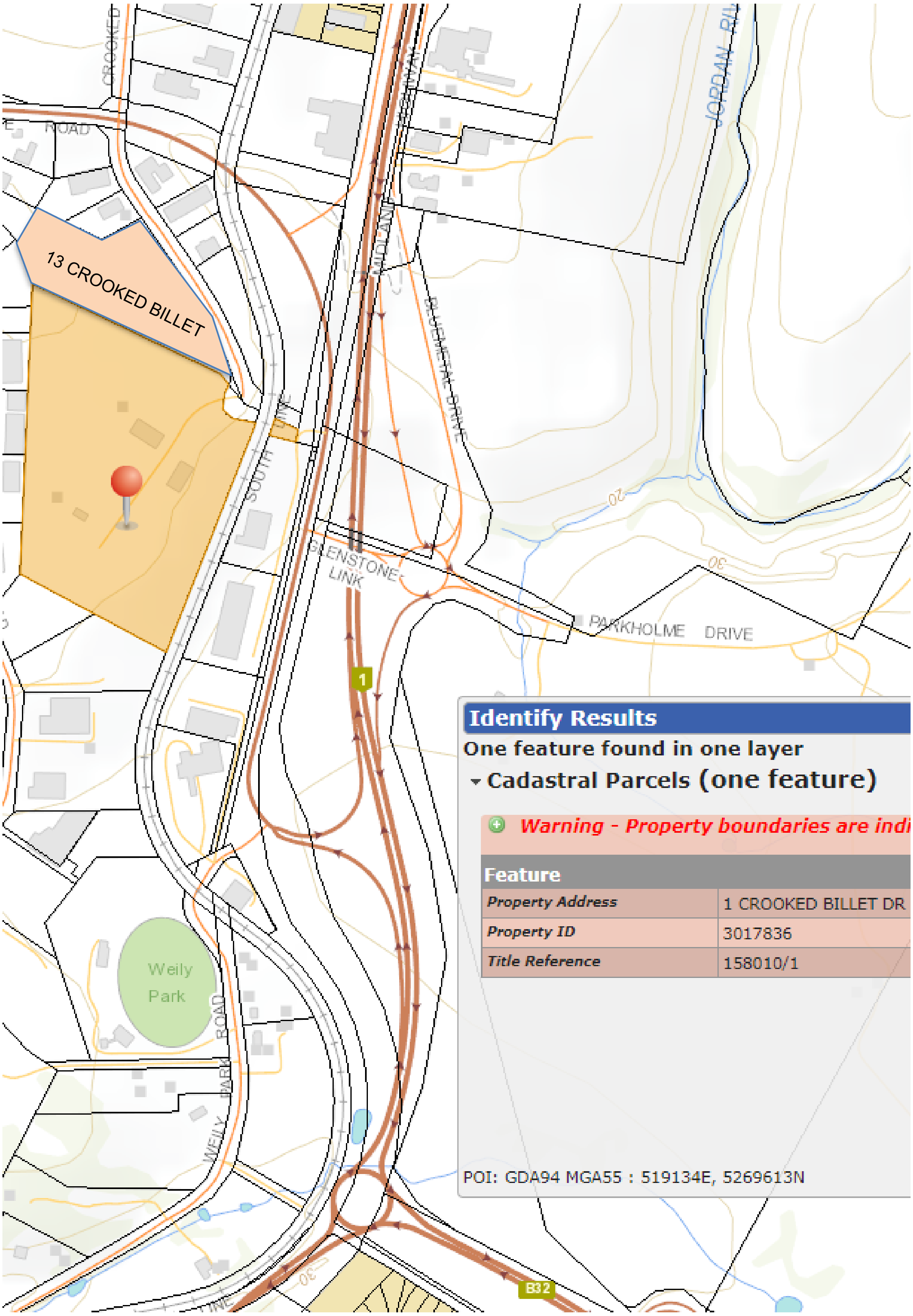
1) Background

The proposal is to construct an asphalt plant and recycle asphalt pavement processing facility and relocate the concrete batch plant.

2) Site Description

1 & 13 Crooked Billet Drive is located at the Southern end of the road some 350m South of the Glenstone Road intersection and 1km from the Glenstone Southern Interchange on the Midlands Highway, see Figure 1 and 2. The land is cleared with a large level hardstanding area situated on natural topography with some 3-5 % crossfall across the site. Access is to the property is via a 12m wide crossover and 32.5m diameter Cul-De-Sac at the Southern end of Crooked Billet Drive.

Figure 1- 1 & 13 Crooked Billet Drive, Bridgewater



Source: LISTmap

Figure 2 – Aerial view of 1 & 13 Crooked Billet Drive, Bridgewater

Source: LISTmap

3) Proposal

3.1 Description of Proposed Development

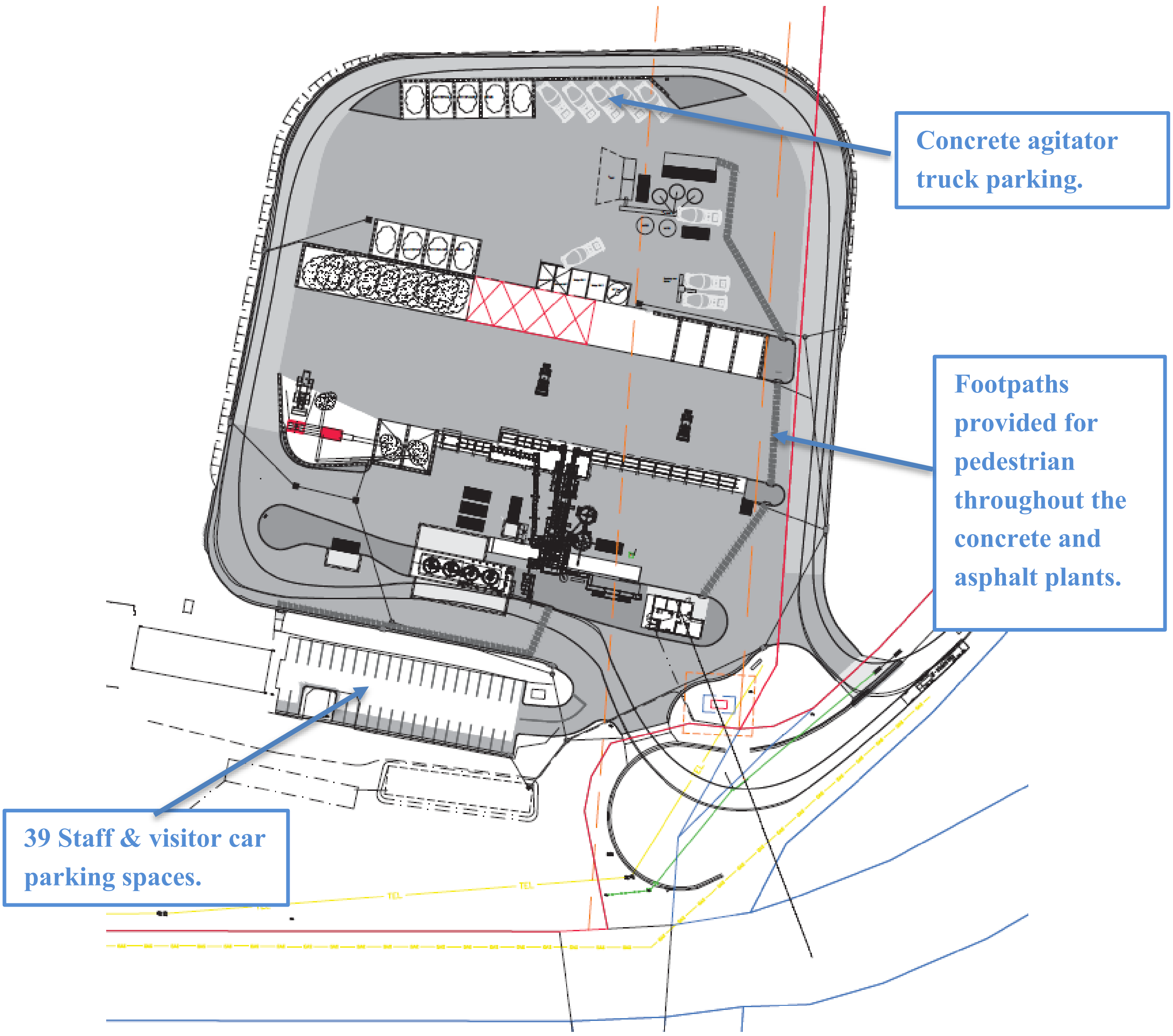
The proposal is to construct an asphalt plant and recycle asphalt pavement processing facility in front of the relocated concrete batch plant.

Estimated production is:

- Concrete batch 20,000 m3 pa.
- 50,000 tpa of asphalt which includes 5,000 tpa of reclaimed asphalt

Figure 3 shows the proposed plant layouts. See Appendix A for full site layout plans. Detailed Survey Plans are attached in Appendix G.

Figure 3.0 – Overall proposed plant layout



3.1.1 Relocated Concrete Batch Plant (20,000m3 **pa)**

Figure 2 shows the existing plant location. See Appendix A for full site layout plans. Detailed Survey Plans are attached in Appendix G.

A - Raw materials truck traffic:

1,061 truck entry movements pa & 2,122 truck movements pa in total. See Appendix A.1.1.

This equates to 44 truck movements /week or **9 truck movements /day** or 1 vph (delivery and return)

B - Concrete truck traffic:

Production rate of 20,000m3 pa i.e. 83m3/day

Load size affects traffic generation as per the following table.

Load Size	Loads	Trips	
(m3)	(day)	(day)	(hour)
6	14	28	4
3	28	56	8
1	83	166	24

e.g. 83m3 / 6m3 = 14 loads / day

or **28 agitator truck movements/ day** (delivery and return)

C- Light traffic:

12 car parking spaces are provided to cater for:

- 2 spaces for batch plant operators
- 6 spaces agitator truck drivers
- 4 spaces for visitors

Staff arrival & departure for 12 space car park i.e **24 movements/day or 3vph.**

In total the estimated concrete plant traffic is:

- **61 vpd or 8 vph (6m3 average concrete loads) or**
- **199 vpd & 28 vph (1m3 average concrete loads).**

3.1.2 Residence at 1 Crooked Billet Drive

There is a residence at 1 Crooked Billet Drive, see Figures 3.1 & 3.2.

The residence functions as a caretaker's residence and demolition of the building is planned at an appropriate time.

Residential access is provided, see Figure 3.3, also so Appendix A.2.7.

The caretaker's residence is estimated to generate some 6 vpd or 1 vph and has no impact on the proposal.

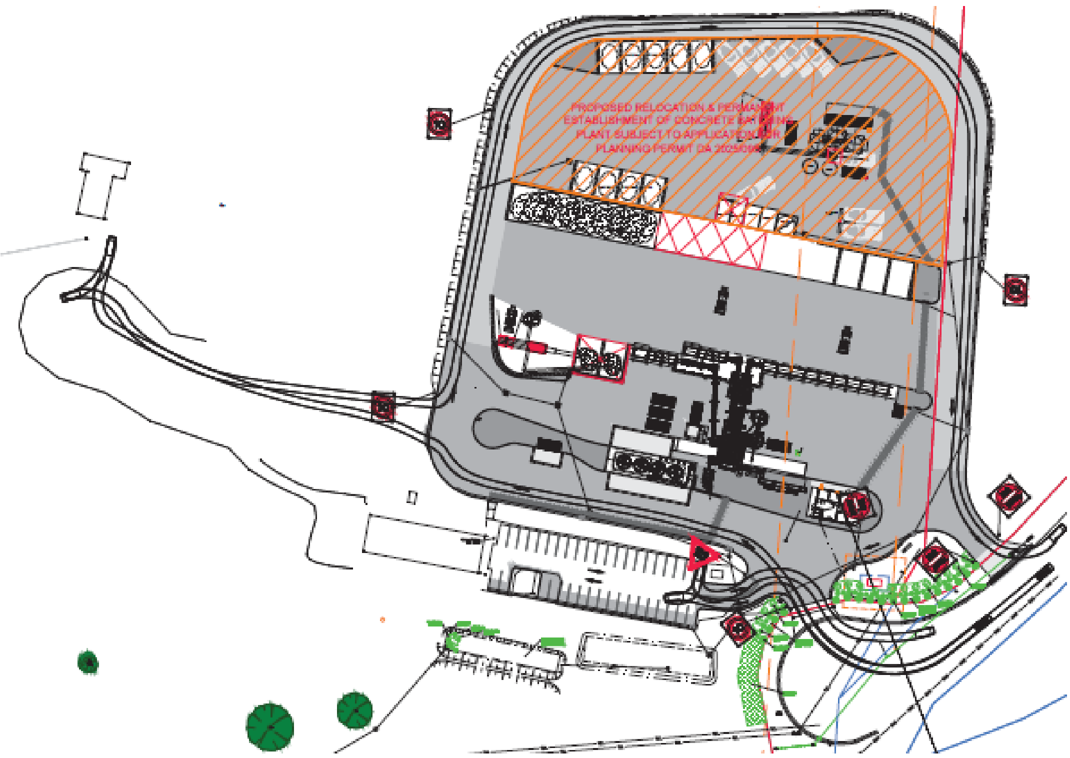
Figure 3.1 – 1 Crooked Billet Drive residence

Source: LISTmap

Figure 3.2 – 1 Crooked Billet Drive residence

Source: LISTmap

Figure 3.3 – 1 Crooked Billet Drive residence



3.1.3 Proposed Asphalt Plant (50,000 tpa)

A - Raw Materials Truck Traffic

Most incoming aggregate materials will be from the Hazell Bros. Leslie Vale Quarry.

Imported/receival:
- 58.5% of total Incoming Raw Materials 29,250 tpa hard rock agg. in 33 tonne deliveries from HB Quarry Leslie Vale **i.e 886 truckloads pa.**

- 10,500 tpa of fine washed sand in 33 tonne deliveries; from Males Sand- South Arm **i.e. 318 truckloads pa.**

- 2,500 tpa of hard rock aggregate from Boral Quarry Flowery Gully- High PAFV Aggregate in 42 tone deliveries **i.e 60 truckloads pa.**

- 150 tpa of hydrated lime in 29 tonne Pneumatic Semi Tankers deliveries; Sibelco Mole Creek **i.e. 5 truckloads pa.**

- 2,500 tpa of bitumen in 29 tonne deliveries, BP Self's Point- Hobart **i.e 86 truckloads pa.**

Proposed Reclaimed Asphalt Pavement (RAP) Processing Facility (5,000 tpa of RAP will be received & processed onsite)

Imported/receival:
- Hazell Bros. will re-use any asphalt plant waste- which is blended with RAP material, processed and re-used- zero waste stream exiting the site. **i.e 100 truckloads pa. of reclaimed material.**

Exported/dispatched:
- 5,000 tpa of processed RAP used in the manufacture of asphalt on site and is therefore dispatched.

Emulsion:
- Up to 120,000 litres of Bulk Emulsion is received onto the site PA, in 25,000 litre semi tank deliveries, the product is then stored in 1 x 30,000 litre horizontal self-bundled container tank.
The Emulsion product is used for internal sealing crews as tac coat, and available to customers in bulk form. **i.e 5 truckloads pa.**

Diesel:
- up to 450,000 litres of Diesel PA will be received into the facility as a burner fuel and for refueling of internal mobile plant and equipment- Front End Loader Only
Diesel will be received via 25,000 litre semi road tanker deliveries up to 2 deliveries per Month Maximum

Diesel will be stored within a SFL self-bundled containerized above ground diesel tank, complete with Pump Bay adjacent to the pump bay will be a small hardstand area with roll over bund for refueling of the front-end loader which will occur approximately 3 times per week. Diesel qty dependent on if Natural Gas is adopted as primary burner fuel source. If so, the annual volume would drop to 50KL PA for loader use only.

i.e 18 truckloads pa.

Raw materials truck traffic delivered to site is 1,478 tpa & 2,956 truck movements pa in total**.** See Appendix A.2. **This equates to 12 vpd.**

B – Asphalt Truck Traffic

The proposed asphalt plant is estimated to produce 50,000 tpa delivered in 30t loads which equates to 1,666 truckloads pa & 3,333 asphalt truck movements pa in total. **This equates to 14 vpd.**

C – Light Traffic

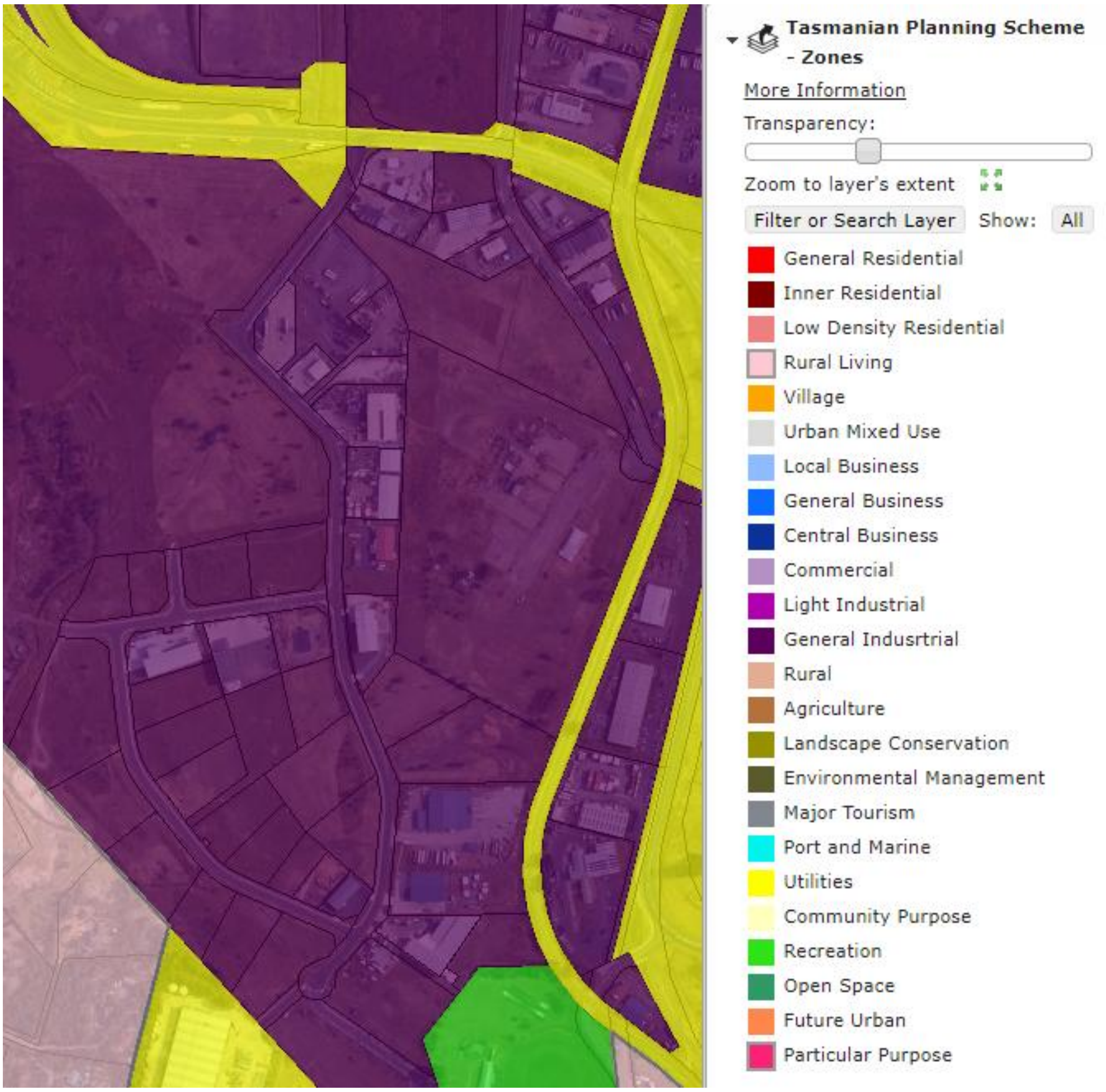
4 employees are proposed to operate the plant requiring 4 car parking spaces and generating some **10 vpd.**

In total the estimated asphalt plant traffic is 36 vpd or 5 vph.

3.2 Tasmanian Planning Scheme – Brighton

Development site zoning for 1 & 13 Crooked Billet Dr is shown in Figure 4.

Figure 4 – 1 Crooked Billet Drive is zoned General Industrial



Source: LISTmap

3.3 Local Road Network Owner Objectives

Brighton Council's objectives are to maintain traffic safety and transport efficiency on the Council Road network.

3.4 State Road Network Owner Objectives

The Department of State Growth (DSG) objectives are to maintain traffic safety and transport efficiency on the State Road network.

4) Existing Conditions

4.1 Midlands Highway

Midlands Highway is a Category 1 Trunk Road in the State Road Hierarchy and part of the Tasmanian 26m B Double Network, see Appendix B. The speed limit is 110km/h, and the road is built to a Category 1 standard with 2m sealed shoulders, 2*3.6m traffic lanes in each direction with a 3m wide median and flexible barrier fence. The road is well delineated with street lighting, audible edge lines, lane lines, rrpms & guideposts. The Highway itself does not have footpaths, but pedestrian facilities are provided on the adjacent service roads.

4.2 Glenstone Road Interchanges

Glenstone Road access to the Midlands Hwy is available at Interchanges at the Northern and Southern end of the Brighton Transport Hub.

The Northern Glenstone Interchange, see Figure 5, is some 1.6km north of the Southern Glenstone Interchange and expected to attract the least of the traffic generated by the proposal.

Figure 5 – Glenstone Road Northern Interchange

Source: LISTmap

The Southern Glenstone Interchange, see Figure 6, is closest to 1 & 13 Crooked Billet Drive and expected to attract most of the traffic generated by the proposal.

Figure 6 – Glenstone Road Southern Interchange

Source: LISTmap

4.3 Glenstone Road

Glenstone Road is a Category 2 Freight Route in the State Road Hierarchy and part of the Tasmanian 26m B Double Network, see Appendix B. The speed limit is 60km/h, see Figure 7, and the road is built to a Category 2 standard with 1.5m sealed shoulders and 3.7m traffic lanes in each direction. The road is well delineated with a median turn lane and edge lines. The road has a footpath one side.

Figure 7 – Glenstone Road Southern approach to Crooked Billet Drive Intersection

4.4 Crooked Billet Drive

Crooked Billet Drive is a sealed rural access road either side of Glenstone Road and a No Through Road to the North and South. Crooked Billet Drive is part of the Tasmanian 26m B Double Network, see Appendix B. The speed limit is 50km/h, and the road has a relatively straight alignment with a sealed width of 8m. There are no footpaths.

4.5 Glenstone Road / Crooked Billet Drive intersection

The Glenstone Road / Crooked Billet Drive intersection and approaches are shown in Figure 8. Glenstone Road has right turn lanes for accessing Crooked Billet Drive.

Figure 8 – Aerial view of Glenstone Rd / Crooked Billet Dr int.

Source: LISTmap

4.6 Lot 1 - 1 Crooked Billet Drive Access

Figures 9 - 14 show the access alignment and approaches.

Figure 9 – Aerial view of the access to 1 & 13 Crooked Billet Drive

Source: LISTmap

Figure 10 – Elevation of access to 1 & 13 Crooked Billet Drive

Figure 11 – Approach to 1 & 13 Crooked Billet Drive

Figure 12 – Looking left along Crooked Billet Dr from access

Sight distance left is 80m.

Figure 13 – Access approach to Crooked Billet Drive

Figure 14 – Access approach to Crooked Billet Drive

4.7 Traffic Activity

Traffic activity levels are summarised as follows:

- Midlands Highway estimated AADT at Glenstone Road is 24,740 vpd (2021), see Appendix C. Capacity of this road is > 60,000 vpd.

- Glenstone Road estimated AADT near Crooked Billet Drive is 3,373 vpd (2021), see Appendix C. Capacity of this road is 20,000 vpd.

- Crooked Billet Drive (South) estimated AADT is 145 vpd (2022), see Appendix D. Capacity of this road is > 5,000 vpd.

4.8 5 Year Reported Crash History

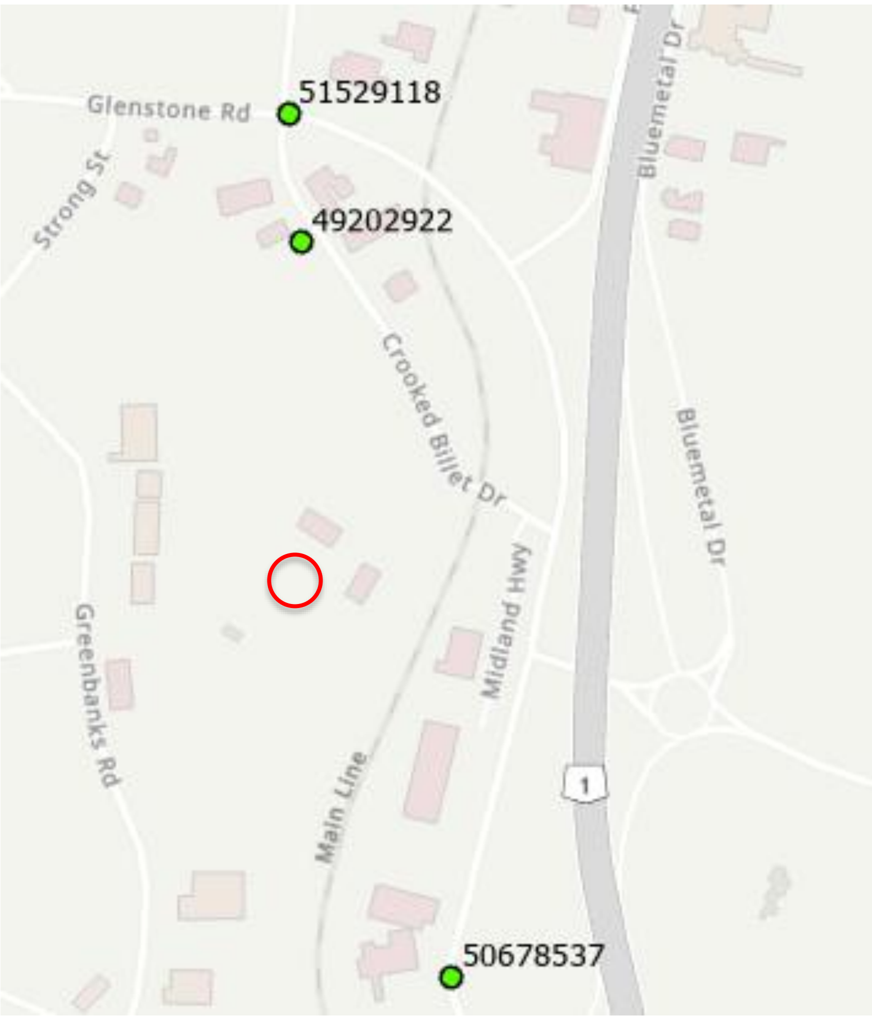
The 5 Year reported crash history indicates a property damage only crash at the Glenstone Road / Crooked Billet Drive intersection and a property damage only crash off road from Crooked Billet Drive, see Figures 15 and 16. The reported crash history does not indicate a crash propensity in the area or in the vicinity of the existing access to 1 Crooked Billet Drive.

Figure 15 – Crooked Billett Drive 5 Year Reported Crash History

Crash ID	Description	Date	Time	Severity	Light	Speed Limit	Location	Units
49202922	144 - Parking vehicles only	16-Apr-2018	13:00	PDO	Day	50	Off Crooked Billet Drive	HV & LV
50678537	184 - Out of control on carriageway	12-Jun-2020	17:20	PDO	Night	60	Glenstone Road	LV
51529118	n/a	22-Jan-2022	06:40	PDO	Day	60	Glenstone Rd. / Crooked Billet Dr. Int.	LV & HV

PDO	Property Damage Only
LV	Light Vehicle
HV	Heavy Vehicle

Figure 16 – Crooked Billet Drive 5 Year Reported Crash Locations



4.9 Road Safety Review

No road safety issues were identified with:

- Glenstone Road approaches to Crooked Billet Drive intersection.
- Crooked Billet Drive approaches to 1 & 13 Crooked Billet Drive.

From Austroads Safe System Assessment of the Glenstone Road approaches to Crooked Billet Drive (South):

- Crash exposure is very low as traffic activity is low estimated at some 3,400vpd (2022) and there is minimal vulnerable road user activity.

- Crash likelihood is low as the road is relatively straight and suitable width for heavy commercial vehicle use with adequate sight distance with right turn lanes provided.

- Crash severity is low as the estimated speed environment is 60km/h.

Consistent with Austroads Safe System Assessment methodology crash risk at the Glenstone Road / Crooked Billet Drive intersection is very low.

4.10 Sight Distance Review

The sight distance is summarised in Figure 17, also see Figure 12.

Figure 17 – Sight Distance Summary

Junction	Speed		Road frontage sight distance			
Major Rd - Minor Rd	Limit (km/h)	Environment (km/h)	Austroads SISD (m)	Available Left(m)	Available Right(m)	AS/NZS 2890.1 SSD*
Glenstone - Crooked Billet	60	60	123	150	150	65
Access to #1 Crooked Billet	50	40	73	80		35

Austroads SISD Compliant

Safe Intersection Sight Distance	**SISD**
Stopping Sight Distance	**SSD**

4.11 Access Standard

Rural accesses on Council roads should comply with LGAT Standard Drawings for Rural Property Accesses, TSD-R04 & TSD-R05, see online at:

https://www.lgat.tas.gov.au/__data/assets/pdf_file/0027/813735/Tasmanian-Municipal-Standards-Drawings-v3-December-20202.pdf

The existing access satisfies the above standards.

5) Traffic Generation and Assignment

5.1 Traffic Growth

Estimated compound annual traffic growth on Crooked Billet Drive is 0%.

5.2 Trip Generation

The following traffic generation is estimated based on operation parameters detailed in Section 3.1 of this report & Appendix A.

5.2.0. Existing Site

- 62 vpd or 8 vph (6m3 concrete loads)

5.2.1. Relocated Concrete Batch Plant (20,000m3 pa)

See section 3.1.1 for details.

- 61 vpd or 8 vph (6m3 loads) or
- 199 vpd or 28vph (1m3 loads)

5.2.2. Caretakers Residence

See section 3.1.2 for details.

Caretakers Residence is estimated to generate 6 vpd or 1 vph

5.2.3 Asphalt Plant (50,000 tpa)

See section 3.1.3 for details.

Asphalt Plant traffic generation is estimated at 36 vpd or 5 vph

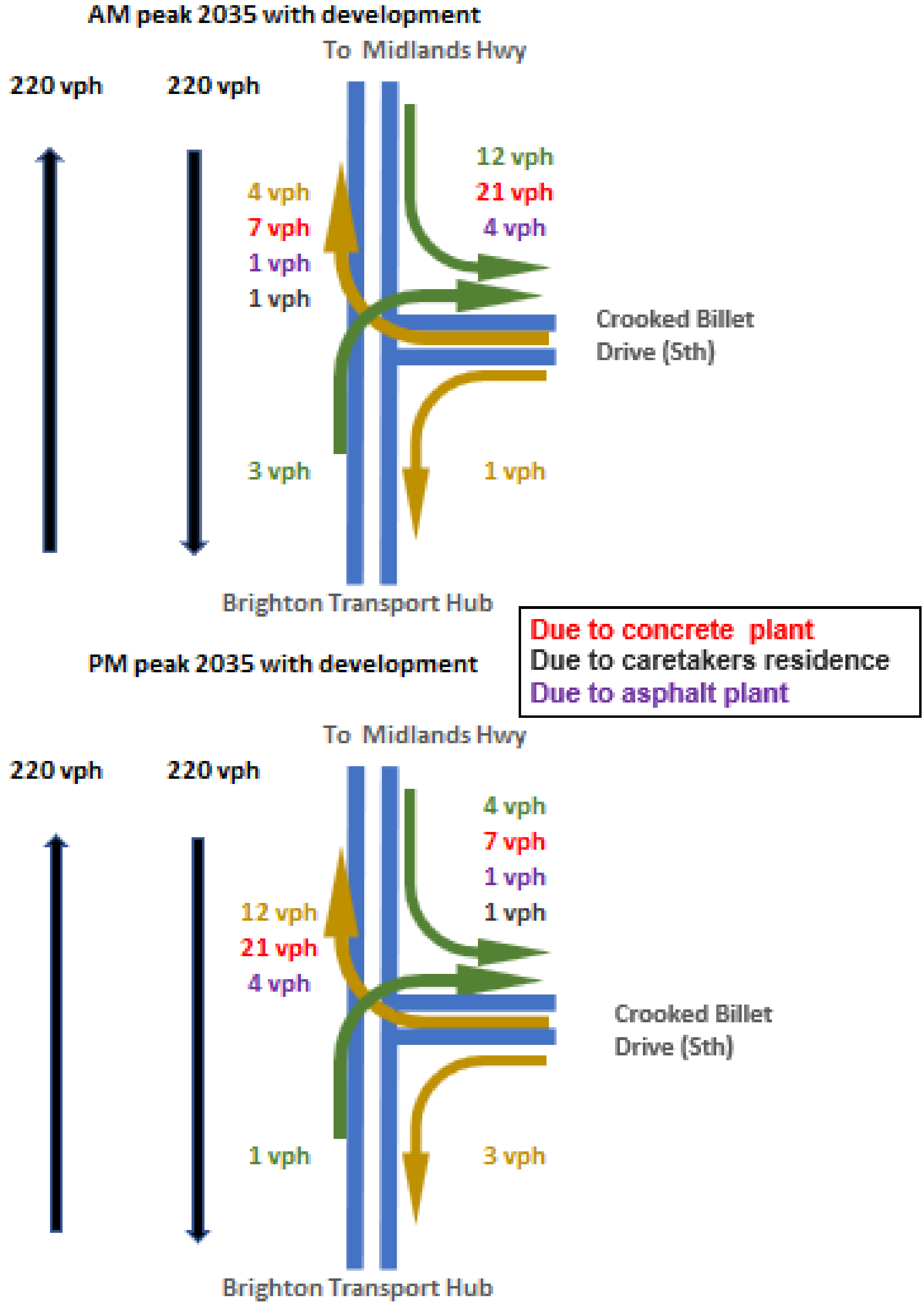
5.2.4 Whole Site

Estimated traffic generation is up to 241vpd or 34vph
(Based on 1m3 concrete loads)

5.3 Trip Assignment

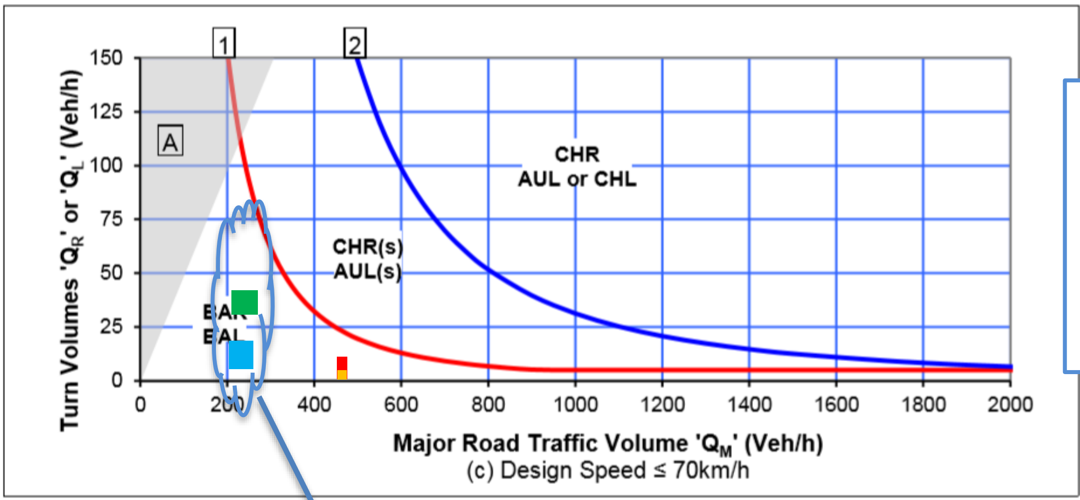
Crooked Billet Drive is a No Through Road and located North of the Bridgewater Bridge construction site. Accordingly, it is assumed most of the traffic generated by the proposal would have origin and destination South of the closest interchange, the Glenstone Southern Interchange. See Figure 19 for projected traffic assignment at the Glenstone Road / Crooked Billet Drive junction.

Figure 19 – Trip Assignment for 2035



5.4 Austroads junction warrant

Figure 20 – Austroads junction warrant for 2035



Based on 1m3 concrete agitator truck loads to be conservative.

Peak Hour Movement Summary(vph)		
AM	Turns	TEF
Left In	37	220
Right In	3	477

Peak Hour Movement Summary(vph)		
PM	Turns	TEF
Left In	13	220
Right In	1	453

Sensitivity Analysis:

The critical turning movement at the Glenstone Rd / Crooked Billet Dr junction in terms of Austroads junction layout requirements is the impact of the proposal on the Left turn into Crooked Billet Dr.

Figure 20 demonstrates that even if left turn movements to Crooked Billet Dr double, the existing BAL facility for left turners is adequate.

This means there is ample capacity for concrete agitator trucks to operate with small loads (<< 1m3)

Figure 20 indicates that technically 2035 traffic activity meets the warrant for an Austroads BAR junction layout. However, the existing junction is already channelised with a CHR(s) layout, so no changes are required.

The roads exposed to the proposal are part of the Brighton Transport Hub, developed to cater for the high productivity vehicles and transport efficiency.

The Glenstone Road Interchanges, Glenstone Road / Crooked Billet Road intersection and Crooked Billet Drive are all able to cope with the estimated 5 vph due to the proposal. Intersection analysis is not required to demonstrate this as proposed and current traffic activity levels on these roads are low and these roads operate at Level of Service A. See Appendix E for Level of Service definitions.

6) Tasmanian Planning Scheme – Brighton

Parking and Sustainable Transport Code C2

C2.5.1 Car parking numbers

Acceptable Solution A1: *The number of on-site car parking spaces must be no less than the number specified in Table C2.1, excluding if:*

(a) The site is subject to a parking plan for the area adopted by Council, in which case parking provision (spaces or cash in lieu) must be in accordance with that plan,
(b) The site is contained within a parking precinct plan and subject to Clause C2.7,
(c) The site is subject to Clause C2.5.5; or
(d) It relates to an intensification of an existing use or development or a change of use where:

i. The number of onsite car parking spaces for the existing use or development specified in Table C2.1 is greater than the number of car parking spaces specified in Table C2.1 for the proposed use or development, in which case no additional onsite car parking is required; or

ii. The number of onsite car parking spaces for the existing use or development specified in Table C2.1 is less than the number of car parking spaces specified in Table C2.1 for the proposed use or development, in which case on-site car parking must be calculated as follows:

From Table C2.1 Manufacturing & Processing requirement is 2 spaces per 200m2 of floor area or 2 spaces per 3 employees whichever is greater.

Asphalt Plant:
Floor area is negligible. Up to 5 employees are envisaged equating to a requirement for 4 car parking spaces.

Caretakers Residence:
2 car parking spaces required for the residence.

Concrete Plant:
Floor area is negligible. 2 plant & 6 agitator truck employees are envisaged equating to a requirement for 6 car parking spaces.

In total Table C2.1 requires 12 car parking spaces in total.
39 car parking spaces and 5 concrete agitator truck parking spaces are proposed, see Appendix A parking summary. **A1 is satisfied.**

C2.5.2 Bicycle parking numbers

Acceptable Solution A1: Bicycle parking spaces must:

- ***(a)*** *Be provided on the site pr within 50m of the site and*
- ***(b)*** *Be no less than the number specified in Table C2.1.*

From Table C2.1 t From Table C2.1 Manufacturing and Processing requirement is 1 space per 5 employees. The proposal envisages 13 employees in total equating to a requirement for 2 bicycle parking spaces as proposed, se Appendix A.2.7. **A1 is satisfied.**

C2.5.3 Motorcycle parking numbers

Acceptable Solution A1: *The number of on-site motorcycle parking spaces for all uses must:*

- *(a) Be no less no less than the number specified in Table C2.4. and*
- *(b) if an existing use or development is extended or intensified, the number of on-site motorcycle parking spaces must be based on the proposed extension or intensification, provided the existing number of motorcycle parking spaces is maintained.*

Table C2.4 requires no motorcycle parking space where 0 - 20 car parking spaces are required. As 10 car parking spaces are required by C2.4 no motorcycle space is required. **A1 is satisfied.**

C2.5.4 Loading Bays

Acceptable Solution A1
A loading bay must be provided for uses with a floor area of more than 1000m2 in a single occupancy.

Not applicable as the proposal does not have any buildings with GFA of more than 1000 m2.

C2.6.1 Construction of parking areas

Acceptable Solution A1: *All parking, access ways, manoeuvring and circulation spaces must:*

- *(a) be constructed with a durable all-weather pavement,*
- *(b) be drained to the public stormwater system, or contain stormwater on the site; and*
- *(c) excluding all uses in the Rural Zone, Agricultural Zone, Landscape Conservation Zone, Environmental Management Zone, Recreation Zone and Public Open Space Zone, be surfaced by a spray seal, asphalt, concrete, pavers or equivalent material to restrict abrasion from traffic and minimise entry of water to the pavement.*

An unsealed permeable crushed rock pavement is proposed for the hardstand and parking areas which is fit for purpose for batch plant operations in a General Industrial setting. The paved areas will be drained to the existing stormwater system. **A1 is satisfied.**

C2.6.2 Design and layout of parking areas

Acceptable Solution A1.1: *Parking, accessways, manoeuvring and circulation spaces must All parking, access ways, manoeuvring and circulation spaces must either:*

(a) comply with the following:

i. *have a gradient in accordance with Australian Standard AS 2890 Parking facilities, Parts 1-6.* Satisfied with longitudinal slopes < 25% and crossfall slopes < 5%.

ii. *Provide for vehicles to enter and exit the site in a forward direction where providing for more than 4 parking spaces.* Satisfied

iii. *Have an access width not less* than the requirements in Table C2.2. Proposal exceeds driveway width specified. The driveway is some 25m wide in total catering for separate heavy and light vehicle movements. The heavy vehicles include triaxle semitrailers delivering materials to the site. The proposal satisfies Table C2.2 requirement. See Appendix A Turn templates demonstrating adequate width for require movements entering and exiting the site.

iv. *Have car parking space dimensions which satisfy the requirements in Table C2.3.*
Proposed car parking spaces comply with Table C2.3 being at least 2.6m wide by 5.4m long, see Figure 21.

Figure 21 – Proposed car parking spaces

v. *Have a combined access and manoeuvring width adjacent to parking spaces not less than the requirements in Table C2.3 where there are 3 or more car parking spaces.*
Proposed car parking has 6.6m of manoeuvring width, see Figure 21.

vi. *Have a vertical clearance of not less than 2.1 metres above the parking surface level,* Satisfied.

vii. *Excluding single dwelling, be delineated by line marking or physical means*. Delineation of parking spaces to be provided with timber edging painted white. Satisfied.

A1.1 is satisfied.

Acceptable Solution A1.2: *Parking spaces provided for use by persons with a disability must satisfy the following:*

(a) Be located as close as practical to the main entry point to the building.

(b) be incorporated into the overall car park design.

(c) be designed and constructed in accordance with Australian/ New Zealand Standard AS/NZS 2890.6-2009 Parking facilities - Off-street parking for people with disabilities.

Not applicable for the proposed use.

C2.6.3 Number of accesses for vehicles

Acceptable Solution A1

The number of accesses provided for each frontage must:

(a) be no more that 1; or

(b) no more than the existing number of accesses whichever is greater.

A specifically designed driveway is proposed providing separation for light and heavy vehicles, see Figure 3.4. **A1 is technically not satisfied.**

Performance Criteria P1

The number of accesses provided for each frontage must minimise, having regard to:

(a) any loss of on-street parking; and

(b) pedestrian safety and amenity

(c) traffic safety

(d) residential amenity on adjoining land; and

(e) the impact on the streetscape.

The proposal does not effect on-street parking, pedestrian safety or residential amenity.

The proposal is considered safe and physically separates light and heavy vehicle access, see Figure 3.4.

Residential amenity is not affected and there is not impact on the streetscape. **P1 is satisfied.**

C2.6.5 Pedestrian access

Acceptable Solution A1.1: *Uses that require 10 or more car parking spaces must:*

(a) have a 1m wide footpath that is separated from the access ways or parking aisles, excluding where crossing accessways or parking aisles, by:

- i. *a horizontal distance of 2.5m between the edge of the footpath and the access way or parking aisle; or*
- ii. *protective devices such as bollards, guardrails or planters between the footpath and the access way or parking aisle; and*

(b) be signed & line marked where pedestrians cross access ways or parking aisles.

Though the proposal includes provision of a 39-space car park for staff and visitors, 10 car parking spaces are required for staff parking for the concrete and asphalting operations.

The proposed asphalt plant (requiring 4 car parking spaces) does not trigger provision of footpaths as per A1.1.

See Figure 3 showing designation of pedestrian pathways throughout the site. The proposed pedestrian facilities are considered appropriate for operational staff where there are no car parking facilities required.

A1.1 is satisfied.

Acceptable Solution A1.2: *In parking areas containing accessible car parking spaces for uses by persons with a disability, a footpath having a width not less than 1.5m and a gradient not steeper than 1 in 14 is required from those spaces to the main entry point to the building.*

Not applicable for the proposed use.

Road and Railway Assets Code C3

C3.5.1 Traffic generation at a vehicle crossing, level crossing or new junction

Acceptable Solution A1.1 – **Not applicable** as the roads under consideration are not Category 1.

Acceptable Solution A1.2 – *For a road, excluding a Category 1 road or a limited access road, written consent for a new junction, vehicle crossing, or level crossing to serve the use and development has been issued by the road authority.*

Not applicable as an existing access is proposed.

***Acceptable Solution A1.3* – Not applicable** as no rail network is involved.

Acceptable solution A1.4: *Vehicular traffic to and from the site, using an existing vehicle crossing or private level crossing will not increase by more than:*

(a) The amounts in Table C3.1
(b) Allowed by a licence issued under Part IVA of the Roads and Jetties Act 1935 in respect to a limited access road; and

A1.4 is not satisfied as proposal involves an estimated increase traffic due to the proposal (asphalt plant) of up to 179 vpd or 26 vph on other roads which is greater than 10 vehicle movement per day for a major road. Glenstone Road is a major road. 179 vpd is considered very conservative with concrete agitator truck loads averaging 1m3.

Performance Criteria P1: *Vehicular traffic to and from the site must minimise any adverse effects on the safety of a junction, vehicle crossing or level crossing or safety or efficiency of the road or rail network, having regard to:*

(a) any increase in traffic caused by the use.

The increase in traffic due to the proposal of 179 vpd is easily absorbed by the adjacent road network. The Glenstone Road / Crooked Billet Drive junction has adequate capacity to cope with the estimated traffic.

(b) the nature of the traffic generated by the use.

The proposed carpark will generate low speed light vehicular traffic. The proposed access is considered suitable for this traffic activity.

(c) the nature of the road.

Crooked Billet Drive is designed for General Industrial access and suitable for concrete agitator truck, asphalt delivery trucks and staff car use.

(d) the speed limit and traffic flow of the road.

Crooked Billet Drive has a 50km/h speed limit considered suitable for safe and efficient operation of the proposed access.

(e) any alternative access to a road.

There is no viable alternative access.

(f) the need for the use.

The use is justified on commercial business operation grounds and to meet customer access needs.

(g) any traffic impact assessment; and

This TIA finds no reason to disallow the proposal due to traffic impacts.

(h) any advice received from the rail or road authority.

No advice on acceptability of the proposal has been received from Council.

In summary the proposal is not expected to have any adverse effects on adjacent road network. **P1 is satisfied.**

Acceptable Solution A1.5: *Vehicular traffic must be able to enter and leave a major road in a forward direction.*

A1.5 is satisfied.

C3.6.1 Habitable buildings for sensitive uses within a road or railway attenuation area

Not applicable as the proposal does not involve construction within a road or railway attenuation area.

C3.7.1 Subdivision for sensitive uses within a road or railway attenuation area

Not applicable as no subdivision is proposed.

7) Impacts on the environment and road users

The proposed additional access will have negligible impact on road users provided the recommendations are implemented.

7.1 Environment

- No adverse environmental impacts are anticipated in terms of:
  - Noise, vibration, visual impact and residential amenity
  - Ecological Impacts, Heritage and Conservation
- Street lighting is not required.

7.2 Road users

- Public Transport - No impact.
- Delivery Vehicles - No impact.
- Pedestrians and Cyclists - No impact.

8) Recommendations and Conclusions

This traffic impact statement has been prepared to assess the relocated concrete batch plant and proposed asphalt & reclaimed asphalt pavement processing operations at 1 Crooked Billet Drive, Bridgewater.

Existing site traffic is estimated at 62vpd & 8 vph

Proposed site traffic is estimated at 241 vpd & 34 vph as follows:

- 20,000m3 pa of concrete generating an estimated 199 vpd and 28 vph based on 1m3 agitator truck loads.
- Caretakers' residence estimated to generate 6vpd & 1 vph.
- 50,000 tpa of asphalt generating an estimated 36 vpd & 5 vph.

Accordingly, the estimated increase in traffic is 179vpd & 26vph

Existing road conditions have been reviewed including traffic safety, crash risk, the speed environment and available sight distances.

It is assessed that the proposal will have minimal impact on traffic safety and capacity for all road users and the existing access location is safe and appropriate.

The roads exposed to the proposal are part of the Brighton Transport Hub, developed to cater for the high productivity vehicles and transport efficiency.

The Glenstone Road Interchanges, Glenstone Road / Crooked Billet Road intersection and Crooked Billet Drive are all able to cope with the estimated peak hour increase of 26 vph due to the proposal. Intersection analysis is not required to demonstrate this as proposed and current traffic activity levels on these roads are low and these roads operate at Level of Service A.

Evidence is provided that the proposal satisfies the Tasmanian Planning Scheme – Brighton - Parking & Sustainable Transport Code C2 and Road & Railway Assets Code C3.

Recommendations:

- *There are no recommendations.*

Overall, it has been concluded that the proposal will not create any traffic issues and traffic will continue to operate safely and efficiently along Glenstone Road and Crooked Billet Drive (Sth). Based on the findings of this report and subject to the recommendations above, the proposal is supported on traffic grounds.

9) Assessor Credentials

Richard Burk is a qualified Traffic and Civil Engineer with over 38 years of experience with State and Local Government in the Roads and Traffic industry in Tasmania. Visit www.trafficandcivil.com.au .

Yours sincerely

Richard Burk

Director
Traffic and Civil Services
M: 0456 535 746
P: 03 63341868
E: Richard.burk@trafficandcivil.com.au

Appendices:

Appendix A – Proposed plant plans and operational details

Appendix B – Tasmanian 26m B Double Network

Appendix C – Traffic Data

Appendix D – Crooked Billet Dr (Sth) AADT

Appendix E – Level of Service Descriptions

Appendix F – Plan of Subdivision

Appendix G – Detail Survey Plan

Appendix A – Proposed plant plans and operational details

TRAFFIC & CIVIL SERVICES

Appendix A.1 – Concrete Batch Plant

1/13 Crooked Billet Drive Bridg Proposed DRY Batching Plant Operational Quantities

Legal Entity Hazell Bros. Concrete PTY LTD, 14 Farley Street, Moonah, 7009, ABN: 56 118 390 800

Last Updated 12/05/2025

Requirements	***Capability / Capacity***	***Comments***
Production Rate	60m3 / hour- Maximum	Maximum 60m3 per hour mixing 32MPa Mix
	Average 9 loads per hour, maximum 10 loa	Under full production days only
Operating Hours	Monday - Sunday 24 hrs per day	Required to meet customer or project specific requirements, General operations are Monday to Friday 5am-3pm- General Clients
Average Working Day	10hours	Work load dependant
Normal working hours	5am - 3pm	Work load dependant
Batch Size	Average Batch size 5.4m3	Maximum 7.8m3
Mixing Technology	Dry Mixing Operation	
Quality Standard	AS1379- Specification and supply of concrete	
Aggregate Storage	External stockpiles made of concrete block bay walls with concrete hardstand foundation- Each stockpile fitted with automated dust suppression sprinklers	
Aggregate Management	Front End Loader fed load bins from stockpiles	
Front End Loader (FEL) Type and Size	Hyundai 760-9	
Cementitious Material Storage	3x100m3 Vertical silos	
Admixtures- Liquid	8x Sikka admixtures	Stored in 40" self bunded container
Solid Additives	Colour oxides and fibres- Bags	Undercover loading stand
Slumping	Dual Lane drive through- drop down platfor	2 x Agitator slumping stand and concrete hard stand
Loading	2 x load weigh bins- 1 conveyor	Load bins with Covered Hood and Dust suppression

Loading Bay	Fully covered with automated dust suppression misting system	Automated dust supression system is activated when conveyor belt starts in readiness for batching	
Concrete Temperature Control	Cold Potable water only		
Water Supply			
Water Storage	Inground recycled stirrer tank	5mx5mx3.5m 87.5m3 or 87,500 litres	
	2 x 22,000litre Fresh water surge tanks		
Fresh Water	Mains potable for fresh water 50mm conne	50mm Main top up of 22,000 litre water tank	
	Dust Suppression	second 22,000 litre water tank used as surge tank for dust control measures	
Recycled Water	Recycled collected from site run off- captured in wedge pits for sediment separation- then water stored in 87,500 litre stirrer tank for re use in concrete		
Agitator- Trucks	4 x twin drive twin steer and 1 x Tri axle drive twin steer		
Operating Control System	U-batch	Automated batching software	
Batch Office	6x3.0 metres		
Crib room office/ toilet	12x3.0metres		
Ticketing	U Batch	Linked to batching software	
Power Supply	Mains supply via new 2MVA transformer	Underground mains supply to (MCC)- Motor Control Centre	
Sewer			
Communications	WIFI and UHF		
Accommodation	2 Operational Staff and 5 x Agitator drivers	Part time Supervisor/ Manager	
Car Parking	8 spots	Main carpark for site- Existing	
Agitator Truck Parking	5		
		Annual volume	
Traffic Flow	20,000m3	20,000m3	
	Incoming Raw Aggregate/ Sand Deliveries	82%- 16,400m3 * 2.1Tonne/m3 = 34,440 tonnes	
	Incoming Cementitious Deliveries	12%- 2,400m3 * 1.44 Tonne/m3= 3,456 tonnes	
	Incoming Admixtures	0.05%- 10m3 or 10,000 litres	
	Water Mix of Potable and recycled	5%- 100m3 or 1,000,000 litres	

Trucking

36tn truck and trailer	34440/36	957 truck and trailer deliveries PA
35tn average	3456/35	99 Tanker Deliveries PA
2,000 litre deliveries		5 Deliveries PA
Mains supply		

Appendix A.2 – Asphalt Batch Plant

A.2.1 Heavy Vehicle Movements

Import raw materials
[7] trucks and trailers of 30 tonne net load per day average (transporting aggregates, sand, lime, RAP, Emulsion and bitumen) Mon to Friday (252 days/annum) - Note Approx.
[2-5] laden trucks per day Sat (if operating only) Would mainly be bitumen or RAP loads only
[2-5] laden trucks per day Sun (if operating only) Would mainly be Bitumen or RAP loads only

Aggregate deliveries will be on an as needed basis pending production outputs- average of 7 truck and trailer deliveries of raw materials per weekday or 210 tonnes of material based on 50,000 tonnes per annum, 50 weeks operating on 5 days a week (or 252 days a year). This may increase or decrease dependant on project or workload by a daily basis.

Dispatch materials / product
40] laden trucks at 30tn per day Mon to Sun Dependent on workload and project specific - maximum 40 truck and trailers per day- if the plant was to produce 1200 tonnes on a specific project, extreme example but within capabilities of the plant. Sat and Sun truck movements are not normal and project specific. Dependant on client and available access to end job site- may require weekend or night shift works to alleviate road congestion during peak times

Emulsions:
1 x 25,000litre laden semi tanker of emulsion delivered to the site every two 2 months

Service and Maintenance:
Loader servicing only one service per 3-month intervals, forklift service 1 service per annum- forklift and Loader are serviced offsite.

Busiest Hour:
Define when is likely to be the busiest hour that there are the most trucks arriving and departing the site and how many trucks will be arriving and departing in this busiest hour broken down by activity type and arrival and dispatch: Between 8am and 10am, ex-bin sales Mon-Friday

A.2.2 Heavy Vehicle Routes

Hazell Bros. to confirm the percentage split of heavy vehicle routes to and from the site.

Asphalt plant:
Import raw materials
72 % of trucks travel via-Leslie Vale Quarry- Southern Outlet and Brooker Highway
8 % of trucks travel via East Derwent Highway- Sand
5 % of trucks travel via Midland Highway- Boral Flowery Gully Hard Rock
High PAFV Aggregates would travel Midland Highway South- 5% of total incoming raw materials
Lime 150tn PA 5 trucks PA South on Midlands Highway from Mole Creek to Bridgewater
Bitumen 2500tonne PA or 5% of total Raw material intake is from BP Self's Point in Hobart, Brooker Highway and Bridgewater Bridge equates to 1.7 semi tanker loads of 29tonne per week 0.3 loads per day

Dispatch materials / product
100 % of trucks travel via TBC

A.2.3 Light Vehicle Movements

The asphalt plant will employ approximately 4 personnel.
(Dayshift - 7am - 17:00 pm) - 4 employees (typical day 7am to 4 pm); 5 employees (worst case day 6am-6pm)
1 x Plant Operator
1x Laboratory Technician- mostly Plant Operator will complete Laboratory testing scope
1x Loader Operator/ Emulsion Sales
1 x Part time Production Manager 50/50
(Nightshift - 6 pm - 6 am) - 3 employees (worst case)
1x Plant Operator
1x Loader Operator
1 x Laboratory Technician- Mostly Plant Operator will complete Laboratory testing scope

The project will have the following roles and employees during operation:
☐ One plant operator.
☐ One laboratory technician.
☐ One loader operator.
☐ One part time supervisor or manager.

A.2.4 Internal Vehicle Movements

Proposed is for one Heavy Vehicle & Light Vehicle shared entry point only.

Light Vehicles immediately entering a light vehicle reverse parking car park upon arrival- with designated light vehicle exit point- combining with HV exit point.

Heavy Vehicles will also always have one-way internal flow in a clockwise direction
Heavy Vehicles will also have there only internal loop access road if they need to circulate back around within the site to illuminate reversing where possible and will also have a designated heavy vehicle exit point

A.2.5 – Proposed Reclaimed Asphalt Pavement Processing Facility

Heavy Vehicle Movements

Import raw materials
Mon to Sunday Project specific availability to millings, may obtain up to 300 tonnes in one shift- 10 truck and trailers, but generally may be as low as one to two trucks per week- low volume site- this volume intake is included in total incoming raw materials for the site

Dispatch materials / product
Not applicable for RAP as do not dispatch RAP product

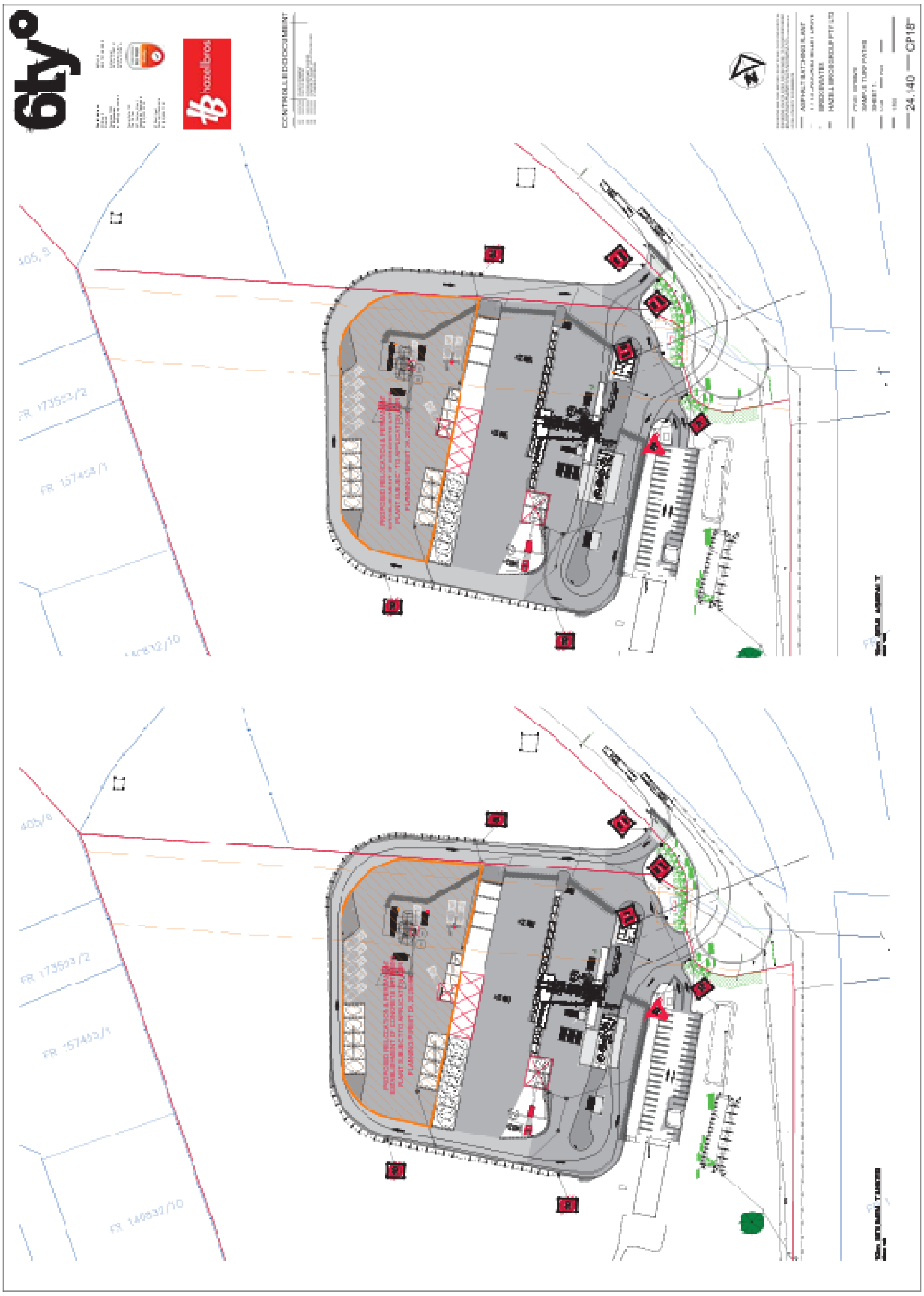
Heavy Vehicle Routes

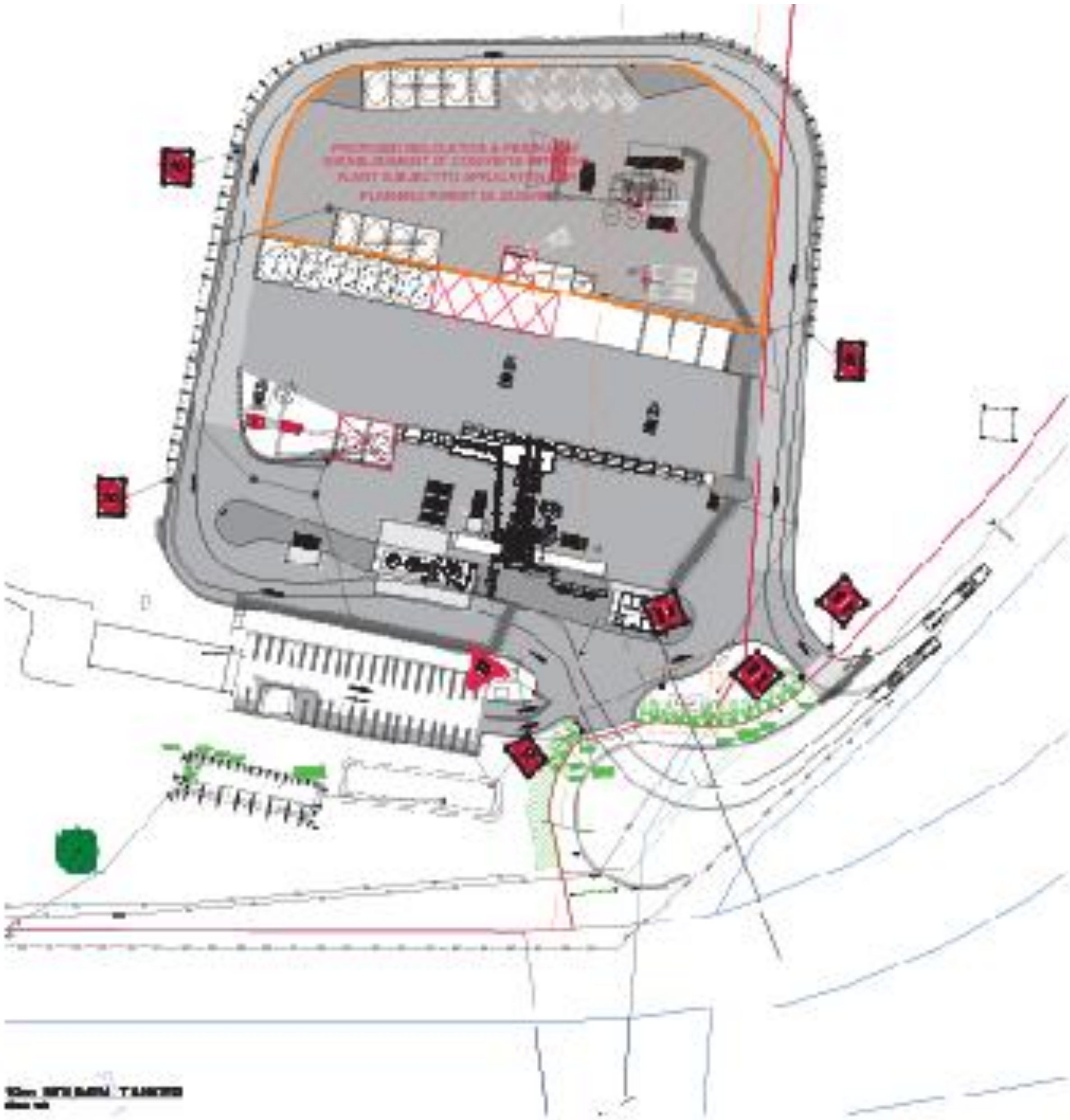
Import raw materials
10 % of trucks travel via unknown future job sites and projects.
Assume 5,000 tonnes of RAP material PA, 30 tonne truck and trailers 252 days per year equates to 0.7 trucks per day or 3 trucks per week- also assuming 50% of incoming RAP trucks will then back load with Asphalt back to job site
Assume 50/50 split (too many variables); 50% of RAP profiling truck entering truck delivery RAP to site will take asphalt out of site

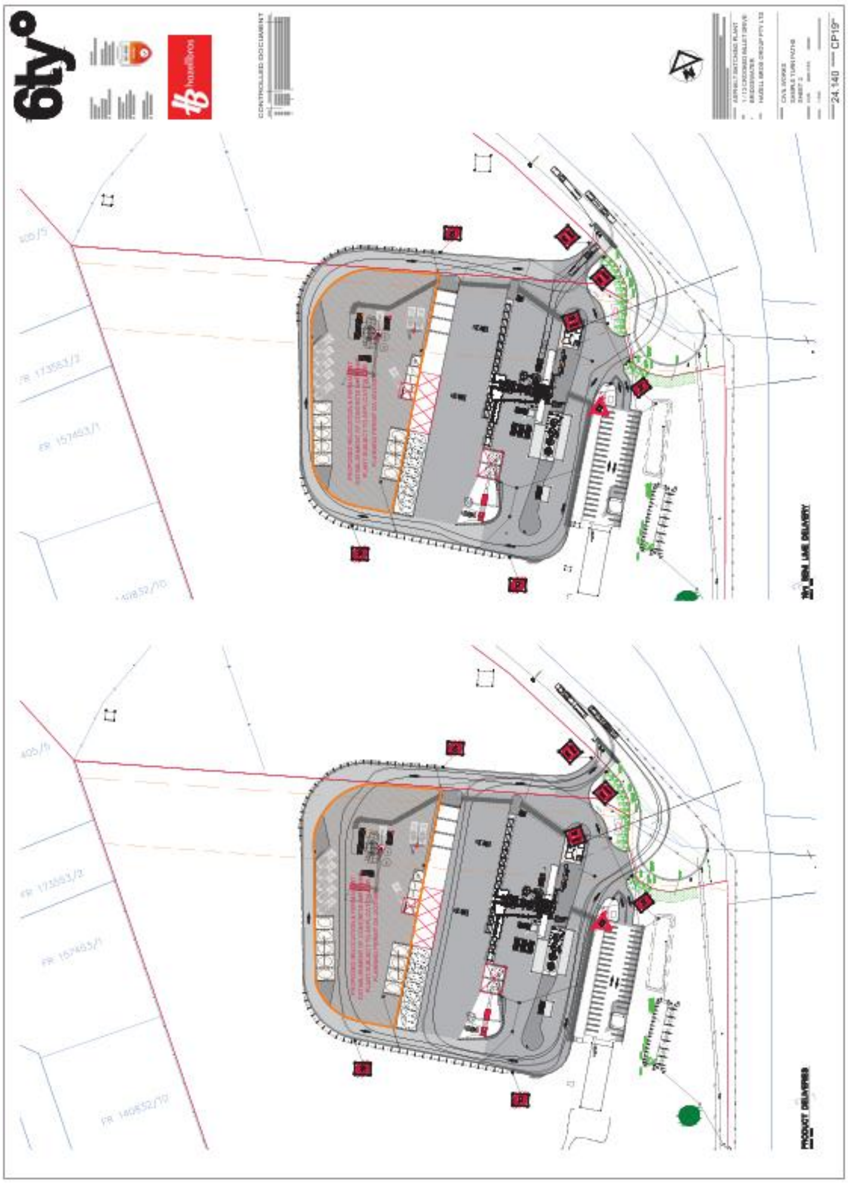
Light Vehicle Movements

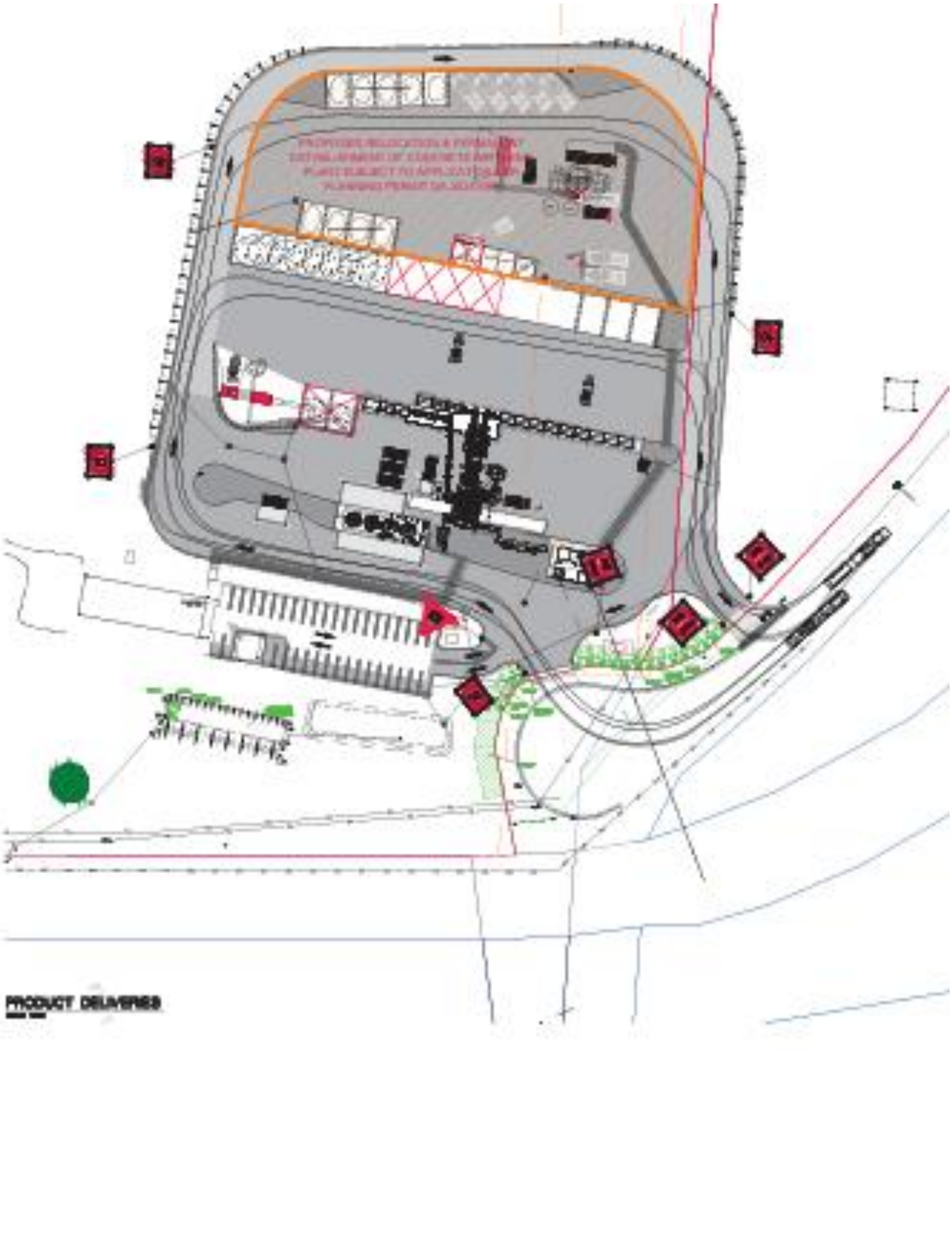
Note the RAP process will be on site for 2 weeks of the year. 20 days total processing, utilising Asphalt Plant Loader Operator

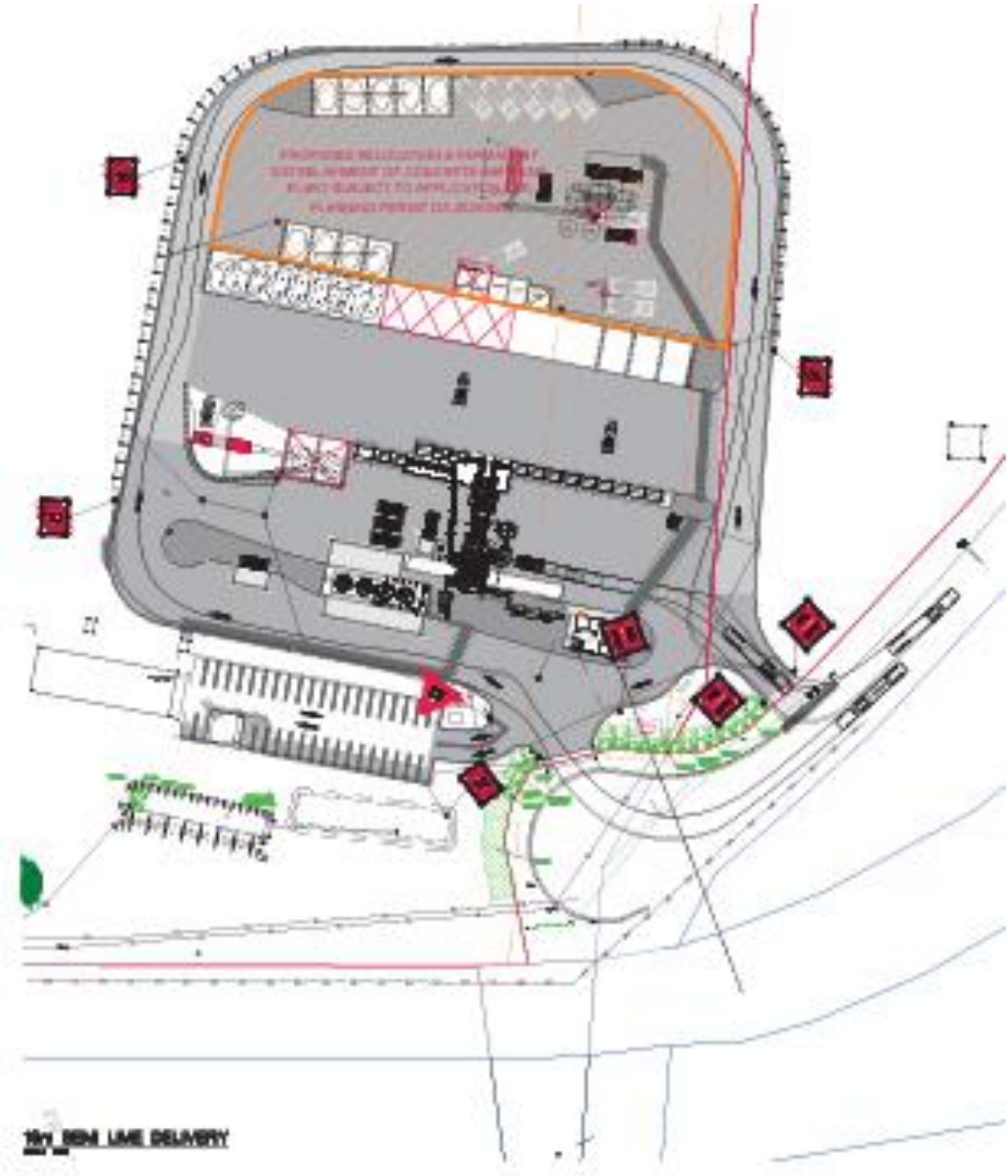
A.2.6 – Prop. Asphalt & Concrete Plant Plans

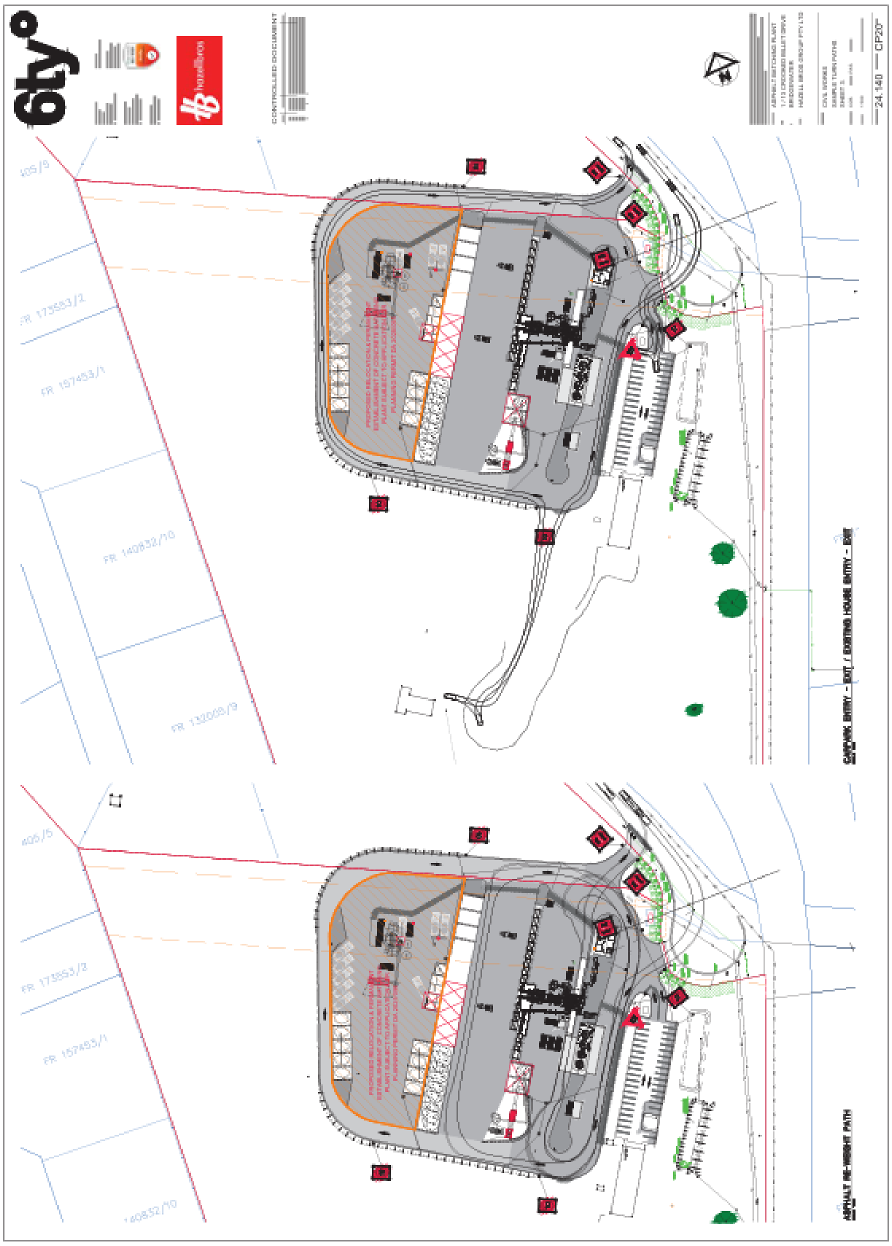


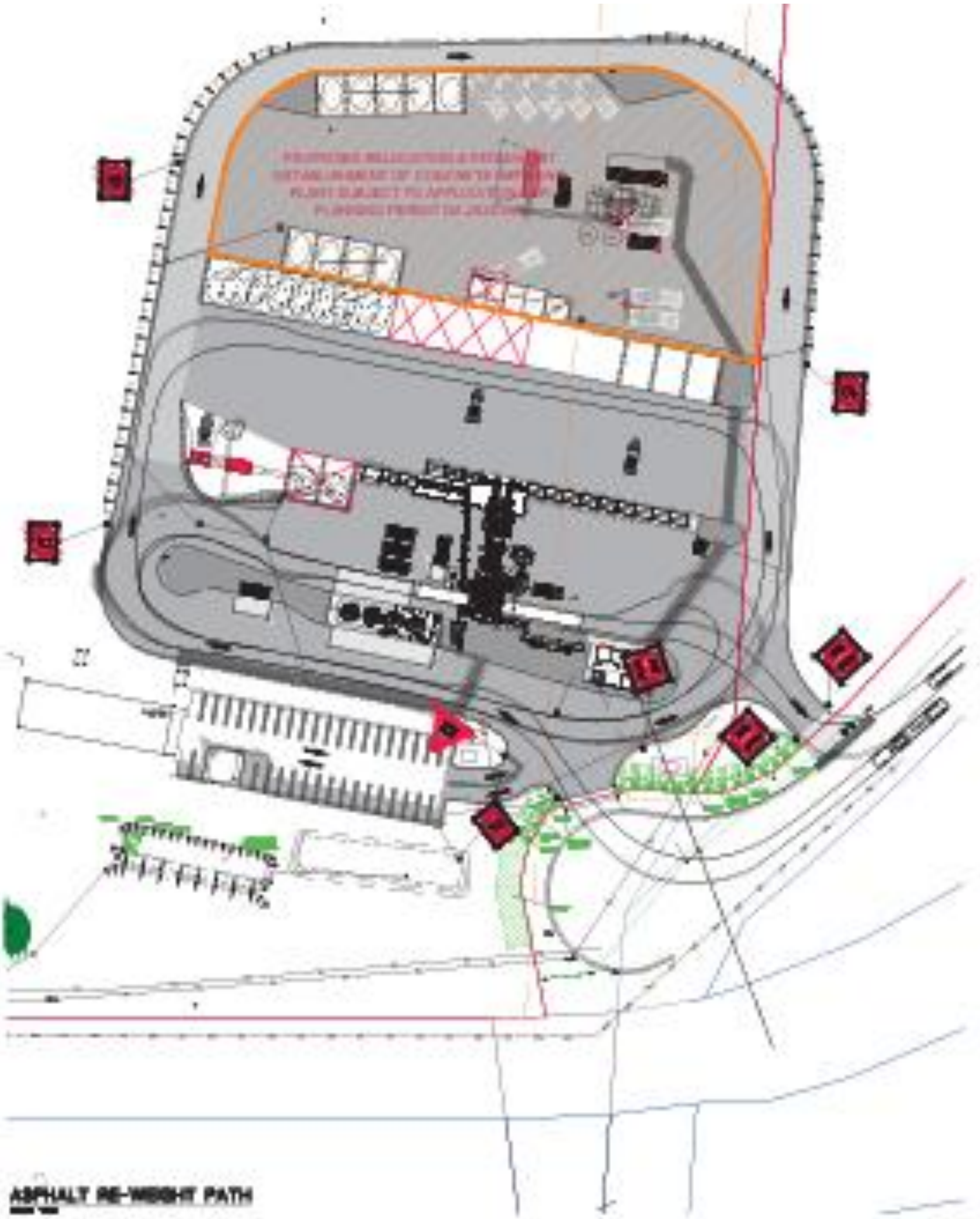


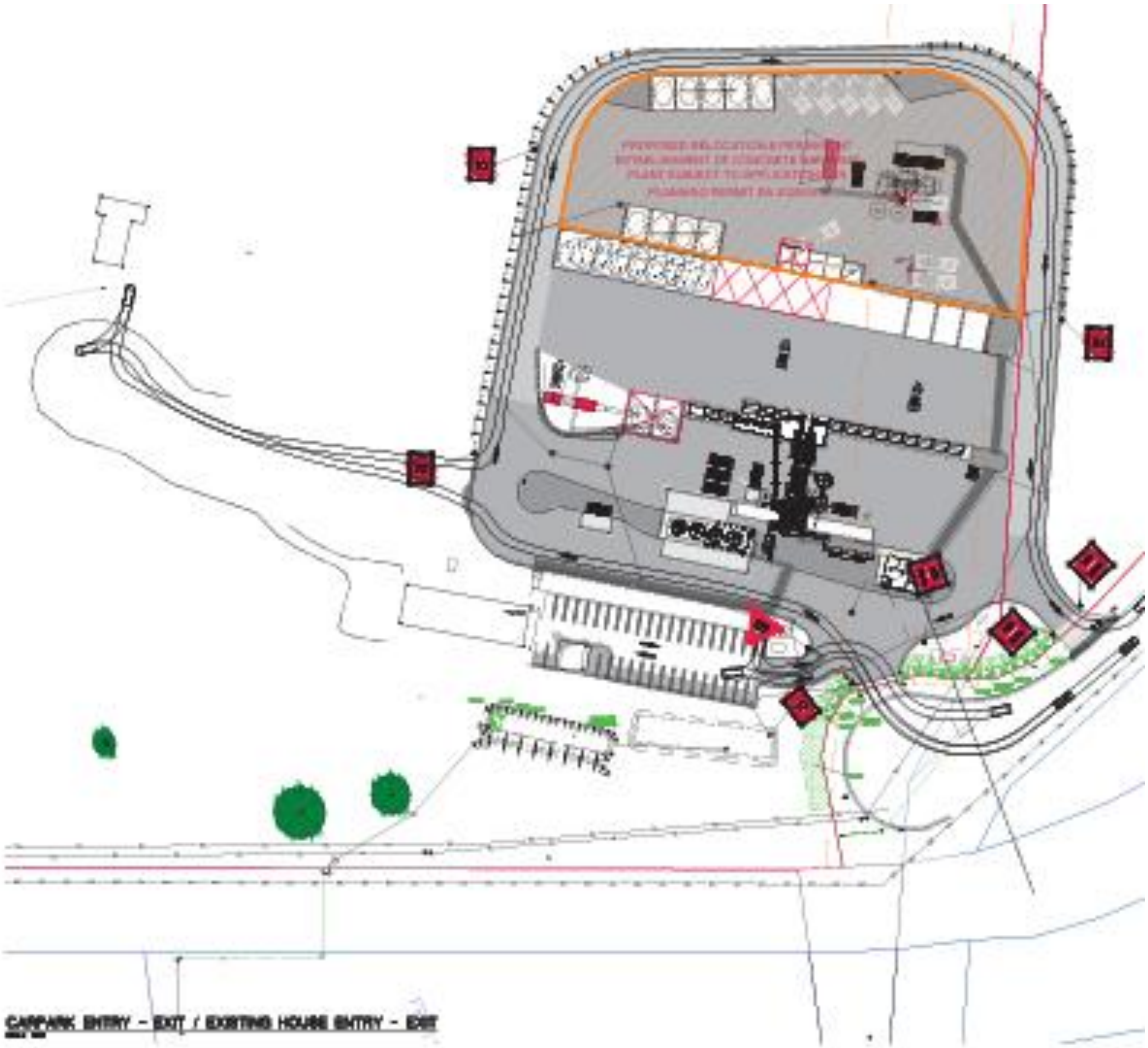



PRODUCT DELIVERIES

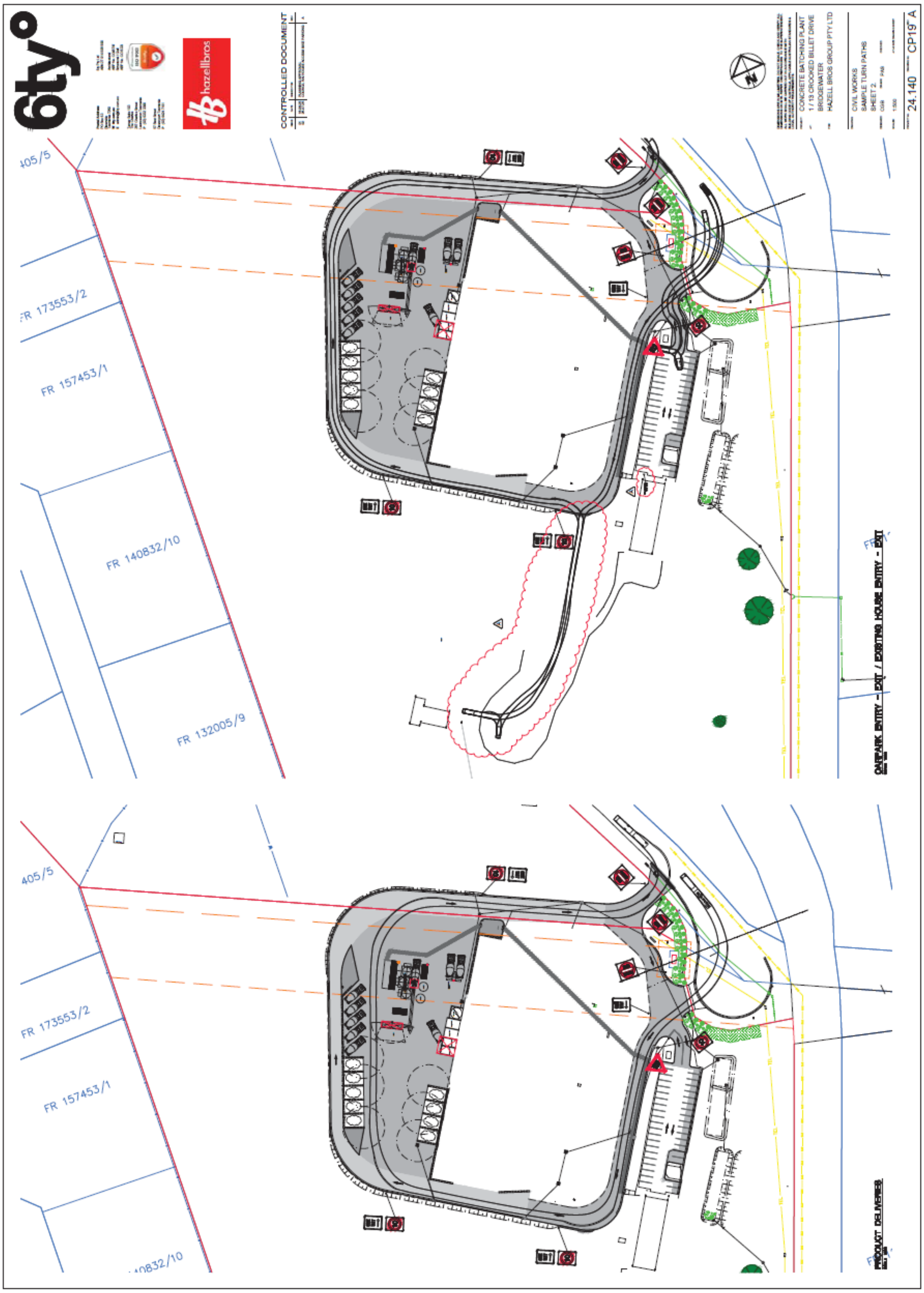




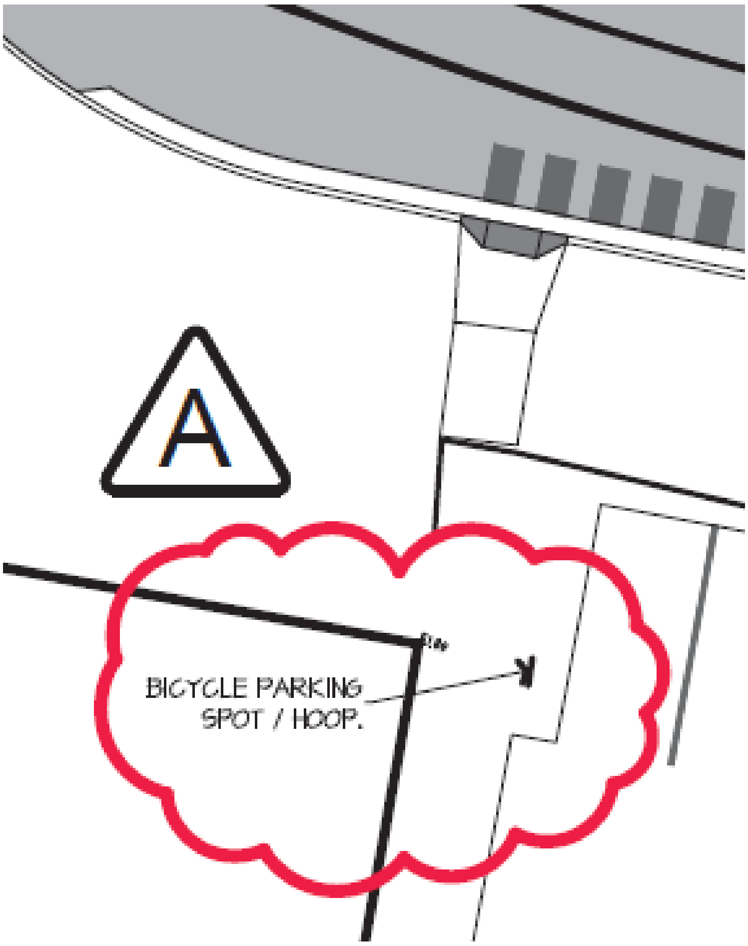

ASPHALT RE-WEIGHT PATH


CARPARK ENTRY - EXIT / EXISTING HOUSE ENTRY - EXIT

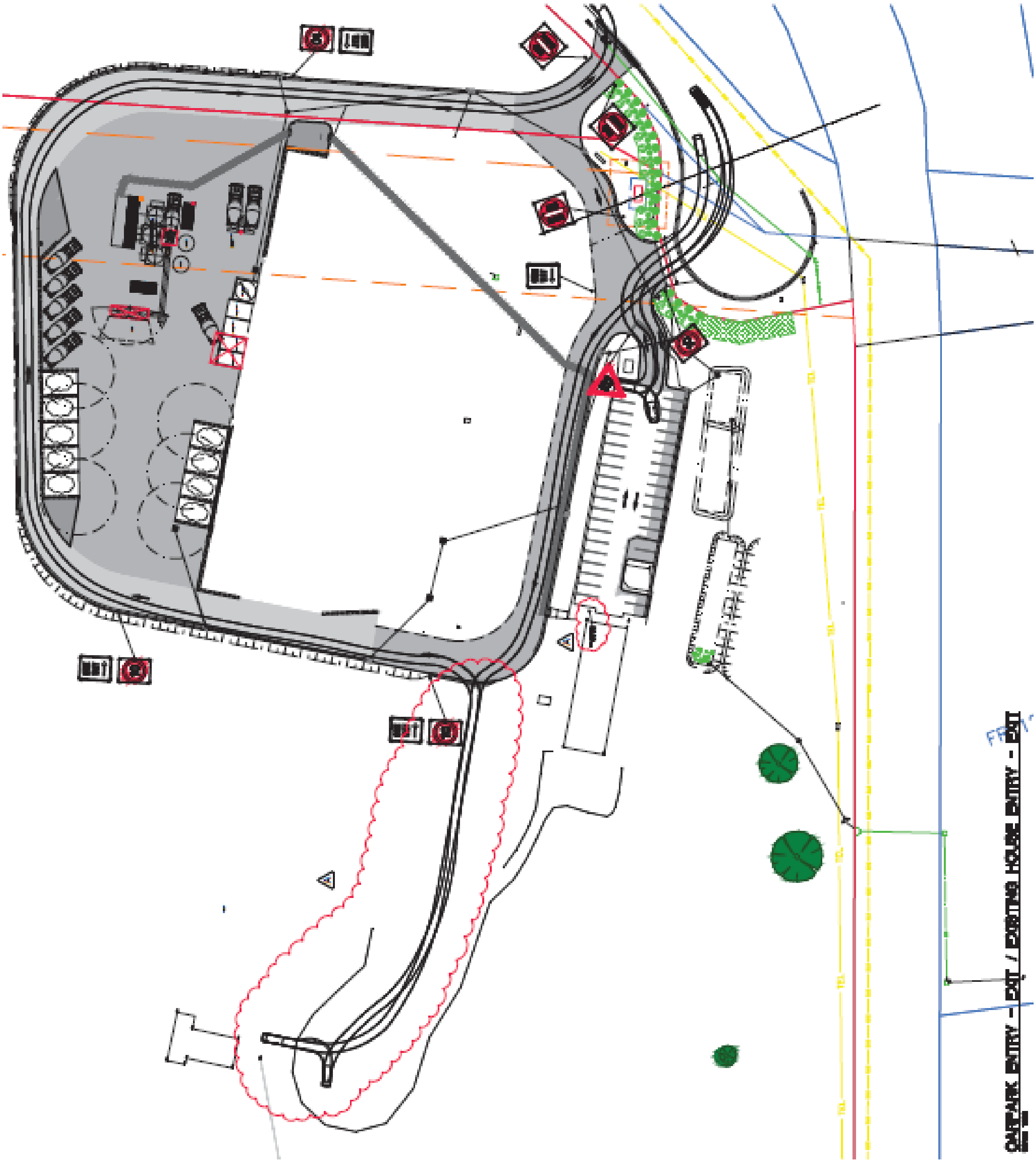
Concrete Plant Plans



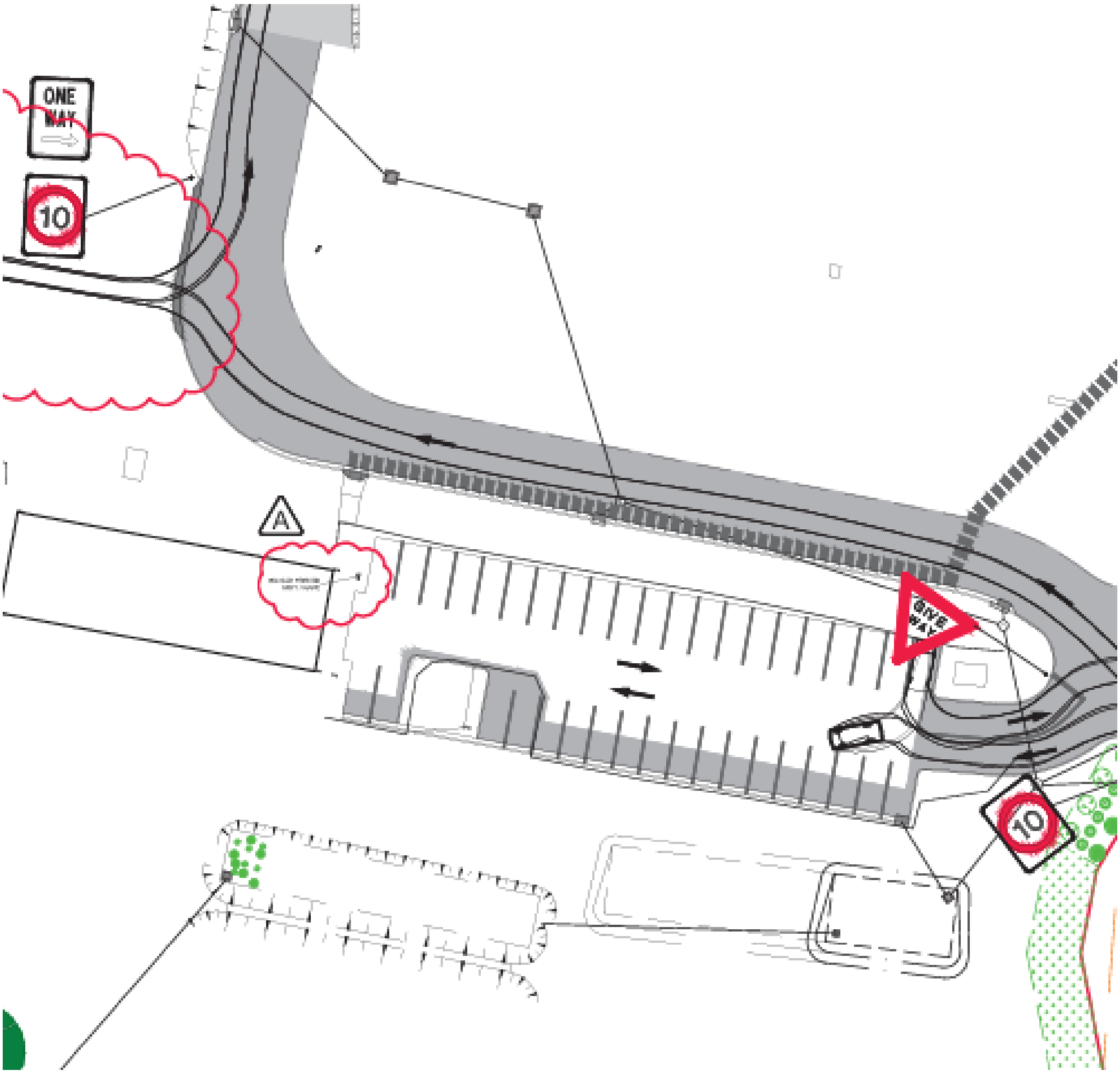
Extract from Bicycle Parking Plan

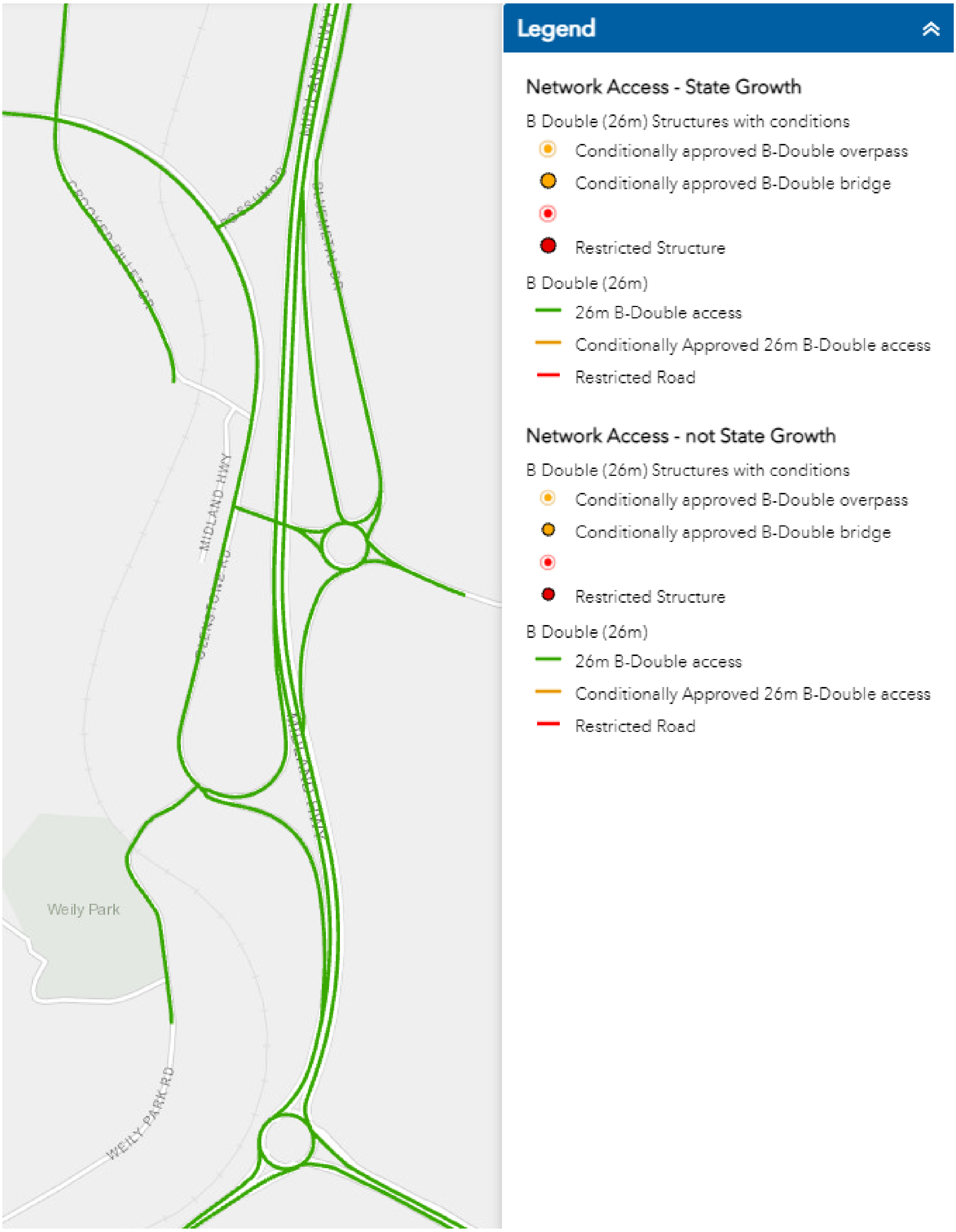


Carpark Entry - extract



Carpark - extract




CROOKED BILLET DR
MIDLAND HWY
Weily Park
WEILY PARK RD
Legend
Network Access - State Growth
B Double (26m) Structures with conditions
Conditionally approved B-Double overpass
Conditionally approved B-Double bridge
Restricted Structure
B Double (26m)
26m B-Double access
Conditionally Approved 26m B-Double access
Restricted Road
Network Access - not State Growth
B Double (26m) Structures with conditions
Conditionally approved B-Double overpass
Conditionally approved B-Double bridge
Restricted Structure
B Double (26m)
26m B-Double access
Conditionally Approved 26m B-Double access
Restricted Road

Appendix C – Traffic Data

Midlands Highway AADT

Site 0000A0087201

A0087201
Description: Midland Highway 440m N Of East Derwent Hwy [UTS L14/ 2.22 - 4.57]
City: Bridgewater
Route number: A0087

Site Data

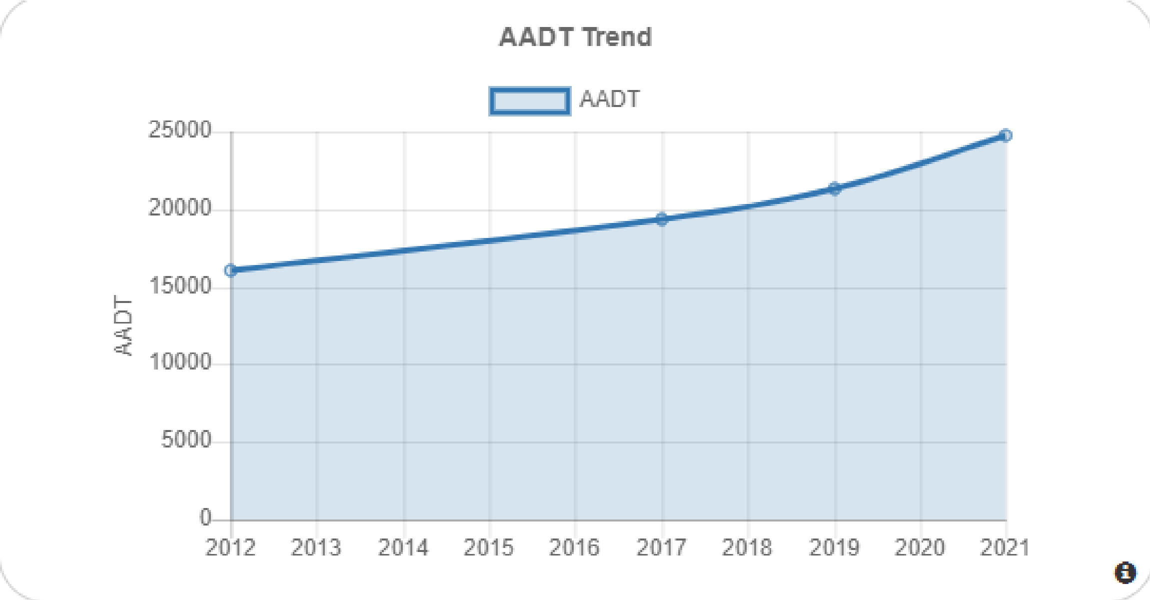
80 km/h

Traffic Statistics by Direction

Direction	Weekday average total traffic	7-day average traffic	Weekly traffic total
North	10,091	9,977	69,836
South	10,633	10,410	72,873
Total	20,724	20,387	142,709

Annual Statistics

Data Item	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
AADT	16,082	-	-	-	-	19,407	-	21,308	-	**24,740**
% HV	10.3%	-	-	-	-	12.5%	-	15.6%	-	**15.5%**



AADT Trend
AADT
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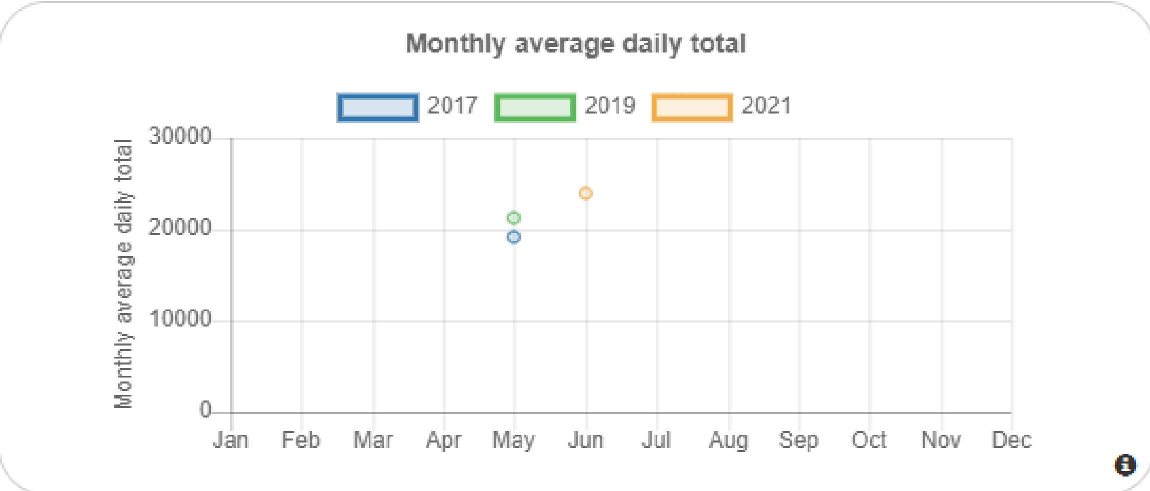
20000
15000
10000
5000
0
AADT
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021



Monthly average daily total
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2019
2021
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20000
10000
0
Monthly average daily total
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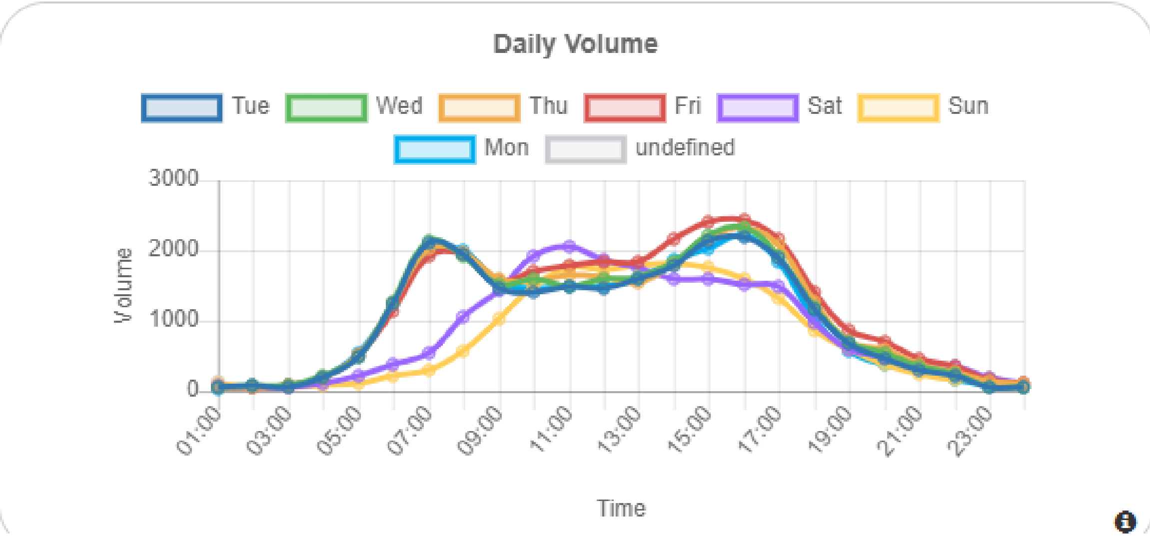
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec



Daily Volume
Tue
Wed
Thu
Fri
Sat
Sun
Mon
undefined
3000
2000
1000
0
Volume
01:00
03:00
05:00
07:00
09:00
11:00
13:00
15:00
17:00
19:00
21:00
23:00
Time

Glenstone Road AADT

Site 0000A1105100

A1105100
Description: Glenstone Main Road 70m N of Glenstone Link Rd [UTS L5/ 0.00 - 1.53]
City: Bridgewater
Route number: A1105

Site Data

60 km/h

Traffic Statistics by Direction

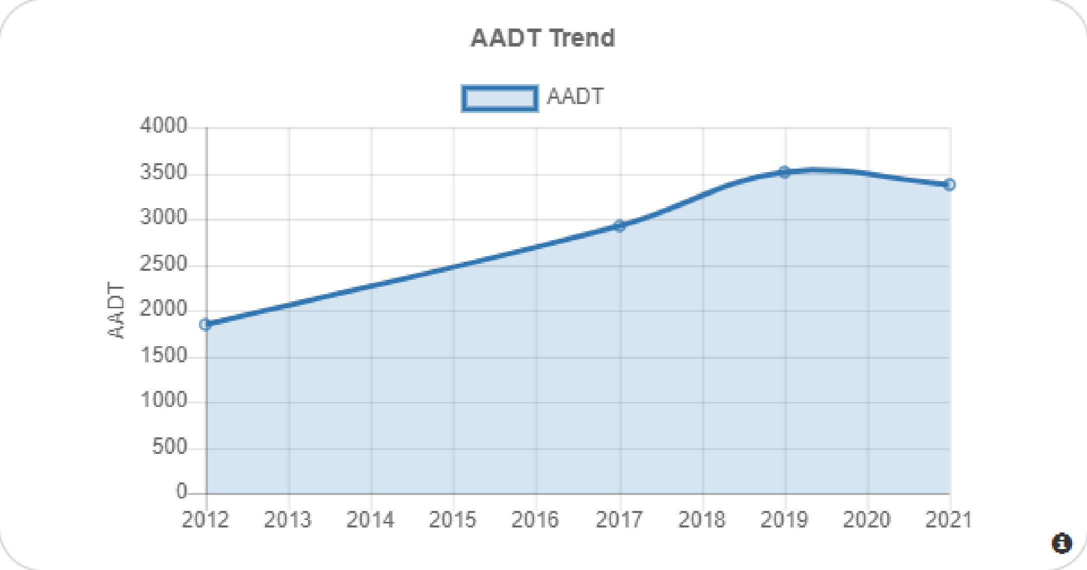
Direction	Weekday average total traffic	7-day average traffic	Weekly traffic total
North	2,002	1,573	11,009
South	2,057	1,614	11,296
Total	4,059	3,187	22,305

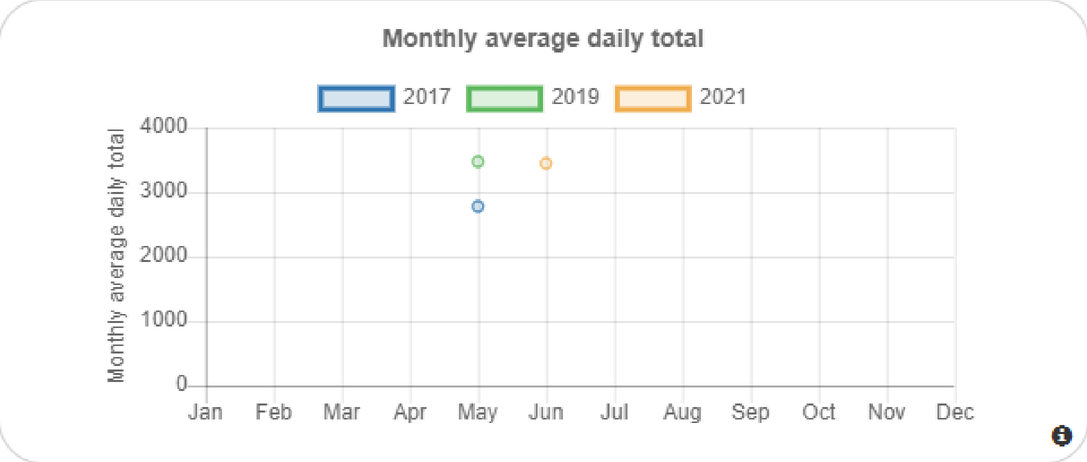
Annual Statistics

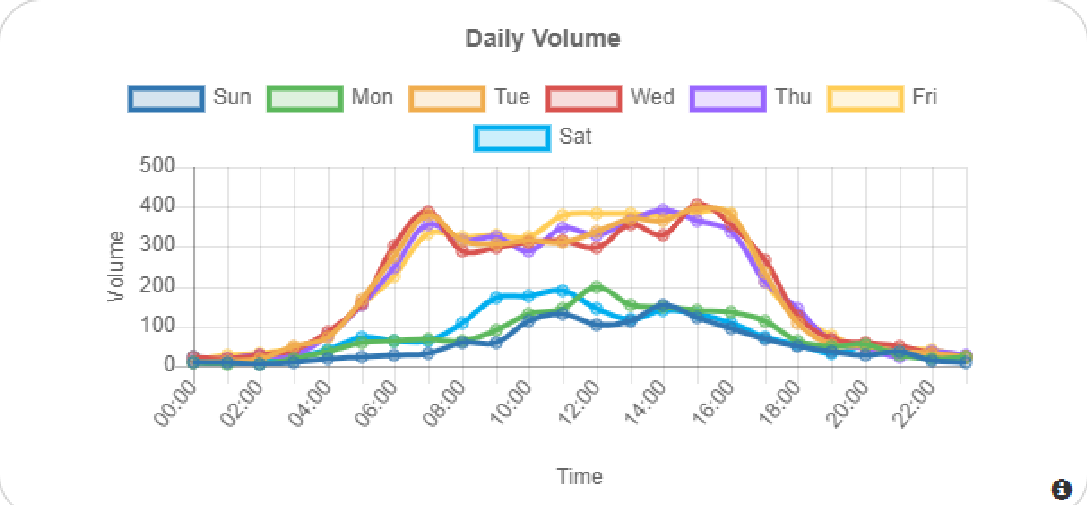
Data Item	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
AADT	1,836	-	-	-	-	2,918	-	3,505	-	3,373
% HV	26.6%	-	-	-	-	33.8%	-	39.9%	-	35.3%

TRAFFIC & CIVIL SERVICES

[redacted]







Appendix D – Crooked Billet Dr (Sth) AADT

Lot	GFA	Daily Trip Generation**	Peak Hour Trip Generation ***
	(m2)	(vpd)	(vph)
27	1,042	42	5.0
23	400	16	2.0
28	680	27	3.0
20	1,045	42	5.0
16	440	18	2.0
Total	**3,607**	**145**	**17**

** Assuming 4vpd / 100m2 of GFA
*** Assuming 0.5vph / 100m2 of GFA

Existing access to 1 & 13 Crooked Billet Drive

Current traffic movements are 12 vpd from Hazell's operation which correlates with the current vehicle storage permit.

Total Crooked Billet Drive (South) AADT

Estimated AADT is 145 vpd and 17 vph at peak times (Nov 2022) without the proposal.

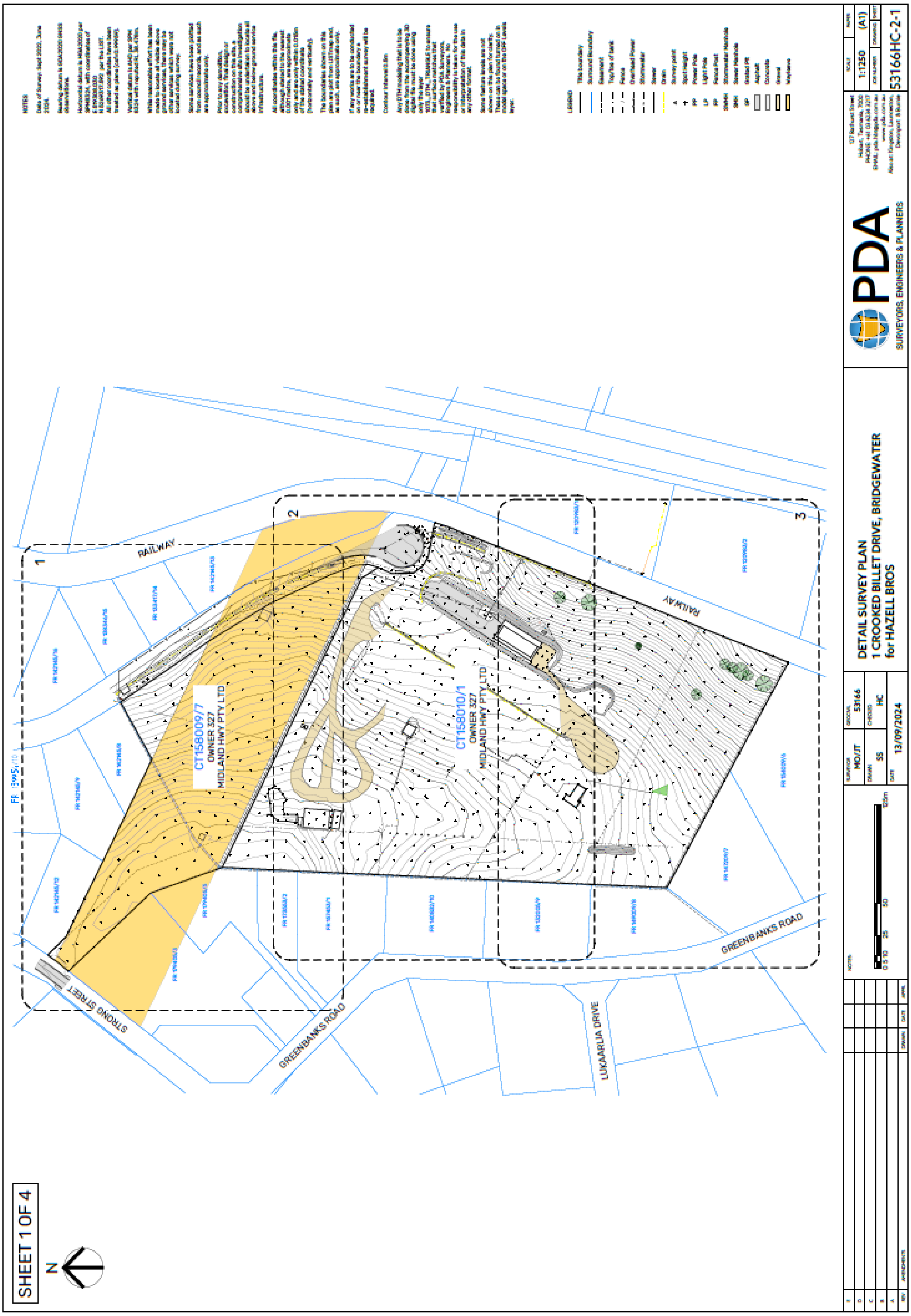
Appendix E – Level of Service Descriptions

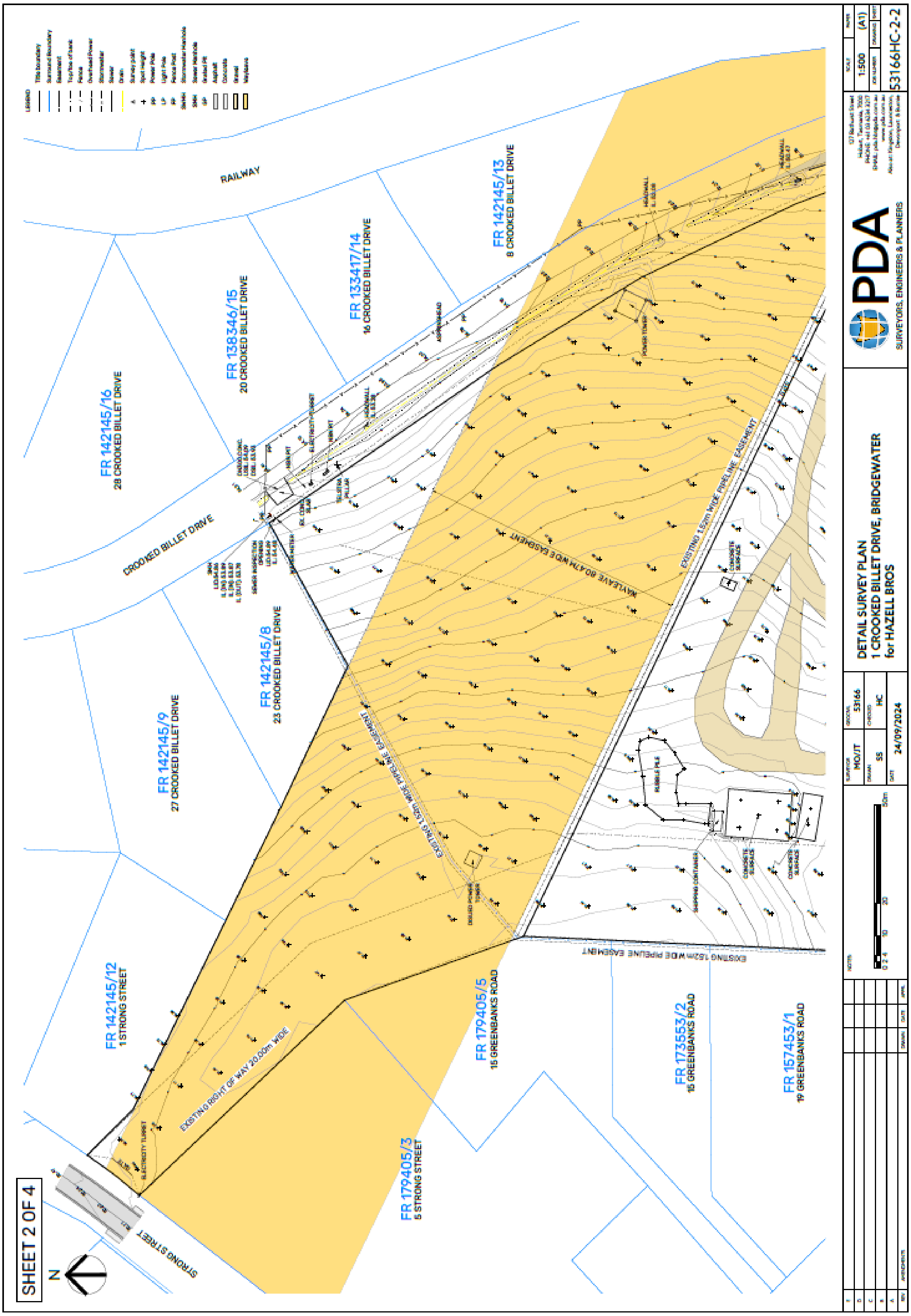
Level of service A	A condition of free-flow in which individual drivers are virtually unaffected by the presence of others in the traffic stream. Freedom to select desired speeds and to manoeuvre within the traffic stream is extremely high, and the general level of comfort and convenience provided is excellent.
Level of service B	In the zone of stable flow where drivers still have reasonable freedom to select their desired speed and to manoeuvre within the traffic stream. The general level of comfort and convenience is a little less than with level of service A.
Level of service C	Also in the zone of stable flow, but most drivers are restricted to some extent in their freedom to select their desired speed and to manoeuvre within the traffic stream. The general level of comfort and convenience declines noticeably at this level.
Level of service D	Close to the limit of stable flow and approaching unstable flow. All drivers are severely restricted in their freedom to select their desired speed and to manoeuvre within the traffic stream. The general level of comfort and convenience is poor, and small increases in traffic flow will generally cause operational problems.
Level of service E	Traffic volumes are at or close to capacity, and there is virtually no freedom to select desired speeds or to manoeuvre within the traffic stream. Flow is unstable and minor disturbances within the traffic stream will cause breakdown.
Level of service F	In the zone of forced flow, where the amount of traffic approaching the point under consideration exceeds that which can pass it. Flow breakdown occurs, and queuing and delays result.

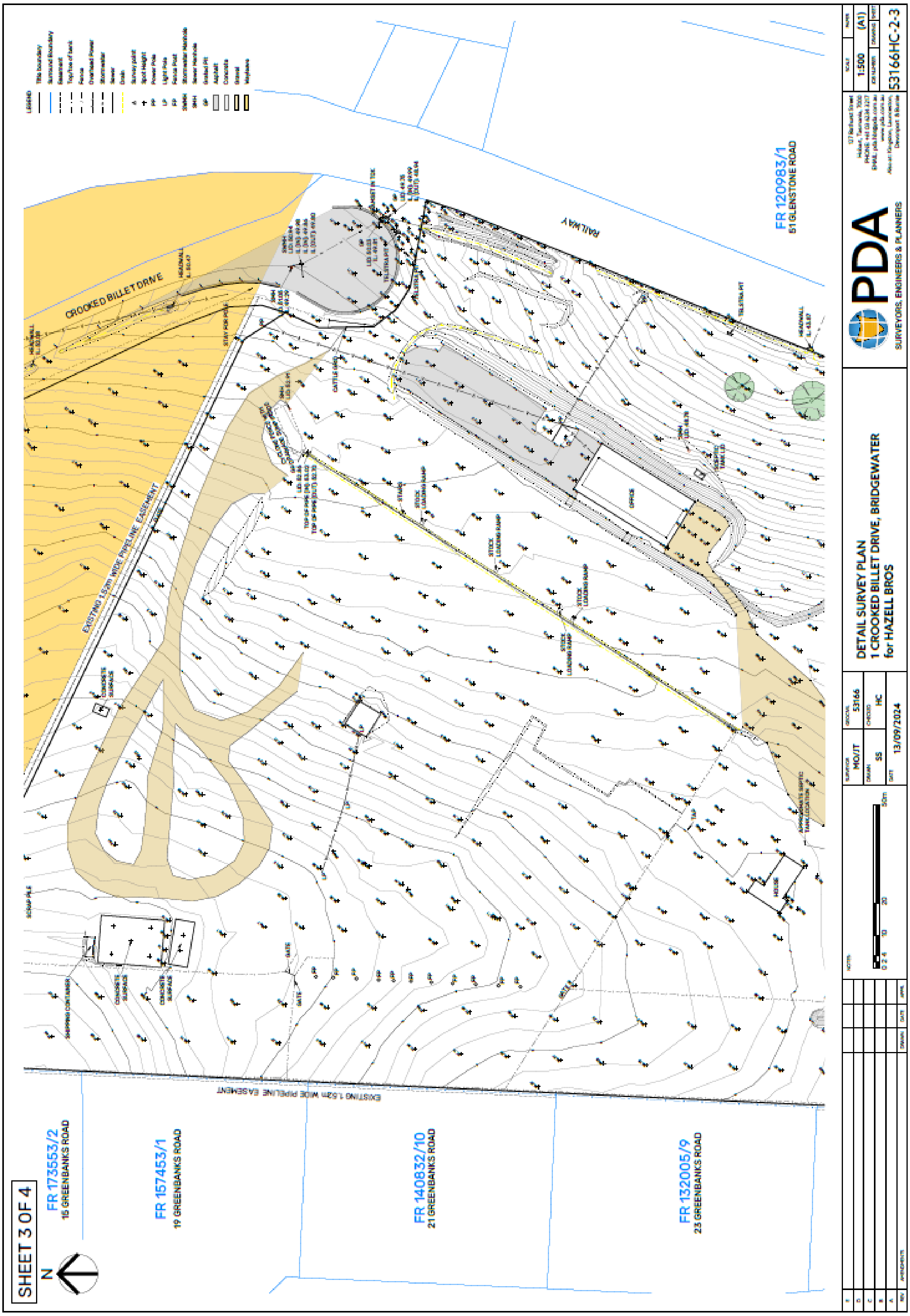
Appendix F – Plan of Subdivision

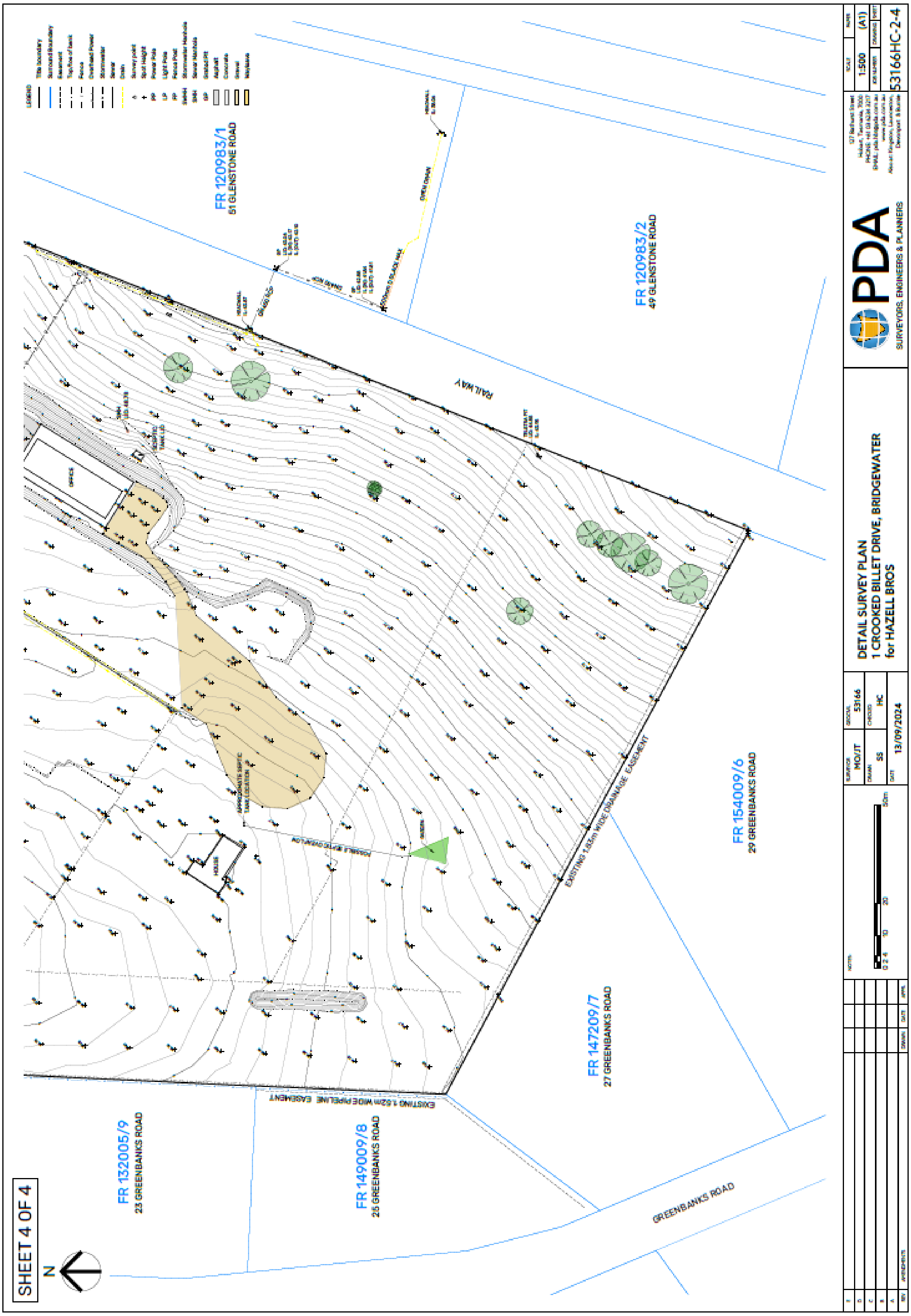
Not at this stage.

Appendix G – Detail Survey Plan



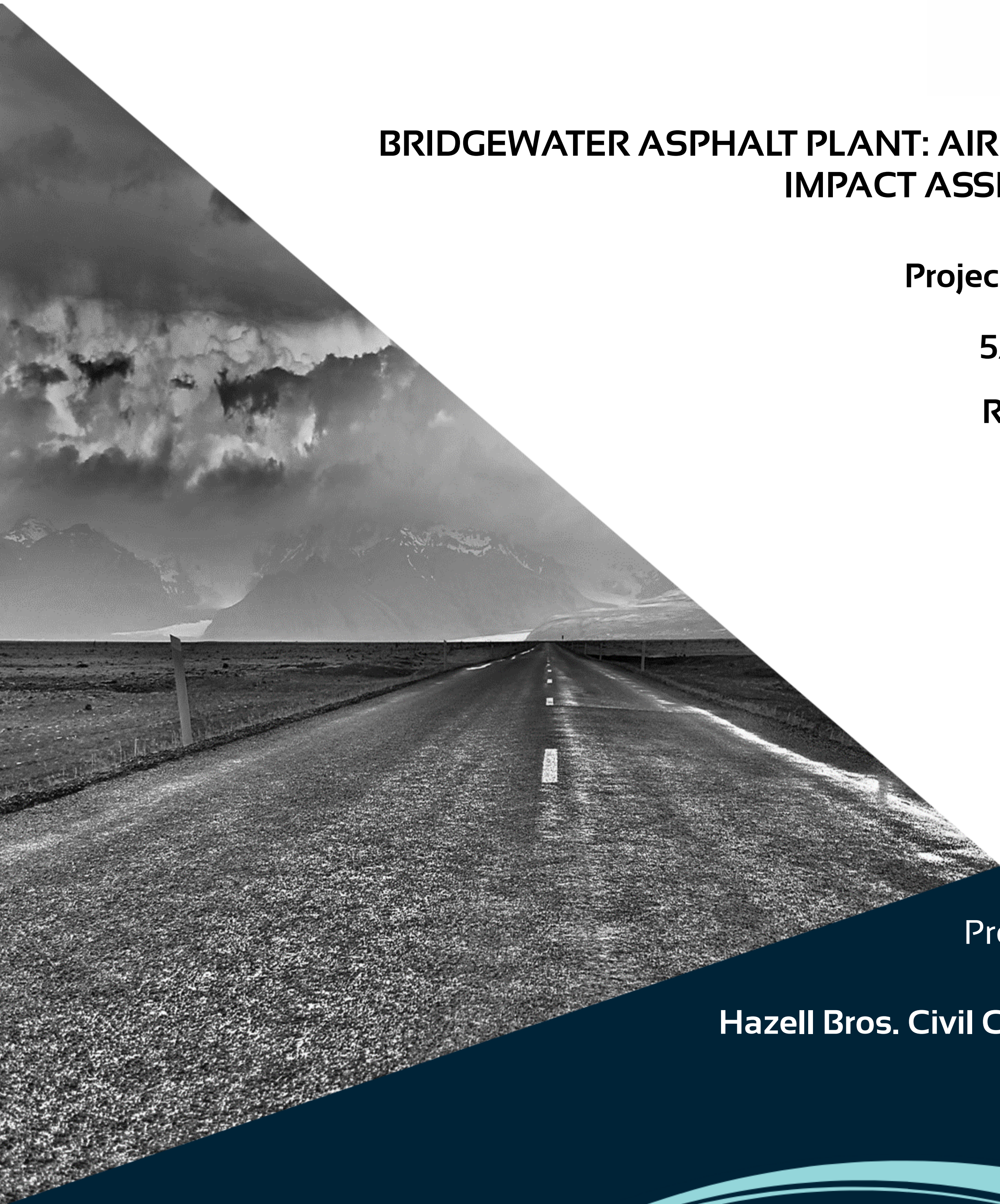

SHEET 2 OF 4
N
STRONG STREET
CROOKED BILLET DRIVE
RAILWAY
FR 142145/16
28 CROOKED BILLET DRIVE
FR 138346/15
20 CROOKED BILLET DRIVE
FR 133417/14
16 CROOKED BILLET DRIVE
FR 142145/13
8 CROOKED BILLET DRIVE
FR 142145/8
23 CROOKED BILLET DRIVE
FR 142145/9
27 CROOKED BILLET DRIVE
FR 142145/12
1 STRONG STREET
FR 179405/3
5 STRONG STREET
FR 179405/5
15 GREENBANKS ROAD
FR 173553/2
15 GREENBANKS ROAD
FR 157453/1
19 GREENBANKS ROAD
EXISTING RIGHT OF WAY 20.00m WIDE
EXISTING 1.52m WIDE PIPELINE EASEMENT
WAYLEAVE 80.47m WIDE EASEMENT
DETAIL SURVEY PLAN
1 CROOKED BILLET DRIVE, BRIDGEWATER
for HAZELL BROS
PDA
SURVEYORS, ENGINEERS & PLANNERS
1:500
(A1)
53166HC-2-2
24/09/2024


SHEET 3 OF 4
N
FR 173553/2
15 GREENBANKS ROAD
FR 157453/1
19 GREENBANKS ROAD
FR 140832/10
21 GREENBANKS ROAD
FR 132005/9
23 GREENBANKS ROAD
FR 120983/1
51 GLENSTONE ROAD
CROOKED BILLET DRIVE
RAILWAY
EXISTING 1.52m WIDE PIPELINE EASEMENT
DETAIL SURVEY PLAN
1 CROOKED BILLET DRIVE, BRIDGEWATER
for HAZELL BROS
PDA
SURVEYORS, ENGINEERS & PLANNERS
1:500
(A1)
53166HC-2-3
MO/JT
SS
53166
HC
13/09/2024



DETAIL SURVEY PLAN
1 CROOKED BILLET DRIVE, BRIDGEWATER
for HAZELL BROS
PDA
SURVEYORS, ENGINEERS & PLANNERS
53166HC-2-4
1:500
(A1)
53166
13/09/2024
SHEET 4 OF 4
N
FR 120983/1
51 GLENSTONE ROAD
FR 120983/2
49 GLENSTONE ROAD
RAILWAY
FR 154009/6
29 GREENBANKS ROAD
FR 147209/7
27 GREENBANKS ROAD
FR 149009/8
25 GREENBANKS ROAD
FR 132005/9
23 GREENBANKS ROAD
GREENBANKS ROAD
EXISTING 1.82m WIDE DRAINAGE EASEMENT
EXISTING 1.52m WIDE PIPELINE EASEMENT

Appendix 2 Air quality impact assessment



BRIDGEWATER ASPHALT PLANT: AIR QUALITY IMPACT ASSESSMENT

Project ID: 16586

5/09/2025

Release: R5

Prepared For:

Hazell Bros. Civil Contracting

Assured Environmental

DOCUMENT CONTROL PAGE

Project Title: BRIDGEWATER ASPHALT PLANT: AIR QUALITY IMPACT ASSESSMENT

Project Reference ID: 16586

Report Prepared by:

Assured Environmental
Unit 7, 142 Tennyson Memorial Avenue
Tennyson, QLD, 4105

Report Prepared for:

Hazell Bros. Civil Contracting
14 Farley St,
Glenorchy, QLD, 4174

B. Matalqah

Author: Baraa Matalqah

Michelle Cliffton

Reviewer: Michelle Clifton

Table 1: History of Revisions

Revision	Date	Issued to	Changes
R0	03/04/2025	I. Standaloft	Initial Release
R1	10/04/2025	I. Standaloft	Minor changes
R2	04/06/2025	I. Standaloft	Update the site boundary and CBP location
R3	13/06/2025	I. Standaloft	Update the site boundary
R4	28/08/2025	I. Standaloft	EPA comments
R5	5/09/2025	I. Standaloft	Minor changes

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GLOSSARY

°C	Degrees centigrade
Conversion of ppm to mg/m^3	Where R is the ideal gas constant; T, the temperature in kelvin (273.16 + T°C); and P, the pressure in mm Hg, the conversion is as follows: $mg\ m^3 = (P/RT) \times \text{Molecular weight} \times (\text{concentration in ppm})$ $= \dfrac{P \times \text{Molecular weight} \times (\text{concentration in ppm})}{62.4 \times (273.2 + T°C)}$ For the purposes of the air quality assessment all conversions were made at 0°C unless stated otherwise.
g/s	Grams per second.
g/m^2	Gram per metre square.
g/m^2/month	Gram per metre square per month.
ha	Hectares.
Hedonic Tone	A judgement of the relative pleasantness or unpleasantness of an odour
kg	Kilograms.
kg/annum	Kilograms per annum.
km	Kilometre
m	Metre.
m/s	Metres per second
mg/m^3	Milligrams (10-3) per cubic metre. Conversions from mg/m^3 to parts per volume concentrations (i.e., ppm) are calculated at 0 °C.
$\mu g/m^3$	Micrograms (10-6) per cubic metre. Conversions from $\mu g/m^3$ to parts per volume concentrations (i.e., ppb) are calculated at 0 °C.
Odour	The property of a substance which affects the sense of smell
Odour annoyance	The generation of one or more of a wide variety of responses due to the intensity and hedonic tone of an odour. Odour annoyance is generally considered to occur at levels of 5 - 10 times the detection threshold.
Odour character	The property that identifies an odour and differentiates it from another odour of equal intensity. The character of an odour results from the combination and concentration of compounds in a mixture.
Odour complaints	Odour complaints are formal acknowledgments of odour annoyance to a person and usually requires persistent or repeated odour annoyance over a considerable length of time.
Odour concentration	The concentration of the odorous gas relative to the concentration at the threshold of detection.
Odour emission rate (OER)	Total rate of emissions from an odour source expressed in units of odour units per unit time (ou/sec).
Odour intensity	An assessment of odour strength based on an initial perception. This perception will rapidly diminish with constant exposure.
Odour threshold	For individuals, the odour detection threshold is that concentration of an odorant above which the individual can smell the odorant and below which they cannot. Human odour sensitivity varies over a

	significant range; therefore, the odour threshold is defined as the level at which 50 % of the population can just detect the odour.
Odour Unit (OU)	An odour unit is a unit of measure of odour concentration. One odour unit is a number where a panel is presented odours in decreasing dilution (increasing concentration) until detection
Panel	A group of panel members (assessors who are qualified to judge samples of odorous gas, using dynamic olfactometry in accordance with AS 4323.3).
Percentile	The frequency of occurrence, for example the 99.5th percentile gives the value exceeded by 0.5% of the measurements or predictions.
Perception	Awareness of the effects of single or multi-sensory stimuli.
ppb	Parts per billion.
ppm	Parts per million.
PM_{10}, $PM_{2.5}$, PM_1	Fine particulate matter with an equivalent aerodynamic diameter of less than 10, 2.5 or 1 micrometres, respectively. Fine particulates are predominantly sourced from combustion processes. Vehicle emissions are a key source in urban environments.
Source odour emission rate (SOER)	Rate of emission from an odour source expressed in odour units per unit area per unit time (ou/sec).

ABBREVIATIONS

AHD	Australian Height Datum
AWS	Automatic Weather Stations
AMT	Accepted Modern Technology
BAT	Best Available Techniques
EIA	Environmental Impact Assessment
EIS	Environmental Impact Statement
EPA	Environmental Protection Authority
GLC	Ground Level Concentration
LPSs	Local Provisions Schedules
NEPC	National Environment Protection Council
NEPM	National Environment Protection (Ambient Air Quality) Measure
NOI	Notice of Intent
NPI	National Pollution Inventory
RAP	Reclaimed Asphalt Pavement
SOI	Southern Oscillation Index
SRTM	Shuttle Radar Topography Mission
tpa	Tonnes per annum
TPS	Tasmanian Planning Scheme

1 INTRODUCTION

1.1 Background

Hazell Bros. Civil Contracting Pty Ltd (herein referred to 'Hazell Bros.') intends to construct and operate an asphalt plant and reclaimed asphalt pavement (RAP) processing facility at 1 and 13 Crooked Billet Drive, Bridgewater, TAS, 7030 (the 'Subject Site').

The Subject Site will produce approximately 50,000 tonnes per annum (tpa) of asphalt, and approximately 5,000 tpa of RAP would be received and processed onsite. This will be a Level 2 Activity under Schedule 2 of the Environmental Management and Pollution Control Act 1994.

Hazell Bros. currently operates both wet and dry concrete batching plants on the Subject Site. The wet concrete batching plant is to be decommissioned and removed in mid-2025, whilst the dry concrete batching plant will be relocated onsite as part of the works occurring during the construction of the asphalt plant.

1.2 Scope of Works

Assured Environmental (AE) was engaged by Hazell Bros to undertake an air quality impact assessment for the proposed asphalt plant. In undertaking the assessment, reference has been made to the following regulations and guidelines:

- Environment Protection Authority (EPA, 2023). Guidelines for Preparing an Environmental Impact Statement;
- Environment Protection Authority (EPA, 2020). *Atmospheric Dispersion Modelling Guidelines*; and
- Environment Protection Authority Broad Statement (EPA, 2022). Update to Air Pollutant Design Criteria used in the Environmental Impact Assessment Process.

In accordance with the requirements of the above guidelines, computational modelling have been undertaken to assess the potential for adverse amenity and health impacts as a result of the proposed development.

1.3 Project Specific Guidelines

This assessment has been prepared in accordance with the Environmental Impact statement (EIS) Project Specific Guidelines for *Hazell Bros Civil Contracting Pty Ltd Asphalt and Reclaimed Asphalt Pavement (RAP) Processing Plant, 1 Crooked Billet Drive, Bridgewater*, dated July 2024. The required information relating to the air quality impact assessment and the corresponding location of information within the report are listed in Table 2.

Table 2: Project Specific Guidelines

Item	Terms of Reference Requirements	Section in Report
Existing Environment		
1	Provide a site map that includes the land boundary and the location of nearest sensitive receptors	Section 6
2	Describe the existing environment including climatic/meteorological conditions, terrain, land use and air quality in the vicinity of the proposal.	Section 6 & Section 8

Item	Terms of Reference Requirements	Section in Report
Assessment		
3	Provide a figure showing the locations and names of all potential sources of atmospheric emissions from the proposed activity	Section 3 & Section 4
4	Describe all potential sources (point and fugitive) of atmospheric emissions and the composition of the atmospheric emissions, including odour and dust, that may arise from activity on the site as well as from loading, unloading, and transport of materials. This includes but is not limited to emissions generated from raw materials, the production plant, storage of product, heating/mixing of bituminous materials as well as processing Reclaimed Asphalt Pavement (RAP). Include emission sources associated with construction.	Section 3, Section 4 & Section 5
5	Provide detailed description of RAP, including its origin, composition, and the likely timing of the year for processing campaigns	Section 2
6	Describe and assess the potential impacts of the atmospheric emissions from the different stages of the production process (including preparation, storage of raw material and handling the product) on the environment in a context of the existing environment (local meteorology, terrain) and land use (particularly proximity of sensitive receptors). The assessment should cover a variety of conditions including worst case scenario and upset conditions. It should contain information about the time of day, duration, and frequency of the atmospheric emissions from the facility to establish suitable parameters for air dispersion modelling.	Section 3, Section 4 & Section 5
7	Provide results of atmospheric dispersion modelling of air emissions from the facility and an assessment of impacts of emissions from all potential sources associated with the proposed activity against the requirements of the Tasmanian Environment Protection Policy Air) and any supplementary documents (including the Board Statement Jan 2022). Modelling by a suitably qualified specialist must be conducted in accordance with EPA's Atmospheric Dispersion Modelling Guidelines. The modelling should use conservative emission rates and should consider various possible scenarios of operation of the facility. It is recommended that the scope and method of atmospheric dispersion modelling be discussed with the EPA's Air Modelling Officer prior to the commencement of any modelling work.	Section 11
8	Describe climate change projections relevant to the project area, and how the future climate may change the local meteorology and impact of air emissions from the proposal.	Section 9
9	Demonstrate that the assessment is consistent with the requirements of the Tasmanian Environment Protection Policy (Air Quality) 200412 and any supplementary documents (including the Board Statement Jan 2022).	Section 7
Avoidance and Mitigation Measures		
10	Describe measures to be implemented to mitigate the impact of all atmospheric emissions from the site that may cause environmental nuisance or harm at or beyond the site boundary.	Section 3, Section 4 & Section 5
11	Demonstrate application of Accepted Modern Technology (AMT) for reduction of unavoidable emissions. All emission management measures to be employed should be described in detail.	Section 3, Section 4 & Section 5

1.4 Tasmania EPA October 2024 EIS Table of Issues

In December 2024, the EPA Tasmania released the final Table of Issues requiring resolution in relation to the initial EIS submitted for the Subject Site. AE has reviewed the issues relevant to the previous assessment report and prepared updates to the assessment accordingly. A summary of these is provided in Table 3.

Table 3: EIS Table of Issues

Issue No.	Issue of Resolution	AE Response
7	Table 10. Typo in PM_{10} 1-year Average 2016. It should be 10.6.	Now Table 26 has been updated with the correct value.
8	Substances such as heavy metals, polycyclic aromatic hydrocarbons (PAHs), and volatile organic compounds (VOCs) cannot be referred to as parameters. Please revise the text (also on pages 37, 41 (Section 5.1.3.3), and 42 (Section 5.1.3.4) and page 43 of Appendix 2) using an appropriate term such as 'potential other emissions/emissions sources'. The plant components listed as contributing to air emissions need to be clearly marked in the site map.	The term 'potential other emissions/emission sources' is used in Sections 3 and 11.5. The potential emission sources associated with the asphalt plant and the concrete batch plant are presented in Figure 3 (Section 3) and Figure 6 (Section 4), respectively.
9	Please note the Air EPP states: 'when modelled in accordance with the requirements of this Policy, emissions of a pollutant should not cause design criteria for that pollutant, as specified in Schedule 2, to be exceeded at or beyond the boundary of the land on which the industrial activity is located'. The criteria are not applied at sensitive receptors. Please amend all incorrect references (in both text and tables) to criteria and compliance at sensitive receptors.	Revised criteria have been updated on Sections 7 and 11. Odour criteria has been applied at or beyond the boundary, while the potential other emissions have been applied at the sensitive receptors.
20 & 27	The model needs to be reviewed and updated to address the issues raised in the comments. Correct parameters, including emission sources and their emission rates should be used. The relevant information regarding derivation of these emission rates should be provided. The results presented in the documentation should be checked for consistency to ensure correct and accurate information is provided. The modelling results for particulate matter (PM) should be presented both with and without background levels. As it stated in the PSGs, "It is recommended that the scope and method of atmospheric dispersion modelling be discussed with the EPA's Air Modelling Officer prior to the commencement of any modelling work." Additionally, a correct interpretation of the relevant Air EPP criteria must be provided when assessing the potential impact of emissions from the facility. Any results indicating non-compliance should be thoroughly discussed. Incorrect interpretation of the relevant Air EPP criteria. The criteria are applied at or beyond the boundary of a	All emission rates and air dispersion models have been reviewed, as detailed in Sections 3 and 4. The modelling results for particulate matter are presented both with and without background concentrations, as provided in Section 11. The assessment locations for each pollutant are identified in sections 7 and 11.

Issue No.	Issue of Resolution	AE Response
	facility not at sensitive receptors. There are no criteria for sensitive receptors. Please amend all references (in both text and tables) to criteria and compliance at sensitive receptors.	
26	The figure (Appendix 2 9.4, Figure 6) is too small and does not include all the air emission sources listed in the section 9.3 (Dryer stack, main stack, raw material loading area, conveyor belts, filler silo, Cationic Emulsion storage tank, RAP stockpiles). Clarify if the baghouse, dryer stack and main stack share same emission point. Amend the figure.	The site layout is provided in Appendix A. Potential emission sources are detailed in Sections 3 and 4 and presented in figures and tables.

1.5 Tasmania EPA July 2025 EIS Table of Issues

AE has reviewed the previous revision of this assessment report and released the final Table of Issues requiring resolution in relation to the EIS submitted for the Subject Site. AE has reviewed the issues relevant to this assessment report and prepared updates to the assessment accordingly. A summary of these is provided in Table 4.

Table 4: EIS Table of Issues

Issue No.	Issue of Resolution	AE Response
9	No upset conditions associated with equipment malfunction; material handling or process upsets have been considered. No measures to prevent potential upset conditions have been described. Conclusion is based only on the results of modelling for normal conditions. Please address.	The asphalt plant will be operated using an automated control system with built-in safety parameters to minimise the likelihood of upset conditions and to protect equipment and environmental performance. Refer to Section 3.5 for detailed information.
10	It is unclear whether the following all refer to the same emission source: Baghouse filter (E2) (p.20), filler silo-baghouse filter (E2) (Table 6), E2 in Figure 2, baghouse filter (Emission point reference E2) (p.23), and filler silo filling (Section 3.4.3, p.29). Please clarify whether these are all the same source or if they refer to different components.	E2 refers to the imported filler silo- which has its own stand-alone small bag house filter on top of the silo. The Main primary baghouse filter for the plant directly runs via the main exhaust fan and discharges via the exhaust stack E1. All relevant tables and figures have been updated.
11	Clarify the location of the emission discharge point of the "baghouse filter (Emission point reference E2)". Figure 1 and Figure 2 (top diagram) suggest the baghouse filter is connected to emission source E1, therefore the discharge point would be E1. However, Figure 2 bottom suggests E2 has a separate discharge point from E1.	
12	Please provide the manufacturer-supplied information for the dryer stack parameters. Table 7 - Emission rates for PAHs expressed as BaP equivalents are incorrect, in fact over four thousand times lower than estimated. Correct emission rates should be calculated and modelling results amended. Table 8 - Justify the modification of the odour emission rate based on wet standard stack flow rate of 760.8 Nm^3/min when moisture content is of 32.5%.	Exhaust (dryer) stack specifications have been provided in Appendix A. The emission rate for total PAH as B(a)P equivalent has been recalculated and updated as per Table 8. Odour emission rates from the dryer (exhaust) stack have been recalculated

Issue No.	Issue of Resolution	AE Response
	Include odour emission for 0% RAP (i.e. asphalt production without RAP).	based on a new flue gas moisture content of 20%, as provided by Hazell Bros and backed up emissions testing at similar facilities in Tasmania. More explanation about odour emissions from the exhaust stack and the modelled emission rate has been provided on Section 3.4 (Table 9). According to ASTEC, the change in the moisture content increased the emission rate of PM to 0.73 kg/hr (compared to 0.62 kg/hr in the previous assessment R3). Accordingly, the emission rates for PM_{10} and $PM_{2.5}$ from the exhaust stack have been updated and the modelling results and contours have also been revised.
13	Inconsistency between the AQ and the model input file. AQ stated "emissions from the loading of bitumen into storage tanks were modelled for two hours a day at 8 am on Monday and Thursday". However, the tanks were modelled for one hour a day on Monday and Thursday. Please clarify. Table 9 - odour emissions from deliveries are low compared with the previous EIS modelling. Please justify.	The unloading is done maximum for 4 times a week, with 30 min per load. Meaning 2 hours a week. The model is correct, the statement in the report has been modified. Odour emissions in this report are calculated after applying 80% reduction for carbon filter.
14	Figure 9 in main EIS (p20) shows only one imported filler silo (16), whereas table 10 refers to two silos. Amend or explain the discrepancy.	The emissions point in the main EIS was unclear and has been corrected by Hazel Bros. Only one baghouse filter will be installed at the imported filler silo. Modelling approach and results have been modified.
15	Table 11 - provide justification (more information) for the odour concentrations and emission rates during truck load out.	More explanation about odour emissions and the modelled emission rate has been provided on Section 3.4.4.
16	Table 13 - dust emission rates are lower than used in the previous modelling (EISv1). Please justify.	The site plan has been changed compared to the previous assessment.
17	Table 14 - the areas are smaller and emission rates lower than in previous modelling (EISv1). Please justify.	
18	Table 28 - TAPM model did not include 300 m spaced grid. CALMET version was 6.x not 7.0.	The data has been corrected as per Table 29
19	The description of receptors at distances (e.g. 200m at 20m intervals) is confusing. Please clarify.	Typo. The description has been paraphrased.
20	Tables 30-37 - some of the maximum concentrations presented in the tables appear to occur at the site boundary rather than beyond it (e.g. lead). However, as the extent of the area shown in the figures (App E and F) is limited, it is unclear whether maximum concentrations beyond the boundary have been fully	The maximum predicted concentration at the off-site receptors have been included in the report. Maximum GLC recorded at the sensitive receptors are included in Appendix H.

Issue No.	Issue of Resolution	AE Response
	captured. As the policy applies at or beyond the boundary, the results should be reviewed and relevant sections amended accordingly, if necessary.	
21	Clarify whether the results of asphalt plant and concrete batch plant presented in the Table 31 and 32 are without background.	The tables have been modified
22	It is noted that the NEPM criteria for chemical compounds are reported in ppm. If concentrations are presented, they must be expressed as at 1 atm and 25 °C, not at 0 °C.	NEPM criteria has been recalculated at 1 atm and 25 °C (Table 24)
23	Table 39 - for reference, state the information source for the PM emission rates, particularly for RAP screening, aggregate transfer and truck loading.	All references have been included in the table (now Table 41).
24	Comment: Land use is considered to be crude. More accurate data could lead to different results.	The land use in our CALMET setup was derived the List zoning. It has been agreed with the EPA that a specific area is considered crude and this area does not include any sensitive receptors so it will not affect the assessment results.

1.6 This Report

This report summarises the methodology, results, and conclusions of the air quality impact assessment.

The changes made to this revised are made based on the EPA comments listed on Table 4.

2 BRIDGEWATER OPERATIONS

2.1 Site Infrastructure

A summary of the existing and proposed Subject Site infrastructure is provided in Table 5.

Table 5: Existing and Proposed Site Infrastructure

Process	Existing	Proposed	Production capacity	Operating hours
Concrete batching plant: wet	Yes	No	-	-
Concrete batching plant: dry	Yes	Yes, existing plant to be relocated	400 m^3/day	24 hours a day, 7 days a week
Asphalt plant	No	Yes	50,000 tpa 160 tonnes per hour	24 hours a day, 7 days a week

2.2 Concrete Batching Plant

Hazell Bros. currently owns and operates a concrete batching plant on the northern portion of the Subject Site. This includes both a wet and a dry batch plant and supporting infrastructure for each, namely:

- Raw material stockpiles;
- Front end loaders;
- In-feed bins;
- Belt conveyors;
- Storage silos (with attached dust filters);
- Mixing chambers;
- Loading areas; and
- Washing areas.

Both the wet and dry ends of the existing concrete batch plant operate with similar processes as follows:

- Raw materials (sand, aggregates, etc.) are loaded from stockpiles into in-feed bins using a front-end loader.
- The material is deposited onto an enclosed belt conveyor by a hopper.
- The enclosed belt conveyor transports the raw materials into a mixing chamber where they are combined with other inputs such as water, cement, and fly ash.
- The mixed material is then loaded into trucks via another hopper.

AE has been advised that the existing concrete batch plant has an existing consent that permits the operation of the facility 24/7.

2.3 Asphalt Plant

The primary infrastructure associated with the plant is presented in Figure 1 and described as:

- Virgin Material Feeders/Hoppers: Cold feeders bulk-feed virgin aggregates and sand into the Asphalt plant via front-end loaders. The loaders transport materials to labelled hoppers, which must remain more than half full during operation. The hoppers discharge material at varying rates based on the Asphalt recipe. Materials typically include sand and various aggregates (5mm, 7mm, 10mm, 14mm, 20mm). Each hopper's conveyor belt is calibrated for material density and moisture, delivering the combined materials to the Rotary Dryer.

- Rotary Dryer: The Rotary Dryer is a rotating, inclined drum that uses internal flights and lifters to lift and veil incoming virgin materials. A controlled burner flame heats the materials, drying moisture and superheating them to 160-240°C, depending on the asphalt product. The burner can run on either Natural Gas or XLS-Diesel. After exiting the dryer at the desired temperature, the material is elevated by a virgin enclosed bucket elevator, which uses rotating buckets to transport the material to the top of the plant. The material is then discharged into the enclosed screen house, where the material passes over the screen deck.

- Baghouse Dust Extractor: The Baghouse dust extractor filters exhaust air from the rotary dryer. Suction from an exhaust air fan provides oxygen for combustion while extracting fine particles from the drying process. The air passes through high-temperature meta-aramid bags, capturing particulates before clean air and steam are released through the plant exhaust stack. The captured particulates are stored in a sealed silo and metered back into the asphalt mix as part of the recipe.

- Hot Screen: Heated virgin materials are re-screened into refined fractions at the top of the asphalt plant before being stored in the hot aggregate silos. The materials are screened into the following fractions:

  - Fines: 0-3.5mm
  - 7mm: 3.6mm-7mm
  - 10mm: 7mm-10mm
  - 14mm: 10mm-14mm
  - 20mm: 14mm-20mm
  - Oversize: Foreign or oversize material is rejected and sent to a separate disposal chute.

- Hot Aggregate Storage Silo: The hot aggregate storage silos are individual units where hot, dry material is stored before the next stage of the process. Up until this point, the entire process is continuous, with material being constantly fed, conveyed, dried, elevated, and stored.

- Mineral Scale: The Mineral Scale is a calibrated weigh hopper used to weigh hot stored materials according to the selected mix design. A full batch, typically 2-3 tonnes, is created by weighing materials such as fines, 7mm, and 10mm aggregates until the desired weights are achieved. In parallel, other materials are weighed, including Bitumen Weigh Scale, Mineral Filler Scale, RAP Weigh Belt Scale and Granular Additive Weigh Scale. Once all components are weighed to the required recipe, they are discharged into the pug mill mixer.

- Pug Mill Mixer: The Pug Mill Mixer is a twin shaft counter rotating mixing chamber where all materials in the recipe are combined to produce a homogeneous asphalt product. The mixing cycle typically lasts between 45 to 60 seconds. Once mixed, the finished asphalt is discharged into one of three designated hot asphalt storage silos, ready for loading.

- Hot Asphalt Storage - Load Out: The hot asphalt storage system consists of two 45-tonne silos and one 6-tonne silo, allowing different mixes or quantities to be stored for loading into customer vehicles. The large silos are designed to hold enough asphalt to fully load a truck and trailer, with the ability to store the mix for several hours without temperature loss. Upon truck arrival, it is weighed on an inground weighbridge. The truck is then inspected and temperature-checked at the laboratory sampling stand before departure.

- Bitumen Storage Tanks Overview: The Bitumen Storage system consists of four 60 m^3 vertical tanks, insulated and cladded with electrical base heating, located within a concrete bund area. Bitumen is received by road tanker (25,000 litres per load) and pumped into the tanks, where it is stored at 165°C. The bitumen is then fed to the batching plant through heated and insulated pipework, weighed, and incorporated into the asphalt recipe. Since bitumen is pumpable only above 150°C, the tanks feature a breather pipe to vent air, connected to an activated carbon filter to capture vapours and odours before being released into the atmosphere.

- Imported Filler Silo: Imported filler, typically hydrated lime, is received by road pneumatic tanker and pumped into a 60 m^3 vertical silo for storage. The filler is then elevated by an enclosed bucket elevator to a small holding hopper, where it is augured to the filler weigh scale. The weigh scale, controlled by the batching computer, measures the filler as part of the asphalt recipe.

- Reclaimed Filler: Reclaimed filler consists of fine particulates captured by the baghouse filter system. These fines are elevated via an enclosed bucket elevator into a small, enclosed holding hopper, where they are augured to the filler weigh scale as needed, based on the batching computer, as part of the asphalt recipe.

- Granular Additives Addition Hopper: Granular additives, such as cellulose fibre (used in SMA mixes) and crumb rubber (from recycled truck tires), are added in small quantities to specific asphalt mixes. These materials are elevated by an enclosed bucket elevator to a small holding hopper, where they are augured and weighed using the additive weigh scale. Typically, only one additive is used per mix design. The additives are introduced cold into the pug mill mixer, where they mix with the heated virgin materials to form the final asphalt mix.

- Process Oil: The process oil system uses a liquid dosing pump to add an oxidising agent (Recosol 185) to the bitumen weigh scale when producing Cold Mixed Asphalt. This type of asphalt is made at lower temperatures than standard hot mix asphalt. The additive slows the oxidising process of the binder, extending the asphalt's usability in smaller quantities for applications like potholes and temporary trench reinstatements.

- RAP Feeder Hopper: The old, aged asphalt pavements and any waste asphalt produced is stockpiled and re screened to generate controllable fractionated RAP with a known particle size distribution and known residual binder content. The processed RAP is fed into a hopper by a front-end loader, metered via a conveyor belt, and elevated to a holding hopper using an enclosed bucket elevator. When needed, RAP is metered directly into the pug mill mixer via a weigh belt to meet the recipe requirements. The plant can handle up to 30% RAP in the asphalt mix.

The RAP processing facility is capable of receiving and processing (screening) up to 5,000 tpa of RAP. However, the actual intake may fluctuate based on project-specific requirements. RAP is typically obtained from deep lift type pavements, which allows for better material quality due to reduced contamination from base and sub-base layers. The sustainable intake for RAP is estimated at 10% of the total asphalt volume within the Greater Hobart area.

The area designated for RAP stockpiles allows for up to 5,000 tonnes of material, with an average stockpile height of 3 m and a material density of 2.4 tonnes per m^3. The stockpiling area includes a boundary buffer to manage site constraints and ensure compliance with environmental regulations.

The facility plans to conduct two processing campaigns per annum, however, there is no set RAP time periods. The intention is as the unprocessed RAP stockpile builds up to around 2-3,000 tpa, the mobile screener will be mobilised and the available material will be processed using the asphalt plant front end loader, the finished two fractions being fine and coarse, are then stockpiled in the designated storage bays ready to be tested and then used within the new asphalt, as the RAP material is consumed and the unprocessed stockpile builds, the process will be repeated again as necessary.

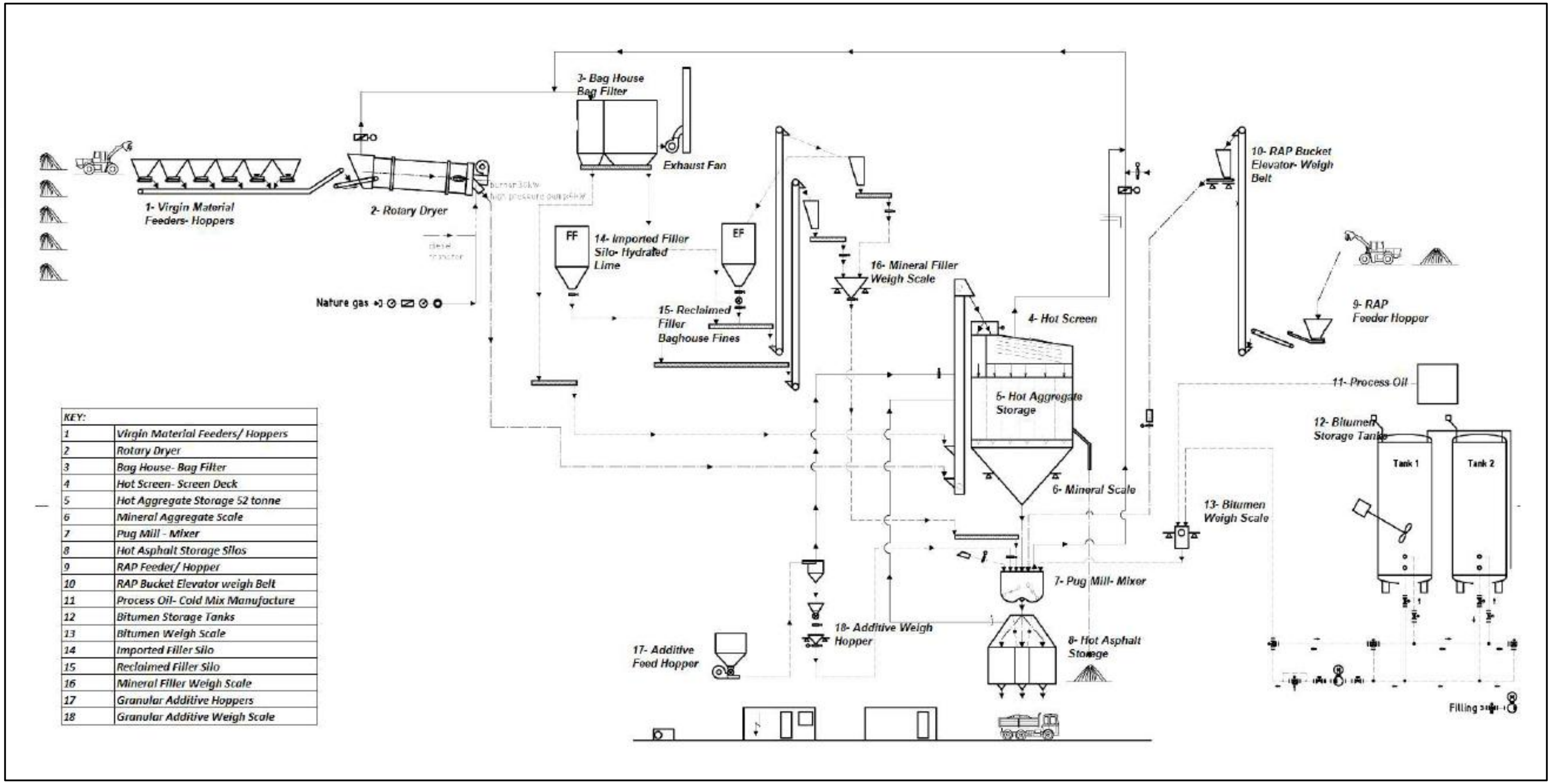


Figure 1: Process Flow Diagram Asphalt Plant (Source: Hazell Bros.)

3 AIR EMISSIONS QUANTIFICATION: ASPHALT PLANT - OPERATIONAL PHASE

3.1 Asphalt Plant

The proposed plant is an ASTEC BG2200XL, rated at 160 tonnes per hour (t/h) with a nominal 5% moisture content. The plant will have the capacity to incorporate recycled materials within the finished asphalt products. The plant specifications are listed in Table 6.

Table 6: Plant Specifications

Aspect	Specifications
Operating hours	The asphalt plant will operate at irregular hours depending on individual campaigns. For this assessment, it is assumed that the facility will operate 24 hrs a day, 7 days a week.
Capacity	160 t/h
Asphalt production	50,000 tpa
RAP processed	5,000 tpa - screening and material transfers
Fuel type	Natural gas or XLS-diesel

It is worth noting that XLS-Diesel is a low-sulphur diesel fuel that has been refined for cleaner combustion and is designed to meet stringent environmental standards by reducing emissions of sulphur compounds. However, natural gas is cleaner burning and produces fewer emissions compared to diesel and hence reduce the clog and maintenance of the meta-aramid filter bags.

The proposed plant includes several major units that could contribute to air emissions (it should be noted that E references relate to Figure 2):

- Material feeders/ hoppers;
- Exhaust stack (E1);
- Imported filler silo baghouse filter (E2);
- Hot screen;
- Hot aggregate storage silo;
- Mineral scale;
- Pug mill mixer;
- Hot asphalt storage- load out (E4); and
- Bitumen tanks carbon filter (E3).

Table 7 summarises the sources and types of emissions from the proposed Asphalt Plant operations. Figure 2 presents the exhaust gas flow with the point emission sources from the proposed Asphalt Plant.

Table 7: Summary of Potential Emissions

Potential Emissions Source	Activity	Potential Emission	Mitigation Measure
Exhaust stack (E1), imported filler silo-bag house (E2)	Fine particles from aggregates, fillers, and RAP.	Particulate matter	Bag house will filter most of the particles.
Bitumen tanks carbon filter (E3), bitumen tank filling, process oil system, exhaust stack (E1)	VOCs may be released from bitumen evaporation and the addition of oxidising agents during cold mix asphalt production.	Volatile Organic Compounds (VOCs) and odour	Activated carbon filter will be installed at the vents of the bitumen tanks
Exhaust stack (E1)	Formed during combustion in the Rotary Dryer.	Combustion gases (Nitrogen Oxides (NOx), Carbon Monoxide (CO) and Sulphur Dioxide (SO_2))	Low-sulphur diesel and natural gas will be used. Both fuels are considered environmentally friendly in terms of reducing air pollutant emissions, particularly sulphur dioxide, particulate matter and nitrogen oxides (NO_x), compared to conventional diesel.
Material Transfer Points (conveyors, feeders, elevators, and hoppers)	Particulate can be emitted during the handling, transfer, and loading/unloading of virgin materials, aggregates, and RAP.	Particulate matter	All conveyors are enclosed
Vehicle Movement on Paved Roads	Particulate can be generated when vehicles and equipment move over paved roads.	Particulate matter	All roads will be paved
Wind Erosion from Stockpiles	Particulate matter can be blown off the stockpiles during windy conditions	Particulate matter	Bunkers

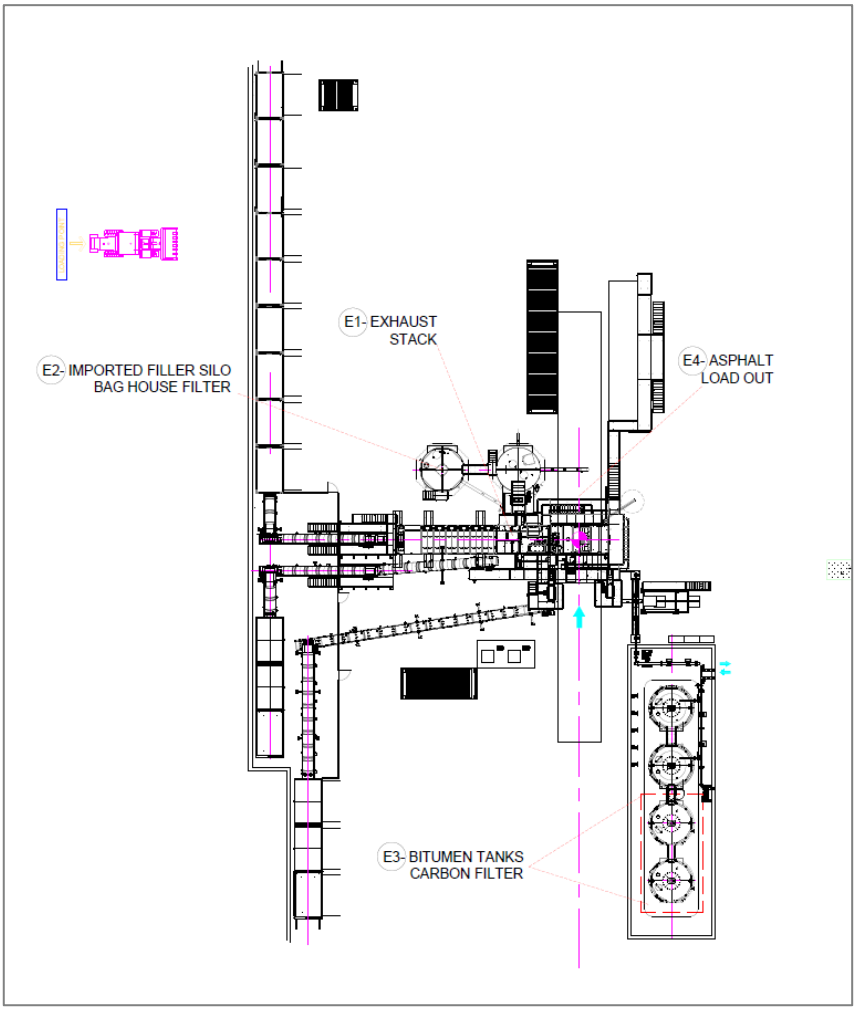


Figure 2: Exhaust Gas Flow and Emission Points

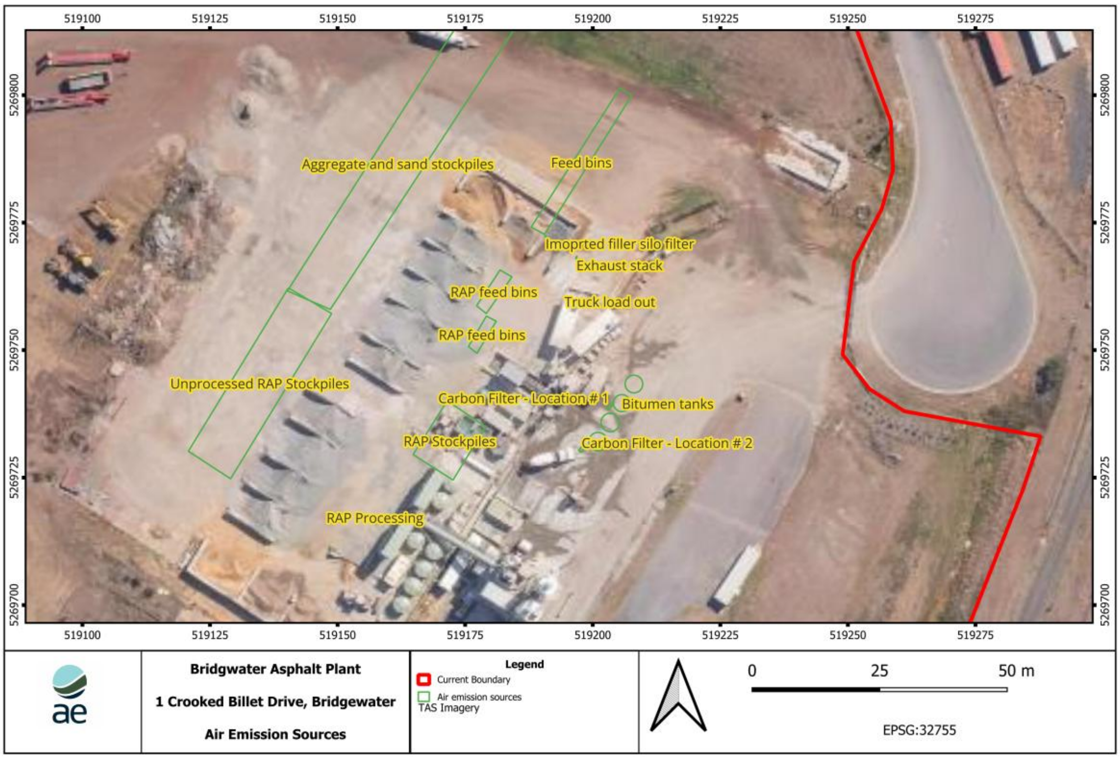


Figure 3: Potential Air Emission Sources

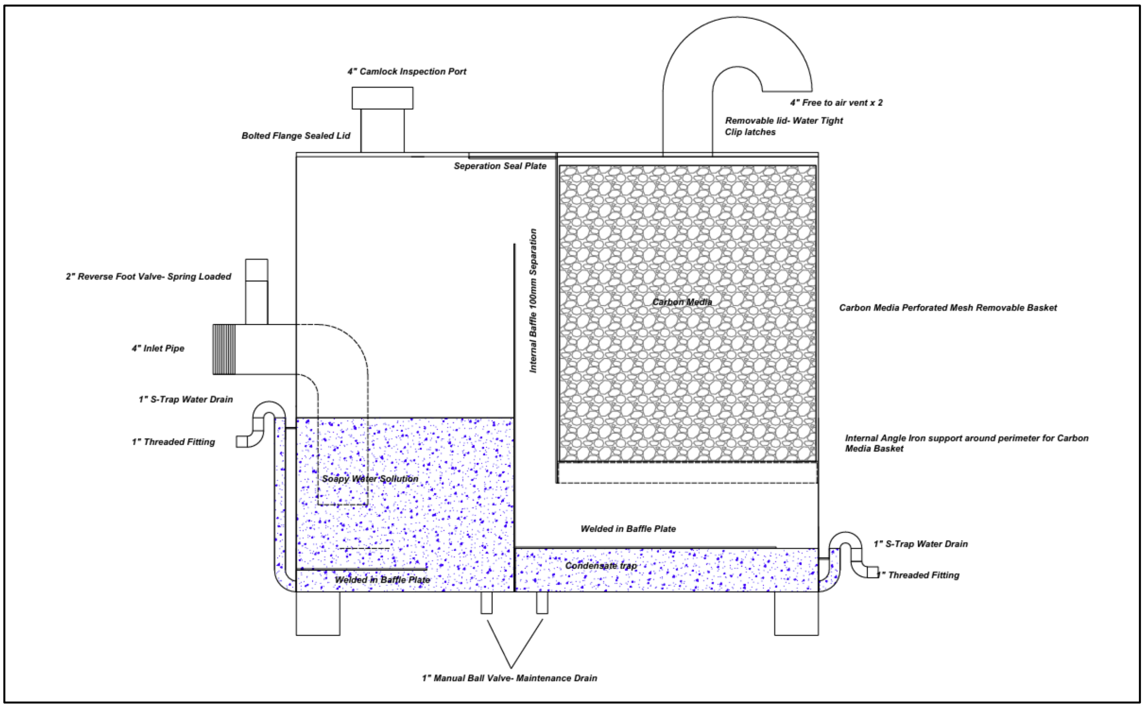
3.2 Management Emission Measures

To minimise dust and odours emissions from the facility, the following units will be installed:

- **Baghouse filter (Emission point reference E1 and E2):** The Main primary bag house filter for the plant directly runs via the main exhaust fan and discharges via the exhaust stack (E1). The imported filler silo has its own stand-alone small bag house filter (E2) on top of the silo. As the silo is filled with hydrated lime via a pneumatic road tanker, the filter allows filtration of the displacement air exiting the silo as product is filling the silo. The baghouse utilises two-stage filtration with a primary collector which separates coarse material from the gas stream and protects the bags from abrasion. The dust-laden gas then enters the baghouse where the dust collects on the heat-resistant meta-aramid bags. Pneumatically operated cylinders clean bags a row at a time. Collected dust can be stored or returned to the mix.

- **Activated carbon filter (Emission point reference E3)** is a highly effective method for removing odorous compounds from exhaust gases. This technology utilises installing of activated carbon to adsorb volatile organic compounds (VOCs) and other odorous substances released during the breathing operations from the bitumen tanks.

  Four bitumen tanks with capacity of 60 m^3 each will be installed at the Subject Site. All tanks will be connected to a single carbon filter. The four tanks have an interconnected breather system that feeds through to the activated carbon filter as a single point of discharge. The activated carbon filter has 2 x 4-inch outlets to prevent the system from being pressurised. The exit vents are designed to be horseshoe type as illustrated in Figure 4.



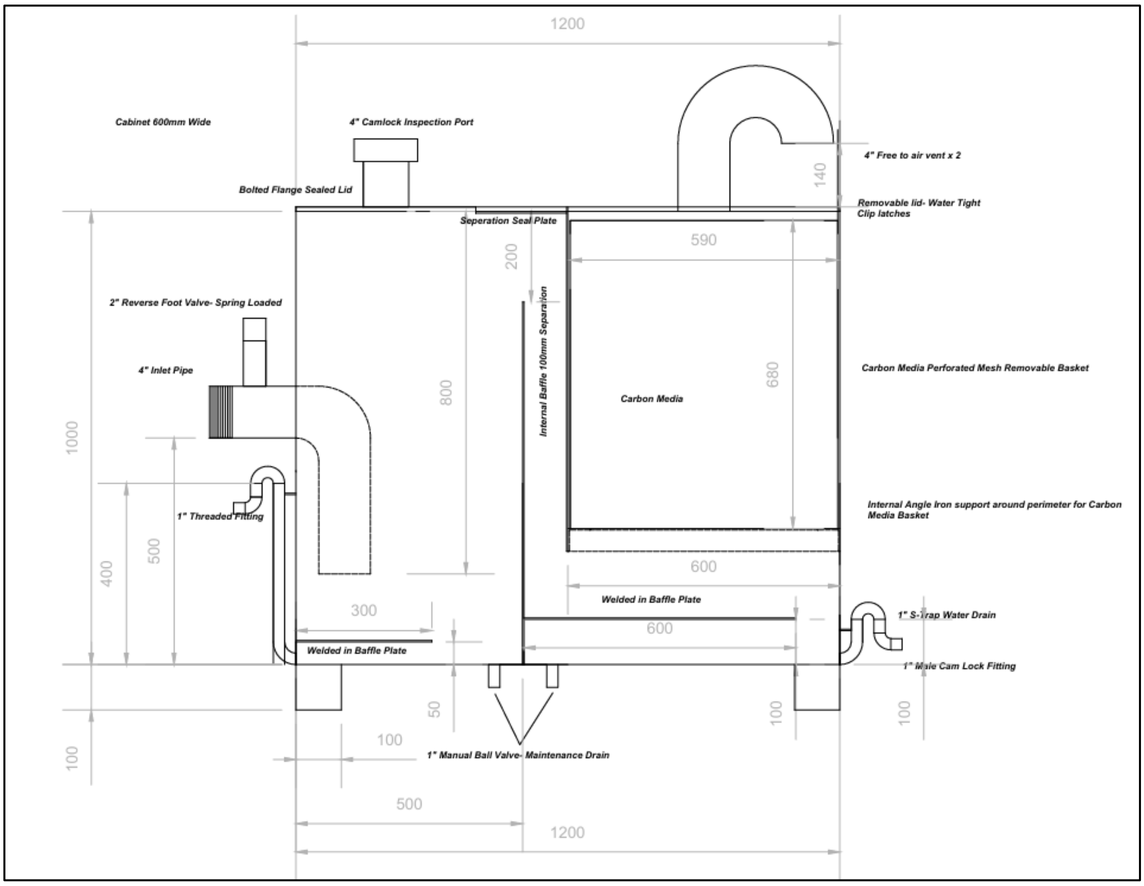


Figure 4: Activated Carbon Filter Design

3.3 Identification of Emission Sources

3.3.1 Odour

The primary sources of odour emissions identified at the Subject Site are expected to be:

- Aggregate drying system, including the plant's exhaust stack;
- Recycled asphalt additions;
- Mixing;
- Loading of trucks with asphalt from the storage silos; and
- Bitumen storage tanks.

The most significant point source of odour emissions is the main stack whilst heating asphalt that contains RAP material and other recycled additives. Emissions from the bitumen storage tanks' vents are acknowledged but are minor by comparison with those discharged from the main stack.

Fugitive odour emission sources are primarily associated with bitumen tanks and the loading of asphalt product into transport vehicles. The majority of the fugitive emissions are minor in nature. However, the process of loading hot mix asphalt onto transport trucks, which occurs periodically, has the potential to result in a transient, but noticeable odour emission, as is also the case when asphalt is applied to road surfaces.

3.3.2 Dust

Dust emissions from the Subject Site can be generated from several major activities, these includes:

- Drying and heating of the aggregates in the drum dryer are major sources of dust emissions. Dust emissions could also be generated due to the combustion of fuel in the burner. However, Hazell Bros will install a baghouse after the burner/dryer drum and before the main exhaust fan and stack to control dust emissions.

- Dust might be generated during the loading of raw aggregate onto conveyor belts, hot elevators, storage bins and the loading of asphalt mix to the silos. However, all these elements are enclosed, which will significantly reduce dust emissions. Dust could also arise from wind erosion and mechanical disturbance of aggregate stockpiles.

3.3.3 Gaseous Pollutants

Combustion gases, including sulphur dioxide (SO_2), carbon monoxide (CO), nitrogen oxides (NOx) and small amounts of organic compounds of various species could be emitted during the combustion of the fuel in the burner. CO and organic compounds could be emitted due to incomplete combustion of the fuel. While NOx is generated from high temperature combustion processes. These pollutants could also be released during the transfer of hot asphalt mix to storage silos and loading trucks. The plant dryer will operate on natural gas, with the option to run on diesel in certain situations.

3.4 Emission Rates

The major air emissions from asphalt plant are the exhaust stack as well as fugitive emissions. The following sections present the activity data and assumptions used in the emission factor estimations.

3.4.1 Exhaust Stack

Table 8 presents the parameters of the exhaust stack as provided by the manufacturer for two types of fuel; natural gas and diesel. The emissions for the exhaust stack are based on emission factors from US EPA AP-42 Chapter 11.1 (Hot Mix Asphalt Plants) and based on maximum hourly capacity of 160 tonnes/hour. The Emissions from the exhaust's stack were modelled assuming continuous operation (24/7).

The manufacturer-supplied information for the exhaust stack parameters is provided in Appendix A.

Table 8: Exhaust Stack Emissions

Parameters	Natural Gas Emission (g/sec)	Diesel Emission Rate (g/sec)	Comments
Stack Parameters			
Stack coordinates (UTM)	519202.332, 5269759.330		-
Stack diameter (m)	1		-
Stack height (m)	23.246		-
Stack velocity (m/s)	23		-
Stack temperature (K)	388		-
Production rate	160 tonnes / hr		-
Rain cap	Yes		
Pollutant			
PM_{10}	0.104	0.104	
$PM_{2.5}$[1)]	0.100	0.100	
Sulphur Dioxide	0.10	0.79	Difference in emission rates dependant on fuel type
Carbon Monoxide	2.94	2.94	
Oxides of Nitrogen	0.59	1.24	
VOCs			
Acetaldehyde	0.007	0.007	No difference in emission rates
Benzene	0.006	0.006	
Ethylbenzene	0.050	0.050	
Formaldehyde	0.017	0.017	
Toluene	0.023	0.023	
Xylene	0.061	0.061	
Polycyclic Aromatic Hydrocarbons – PAHs[2)]			
2-Methylnaphthalene	1.6E-03	3.8E-03	-
Acenaphthene	2.0E-05	3.2E-05	-
Acenaphthylene	1.3E-05	5.0E-04	-
Anthracene	4.7E-06	7.0E-05	-
Benzo(a)anthracene	1.0E-07	4.7E-06	-
Benzo(a)pyrene	7.0E-09	2.2E-07	Single model run using diesel emission rate

Parameters	Natural Gas Emission (g/sec)	Diesel Emission Rate (g/sec)	Comments
Benzo(b)fluoranthene	2.1E-07	2.3E-06	-
Benzo(g,h,i) perylene	1.1E-08	2.5E-06	-
Benzo(k)fluoranthene	2.9E-07	9.0E-07	-
Chrysene	8.6E-08	9.3E-07	-
Dibenz(a,h)anthracene	2.1E-09	4.1E-06	-
Fluoranthene	3.6E-06	1.4E-05	-
Fluorene	3.6E-05	2.5E-04	-
Indeno(1,2,3-cd) pyrene	6.8E-09	1.6E-07	-
Naphthalene	8.1E-04	1.5E-02	-
Phenanthrene	5.9E-05	2.0E-07	-
Pyrene	1.4E-06	5.2E-04	-
Heavy Metals			
Arsenic	1.0E-05	1.0E-05	Single model run; no difference in emission rates
Barium	3.4E-05	3.4E-05	
Beryllium	3.4E-06	3.4E-06	
Cadmium	1.4E-05	1.4E-05	
Chromium	1.3E-05	1.3E-05	
Copper	1.1E-06	1.1E-06	
Hexavalent Chromium	6.3E-07	6.3E-07	
Lead	2.0E-05	2.0E-05	
Manganese	1.6E-04	1.6E-04	
Mercury	9.3E-06	9.3E-06	
Nickel	6.8E-05	6.8E-05	
Selenium	1.1E-05	1.1E-05	
Zinc	1.5E-04	1.5E-04	

1) The emission factor for $PM_{2.5}$ was calculated as 96% of the PM_{10} emission factor as per USEPA AP42 for combustion sources.

2) The EPP criteria are available solely for PAHs in the form of Benzo(a)pyrene. Therefore, the emission rate for PAHs expressed as BaP equivalents has been calculated based on the toxicity equivalency factors provided on the Advisory Note - Classification of Polycyclic Aromatic Hydrocarbons. The modelled emission rate is 2.6E-5 g/sec.

Odour concentrations were not provided by the manufacturer. Therefore, based on AE's odour monitoring at asphalt plants around Australia, the following concentrations and emissions factors presented in

Table 9 were adopted in the model[ab]. The 30% RAP odour emission rate exceeds the 0% RAP rate for both natural gas and diesel fired operation. This indicates that RAP content, rather than

[a] Beyers, C and Clifton, M (2017) Land Use Planning and the Impacts of Odour Emissions from Waste Recycling in Asphalt Production. Presented at the 17th AAPA International Flexible Pavements Conference 2017. Melbourne, Australia.

[b] Assured Environmental (2020). Asphalt Industry – Review of Air Emissions Standards. Report reference 12346, Version 0 dated 1 May 2020.

fuel type, is the primary driver of exhaust stack odour emissions when RAP is used. Accordingly, odour concentrations and emission rates are reported for two cases:

- 0% RAP (virgin asphalt) fired on natural gas or diesel; and
- 30% RAP which represents RAP using regardless of fuel type.

Table 9: Odour Emissions from the Exhaust Stack

Item	Concentration (OU)	Emission Rate (ou/m^3/sec) a)
Natural Gas	1,600	17,118
Diesel	2,600	27,816
30% RAP	5,000	53,493

a) Based on Wet Standard Stack Flow Rate of 641.9 Nm^3/min and moisture content of 20%.

3.4.2 Bitumen Tank

Odour and volatile organic compounds emissions from the bitumen tanks are derived from AE's extensive monitoring database for asphalt plants. The odour emission rate from bitumen plants is 436 ou/m^3/sec without carbon filter and the emissions are detailed in Table 10.

The emission factors represent odour and VOCs emissions with control efficiency of 80% to represent a poorly performing carbon filter. Bitumen tanks are loaded two to four times a week. Road tanker unloading takes approximately 27 minutes, with each tanker having a capacity of about 25 m^3 and transferring its contents into onsite storage tanks with a 60 m^3 holding capacity. So, emissions from the loading of bitumen into storage tanks were modelled for two hours a week at 8 am on Monday and at 8 am on Thursday, while breathing operations were modelled for the remaining hours.

Table 10: Bitumen Tank Emissions

Parameters	Breathing	Deliveries
Stack Parameters		
Stack type	horseshoe	--
Stack diameter (m)	0.1	--
Stack height (m)	1.2	--
Stack velocity (m/s)	0.5	--
Stack temperature (K)	298	--
Stack release	Horizontal	--
Emissions (g/sec)		
Odour (ou/m^3/sec)	87.2	228.3 a)
Benzene	0.00039	--
Toluene	0.00109	--
Ethylbenzene	0.00038	--
Xylenes	0.00013	--
Trimethylbenzene	0.00010	--

Activated carbon filter is proposed to either be in location #1 in the middle of the four tanks or at location #2 at the end of the four tanks as indicated in Figure 5. Accordingly, the emissions from the bitumen tank were modelled for the two locations.

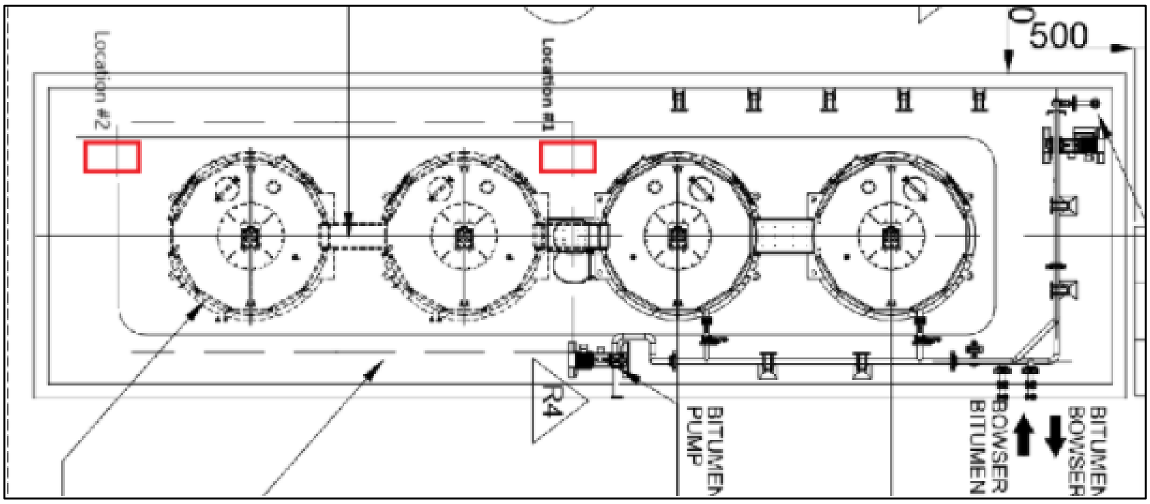


Figure 5: Proposed Locations of the Activated Carbon Filter

3.4.3 Filler Silo Filling

The imported filler storage silo is equipped with its own fabric pulsing bag filter which ensures lowest dust emissions (1 mg per m^3) during filling from the pneumatic road tanker. The filter unit is a WAM product, and it resides on top of the silo. A 150 mm vent pipe is directed down the side of the silo and terminates at the base of the silo normally 1 m above ground level, next to the filling point. The silo filter is normally in operation whilst the silo is being filled, the silo capacity is 60 m^3, the fill pipe from the pneumatic tanker to silo is 100 mm and is normally pumped in at a safe maximum pressure of 50 kPa. Table 11 represents the vent parameters and the emission factors adopted in the model.

Table 11: Emission Rates from the Imported Filler Silo Vent

Parameters	Imported Filler Silo Vent
Vent Parameters	
Stack type	Vertical
Stack diameter (m)	0.15
Stack height (m)	1
Stack velocity (m/s)	23.6
Stack temperature (K)	298
Emissions (g/sec)	
Total PM[1)]	0.00042
PM_{10}[2)]	0.00042
$PM_{2.5}$[2)]	0.00040

1) Total PM was excluded from modelling as neither the EPP nor the NEPM provide criteria for this pollutant.

2) The emission factor for PM_{10} was calculated as 100% of the Total PM emission factor. The emission factor for $PM_{2.5}$ was calculated as 96% of the PM_{10} emission factor.

3.4.4 Truck Load Out

Bluesmoke from truck loadout is typically a significant source of emissions. With an expected average truck capacity of 24 tonnes and an hourly production rate of 160 tonnes, approximately seven truck loadouts will occur per hour. The highest hourly average odour emission rates, based on this loading rate at the maximum production capacity, are presented in Table 12. Emissions were modelled under the assumption of continuous operation (24/7). Odour concentrations and emission rates are reported for two cases:

- 0% RAP (virgin asphalt); and
- 30% RAP.

From Table 12, the 30% RAP scenario generates higher odour emission rates than the 0% RAP scenario. This demonstrates that RAP content is the primary driver of truck loadout odour emissions. Accordingly, the 30% RAP case was adopted as the worst-case scenario for dispersion modelling, as the 0% RAP scenarios will not exceed this case.

Table 12: Maximum Truck Load Out

Parameter	0% RAP	30% RAP
Odour concentration (OU)	2600	5000
Loading Time per Truck (seconds)	45	45
Number of trucks per Hour	7	7
Time per hour (seconds)	296	296
OU/sec	214	411

3.4.5 Raw Material Handling and Transfer

Fugitive particulate matter emissions from aggregate storage piles are generally caused by front-end loader operations that transport the aggregate to the feed unit hoppers. Emission rates are calculated based on the AP-42, Chapter 13.2.4, Aggregate Handling & Storage Piles. These emissions are summarised in Table 13 and were modelled assuming continuous operation (24/7) for the aggregate and sand handling and transfer. Dust emissions from RAP transfer, handling, and processing were modelled as weekly/diurnal sources, operating from 7:00 am to 5:00 pm, Sunday to Saturday. The modelled emissions represent a conservative scenario, as they assume daily operation from Sunday to Saturday, which exceeds the actual RAP processing campaign duration of approximately 20 days per year.

Table 13: Fugitive Dust Emissions from Raw Material Handling and Transfer

Activity	Emission Factor (g/sec)		Applied Mitigation Control
	PM_{10}	$PM_{2.5}$	
Truck unloading of raw materials	0.003	0.0004	Water sprays and bunker
Loading of raw material onto the feed bins	0.005	0.001	Water sprays and bunker
Truck unloading to RAP (processed and unprocessed) stockpiles	0.012	0.0018	-
Loading of RAP from stockpile to the crusher and screening area	0.006	0.0009	-
RAP screening	0.03	0.002	-
Loading of processed RAP into feed bins	0.006	0.0009	-

3.4.6 Truck movements

The expected number of vehicle movements related to the delivery of raw material and dispatching of final product are outlined as below:

- Seven truck and trailers with a capacity of 30 tonnes each for 252 days per year.
- Two to five laden trucks per day Saturday (if operating only) Would mainly be bitumen or RAP loads only.
- Two to five laden trucks per day Sunday (if operating only) Would mainly be bitumen or RAP loads only.

Table 14 below summarises the emissions factors of particulate matter (PM_{10} and $PM_{2.5}$) from heavy vehicles traveling on paved surfaces inside the Subject Site boundary, which have been derived based on the equations developed by the USEPA AP-42: Compilation of Air Emission Factors, Chapter 13.2.1 Paved Roads. A detailed description of the dust emission factor equations is provided in Appendix E. Dust emissions from vehicle movements on paved roads were modelled assuming continuous operation (24/7).

Table 14: Dust Emission Factors from Vehicles Movement on Paved Roads

Activity	Emission Factor (g/sec)	
	PM_{10}	$PM_{2.5}$
Asphalt Plant - Laden	5.5E-06	1.3E-06
Asphalt Plant - Unladen	1.6E-06	4.0E-07

3.4.7 Wind Erosion

Wind erosion occurs continuously, 24 hours a day, regardless of operational activities. The amount of dust lifted into the air is influenced by wind speed, which is typically higher during the daytime than at night. While this may lead to increased dust lift-off during the day, nighttime conditions often result in poorer dispersion due to a lower mixing height and more stable air. Consequently, a constant wind speed has been assumed for all hours in the modelling. The emission factors for the stockpiles were derived from the AP42 document, Chapter 11.9, Western Surface Coal Mining (October 1998), as detailed in Table 15.

Table 15: Dust Emission Factors from Wind Erosion

Activity	Area (m^2)	Emission Factor (g/sec)		Emissions Control
		PM_{10}	$PM_{2.5}$	
Asphalt Plant	846.7	0.003	0.0005	No controls
RAP (processed and unprocessed) stockpiles	463.4	0.0018	0.0003	No controls

3.5 Upset conditions

The asphalt plant will be operated using an automated control system with built-in safety parameters to minimise the likelihood of upset conditions and to protect equipment and environmental performance. The system is designed to detect abnormal conditions and to initiate safe shutdown procedures where required. For example, if a loss of pressure or over-pressure is detected in the exhaust air stream, the rotary dryer burner automatically shuts down. Similarly, if the baghouse exit temperature sensor detects temperatures above 220°C, the plant will shut down to prevent damage to the filter media. The natural gas/diesel burner will be installed by licensed combustion engineers and commissioned under the supervision of the Tasmanian Gas Regulator, ensuring that all safety features and operating parameters are fully tested. The burner system is designed with safeguards such that, if the pilot light fails to ignite after the purge sequence, the primary fuel source remains closed, preventing main flame ignition and triggering an automatic shutdown.

The system also incorporates safety interlocks linked to the exhaust fan. If the shaft rotation sensor detects no movement, the system recognises that there is no airflow and prevents commencement of the purge sequence or burner ignition. The plant is therefore designed to operate only when the main exhaust fan is functioning, and material feed is prevented unless adequate airflow is maintained.

An example of a potential upset condition includes an overload of the main collecting conveyor drive motor, resulting in a conveyor stall. In such a case, the system detects the stoppage and halts the upstream aggregate feeders, preventing further material entry into the dryer. The absence of material in the rotary dryer can result in elevated exhaust gas temperatures; however, if not immediately detected by the operator, the system ensures that the dryer and burner shut down automatically when the exhaust exit temperature reaches 220°C. The main exhaust system remains operational until the drum temperature returns to ambient conditions. Once the conveyor fault is rectified, the burner sequence can safely recommence, the rotary dryer restarted, and material feed resumed.

These automated safeguards, together with regulated commissioning and ongoing monitoring, provide a strong framework to ensure that the plant operates within safe and controlled limits. As a result, the risk of uncontrolled emissions during upset conditions is expected to be negligible, and any short-term variations in process performance are unlikely to significantly impact compliance with the relevant air quality assessment criteria.

4 AIR EMISSIONS QUANTIFICATION: CONCRETE BATCH PLANT - OPERATIONAL PHASE

4.1 Overview

Air emissions from the dry concrete batch plant primarily arise from dust generated during various stages of the operation. Table 16 summarises the sources and types of emissions from the existing operations. Figure 6 shows the locations of air emission sources.

Table 16: Summary of Potential Emissions from Concrete Batching Plant

Potential Emission Source	Activity	Potential Emission
Material Transfer	Unloading of sand, aggregate, etc. from trucks to stockpiles.	Particulate matter, fugitive dust
Truck Loading	Loading mixed concrete into trucks	Particulate matter, fugitive dust
Vehicle Movement on Paved Roads	Particulate can be generated when vehicles and equipment move over paved roads.	Particulate matter, fugitive dust
Wind Erosion from Stockpiles	Particulate matter can be blown off the stockpiles during windy conditions	Particulate matter, fugitive dust

4.2 Management Emission Measures

To minimise dust emissions from the concrete batch plant, the following mitigation measures have been installed:

- Dust filters on the storage silos; and
- Enclosed conveyors and transfer points to move aggregate to hoppers.

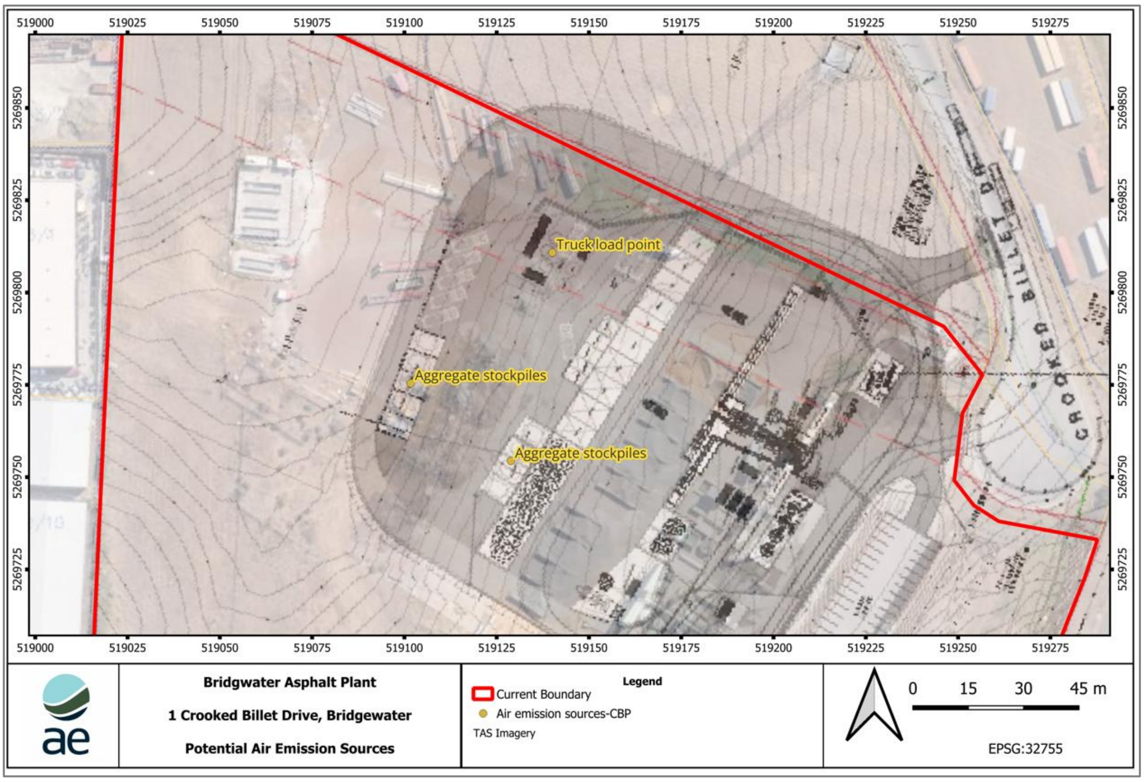


Figure 6: Potential Air Emissions Sources

4.3 Emission Rates

The major air emissions from the dry concrete batch plant are the fugitive emissions. The following sections present the activity data and assumptions used in the emission factor estimations.

4.3.1 Raw Material Transfer and Handling

Fugitive particulate matter emissions from raw material (sand, aggregate, etc.) storage piles are generally caused by front-end loader operations that transport the material into in-feed bins. Emission factors from AP-42, Chapter 13.2.4, Aggregate Handling & Storage Piles and Chapter 11.12, Concrete Batching have been used. It should be noted that $PM_{2.5}$ does not have emission factors for some operations.

Based on information provided by Hazell Bros. the hourly transfer rate is 35 tonnes per hour for controlled emissions. These emissions are summarised in Table 17 and were modelled assuming continuous operation (24/7).

Table 17: Fugitive Dust Emissions from Raw Material Handling and Transfer

Activity	Emission Factor (g/sec)		Applied Mitigation Control
	PM_{10}	$PM_{2.5}$	
Truck unloading to stockpile	0.009	0.0013	-
Truck Loading (truck mix)	0.0011	-	Enclosed awning shed with water jet sprays and telescopic chute

4.3.2 Truck movements

According to the Traffic Impact Assessment, the expected number of vehicle movements related to the delivery of raw material and dispatching of final product are outlined in Table 18.

Table 18: Traffic Movements – Concrete Batch Plant

Activity	Traffic Movements	Comments
Incoming raw materials	1,166 movements	Calculated based on 20,000 m^3 per year, 2.1 t/m^3 and 36 t/truck
Outgoing concrete agitators	3,300 movements	Calculated based on 20,000 m^3 per year and 6 m^3 per load

Table 19 below summarises the emissions factors of particulate matter (PM_{10} and $PM_{2.5}$) from heavy vehicles traveling on paved surfaces inside the concrete batch plant boundary, which have been derived based on the equations developed by the USEPA AP-42: Compilation of Air Emission Factors, Chapter 13.2.1 Paved Roads. A detailed description of the dust emission factor equations is provided in Appendix E. Dust emissions from vehicle movements on paved roads were modelled assuming continuous operation (24/7).

Table 19: Dust Emission Factors from Vehicles Movement on Paved Roads

Activity	Emission Factor (g/sec)	
	PM_{10}	$PM_{2.5}$
Concrete Batch Plant - Laden	2.1E-06	5.0E-07
Concrete Batch Plant - Unladen	3.7E-07	9.0E-08

4.3.3 Wind Erosion

Wind erosion occurs continuously, 24 hours a day, regardless of operational activities. The amount of dust lifted into the air is influenced by wind speed, which is typically higher during the daytime than at night. While this may lead to increased dust lift-off during the day, nighttime conditions often result in poorer dispersion due to a lower mixing height and more stable air. Consequently, a constant wind speed has been assumed for all hours in the modelling. The emission factors for the stockpiles were derived from the AP42 document, Chapter 11.9, "Western Surface Coal Mining" (October 1998), as detailed in Table 20.

Table 20: Dust Emission Factors from Wind Erosion

Activity	Area (m^2)	Emission Factor (g/sec)		Emissions Control
		PM_{10}	$PM_{2.5}$	
Concrete Batch Plant	517.5	0.002	0.0003	No controls

5 AIR EMISSIONS: CONSTRUCTION PHASE

The construction of the expansion is expected to involve a number of different activities undertaken in conjunction with each other. The primary stages are divided into:

- Concrete plant removal/relocation: dismantling the wet batching plant and relocating the dry batching plant;
- Civil works: including site clearing/levelling, and establishment of foundations; and
- Asphalt plant erection: including construction of structural frame and asphalt plant.

Table 21 below presents a summary of the plant and equipment likely to be required to complete the on-site construction works.

Table 21: Civil Work Construction Details

Construction Stage	Plant Item	Number Required
Concrete plant removal / relocation	Trucks	4
Civil works	Trucks	6
	Excavator	2
	Dozer	1
	Grader	1
	Piling rig	1
Asphalt plant erection	Trucks	4
	Generator	1
	Roller	1

The generator to be used during the construction of the asphalt plant will produce air emissions, including nitrogen oxides (NO_x), carbon monoxide (CO), particulate matter (PM), volatile organic compounds (VOCs), and sulphur dioxide (SO_2), depending on the fuel type. However, these emissions are not included in this assessment, as the generator will be used only during the construction phase to support activities such as equipment operation and site setup. Given the temporary nature of construction and the limited duration of generator use, any potential air quality impacts at sensitive receptors are expected to be minimal and short-term. Accordingly, the generator's air emissions are not assessed in this study.

Particulate matter is the primary pollutant generated from construction activities, particularly those involving earthworks (i.e. land clearing and earth moving), as well as from traffic movement. During the construction of the Asphalt Plant, temporary and localised adverse impacts on air quality are anticipated. These impacts will vary daily, depending on the type and intensity of the construction activities.

Dust emissions from construction are generally more manageable and controllable through implementing good site practices. The relatively short duration of construction activities further simplifies dust management compared to ongoing operational emissions. Also, there are no sensitive receptors located in close proximity to the construction site, reducing potential impacts on nearby populations. Therefore, dust modelling would not provide significant additional insight into the management of these emissions. Instead, effective dust control measures and regular monitoring will ensure that emissions are kept within acceptable limits and managed appropriately throughout the construction phase.

Tasmania does not have a national standard or regulation specifically governing air emissions from construction activities. However, the ACT Government refers to the UK Institute of Air Quality Management (IAQM) 2014 guidelines for assessing potential dust impacts during construction. This guidance outlines a qualitative risk assessment process for the potential unmitigated impacts of dust from demolition, earthworks, and construction activities. The IAQM guidance consists of a four-step, risk-based assessment as follows:

- Step 1: Screening Assessment;
- Step 2: Dust Risk Assessment;
- Step 3: Site-Specific Mitigation; and
- Step 4: Reassessment

According to Step 1 of the IAQM guidance, a detailed risk assessment (Steps 2 to 4) is required if sensitive receptors are located within 350 m of the Subject Site boundary, within 50 m of routes used by construction vehicles, or within 500 m of the Subject Site entrance.

The closest sensitive receptor to the Subject Site is approximately 375 m from the Subject Site boundary, which is greater than the IAQM's 350 m screening distance. Moreover, no sensitive receptors are located within 50 m of the routes used by the construction vehicles or within 500 m of the Subject Site entrance. Therefore, a detailed construction dust risk assessment is not required.

Despite this, dust mitigation measures should be implemented as part of good site practice. The following measures are recommended to control particulate matter emissions (NSW Module 3: Guidance Note—Construction Sites):

- Use water or water-based surfactants on construction sites and access roads to control dust emissions.

- Set and enforce low-speed limits for construction vehicles and equipment to minimise dust generation from vehicle movement.

- Ensure that construction equipment and vehicles are well-maintained.

- Use gravel, concrete or bitumen to seal main trafficable areas.

- Regularly sweep and clean paved areas to remove accumulated dust and debris.

6 DESCRIPTION OF ENVIRONMENTAL VALUES

6.1 Location

The current Subject Site covers the land of 1 and 13 Crooked Billet Drive, Bridgewater, TAS, 7030. The existing land is identified as property ID 3017836, Title Reference 158010/1 and property ID 3017801, Title Reference 158009/7, with an existing area of 10.31 hectares. The potential future boundary would be created after a subdivision and be known as 1 Crooked Billet Drive, with an area of 8.42 hectares. These lots are located within a General Industrial zone and are shown in Figure 7.

The surrounding land uses primarily comprises of industrial activities with both recreation area to the south and residential (rural living) to the south and southwest of the Subject Site. The surrounding land use, as defined in the Tasmanian Planning Scheme (TPS), is shown in Figure 7.

6.2 Sensitive Receptors

Table 22 and Figure 7 presents the nearest sensitive receptors to the Subject Site.

Table 22: Sensitive Receptors

ID	Location (EPSG: 7855)		Land Use
	X	Y	
R1	519570	5269401	Residential
R2	519270	5269108	Residential
R3	519277	5269065	Residential
R4	519280	5269035	Residential
R5	519316	5269037	Residential
R6	519101	5269098	Residential
R7	519120	5269015	Residential
R8	519148	5268964	Residential
R9	519196	5268953	Residential
R10	519207	5268920	Residential
R11	518689	5269270	Residential
R12	518709	5269187	Residential
R13	518670	5269104	Residential
R14	518547	5269409	Residential
R15	518501	5269445	Residential
R16	518567	5269215	Residential
R17	518470	5269297	Residential
R18	518434	5269370	Residential
R19	518431	5269506	Residential
R20	518303	5269604	Residential
R21	518261	5269510	Residential
R22	518316	5269464	Residential
R23	518372	5269416	Residential

ID	Location (EPSG: 7855)		Land Use
	X	Y	
R24	518291	5269122	School

All the receptors identified are residential dwellings and one educational facility. There are no health care facilities or other sensitive receptors identified nearby.

6.3 Topography

Figure 8 illustrates the local topography, as obtained from The List at 1 m intervals. It can be seen that the topography at the Subject Site ranges 45 – 65 m Australian Height Datum (AHD). There are localised terrain features to the south and southwest with gullies and mounds with elevations varying 10 - 80 m AHD.

6.4 Climate

The long-term climatic conditions for the local area are not available. In lieu of this, a review of the long-term climatic condition recorded at Bureau of Meteorology’s, Campania (Kincora) station (station number 094212) show that January and February are the hottest months, while July is the coldest month. The mean rainfall shows fluctuations throughout the year without a clear seasonal trend, although the summer months have fewer days of rainfall. Humidity levels exhibit variability over the year and seasonal fluctuations. Wind speeds during the warmer months are higher compared to the colder months as shown in Figure 9.

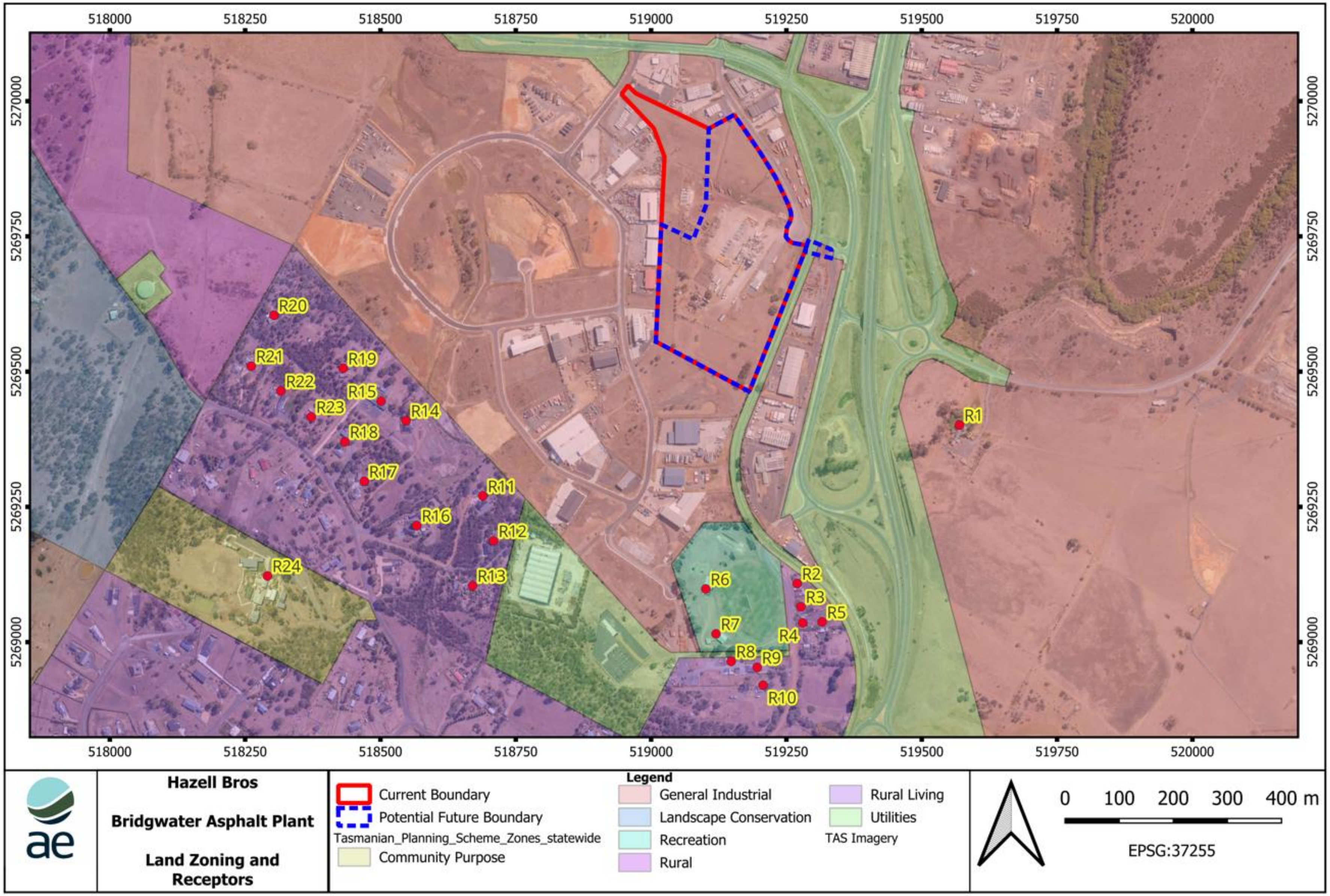


Figure 7: Site Location, Land Zoning and Sensitive Receptors

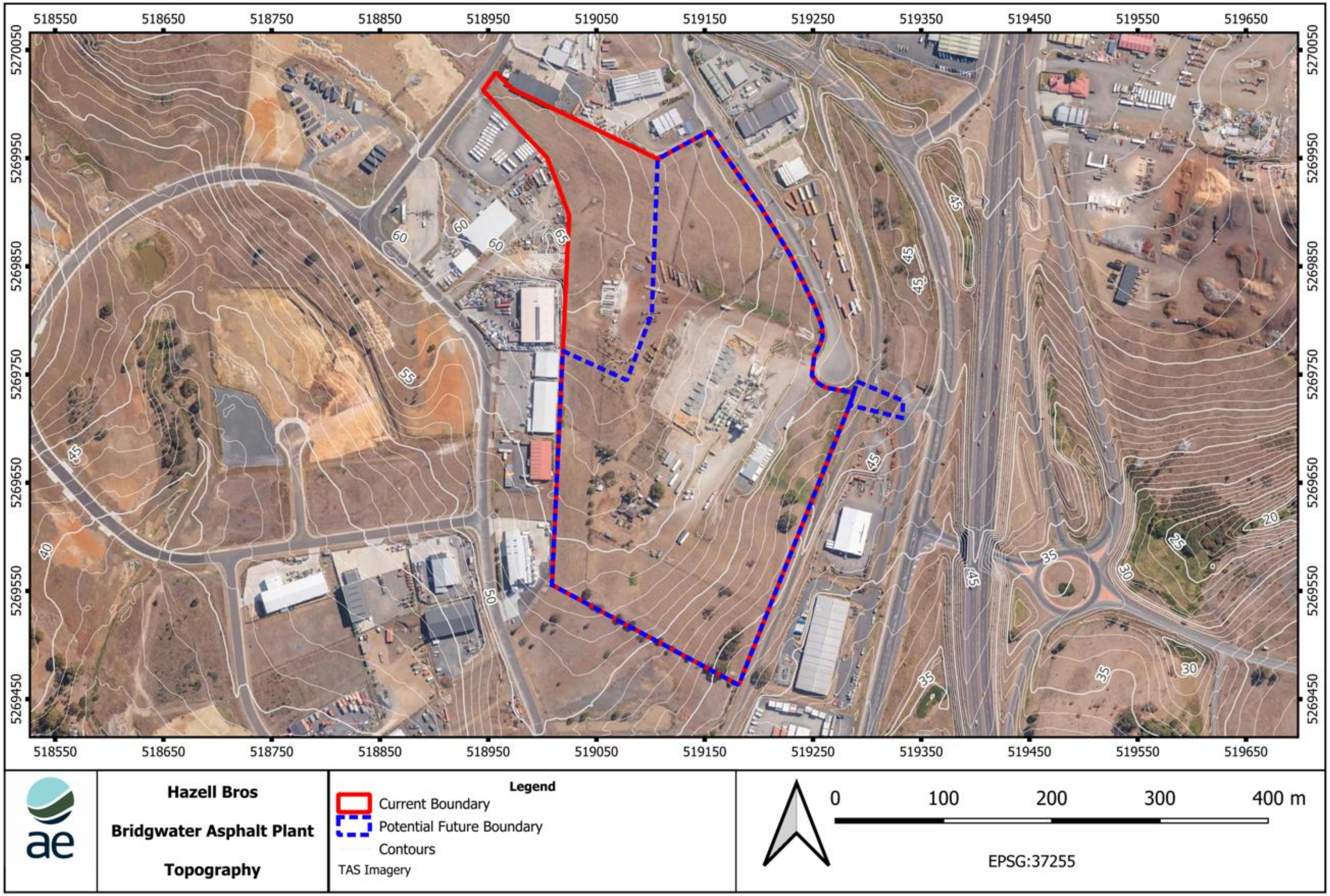
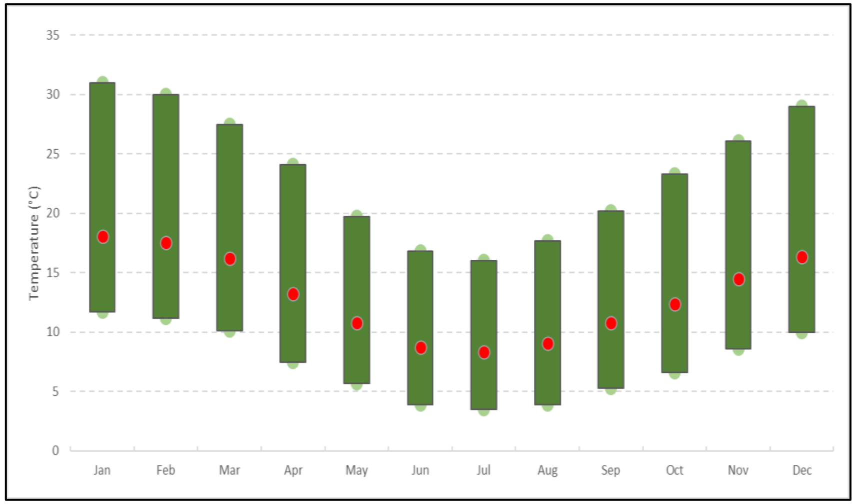
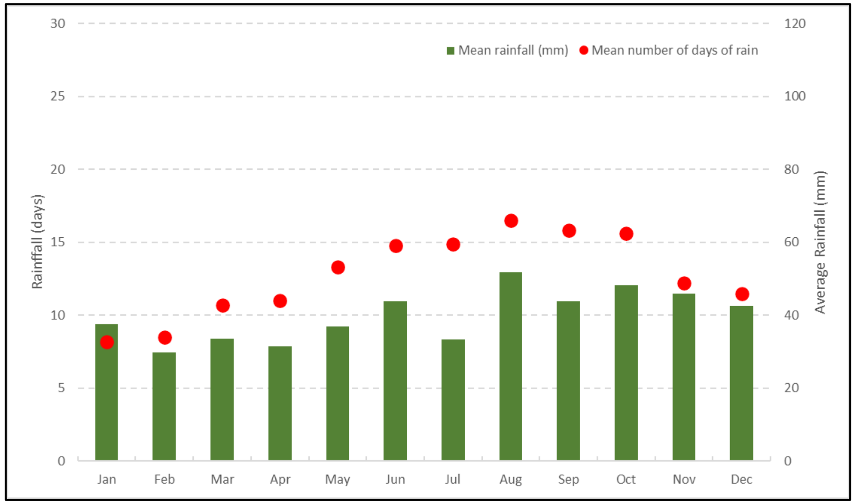


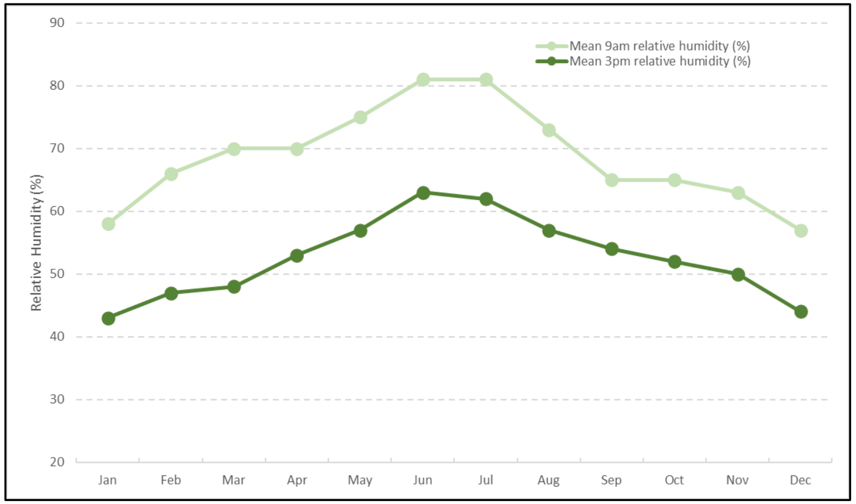
Figure 8: Surrounding Topography from The List



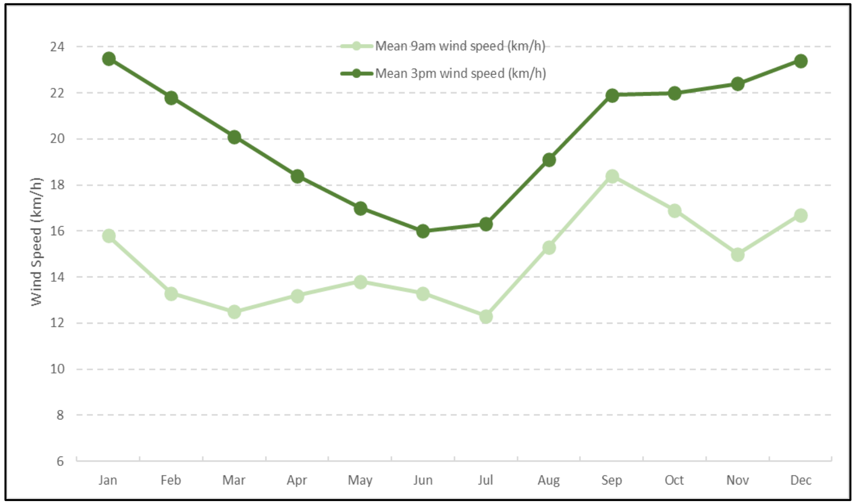
Average Temperature (Min, Max, Mean over 24-year Average)



Average Rainfall and Rainfall Days (24-year Average)



Relative Humidity (24-year Average)



Wind Speed (24-year Average)

Figure 9: Climatic Conditions (BOM Campania)

7 REGULATORY REQUIREMENTS

7.1 Overview

This section provides the criteria applicable to this assessment. The Tasmanian Planning Scheme, the Environment Protection Policy (Air Quality) 2004 (EPP Air), and the EPA Board Statement on Updated Air Pollutant Design Criteria (EPA Board Statement) work together to create a robust framework for managing air quality impacts in Tasmania.

- The Tasmanian Planning Scheme provides the overarching land-use and development framework, requiring developments to assess environmental impacts, including air quality, with reference to the EPP Air and EPA guidelines.

- The EPP Air, established under the Environmental Management and Pollution Control Act 1994, sets statewide ambient air quality objectives, aligning with NEPM (Ambient Air Quality) standards and Tasmanian-specific criteria for pollutants such as PM_{10}, NO_2, and odour.

- The EPA Board Statement clarifies how the EPA Board uses and implements the Environment Protection Policy (Air Quality) 2004 (Air EPP) during the environmental impact assessment (EIA) process and provides important updates to air pollutant design criteria.

Together, these instruments guide air quality impact assessments by requiring baseline data identification, dispersion modelling using approved methods, and compliance demonstration against air quality standards. These instruments emphasise best available techniques (BAT) to minimise emissions and assess cumulative impacts within sensitive airsheds. Compliance is enforced through planning conditions, environmental licenses, and ongoing monitoring, ensuring that developments avoid adverse impacts, particularly on sensitive uses, and align with Tasmania's environmental and health protection goals.

7.2 Tasmanian Planning Scheme

The Tasmanian Planning Scheme (TPS) is a single state-wide planning scheme endorsed in 2017. The TPS incorporates provisions for managing attenuation distances to ensure that developments with potential environmental impacts, such as emissions to air, do not adversely affect sensitive uses like residential areas, schools, and hospitals.

Attenuation distances are defined buffer zones designed to separate industrial or emission-generating activities from sensitive receptors to minimise risks to human health and amenity. Under the TPS, these distances are applied through zoning and overlay provisions within Local Provisions Schedules (LPSs), ensuring that land use decisions align with environmental protection goals.

In relation to air quality, the TPS aligns with the Environment Protection Policy (Air Quality) 2004 and EPA guidelines to ensure developments comply with air quality objectives and maintain safe ambient air conditions. The Scheme emphasises integrating air quality standards, such as those for particulate matter (PM_{10}, $PM_{2.5}$), nitrogen dioxide (NO_2), sulphur dioxide (SO_2), and odour, into planning approvals.

Proponents must incorporate Best Available Techniques (BAT) to control emissions, ensuring compliance with established buffer zones and attenuation distances. For activities near sensitive receptors, the TPS requires that planning applications include evidence-based mitigation strategies, such as enclosed operations, stack height adjustments, or real-time monitoring systems. These measures, combined with appropriate attenuation distances, are critical for balancing industrial development with environmental protection and community health under Tasmania's regulatory framework.

Table C9.1 of the Tasmanian Planning Scheme presents the attenuation distances from industrial uses which may cause environmental nuisance and sensitive receptors.

This activity will be a Level 2 Activity under Schedule 2 of the Environmental Management and Pollution Control Act 1994. The attenuation distance for a Level 2 facility is 1,000 m as presented in Table 23.

Table 23: Tasmanian Planning Scheme Attenuation Distances

Activity	Level 1	Level 2
Pre-mix bitumen plant Works in which crushed or ground rock aggregates are mixed with bituminous or asphaltic materials for the purpose of producing road-building mixtures– emissions such as odour and noise.	500 m	1,000 m

Review of the attenuation distance and the sensitive receptors in Figure 1 identify that all receptors are within this attenuation distance.

7.3 Ambient Air Quality NEPM

The National Environment Protection Council (NEPC) defines national ambient air quality standards and goals in consultation, and with agreement from all Australian state and territory governments. These were first published in 1998 in the National Environment Protection (Ambient Air Quality) Measure (Air NEPM).

A number of Australian states have adopted the Air NEPM standards as air quality objectives. The NEPM standards are presented in Table 24.

Table 24: Ambient Air Quality NEPM Standards

Pollutant	Averaging Period	Concentration Maximum (µg/m³)
PM_{10}	1 day	50
	1 year	25
$PM_{2.5}$	1 day	20
	1 year	7
Carbon Monoxide (CO)	8 hours	10,310
Nitrogen Dioxide (NO_2)	1 hour	151
	1 year	28
Sulphur Dioxide (SO_2)	1 hour	197
	1 day	52
Lead	1 year	0.5

7.4 Environment Protection Policy (Air Quality) 2004 and Board Statement

In Tasmania, the Environment Protection Policy (Air Quality) 2004 (EPP (Air)) and the Board Statement (EPA, 2022)[c] provides regulatory framework for managing air quality impacts from industrial activities.

EPP (Air) is a key regulatory instrument under the Environmental Management and Pollution Control Act 1994 (EMPCA) in Tasmania, aimed at protecting and improving air quality across the state. It sets out ambient air quality objectives that align with the National Environment Protection (Ambient Air Quality) Measure (NEPM), incorporating both national standards and Tasmania-specific criteria for managing key air pollutants along with guidance on odour management.

The policy establishes thresholds that ensure human health and environmental values are protected. The EPP (Air) also provides a framework for managing air quality impacts through the use of Best Available Techniques (BAT), continuous improvement practices, and strategies for mitigating emissions from industrial, commercial, and domestic sources.

The EPA Board Statement on Updated Air Pollutant Design Criteria provides a complementary role to the EPP (Air) by ensuring air quality assessment benchmarks remain current with evolving scientific understanding and regulatory expectations. The Board periodically reviews and updates design criteria to address changes in knowledge about health impacts and pollutant behaviour, particularly for pollutants such as $PM_{2.5}$, which have no known safe threshold. These updates refine the performance benchmarks used in Environmental Impact Assessments (EIAs), requiring proponents to model pollutant dispersion, predict concentrations at facility boundary, and assess compliance with these stringent criteria.

The updated design criteria emphasise a precautionary approach, particularly in airsheds with multiple pollutant sources, by prioritising health protection and promoting more effective mitigation strategies. Together, the EPP (Air) and the EPA Board's updates ensure air quality assessments and approvals processes in Tasmania align with best practice, providing a consistent framework for managing air quality impacts while supporting sustainable development.

[c] The Board of the Environment Protection Authority (2022). *Update to Air Pollutant Design Criteria used in the Environmental Impact Assessment Process.*

7.4.1 Assessment Criteria

Table 25 presents the air pollutant design criteria to be used in the Tasmanian Environmental Impact Assessment process listed in the Board Statement.

Table 25: Air Pollutant Design Criteria

Pollutant	Averaging Period	Concentration Maximum ($\mu g/m^3$)
PM_{10}	24-hour	50
	Annual	25
$PM_{2.5}$	24-hour	25
	Annual	8
CO	8-hour	10,310
NO_2	1-hour (99.9th)	151
	Annual	28
SO_2	1-hour	197
	24-hour	52
Arsenic and compounds	3 min (99.9th)	0.17
Barium	3 min (99.9th)	17
Beryllium	3 min (99.9th)	0.07
Cadmium and cadmium compounds	3 min (99.9th)	0.033
Chromium (total)	3 min (99.9th)	17
Copper fume	3 min (99.9th)	6.7
Lead	90 days	1.5
	Annual	0.5
Manganese and compounds	3 min (99.9th)	33
Mercury (inorganic)	3 min (99.9th)	17
Nickel and nickel compounds	3 min (99.9th)	0.33
Zinc oxide fume	3 min (99.9th)	170
Acetaldehyde	3 min (99.9th)	76
Benzene	3 min (99.9th)	100
Formaldehyde	3 min (99.9th)	50
Toluene	3 min (99.9th)	650
Xylenes	3 min (99.9th)	350

Pollutant	Averaging Period	Concentration Maximum ($\mu g/m^3$)
Ethylbenzene	3 min (99.9th)	14500
Trimethylbenzene	3 min (99.9th)	4000
PAHs as Benzo(a)pyrene	3 min (99.9th)	0.73

7.4.2 Odour

The odour design criterion in Schedule 3 of the EPP(Air) remains set at 2 OU, 99.5th percentile for unknown mixtures. This level is used as the boundary criterion because it exceeds the defined detection threshold of 1 OU, which is the concentration at which odour is generally perceivable by most people. If the odour concentration at the boundary is 2 OU or lower, it is unlikely that odour will be perceptible at nearby residences or businesses.

Assessing and managing odour emissions, however, is inherently complex, as odour can be transient and variable, especially when interacting with other chemicals in the atmosphere. The perception of odour is also influenced by several factors, including the nature and intensity of the source, the distance from the source, terrain, and site-specific meteorological conditions.

Given this complexity, the EPA Board Statement takes into account a range of industry-specific and site-specific factors when making determinations. All development proposals are expected to incorporate Best Practice Environmental Management and Accepted Modern Technology to minimise odour impacts and achieve compliance with the established criteria.

7.4.3 Criteria Adopted in the Assessment

This section summarises the criteria adopted in the assessment, which have been selected based on the most stringent limits for each pollutant.

Table 26: Summary of the Criteria Adopted in the Assessment

Pollutant	Averaging Period	Assessment Location	Concentration Maximum ($\mu g/m^3$)	Source
PM_{10}	24-hour	Subject Site Boundary and beyond	50	NEPM
	Annual	Subject Site Boundary and beyond	25	NEPM
$PM_{2.5}$	24-hour	Subject Site Boundary and beyond	20	NEPM
	Annual	Subject Site Boundary and beyond	7	NEPM

Pollutant	Averaging Period	Assessment Location	Concentration Maximum (µg/m^3)	Source
CO	8-hour	Subject Site Boundary and beyond	10,310	NEPM
NO_2	1-hour (99.9th)	Subject Site Boundary and beyond	151	NEPM
	Annual	Subject Site Boundary and beyond	28	NEPM
SO_2	1-hour	Subject Site Boundary and beyond	197	NEPM
	24-hour	Subject Site Boundary and beyond	52	NEPM
Arsenic and compounds	3 min (99.9th)	Subject Site Boundary and beyond	0.17	EPP Air
Barium	3 min (99.9th)	Subject Site Boundary and beyond	17	EPP Air
Beryllium	3 min (99.9th)	Subject Site Boundary and beyond	0.07	EPP Air
Cadmium and cadmium compounds	3 min (99.9th)	Subject Site Boundary and beyond	0.033	EPP Air
Chromium (total)	3 min (99.9th)	Subject Site Boundary and beyond	17	EPP Air
Copper fume	3 min (99.9th)	Subject Site Boundary and beyond	6.7	EPP Air
Lead	90 days	Subject Site Boundary and beyond	1.5	EPP Air
	Annual	Subject Site Boundary and beyond	0.5	NEPM
Manganese and compounds	3 min (99.9th)	Subject Site Boundary and beyond	33	EPP Air

Pollutant	Averaging Period	Assessment Location	Concentration Maximum (µg/m^3)	Source
Mercury (inorganic)	3 min (99.9th)	Subject Site Boundary and beyond	17	EPP Air
Nickel and nickel compounds	3 min (99.9th)	Subject Site Boundary and beyond	0.33	EPP Air
Zinc oxide fume	3 min (99.9th)	Subject Site Boundary and beyond	170	EPP Air
Acetaldehyde	3 min (99.9th)	Subject Site Boundary and beyond	76	EPP Air
Benzene	3 min (99.9th)	Subject Site Boundary and beyond	100	EPP Air
Formaldehyde	3 min (99.9th)	Subject Site Boundary and beyond	50	EPP Air
Toluene	3 min (99.9th)	Subject Site Boundary and beyond	650	EPP Air
Xylenes	3 min (99.9th)	Subject Site Boundary and beyond	350	EPP Air
Ethylbenzene	3 min (99.9th)	Subject Site Boundary and beyond	14500	EPP Air
Trimethylbenzene	3 min (99.9th)	Subject Site Boundary and beyond	4000	EPP Air
PAHs as Benzo(a)pyrene	3 min (99.9th)	Subject Site Boundary and beyond	0.73	EPP Air
Odour	1-hour, 99.5th	Subject Site Boundary and beyond	2 OU	EPP Air

8 EXISTING AIR ENVIRONMENT

8.1 Ambient Monitoring

Background air quality data specific to Brighton Council is not available. The nearest reference station for ambient air monitoring is located in Hobart (New Town), which provides data solely for PM_{10} and $PM_{2.5}$. To assess cumulative impacts, background air quality data from this station was obtained from the Annual NEPM Reports, covering a period of three years, as presented in Table 27. It should be noted that recent background air quality data for PM_{10}, $PM_{2.5}$, NO_2, SO_2 and CO are not available.

Table 27: Summary of Background Concentrations

Compound	Averaging Period	Parameter	Measured Concentration (µg/m^3)			Modelled Concentration (µg/m^3)
			2015	2016	2017	
PM_{10}	24 hours	70th percentile	14.8	13.7	14.3	14.8 (max)
	1 year	Average	NA	10.6	11.1	11.1 (max)
$PM_{2.5}$	24 hours	70th percentile	7.1	6.5	6.9	7.1 (max)
	1 year	Average	5.8	5.5	5.7	5.7 (average)

8.2 Surrounding Industry

A diverse range of businesses operate within a 500 m radius of the Subject Site. These include a fast-food outlet 100 metres to the north of the Subject Site, warehouses, self-service fuel facility to the northwest, and metal recyclers to the north and west of the Subject Site.

Assured Environmental personnel carried out a site visit of the surrounding area in July 2024. Table 28 summarises the businesses identified in the surrounding area of the Subject Site, which may have an effect on the local air environment. Only one facility; Tasmanian Gas Pipeline Pty Ltd, has been identified in the National Pollution Database (NPI), however, it is located 800 m from the Subject Site and as such will not be included in the assessment. Figure 10 represents the surrounding industry to the Subject Site.

Table 28: Summery of the Identified Businesses in the Area

Business	Location	Comment
Supagas	28 Crooked Billet Dr Bridgewater TAS 7030	▪ Supplier of LPG, industrial, medical, specialty and helium gases. ▪ VOCs and NOx are expected to be released; however; the quantities are considered insignificant based on the site visit as they are not reported to the NPI and will not be included in this assessment.
Greenbanks Distilling Co	25 Greenbanks Rd Bridgewater TAS 7030	▪ Distillery ▪ Ethanol is expected to be released. Will not be included in the assessment as this pollutant is not being released from the Subject Site.

Business	Location	Comment
Hobart Scrap Car Removals & Cash for Scrap Cars	17 Greenbanks Rd Bridgewater TAS 7030	▪ Recycling centers of all ferrous and non-ferrous scrap metals. ▪ Dust emissions will not be included in this assessment, as no visible dust was observed by AE staff during the site visit conducted on 23/7/2024 to the Subject Site.
Tassie Wrecker & Auto Removal	19 Greenbanks Rd Bridgewater TAS 7030	
Bullock Recycling Services	Bridgewater TAS 7030	

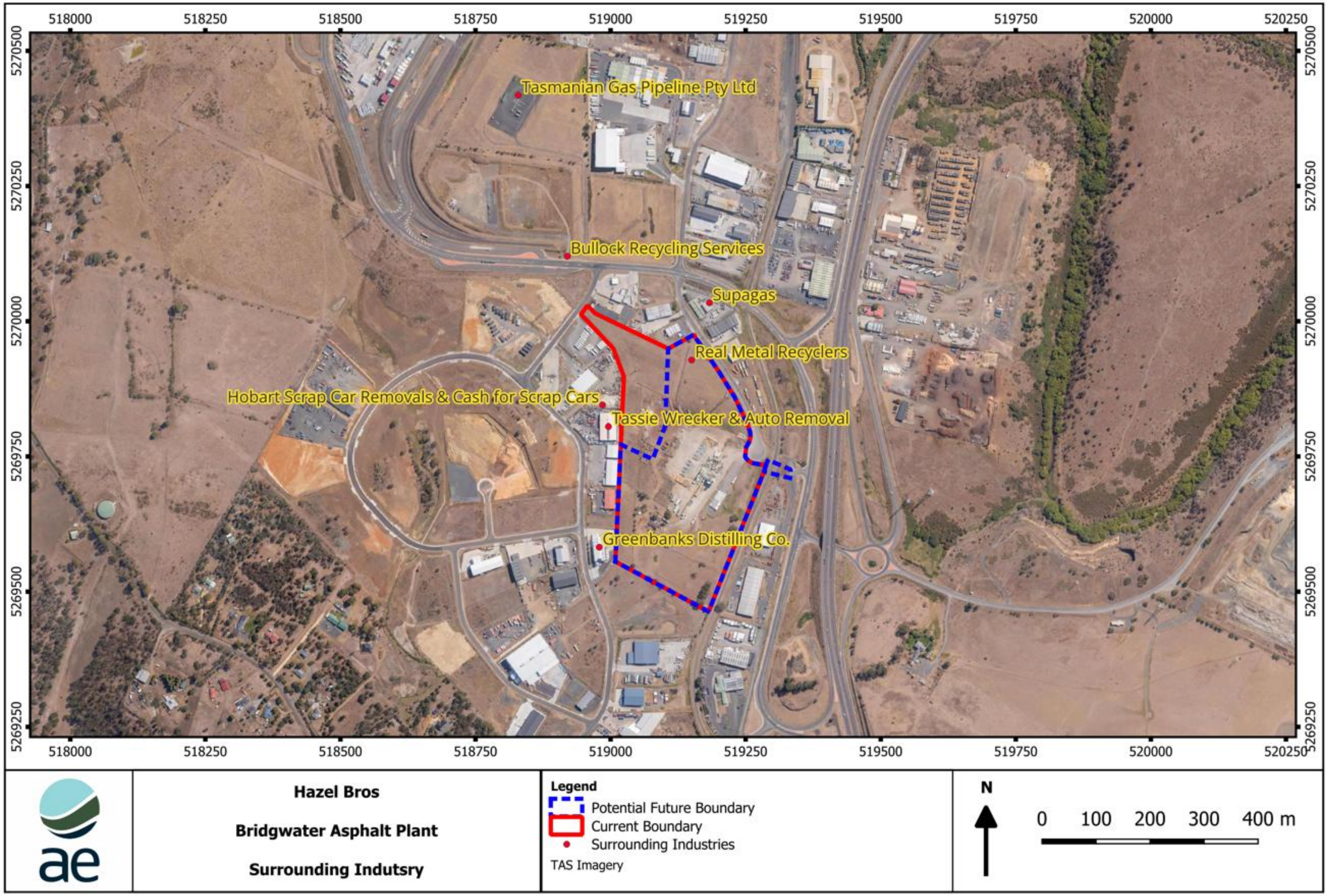


Figure 10: Surrounding Industry to the Subject Site

9 METEROLOGICAL MODELLING

9.1 Introduction

Atmospheric dispersion modelling involves the mathematical simulation of the dispersion of air contaminants in the environment. The modelling utilises a range of information to estimate the dispersion of pollutants released from a source including:

- Meteorological data for surface and upper air winds, temperature, and pressure profiles, as well as humidity, rainfall, cloud cover and ceiling height information;
- Emissions parameters including source location and height, source dimensions and physical parameters (e.g., exit velocity and temperature) along with pollutant mass emission rates;
- Terrain elevations and land use both at the source and throughout the surrounding region; and
- The location, height, and width of any obstructions (such as buildings or other structures) that could significantly impact on the dispersion of the plume.

9.2 Meteorological Modelling Methodology

For the purpose of the assessment, meteorological modelling has been undertaken using TAPM (The Air Pollution Model) and CALMET to predict localised meteorological conditions. The meteorological data derived from these models have been used as an input for the CALPUFF dispersion modelling.

A site-specific meteorological dataset has been determined using the prognostic model TAPM (The Air Pollution Model). Prognostic models, such as TAPM, permit the development of localised meteorological datasets, based on synoptic weather conditions. The model predicts the regional flows important to dispersion, such as sea breezes and terrain induced flows, against a background of larger-scale meteorology provided by synoptic analyses.

The output of this model, when used with a diagnostic meteorological model, such as CALMET, provides a meteorological dataset suitable for introduction into the wind field results. This methodology is the recommended approach for the modelling of contaminant concentrations using CALMET[d].

9.2.1 TAPM and CALMET Settings

Table 29 presents a summary of all the meteorological parameters used in dispersion modelling. The EPA Atmospheric Dispersion Modelling Guidelines specify that TAPM should use a minimum grid resolution of 31 x 31 grid points to ensure sufficient spatial coverage and accuracy for meteorological and dispersion modelling. However, using a larger grid of 41 x 41 grid points is acceptable for incorporating BOM Campania station as detailed in Appendix C.

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[d] TRC Environmental Corporation (March 2011) 'Generic Guidance and Optimum Model Settings for the CALPUFF Modelling System for Inclusion into the 'Approved Methods for the Modelling and Assessments of Air Pollutants in NSW, Australia' prepared on behalf of the NSW Office of Environment and Heritage

Table 29: Summary of Meteorological Modelling Parameter

Model	Aspect	Assigned Parameter
TAPM (v4.04)	Year Modelled	One full year - 2019 which is compared to long-term observations to demonstrate suitability. Meteorological variability and assessment year selection are detailed in Appendix C.
	Grid Centre Coordinates	Latitude: -42°43.5 min; Longitude: 147°14 min EPSG 7855: 519103, 5269696
	Domains Grid	41 x 41 x 30 grid points
	Nesting Spacing	30 km, 10 km, 3 km, 1 km
	Databases	Default databases for sea temperature, and terrain applied. TasSVLU250 (Land Use at 250 m) has been applied.
CALMET (v 6.5)	Model Domain	20-km x 20-km grid (100 m grid intervals)
	Terrain Data	Nasa Shuttle Radar Topography Mission (SRTM) 1-second (approximately 30 m) digital elevation model
	Land Use	Default from USGS for 1 km spacing. Review of the land use was undertaken and updated based on recent aerial imagery at 50 m intervals.
	Vertical Cells / Cell Face Heights	Vertical Cells: 12 Cell Face Heights: 0 m, 20 m, 40 m, 60 m, 80 m, 160 m, 320 m, 640 m, 1,200 m, 2,000 m, 3,000 and 4,000 m
	TAPM Input	3D meteorological data (no-obs mode) was derived from the 1 km meteorological grid from TAPM used as initial guess field to predict meteorological conditions

9.2.2 CALMET Outputs

Figure 11 presents the annual wind rose for the Subject Site for 2019, as generated by CALMET. It can be noted that the dominant wind direction is clearly from the northwest, with a smaller contribution from the west and west-northwest. The majority of wind speeds fall within 2.8 to 5.6 m/s (represented by yellow). Occasionally, higher wind speeds (>8.60 m/s, represented by blue) are observed, but these are limited to the westerly directions (west, west-northwest and northwest) and occur at low frequencies. Calmer conditions are noted at low frequency of 1.12%.

Stability classes indicate atmospheric stability and are categorised based on turbulence levels, which influence emission dispersion. These classes range from A (very unstable, high turbulence) to F (very stable, low turbulence). Unstable conditions favour rapid vertical mixing of pollutants, while stable conditions restrict dispersion, causing pollutants to remain close to the ground.

Review of atmospheric stability classes shows that most winds are associated with stable conditions (Classes D, E and F). This stability further contributes to limited atmospheric mixing, increasing the potential for pollutant or odour accumulation in nearby areas, particularly during calm conditions, which occur 1.12% of the time.

Detailed meteorological analysis of the dataset is presented in Appendix C.

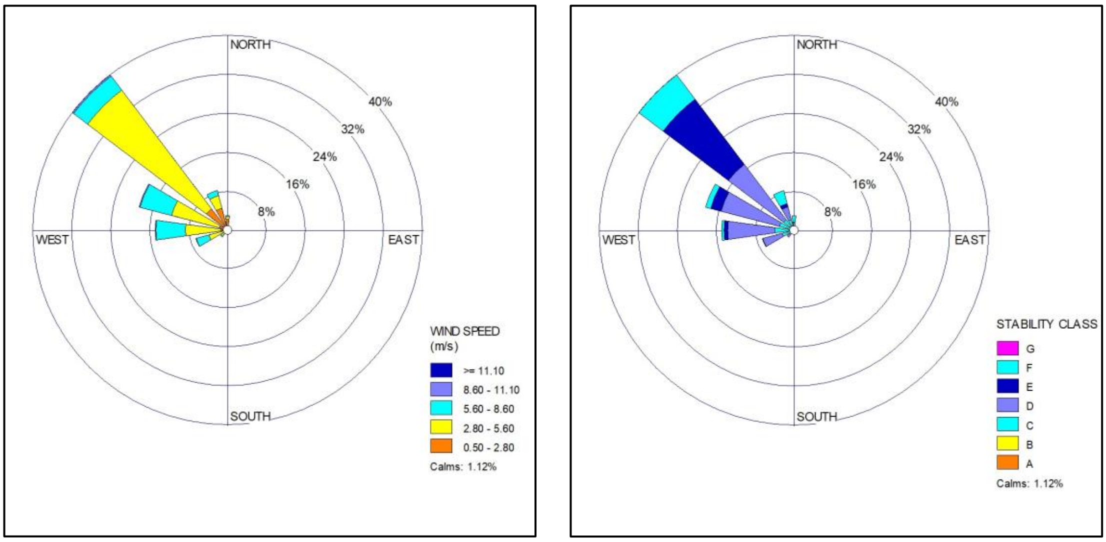

Figure 11: Predicted Annual Wind Rose and Stability Class at Subject Site for 2019

10 DISPERSION MODELLING METHODOLOGY

10.1 CALPUFF Modelling

The CALPUFF modelling system treats emissions as a series of puffs. These puffs are then dispersed throughout the modelling area and allowed to grow and bend with spatial variations in meteorology. In doing so, the model can retain a memory of the plume's movement throughout a single hour and from one hour to the next while continuing to better approximate the effects of complex air flows.

CALPUFF utilises the meteorological processing and prediction model CALMET to provide three-dimensional wind field predictions for the area of interest. The final wind field developed by the model (for consideration by CALPUFF) includes an approximation of the effects of local topography, the effects of varying surface temperatures (as is observed in land and sea bodies) and surface roughness (resulting from varied land uses and vegetation cover in an area). The CALPUFF model can resolve complex terrain influences on local wind fields including consideration of katabatic flows and terrain blocking.

Post processing of modelled emissions is undertaken using the CALPOST package. This allows the rigorous analysis of pollutant predictions generated by the CALPUFF system. CALPOST is able to provide an analysis of predicted pollutant concentrations for a range of averaging periods from 1 hour to 1 year.

10.2 Receptors

The following grids have been modelled:

- Computational and sampling grid: 10 km x 10 km grid at 200 m intervals.
- Nested Grid: centred on the stack location (519202.34, 5269759.5) and receptors at the following distances:
    - 200 m radius at 20 m intervals;
    - 500 m radius at 50 m intervals; and
    - 1000 m radius at 100 m intervals.

Additionally, the Subject Site boundary has been modelled with discrete receptors at 10 m intervals.

10.3 Buildings

As air flows over physical structures, it generates aerodynamic wakes. These wakes can create significant turbulence and lead to downward mixing. When emissions originate from point sources in close proximity to these wakes, they can be drawn downward and recirculated within the sheltered region behind the wake. This process results in localised increases in pollutant concentrations and diminishes the extent of plume rise at a downwind distance. This phenomenon is referred to as "building downwash."

In this assessment, point sources were screened for potential location within building wakes, where wakes were assumed to:

- extend 5 times the lesser of the projected structure width or height downwind from the leeward edge of a structure; and

- extend to a height of 2.5 times the height of the structure.

The exhaust's stack height is recorded at 23.24 m, and the main tower's height is 24.0 m. Given this, the main tower was modelled as a rectangular structure.

10.4 Conversion of NOx to NO_2

Nitrogen oxides (NOx) are typically generated in most combustion processes, arising from the oxidation of nitrogen present in both the fuel and the surrounding air. These NOx compounds, especially nitric oxide (NO) and nitrogen dioxide (NO_2), form during high-temperature processes. At the point of emission, NO usually accounts for approximately 95 percent of the total NOx volume, while the remaining NOx consists of NO_2. Over time, all emitted nitric oxides are oxidised to NO_2 and further transformed into other higher nitrogen oxides.

Modelling NOx emissions presents a challenge, primarily in determining the quantity of NO_2 at a receptor due to uncertainties in conversion rates. In concentrated plumes, the conversion of NOx to NO_2 is initially limited by the availability of ozone, with all accessible ozone being consumed. However, as a plume becomes more diluted and additional ozone mixes in, the reaction transitions to becoming limited by the availability of NO.

At this assessment, a more conservative conversion ratio of 100 percent was employed to translate the predicted NOx emission rates into NO_2.

10.5 Other Settings

For the purposes of the assessment, the air dispersion modelling has utilised the following settings for CALPUFF:

- three-dimensional mode using meteorological data file from CALMET;
- ISC rural wind speed profile;
- no chemical transformation;
- no gaseous deposition;
- transitional plume rise;
- stack tip downwash for point sources;
- partial plume penetration for point sources;
- dispersion coefficients using Pasquill–Gifford coefficients or turbulence calculated from micro-meteorology;
- no adjustment of dispersion curves for roughness;
- partial plume path adjustment method for terrain using default coefficients; and
- Building wakes were modelled using PRIME.

11 PREDICTED EMISSIONS

11.1 Overview

This section presents the predicted ground level concentrations of the potential air pollutants at both the current plant boundary (solid red line) and the potential future boundary (dotted blue line) as shown in Figure 12.

Particulate matter emissions from all activities at the Subject Site (asphalt plant and concrete batching plant) as well as background concentrations are included in this section.

Combustion gases and other potential pollutants from asphalt exhaust stack operating on natural gas and diesel. Background concentrations for combustion gases and other pollutants are not available; therefore, these predicted concentrations are in isolation.

Predicted pollutant Ground Level Concentration (GLC) isopleths are presented in Appendix F and Appendix G. The images in these appendices are presented at slightly different scales. The predicted ground level concentration at the sensitive receptors is presented in Appendix H.

The modelling results provided below represent emissions from both natural gas and diesel. If the emission rates for both fuels, as indicated in Table 8, are similar, only a single model was run. Also, a single model run was performed for PAHs using the diesel emission rate, as the emission rates from both fuels are very low.

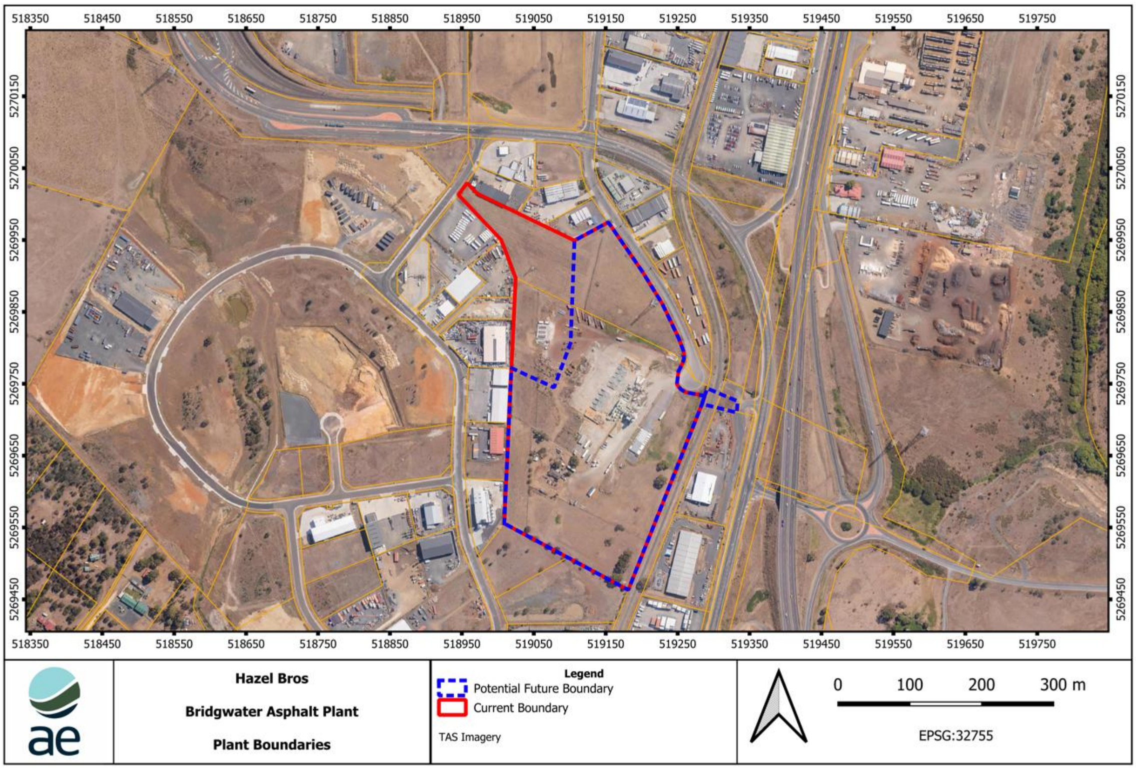

Figure 12: Current and Potential Future Boundaries

11.2 Odour

This section presents the predicted odour concentrations from the activities at the Subject Site, this includes asphalt plant emissions from exhaust's stack, truck load out and bitumen tanks (breathing operations and deliveries). Activated carbon filter is proposed to either be in location #1 in the middle of the four tanks or at location #2 at the end of the four tanks as indicated in Figure 5. Accordingly, six scenarios have been modelled as presented in Table 30.

Table 30: Modelled Scenarios for Odour Emissions and Activated Carbon Filter Locations

Scenario	Exhaust Stack	Activated Carbon Filter Location	Vent Type of the Carbon Filter
Scenario 1	Diesel	Location # 1	Horizontal
Scenario 2	Diesel	Location # 2	Horizontal
Scenario 3	Natural Gas	Location # 1	Horizontal
Scenario 4	Natural Gas	Location # 2	Horizontal
Scenario 5	30% RAP	Location # 1	Horizontal
Scenario 6	30% RAP	Location # 2	Horizontal

Table 31 presents the predicted odour concentrations for each scenario at or beyond the current and potential future boundaries of the Subject Site. The results show that the predicted odour concentrations comply with the applicable criterion at and beyond for both the existing and potential future boundaries.

Table 31: Predicted 1-hour Average, 99.5th Percentile Odour Concentrations at the Subject Site Boundary (OU)

Scenario	Predicted Odour Concentration (OU, 1-hour average, 99.5th percentile)			Criteria (OU)	Compliant ?
	Current Boundary	Potential Future Boundary	Off-site Receptors		
Scenario 1	1.33	1.32	0.54	2	Y / Y / Y
Scenario 2	1.28	1.28	0.54	2	Y / Y/ Y
Scenario 3	1.29	1.32	0.54	2	Y / Y/ Y
Scenario 4	1.28	1.28	0.54	2	Y / Y/ Y
Scenario 5	1.57	1.60	0.77	2	Y / Y/ Y
Scenario 6	1.54	1.58	0.77	2	Y / Y/ Y

11.3 Particulates

This section presents the predicted particulate concentrations from the following activities:

- All operations happening at the asphalt plant in isolation, including points sources (exhaust stack), and fugitive emissions (wind erosion, vehicle movements on paved roads, material transfer and filler silo filling).
- Operations happening at the concrete batch plant in isolation, including fugitive emissions (material transfer, wind erosion and vehicle movements on paved roads).
- Cumulative emissions associated with the background concentrations (Table 27).

The predicted cumulative 24-hours and annual average PM_{10} emissions from the Subject Site are presented in Table 32 and Table 34. It can be seen that the predicted cumulative concentrations comply with the assessment criteria at and beyond both the existing and potential future boundaries.

The predicted cumulative 24-hours and annual average $PM_{2.5}$ emissions from the Subject Site are presented in Table 33 and Table 34. It can be seen that the predicted cumulative concentrations comply with the assessment criteria at and beyond both the existing and potential future boundaries.

Table 32: Predicted Maximum PM_{10} Concentrations at the Site Boundary (µg/m³)

Activity	Current Boundary		Potential Future Boundary	
	24-hour	Annual	24-hour	Annual
Asphalt Plant in isolation	17	2.7	18	2.8
Concrete Batch Plant in isolation	10	0.55	26	1.0
Cumulative (asphalt plant, concrete batch plant and background)	38	14	47	14
PM_{10} Criteria	50	25	50	25
Compliant?	Y	Y	Y	Y

Table 33: Predicted Maximum $PM_{2.5}$ Concentrations at the Site Boundary (µg/m³)

Activity	Current Boundary		Potential Future Boundary	
	24-hour	Annual	24-hour	Annual
Asphalt Plant in isolation	6.2	0.78	6.2	0.81
Concrete Batch Plant in isolation	1.6	0.07	3.9	0.16
Cumulative (asphalt plant, concrete batch plant and background)	15	6.5	15	6.6
$PM_{2.5}$ Criteria	20	7	20	7
Compliant?	Y	Y	Y	Y

Table 34: Predicted Maximum PM_{10} and $PM_{2.5}$ Concentrations beyond the Site Boundary (µg/m³)

Activity	PM_{10}		$PM_{2.5}$	
	24-hour	Annual	24-hour	Annual
Asphalt Plant in isolation	7.7	0.67	2.4	0.34
Concrete Batch Plant in isolation	3.2	0.45	0.48	0.07
Cumulative (asphalt plant, concrete batch plant and background)	26	12	10	6.1
Criteria	50	25	20	7
Compliant?	Y	Y	Y	Y

11.4 Combustion Gases

Table 35 and Table 36 present the maximum predicted concentrations of air emissions generated from the exhaust's stack combustion gases for natural gas and diesel respectively at the site boundary. It should be noted that the modelling of NO_2 has been implemented based on a conservative assumption of 100% conversion of nitrogen oxide to nitrogen dioxide. It can be seen that the predicted concentrations comply with the assessment criteria at and beyond both the existing and potential future boundaries.

Background concentrations for combustion gases are not available; therefore, these predicted concentrations are in isolation.

Table 35: Predicted Maximum Pollutant Concentrations at or Beyond of the Subject Site Boundary (µg/m^3) – Natural gas

Pollutant	Averaging Period	Current Boundary	Future Potential Boundary	Off-site Receptors	Criteria (µg/m^3)	Compliant?
NO_2 (as 100% NOx)	1-hour	19	19	8.84	151	Y / Y / Y
	Annual	2.2	2.2	1.30	28	Y / Y / Y
CO	8-hours	82	81	42	10,310	Y / Y / Y
SO_2	1-hour	4.0	4.0	4.2	197	Y / Y / Y
	24-hours	1.4	1.4	0.86	52	Y / Y / Y

Table 36: Predicted Maximum Pollutant Concentrations at or Beyond of the Subject Site Boundary (µg/m^3) – Diesel

Pollutant	Averaging Period	Current Boundary	Future Potential Boundary	Off-site Receptors	Criteria (µg/m^3)	Compliant?
NO_2 (as 100% NOx)	1-hour	40	40	18.6	151	Y / Y / Y
	Annual	4.6	4.6	2.73	28	Y / Y / Y
CO	8-hours	82	81	42	10,310	Y / Y / Y
SO_2	1-hour	32	31	33	197	Y / Y / Y
	24-hours	11	11	6.76	52	Y / Y / Y

11.5 Potential Other Emissions

Heavy metals, Polycyclic Aromatic Hydrocarbons (PAH), and Volatile Organic Compounds are expected to be released from the operation of the exhaust's stack and the bitumen tank as indicated in the emission factors (Table 8 and Table 10).

Table 37 presents the maximum predicted contaminant concentrations from the Subject Site at or beyond the site boundary. It can be seen that the predicted concentrations comply with the assessment criteria at and beyond both the existing and potential future boundaries.

It should be noted that the presented predicted concentrations are for 3-min averaging period are 99.9th percentile, whilst other time periods are maximum concentrations.

Table 37: Maximum Predicted Ground Level Concentration (GLC) of Heavy Metals and PAH at or Beyond of the Subject Site Boundary (µg/m³)

Pollutant	Averaging Period	Maximum Predicted GLC (µg/m³)			Criteria (µg/m³)	Compliant?
		Current Boundary	Future Potential Boundary	Off-site Receptors		
Heavy Metals						
Arsenic and compounds	3 min	5.9E-04	5.9E-04	2.7E-04	0.17	Y / Y / Y
Barium	3 min	0.002	0.002	9.3E-04	17	Y / Y / Y
Beryllium	3 min	2.0E-04	2.0E-04	9.3E-05	0.07	Y / Y / Y
Cadmium and cadmium compounds	3 min	8.3E-04	8.3E-04	3.8E-04	0.033	Y / Y / Y
Chromium (total)	3 min	7.7E-04	7.7E-04	3.5E-04	17	Y / Y / Y
Copper fume	3 min	6.5E-05	6.5E-05	3.0E-05	6.7	Y / Y / Y
Lead	90 days	1.1E-04	1.1E-04	5.7E-05	1.5	Y / Y / Y
	Annual	7.5E-05	7.5E-05	4.4E-05	0.5	Y / Y / Y
Manganese and compounds	3 min	0.009	0.009	0.004	330	Y / Y / Y
Mercury (inorganic)	3 min	5.5E-04	5.5E-04	2.5E-04	17	Y / Y / Y
Nickel and nickel compounds	3 min	0.004	0.004	0.002	0.33	Y / Y / Y
Zinc oxide fume	3 min	0.009	0.009	4.1E-03	170	Y / Y / Y
PAHs						
Benzo(a)pyrene	3 min	1.5E-03	1.5E-03	7.1E-04	0.73	Y / Y / Y

The activated carbon filter is proposed to be in location #1 in the middle of the four tanks or at location #2 at the end of the four tanks as indicated in Figure 5. Accordingly, two scenarios have been assessed as follows:

- Scenario 1: Stack emissions and activated carbon filter at Location #1
- Scenario 2: Stack emissions and activated carbon filter at Location #2

The predicted concentrations of VOCs at or beyond the site boundary receptors are provided in Table 38 and Table 39. It can be noted that all modelled VOC species comply with the assessment criteria at and beyond both the existing and potential future boundaries, with no significant differences in the predicted GLCs between the proposed two locations of the activated carbon filter.

Table 38: Maximum Predicted Ground Level Concentration (GLC) of VOCs Concentrations at Site Boundary (µg/m³) – Scenario 1

Pollutant	Averaging Period	Maximum Predicted GLC (µg/m³)			Criteria (µg/m³)	Compliant?
		Current Boundary	Future Potential Boundary	Off-site Receptors		
Acetaldehyde	3 min	0.41	0.41	0.19	76	Y / Y / Y
Benzene	3 min	8.3	8.3	2.92	100	Y / Y / Y
Ethylbenzene	3 min	8.1	8.1	2.85	50	Y / Y / Y
Formaldehyde	3 min	1.0	1.0	0.46	650	Y / Y / Y
Toluene	3 min	23	23	8.17	350	Y / Y / Y
Trimethylbenzene	3 min	2.1	2.1	0.75	14,500	Y / Y / Y
Xylenes	3 min	3.9	3.9	1.66	4,000	Y / Y / Y

Table 39: Maximum Predicted Ground Level Concentration (GLC) of VOCs Concentrations at Site Boundary (µg/m³) – Scenario 2

Pollutant	Averaging Period	Maximum Predicted GLC (µg/m³)			Criteria (µg/m³)	Compliant?
		Current Boundary	Future Potential Boundary	Off-site Receptors		
Acetaldehyde	3 min	0.41	0.41	0.19	76	Y / Y / Y
Benzene	3 min	7.2	7.5	2.84	100	Y / Y / Y
Ethylbenzene	3 min	7.0	7.3	2.77	50	Y / Y / Y
Formaldehyde	3 min	1.0	1.0	0.46	650	Y / Y / Y
Toluene	3 min	20	21	7.95	350	Y / Y / Y
Trimethylbenzene	3 min	1.8	1.9	0.73	14,500	Y / Y / Y
Xylenes	3 min	3.7	3.8	1.66	4,000	Y / Y / Y

12 CONCLUSIONS

Assured Environmental (AE) was appointed by Hazell Bros to undertake an air quality impact assessment for the proposed asphalt plant and the existing concrete batch plant at 1 Crooked Billet Drive, Bridgewater, TAS, 7030 (Subject Site).

The assessment has been prepared in accordance with the requirements of the Tasmanian Environment Protection Policy (Air Quality) 2004 and the Environmental Impact Statement Guidelines.

Hazell Bros. currently operates both wet and dry concrete batching plants on the Subject Site. The wet concrete batching plant is to be decommissioned and removed in mid-2025, whilst the dry concrete batching plant will be relocated as part of the works occurring during the construction of the asphalt plant.

Dispersion modelling has been undertaken for the proposed asphalt plant and the existing concrete batch plant. Cumulative impacts, including background concentrations, were also considered.

The results of the predictive modelling demonstrated compliance with the assessment criteria presented in the NEPM and EPP at and beyond both the existing and potential future boundaries for all pollutants. Given this, the risk of adverse impacts is expected to be low.

APPENDIX A: EXHAUST STACK PARAMETERS

Facility Name	**Hazell Brothers**
Facility Location	

Dryer	Stationary 2m X 8.5m [6' x 33'] Aggregate Dryer
	Whisper Jet **WJ-50** 50MMBTU [15MW] Gas/Oil Burner
Batch	**BG 2200XL** 2500kg [5500#] Batch Tower
PM Control	Stationary 65000 m3/hr [38250 ACFM] Reverse Air Baghouse

NOTES	Baghouse Specifications
Plant's rated capacity is based on the production of 320F (160C) conventional-type virgin surface mix, having 5% composite aggregate moisture removal, at 86 F (30C) and sealevel.	* 110kW Exhaust Fan with VFD drive * Vertical exhaust stack with unobstructed discharge opening * 642 sq m [6910 SF] of cloth @ 1.45 m/min [4.77 fpm] filtering velocity (air/cloth ratio)
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	
Heat input based on firing rate required for given production rate @ design conditions	

OPERATIONS

Batch Size	5512	**lb**	2500	**kg**		
Batch Time	60	**sec**				
Production Capacity	179.2	**ton/hr**	160	**tonne/hr**		
	358400	**lb/hr**	160000	**kg/hr**		
Annual Production	275573	**ton/yr**	250000	**tonne/yr**		
Max RAP per mix[1]	45	**%**				
RAP Usage per yr	50	**%**				
Avg AC per mix	5	**%**				
Exhaust Flow Rate	38250	**ACFM**	1083	**m^3/min**		
	2295000	**ACF/hr**	65000	**m^3/hr**		
Standard Flow Rate	19475	**DSCFM**	551	**Sm^3/min**	514	**Nm^3/min**
	1168483	**DSCF/hr**	33068	**Sm3/hr**	30812	**Nm^3/hr**
Maximum Heat Input	50	**mmBtu/hr**	52.8	**GJ/hr**	15	**MW**
Exhaust Temperature	240	**F**	115.6	**C**		
Exhaust Moisture[2]	32.5	**%**				
Stack Discharge Height	77.6	**ft**	23.65	**m**		
Stack Diameter (ID)	39.4	**in**	1.0	**m**		
Stack Area	8.45	**ft^2**	0.79	**m^2**		
Stack Velocity	75.4	**ft/sec**	23.0	**m/sec**		
	4524.5	**ft/min**	1379.1	**m/min**		

[1] RAP @ 3% moisture content; Max 30% RAP through dryer drum ring; Max 25% RAP directly introduced to the mixer.
[2] average stack moisture content at design conds - varies with actual material moistures

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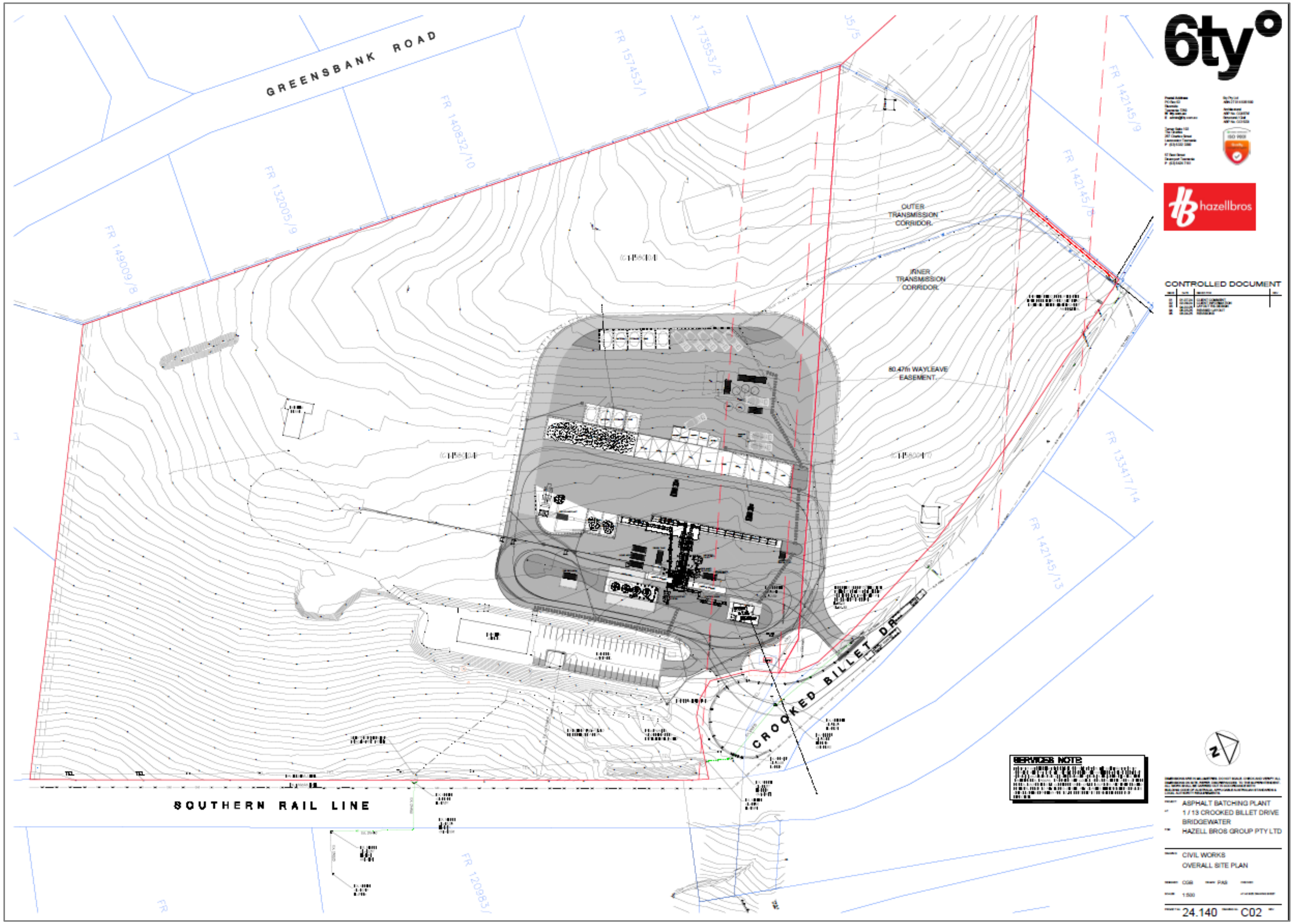
Notes:

- The stack height has been corrected by Hazel Bros to be 23.246 m as per the comments received on Project ID: 15466 | R0 dated 27 August 2024.
- Exhaust moisture is 20% as per the email received from hazel bros dated 22 August 2025.

APPENDIX B: PLANT LAYOUT



APPENDIX C: METEOROLOGICAL VARIBILITY AND ASSESSMENT YEAR SELECTION

Methodology

The nearest available Automatic Weather Stations (AWS) to the project area that are operated by the Bureau of Meteorology is located in Campania (Kincora) station (station number 094212).

Table 40: Summary of Meteorological Parameters Available at BOM Station Reviewed

Station	Meteorological Parameters Available				
	Wind Speed	Wind Direction	Air Temperature	Sea Level Pressure	Rainfall
Campania	Y	Y	Y	N	Y

Meteorological data for Campania (Kincora) station was reviewed between 2018 - 2022 to determine its suitability for use in the air quality modelling. When determining the most suitable year for modelling, the following considerations apply:

- A year with a moderate or strong El Nino Southern Oscillation Index (SOI) classification should be avoided, where possible.
- A year with rainfall significantly higher or lower than average should be avoided, where possible.
- Temperature, wind speed, wind direction and mean sea level pressure should be as close to the mean distribution as possible.

Analysis of Yearly Variability

Southern Oscillation Index

The Southern Oscillation Index, or SOI, gives an indication of the development and intensity of El Niño or La Niña events in the Pacific Ocean. The following is noted from the review of the SOI data:

- The neutral years (neither El Nino or La Nina) is 2018 and 2020.
- El Nino year is 2019 (weak).
- La Nina years are 2021 (weak) and 2022 (strong).

Rainfall

Monthly rainfall is shown in Figure 13. Annually, 2022 is the highest year with 655 mm of rainfall.

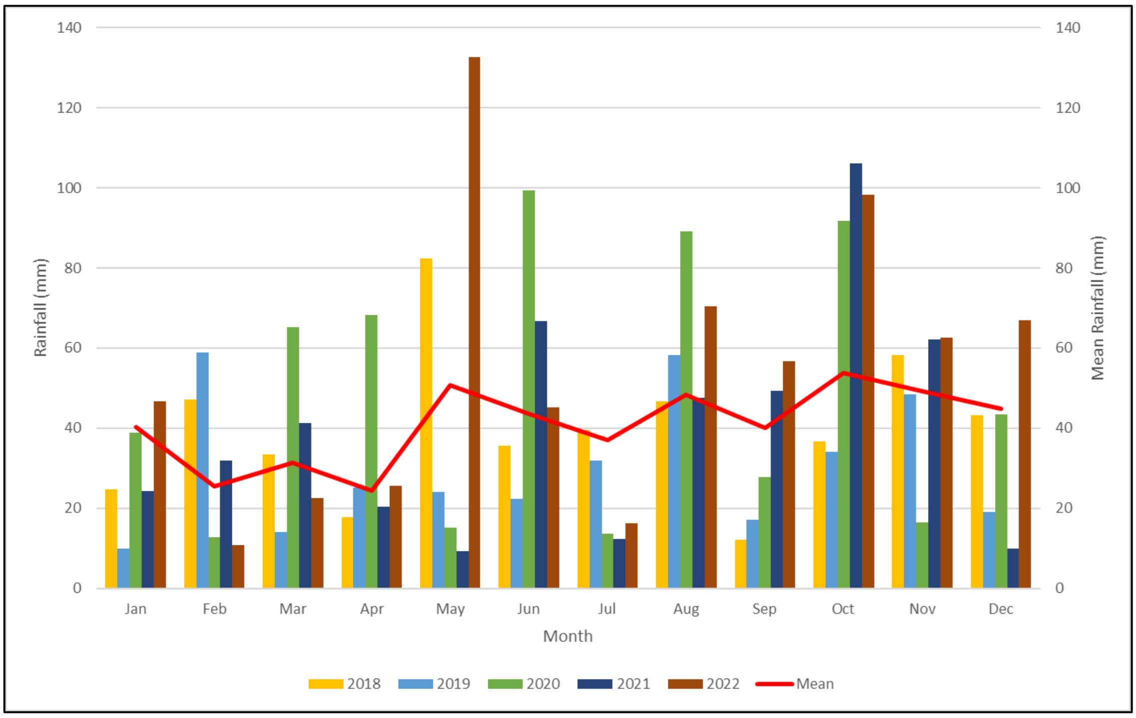
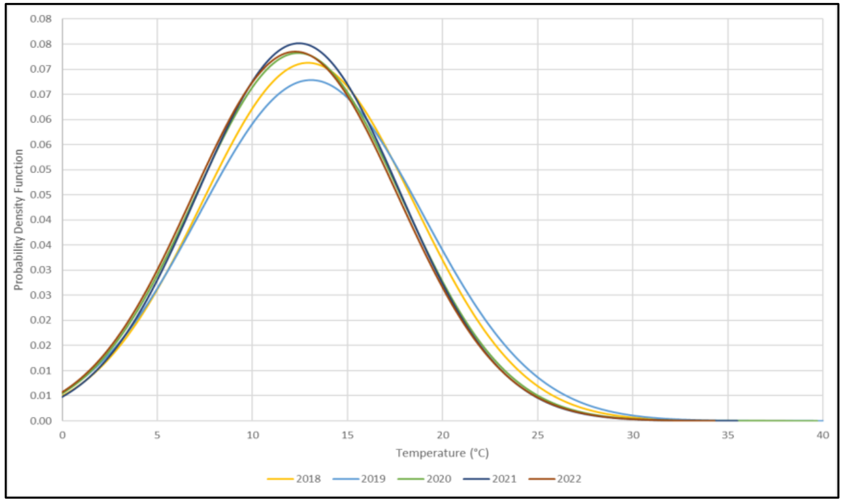


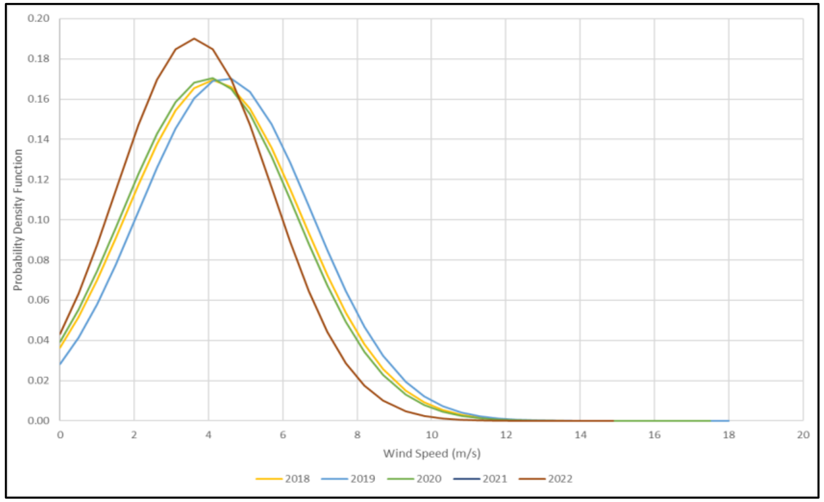
Figure 13: Monthly Rainfall (2015 - 2022)

Temperature, Wind Speed and Direction, Relative Humidity

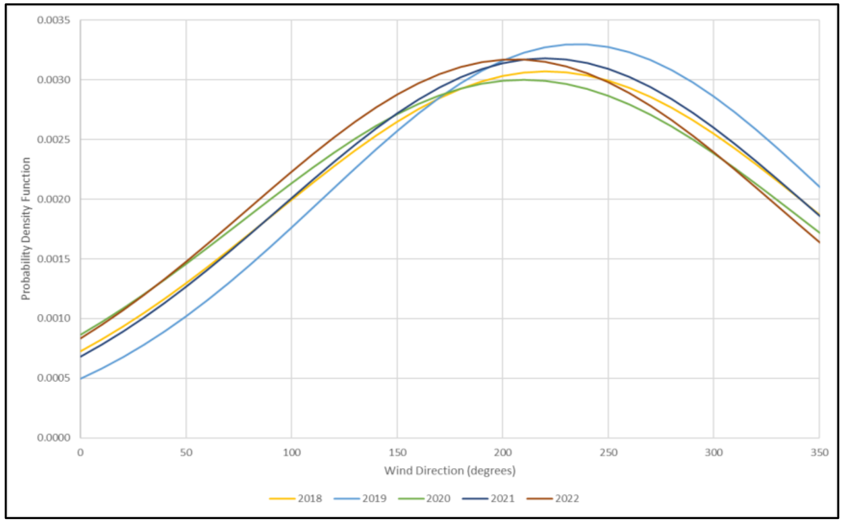
The annual and mean frequency distributions (as probability density function or pdf) for temperature, wind speed, wind direction and relative humidity is presented in Figure 14.



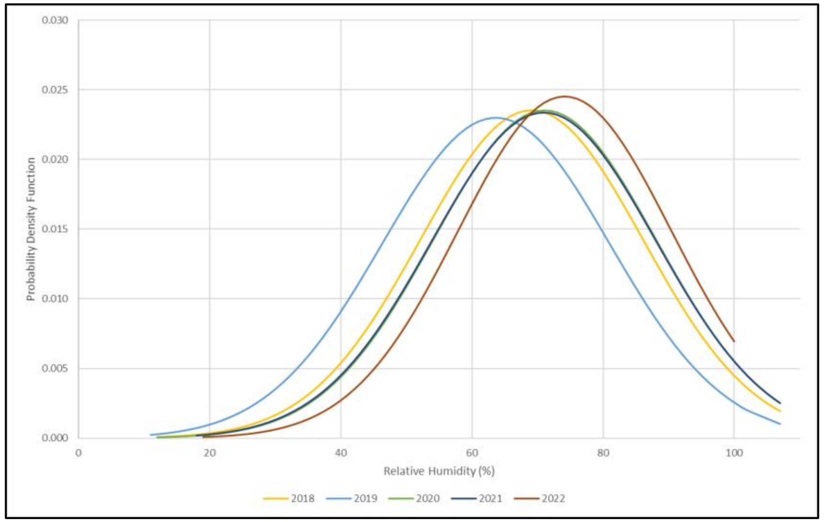
Temperature



Wind Speed



Wind Direction



Relative Humidity

Figure 14: Analysis of Meteorological Parameters (2018 - 2022) for Campania (Kincora) Station

APPENDIX D: METEOROLOGICAL MODEL PERFORMANCE AND SITE CONDITIONS

Model Performance

Figure 15 presents a comparison of the 9 am, 3 pm and annual 2019 predicted and observed wind roses at BOM Campania (Kincora) Station.

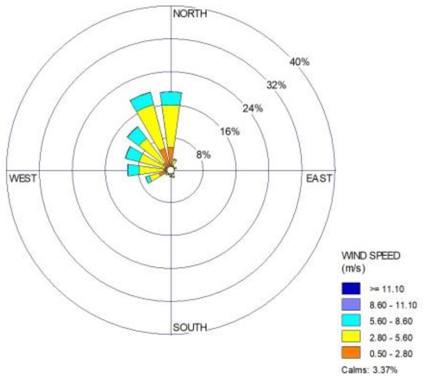
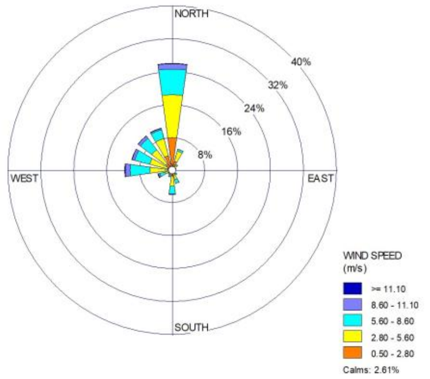
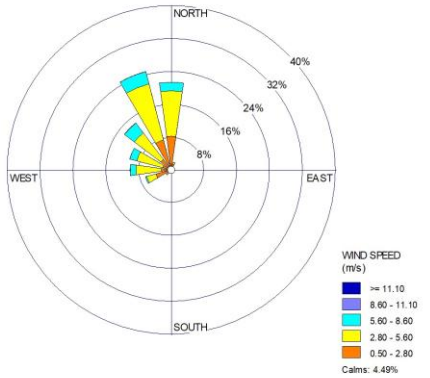
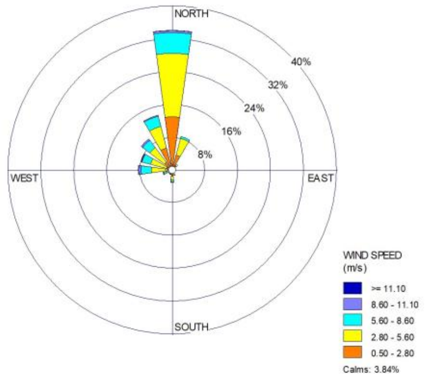
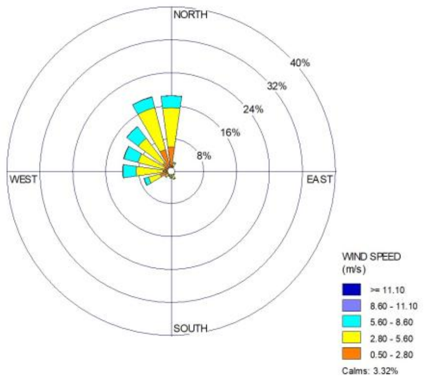
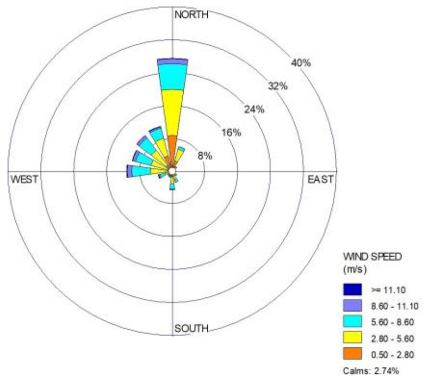
Period	BOM Campania (Kincora) Predicted (2019)	BOM Campania (Kincora) Observed (2019)
Annual		
0900		
1500		

Figure 15: Comparison of Predicted (2019) and BOM Observed Wind Roses (2019) at BOM Campania (Kincora) Station

Comparison of the BOM site observed wind roses with predicted wind roses indicate the following:

- Wind direction was very consistent when compared to the observed wind roses; and
- Lower wind speeds were observed for all predicted wind roses when compared to the observed.

Prognostic Dataset Review at Subject Site

This section provides an analysis of the prognostic meteorological dataset extracted from the CALMET model for 2019 at the Subject Site.

Predicted Atmospheric Stability

The amount of turbulence in the ambient air has a major effect upon the rise and dispersion of emissions. In particular, the amount of turbulence in the atmosphere plays a key role in diffusion of an emitted plume in the air with stronger turbulence (increased instability) increasing the rate of diffusion. Where the atmosphere exhibits weak turbulence (increased stability), downwind contaminant concentrations can be expected to increase due to the limited diffusion. Figure 16 presents the diurnal variability in atmospheric stability identified in the predicted meteorological dataset. As can be seen, atmospheric instability increased during the day where the influence of solar energy drives convection in the atmosphere. Conversely, increased stability can be seen during night periods where stable conditions are predicted for more than 50% of the time.

Monin-Obukhov Length

The Monin-Obukhov Length represents a parameter (with dimension of length) which provides a relationship between parameters characterising dynamic, thermal, and buoyant processes. The parameter, first described by Obukhov in 1946, is the characteristic height scale of the dynamic sub-layer of the atmosphere and is positive for stable stratifications and negative for unstable stratifications.

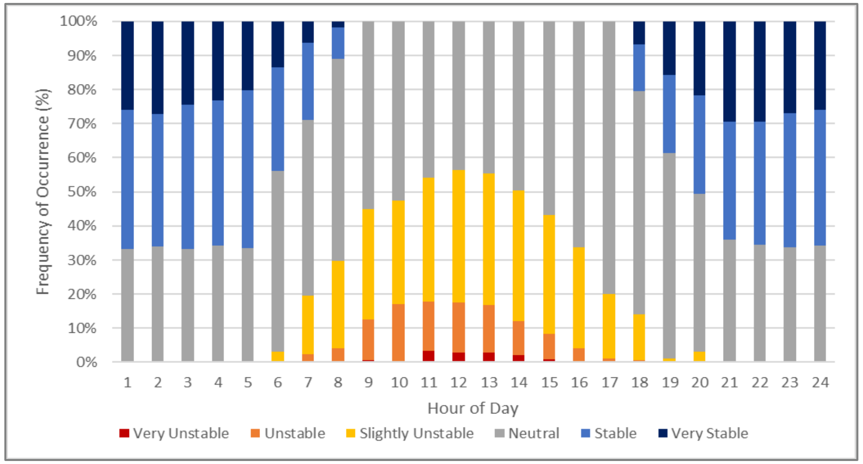
Figure 16 presents a graphical representation of the reciprocal of the Monin-Obukhov length (1/L) for the 2019 prognostic (CALMET) dataset. In this figure, neutral stability conditions have the 1/L value of zero (0), stable conditions have positive values of 1/L and unstable conditions have negative values of 1/L. The more positive 1/L value, the more stable the atmosphere is assumed to be by the model. Similarly, the more negative 1/L becomes, the more unstable the atmosphere is assumed to be by the model.

Predicted Atmospheric Mixing Height

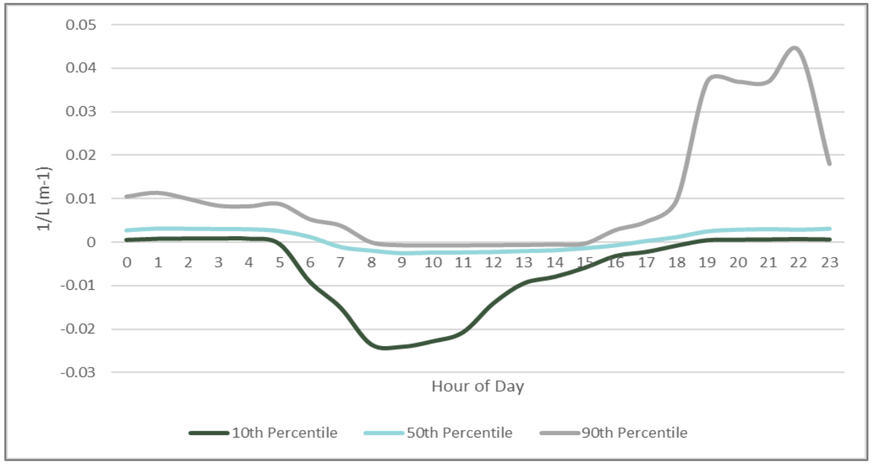
Figure 16 presents an illustration of diurnal variations in maximum and average mixing heights predicted by CALMET at the Subject Site across the 2019 prognostic meteorological dataset. As expected, an increase in mixing height during the morning is apparent, arising due to the onset of vertical mixing following sunrise. Maximum mixing heights generally occur in the mid to late afternoon, due to the dissipation of ground-based temperature inversions and growth of the convective mixing layer. The highest maximum mixing height for the Subject Site occurs during the late afternoon period.

Temperature

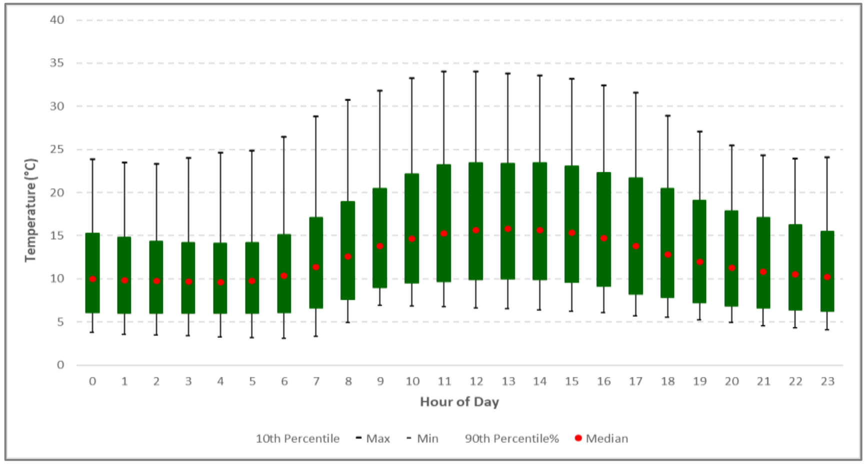
Figure 16 presents an illustration of diurnal variations in maximum and average temperatures predicted by CLMET at the Subject Site across the 2019 prognostic meteorological dataset.



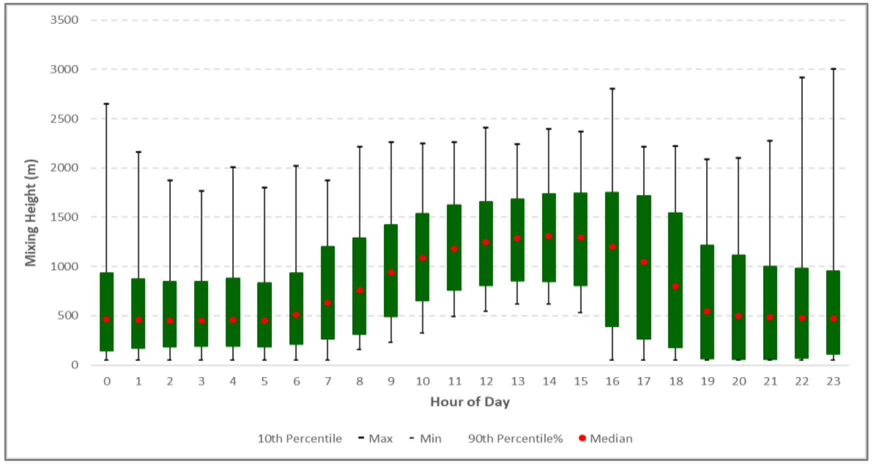
Annual Atmospheric Stability by Hour



Monin Obukhov Length by Hour



Temperature by Hour



Mixing Height by Hour

Figure 16: Meteorological Analysis at Subject Site

APPENDIX E: DUST EMISSION FACTORS CALCULATION

Emission factors shown in Table 41 can be used to estimate emissions of PM_{10} and $PM_{2.5}$ to the air from various sources associated with the Subject Site.

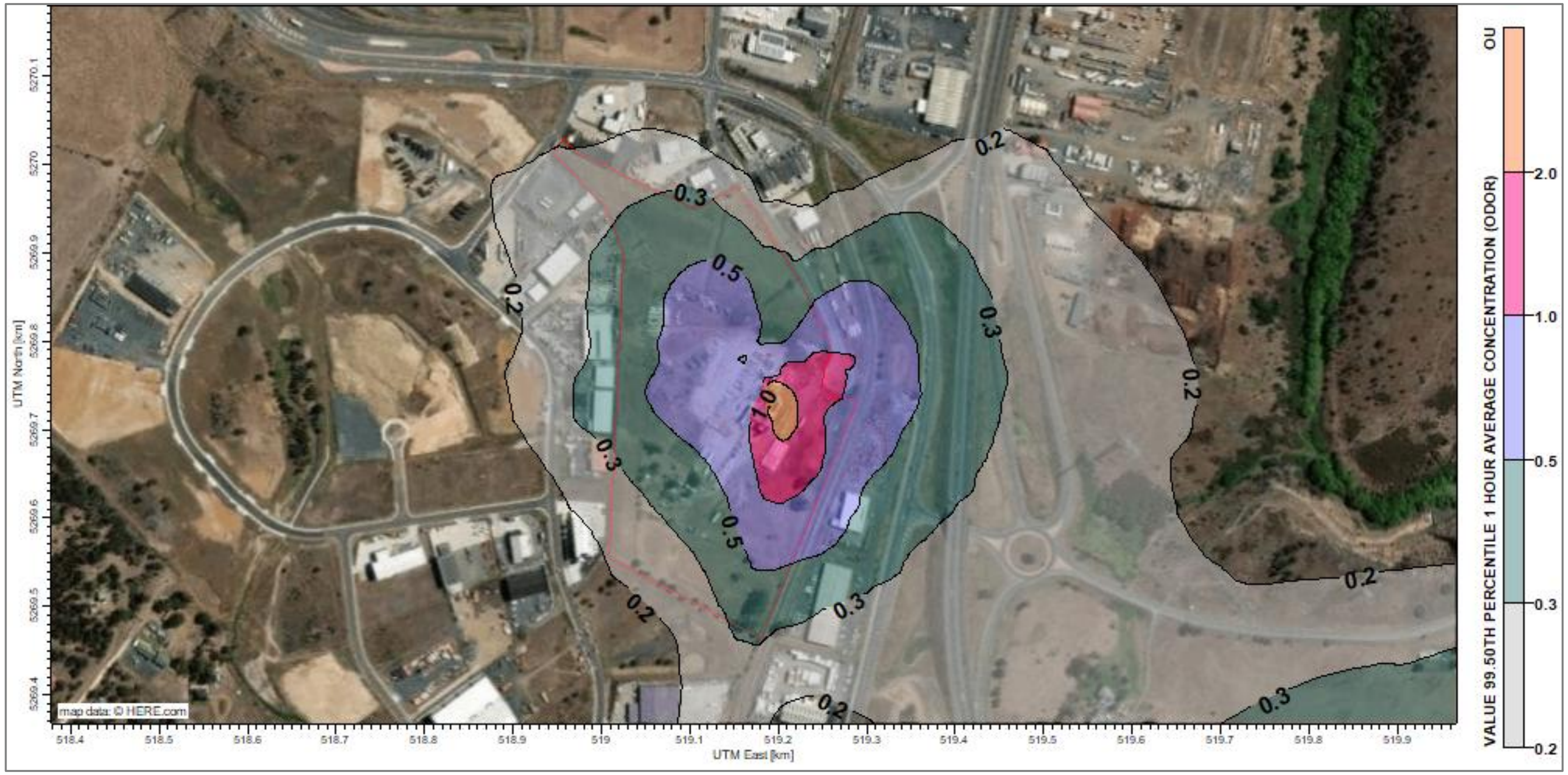
Table 41: Emission Factor by Activity

Activity	Units	PM_{10} Emission Factor	$PM_{2.5}$ Emission Factor	Reference
Wind Erosion from active stockpiles	kg/ha/ hr	TSP x 0.5	PM_{10} x 0.075	AP42 document, Chapter 11.9, Western Surface Coal Mining
Wheel generated particulates on paved roads	g/VKT	$0.62\ x\ \frac{S^{0.91}}{W^{1.02}}$	$0.15\ x\ \frac{S^{0.91}}{W^{1.02}}$	AP-42: Compilation of Air Emission Factors, Chapter 13.2.1 Paved Roads
Material transfer	kg/t	$0.35\ x\ 0.0016\ x\ \frac{(U/_{2.2})^{1.3}}{(M/_{2})^{1.4}}$	$0.053\ x\ 0.0016\ x\ \frac{(U/_{2.2})^{1.3}}{(M/_{2})^{1.4}}$	AP-42, Chapter 13.2.4, Aggregate Handling & Storage Piles
RAP Screening	Kg/t	0.0043	0.00029	AP-42, Chapter 11.19.2, Crushed Stone Processing & Pulverized Mineral Processing
Aggregate transfer - Concrete batch plant	Kg/t	0.0017	-	AP-42, Chapter 13.2.4, Aggregate Handling & Storage Piles
Truck loading (truck mix) - Concrete batch plant	Kg/t	0.0131	-	Chapter 11.12, Concrete Batching

Where:
RD = Number of Rainfall Days
S = material silt content (or surface content in unpaved roads) (%)
W = mean vehicle weight (tonnes)
U = wind speed (m/s)
M = material moisture content (%)

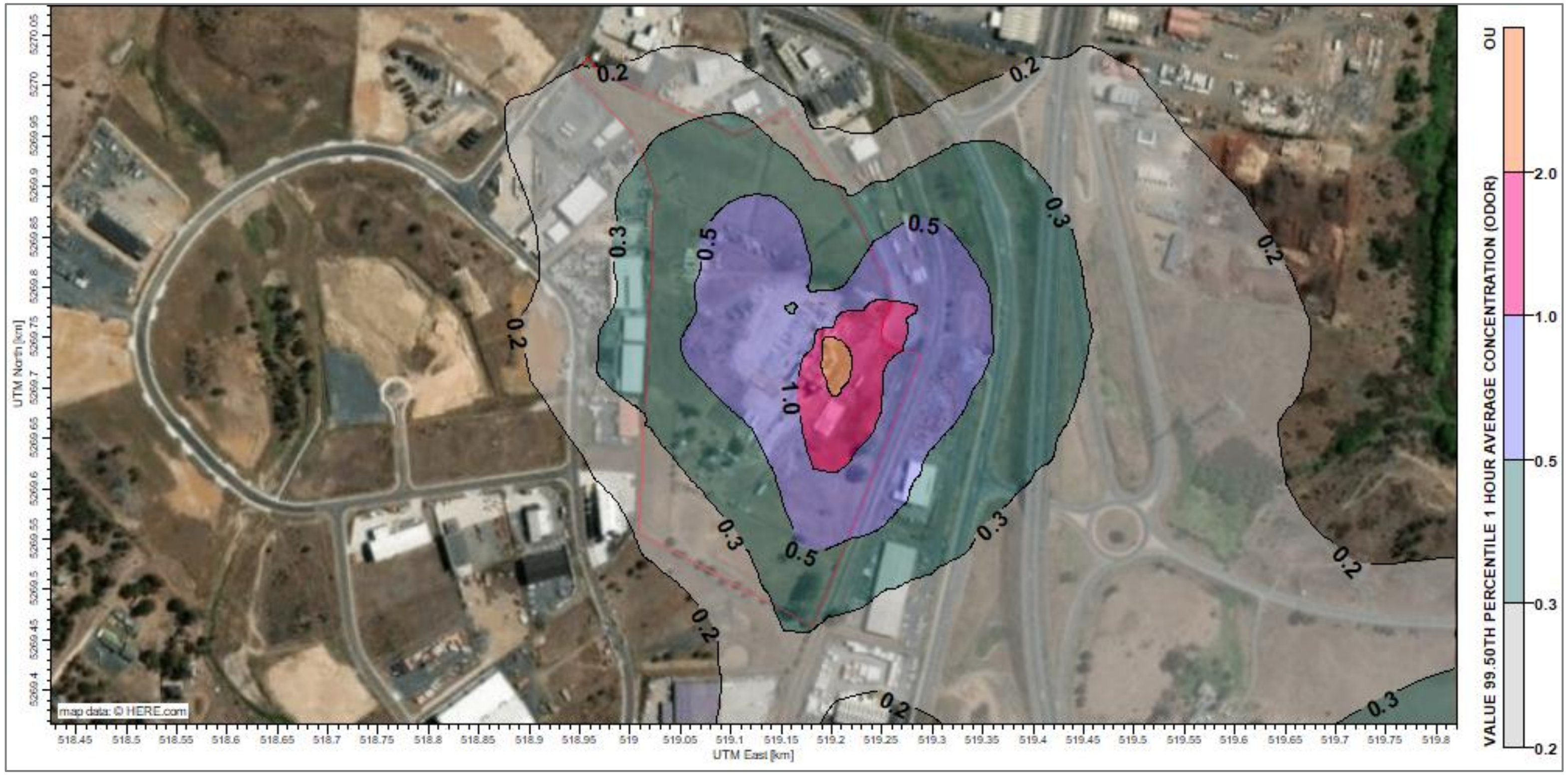
APPENDIX F: PREDICTED POLLUTANT GLC ISOPLETHS – CURRENT BOUNDARY

This Appendix presents the predicted ground level concentrations from daily peak production rates from both the asphalt plant and the concrete batch plant. Due to the interpolation of the gridded results, there may be slight discrepancies with the discrete receptors.



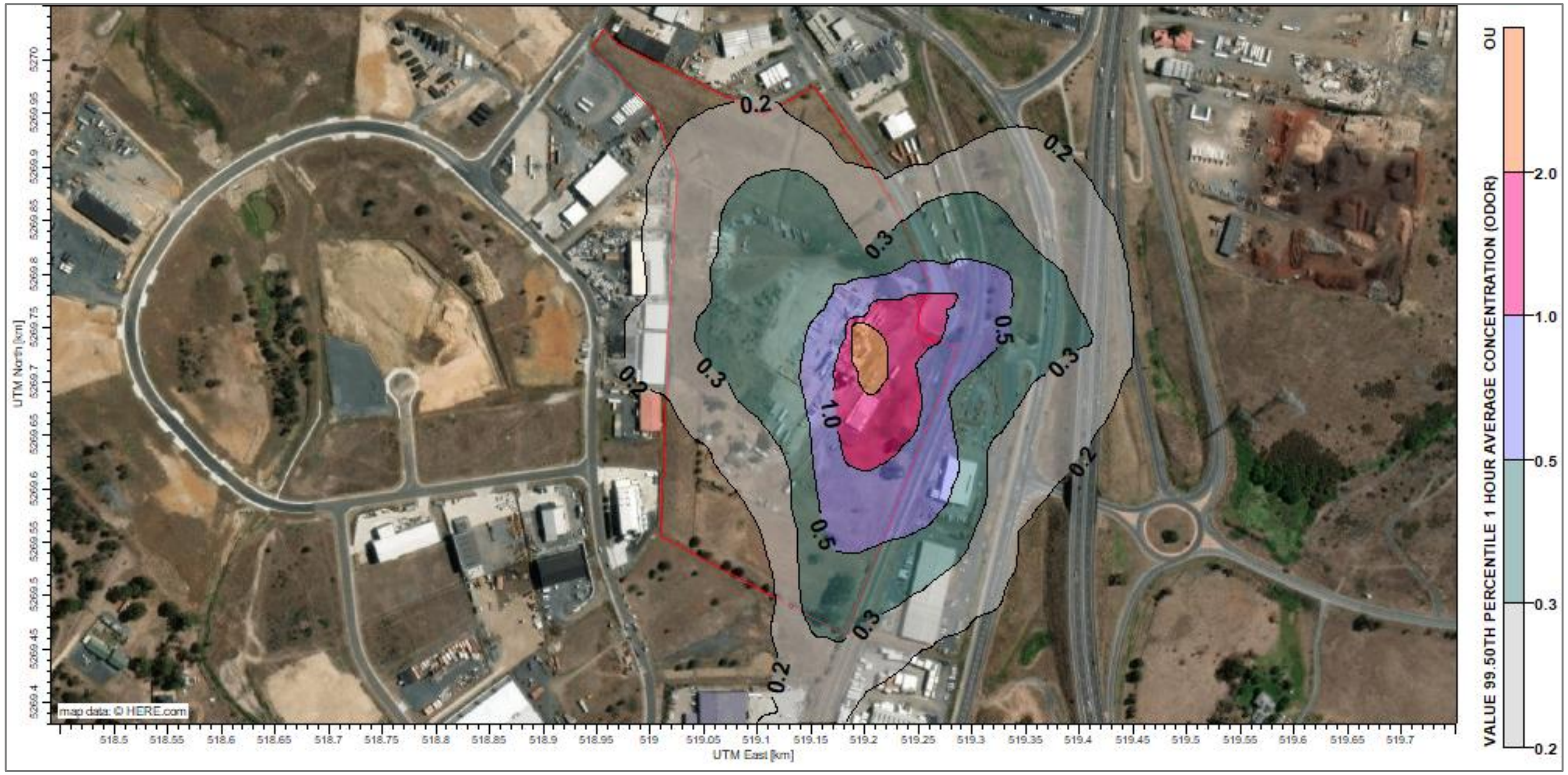
Pollutant: Odour **Period:** 1 Hour **Percentile:** 99.5th **Criteria:** 2 OU

Figure 17: Predicted Odour GLCs for Daily Operations (Scenario 1)



Pollutant: Odour **Period:** 1 Hour **Percentile:** 99.5th **Criteria:** 2 OU

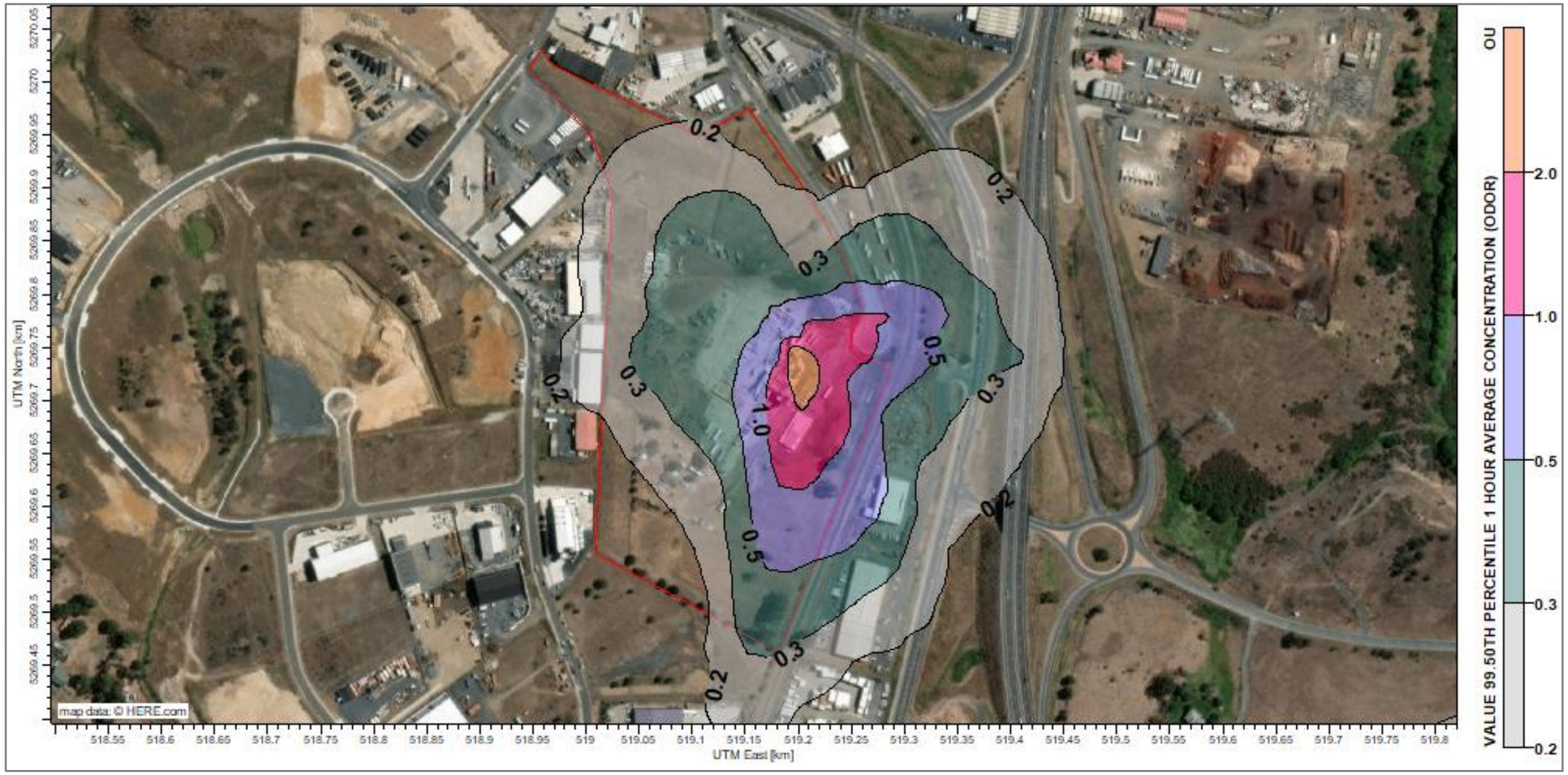
Figure 18: Predicted Odour GLCs for Daily Operations (Scenario 2)



Pollutant: Odour **Period:** 1 Hour **Percentile:** 99.5th **Criteria:** 2 OU

N
W E
S

Figure 19: Predicted Odour GLCs for Daily Operations (Scenario 3)

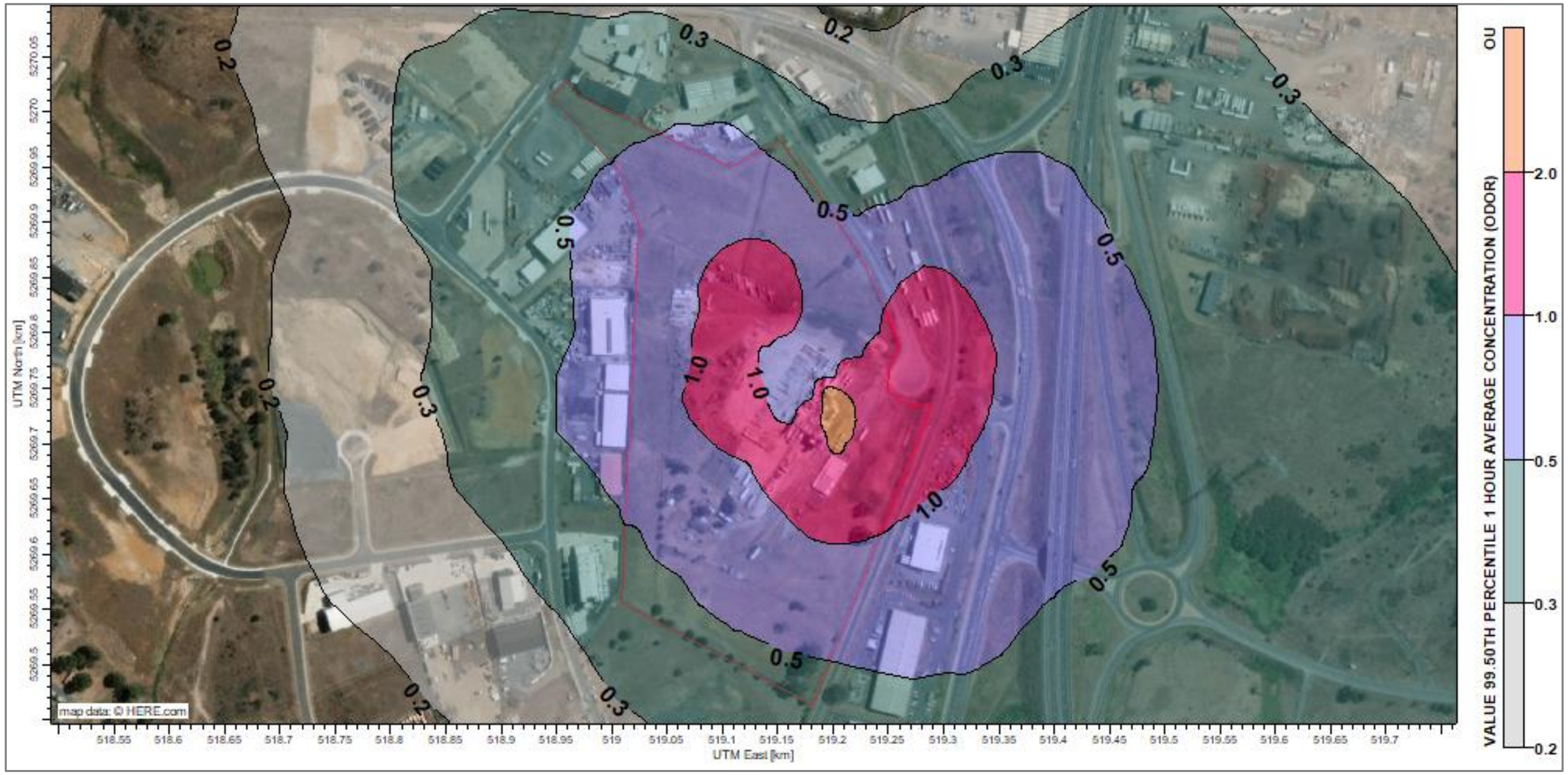


Pollutant: Odour **Period:** 1 Hour **Percentile:** 99.5th **Criteria:** 2 OU

Figure 20: Predicted Odour GLCs for Daily Operations (Scenario 4)

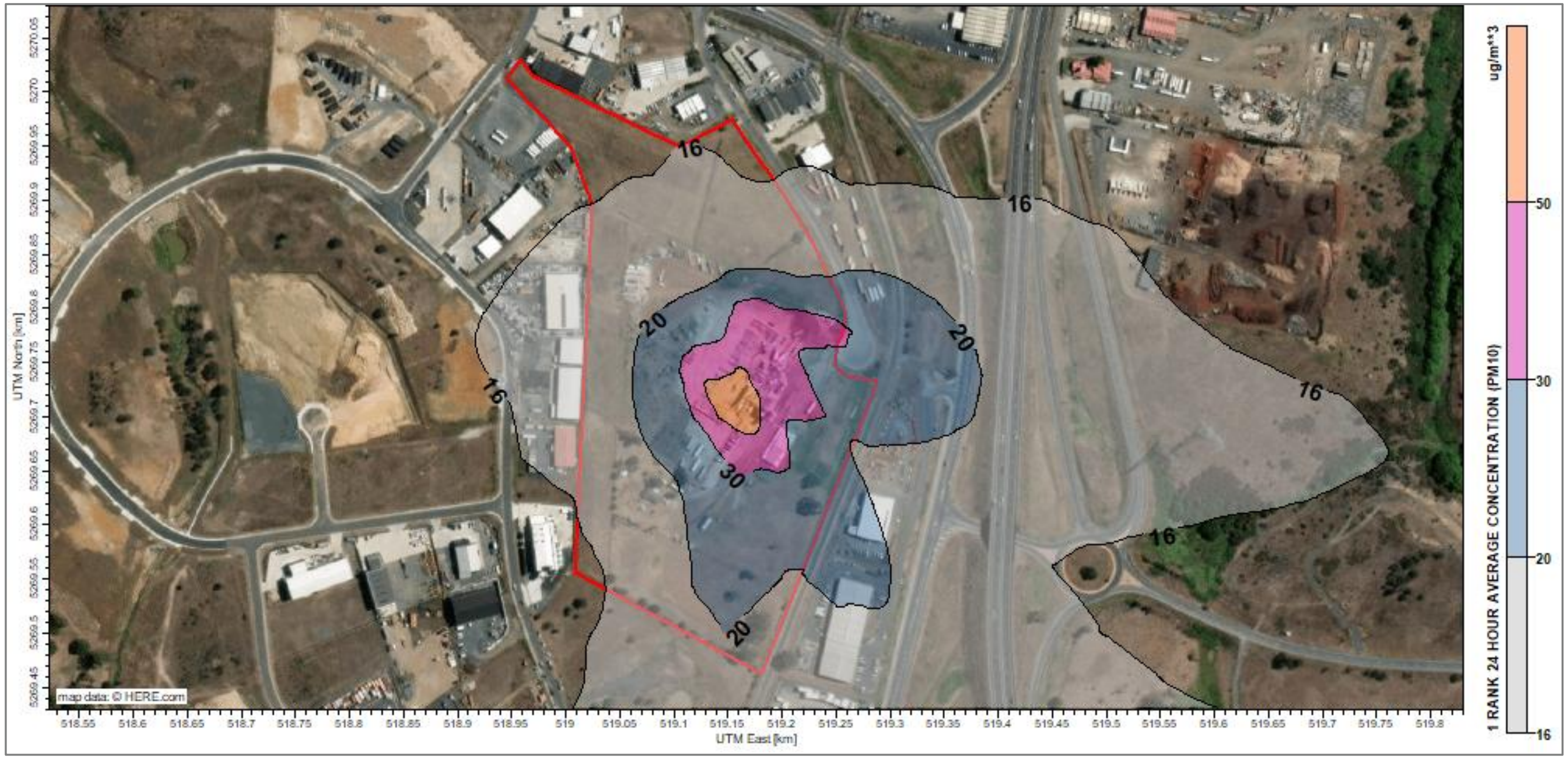
Pollutant: Odour **Period:** 1 Hour **Percentile:** 99.5th **Criteria:** 2 OU

Figure 21: Predicted Odour GLCs for Daily Operations (Scenario 5)



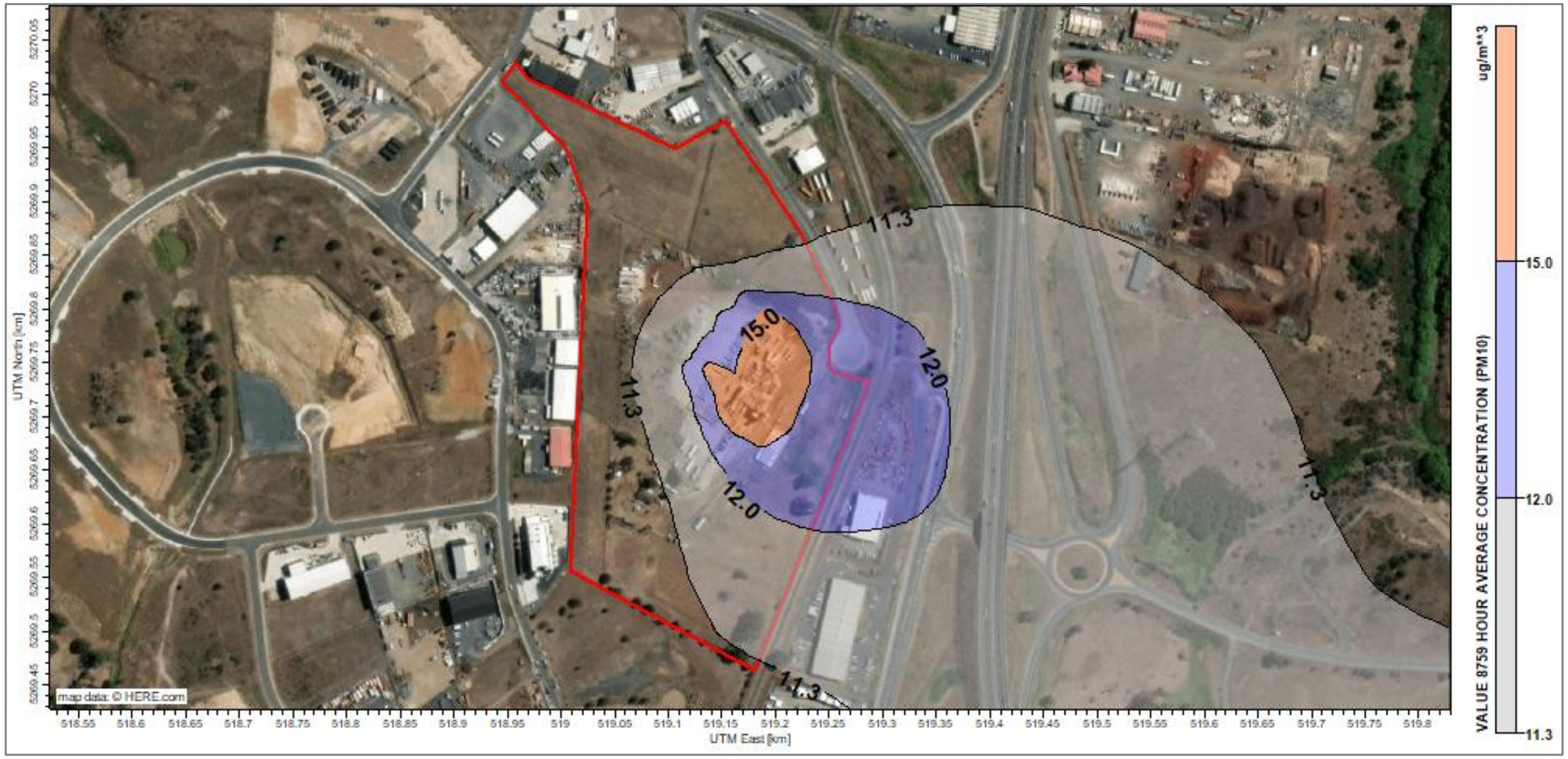
Pollutant: Odour **Period:** 1 Hour **Percentile:** 99.5th **Criteria:** 2 OU

Figure 22: Predicted Odour GLCs for Daily Operations (Scenario 6)



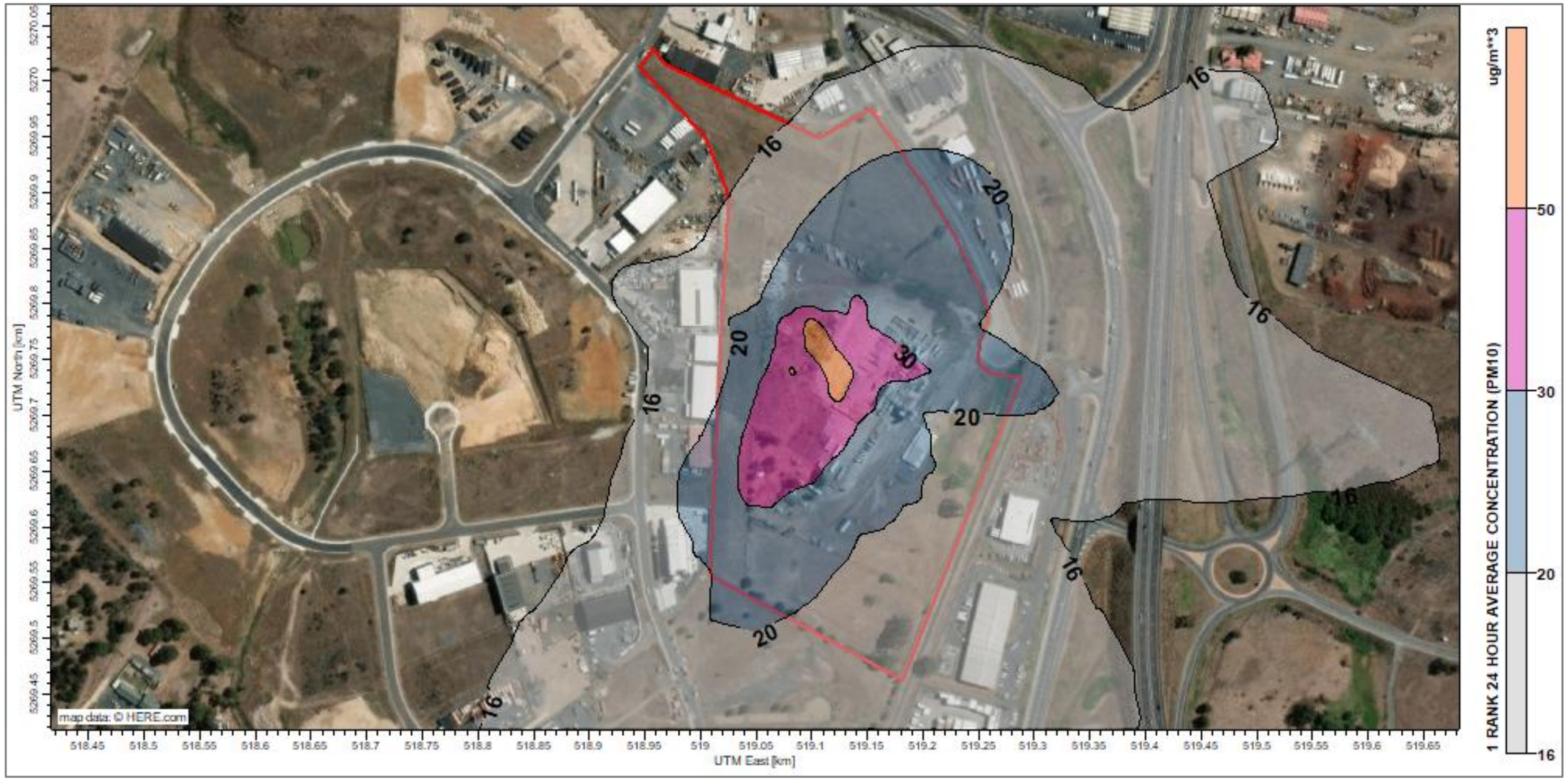
Pollutant: PM_{10} **Period:** 24 Hours **Percentile:** 100th **Criteria:** 50 µg/m^3

Figure 23: Predicted PM_{10} GLCs for Cumulative Impact (Asphalt Plant and Background)



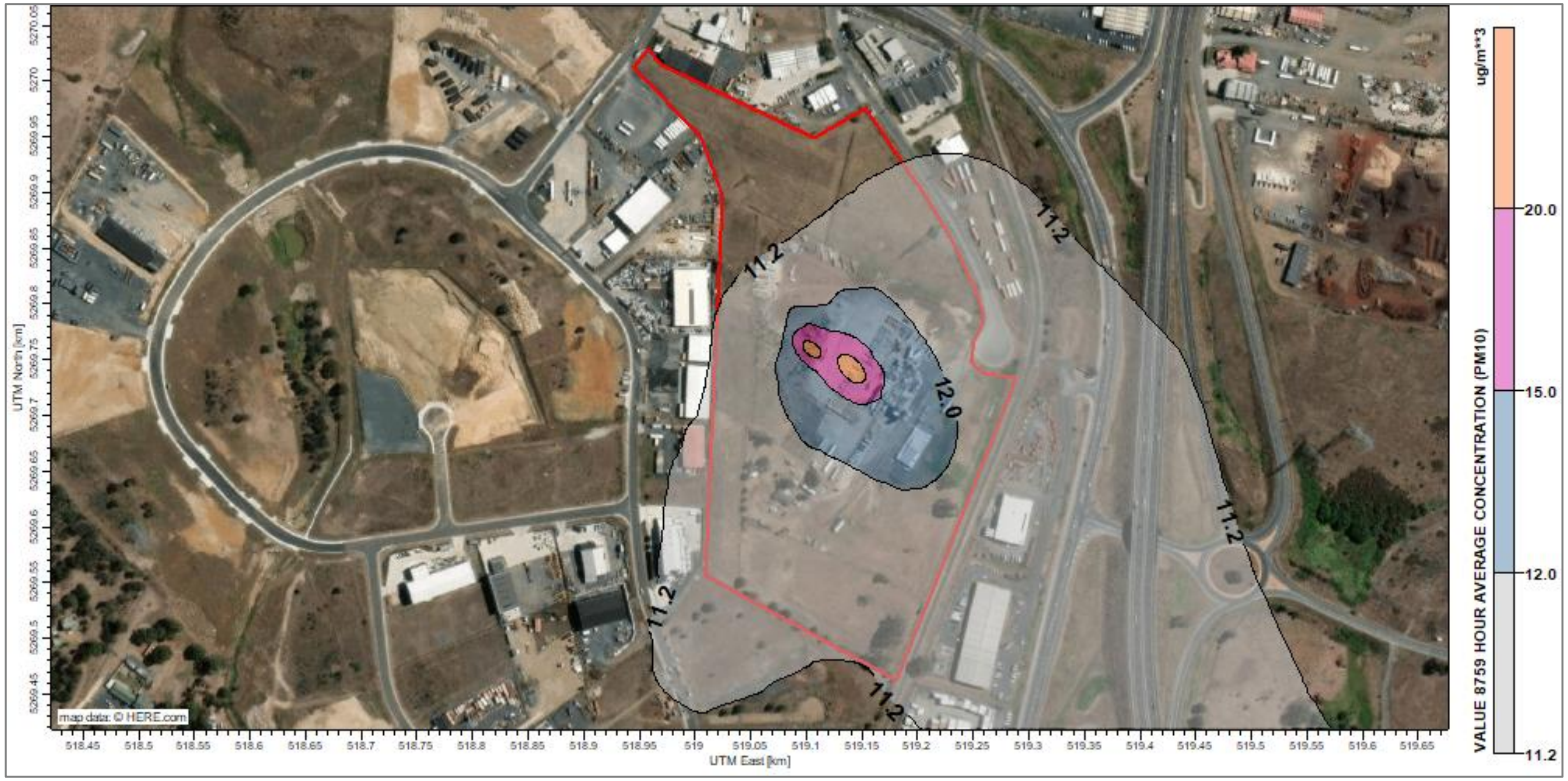
Pollutant: PM_{10} **Period:** Annual **Percentile:** 100^{th} **Criteria:** 25 µg/m^3

Figure 24: Predicted PM_{10} GLCs for Cumulative Impact (Asphalt Plant and Background)



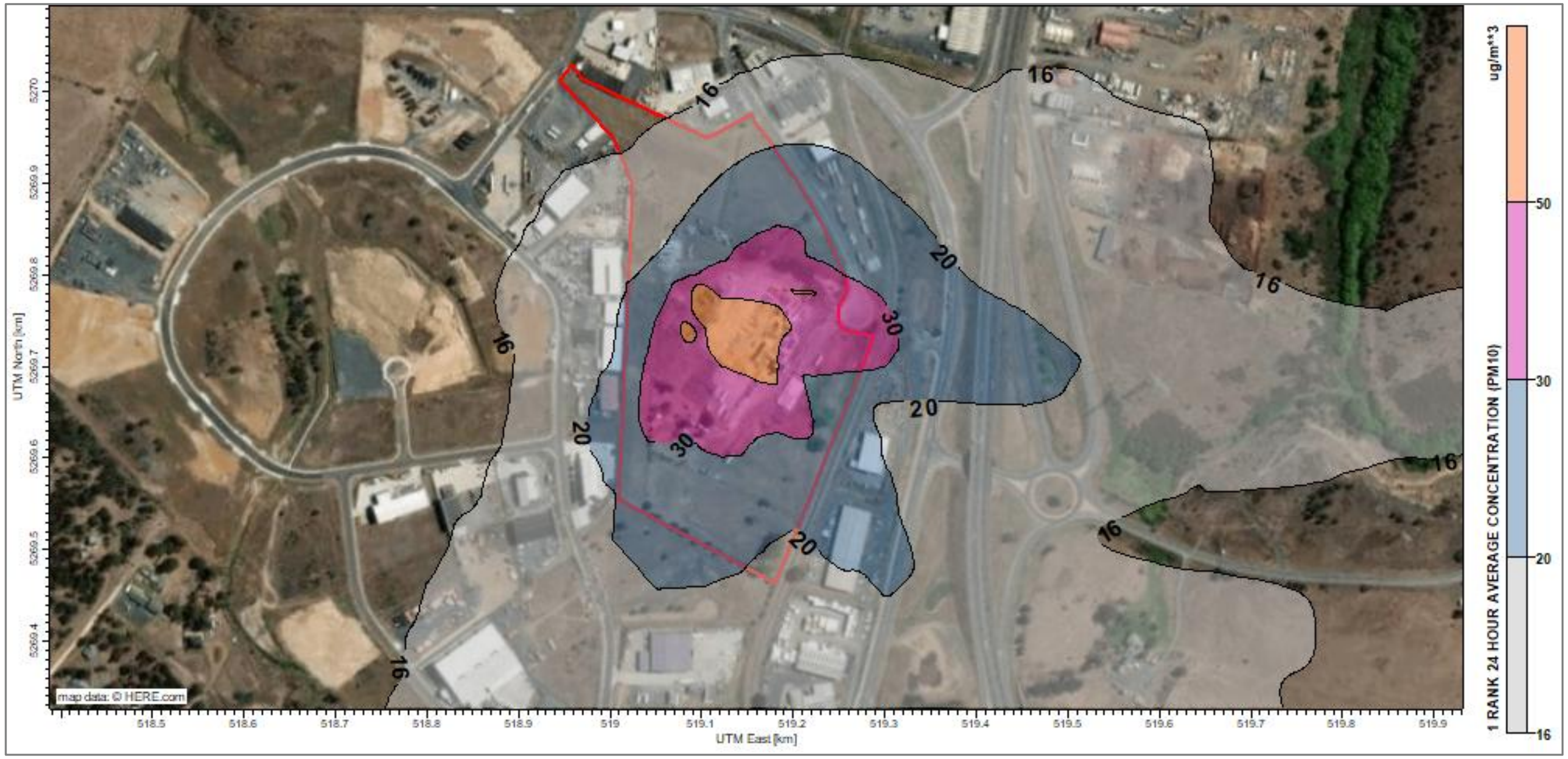
Pollutant: PM_{10} **Period:** 24 Hours **Percentile:** 100th **Criteria:** 50 µg/m³

Figure 25: Predicted PM_{10} GLCs for Cumulative Impact (Concrete Batch Plant and Background)



Pollutant: PM_{10} **Period:** Annual **Percentile:** 100th **Criteria:** 25 µg/m³

Figure 26: Predicted PM_{10} GLCs for Cumulative Impact (Concrete Batch Plant and Background)

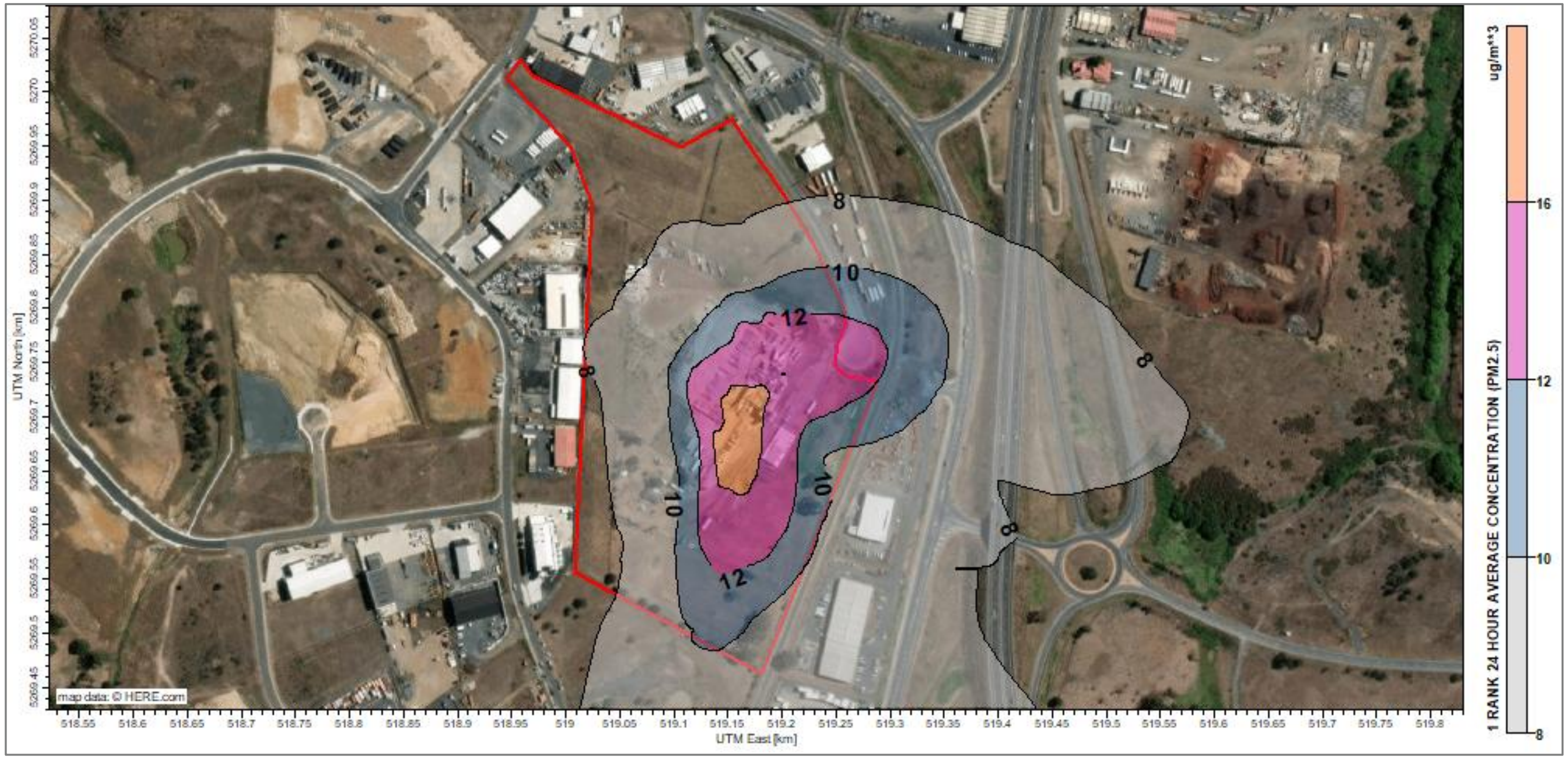


Pollutant: PM_{10} **Period:** 24 Hours **Percentile:** 100^{th} **Criteria:** 50 $\mu g/m^3$

Figure 27: Predicted PM_{10} GLCs for Cumulative Impact (Asphalt Plant, Concrete Batch Plant and Background)

Pollutant: PM_{10} **Period:** Annual **Percentile:** 100th **Criteria:** 25 μg/m^3

Figure 28: Predicted PM_{10} GLCs for Cumulative Impact (Asphalt Plant, Concrete Batch Plant and Background)



Pollutant: $PM_{2.5}$ **Period:** 24 Hours **Percentile:** 100th **Criteria:** 20 $\mu g/m^3$

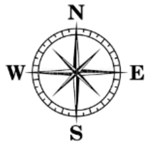
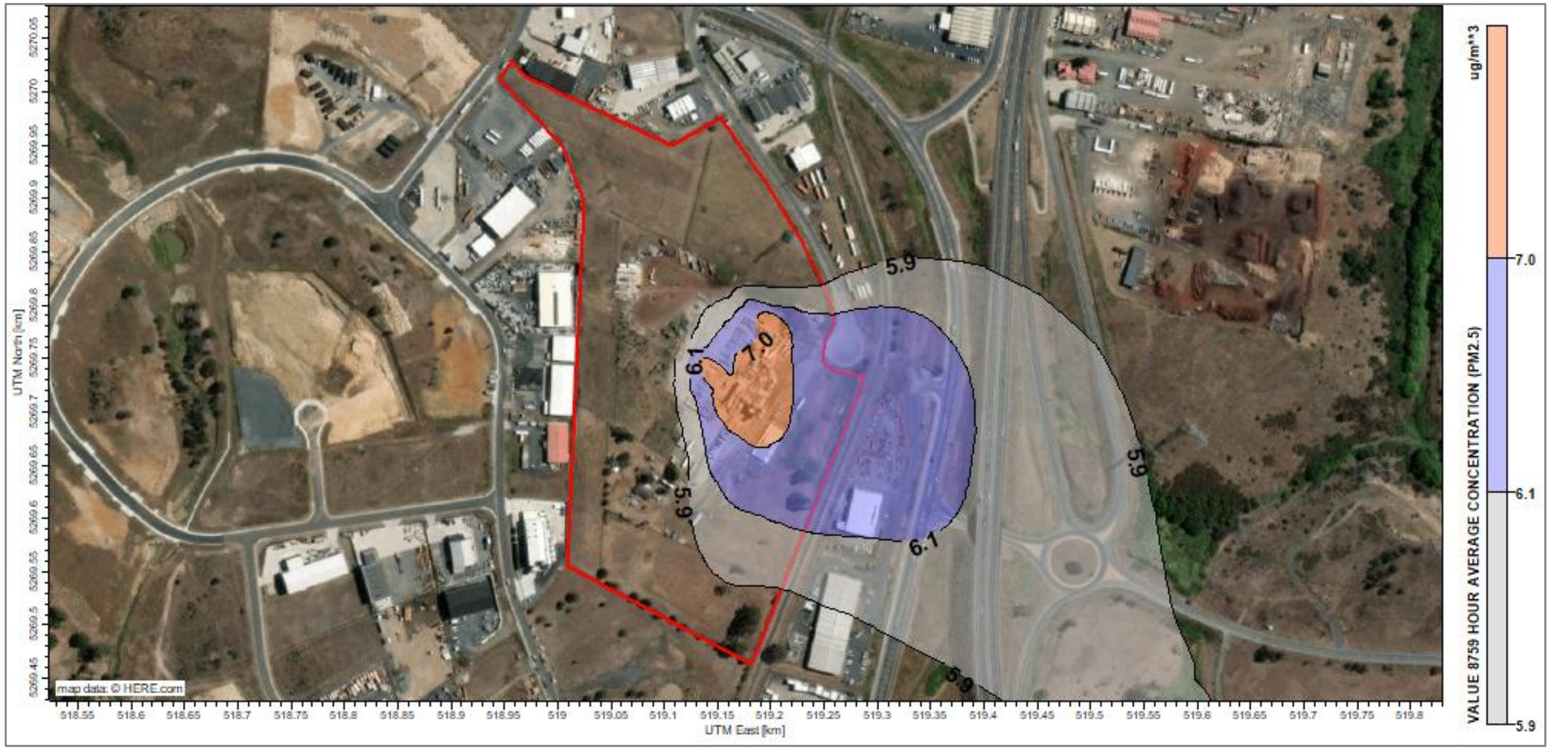


Figure 29: Predicted $PM_{2.5}$ GLCs for Cumulative Impact (Asphalt Plant and Background)



Pollutant: $PM_{2.5}$ **Period:** Annual **Percentile:** 100^{th} **Criteria:** 7 $\mu g/m^3$

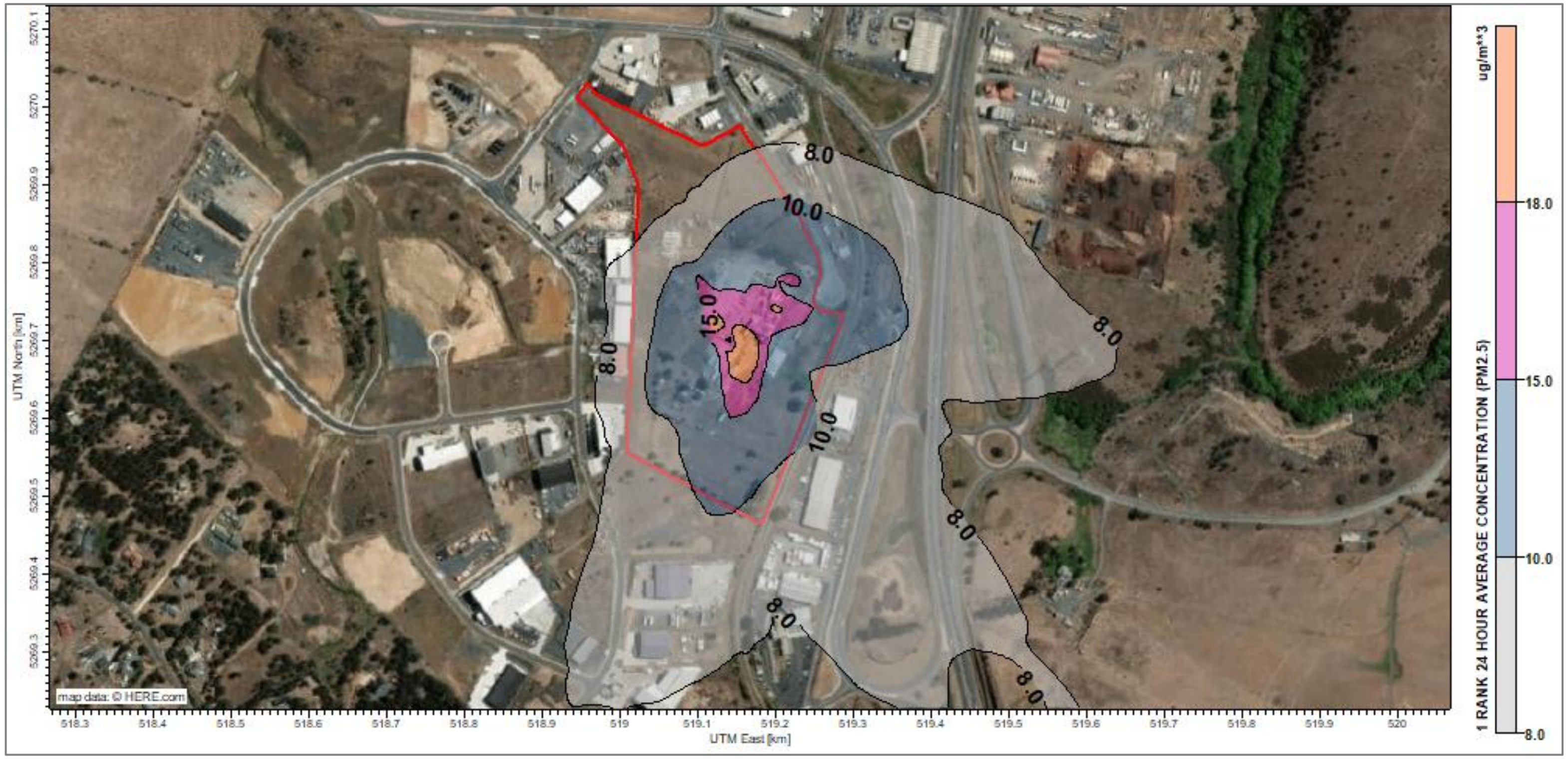
Figure 30: Predicted $PM_{2.5}$ GLCs for Cumulative Impact (Asphalt Plant and Background)

Pollutant: $PM_{2.5}$ **Period:** 24 Hours **Percentile:** 100th **Criteria:** 20 µg/m³

Figure 31: Predicted $PM_{2.5}$ GLCs for Cumulative Impact (Concrete Batch Plant and Background)

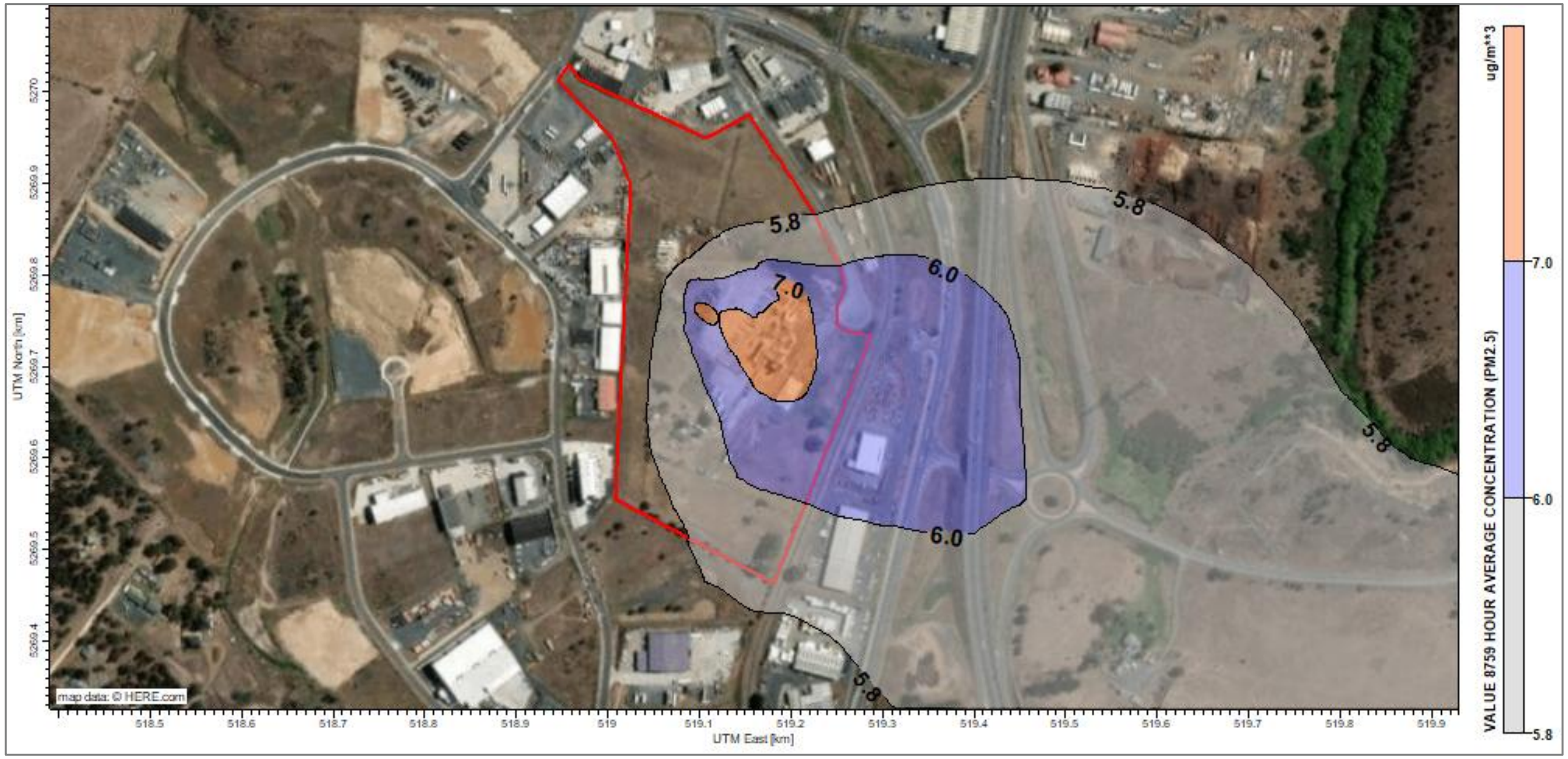
Pollutant: $PM_{2.5}$ **Period:** Annual **Percentile:** 100th **Criteria:** 7 µg/m^3

Figure 32: Predicted $PM_{2.5}$ GLCs for Cumulative Impact (Concrete Batch Plant and Background)



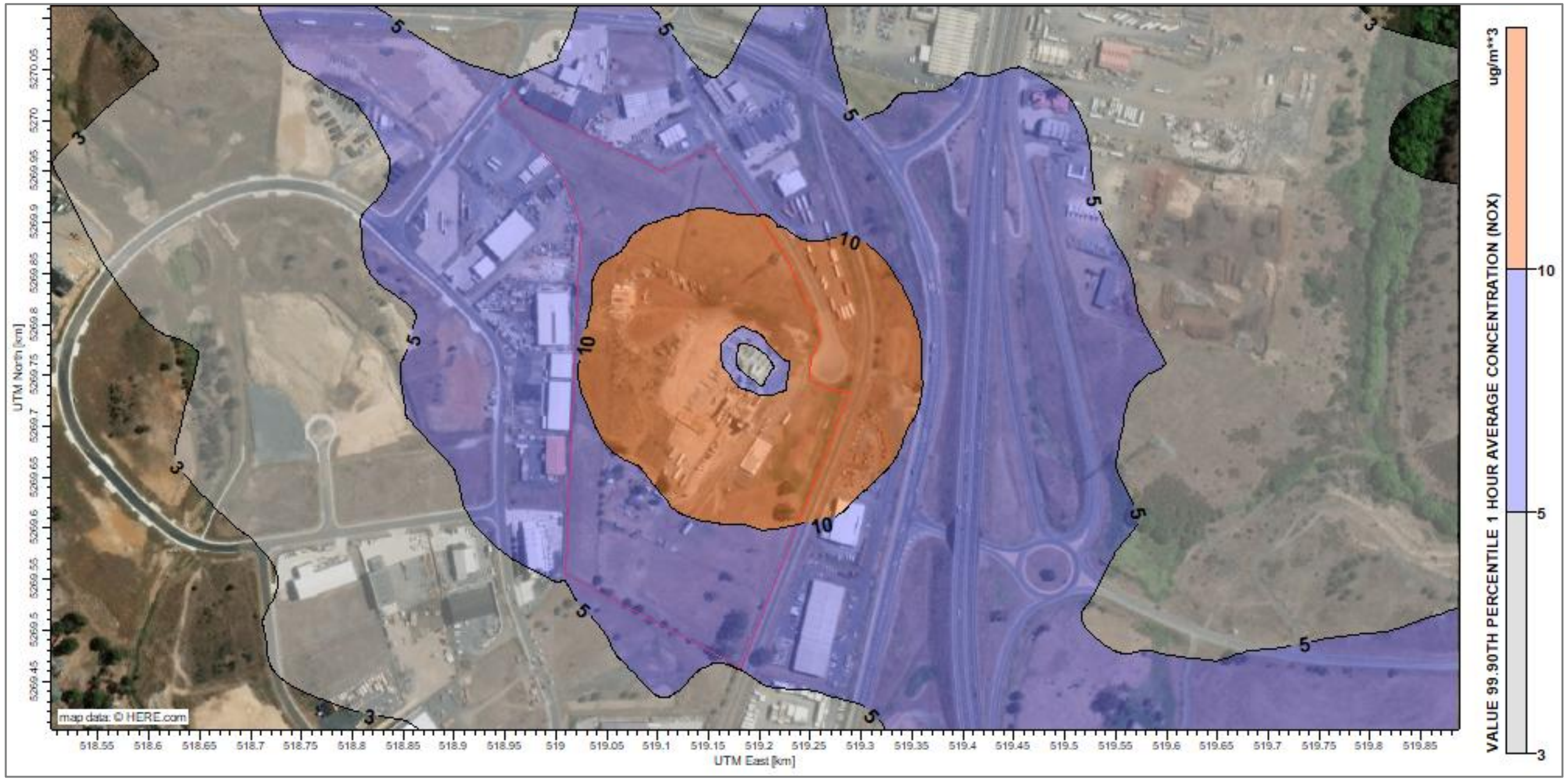
Pollutant: $PM_{2.5}$ **Period:** 24 Hours **Percentile:** 100^{th} **Criteria:** 20 $\mu g/m^3$

Figure 33: Predicted $PM_{2.5}$ GLCs for Cumulative Impact (Asphalt Plant, Concrete Batch Plant and Background)



Pollutant: PM$_{2.5}$ **Period:** Annual **Percentile:** 100th **Criteria:** 7 µg/m^3

Figure 34: Predicted PM$_{2.5}$ GLCs for Cumulative Impact (Asphalt Plant, Concrete Batch Plant and Background)



Pollutant: NO_2 **Period:** 1-Hour **Percentile:** 99.9^{th} **Criteria:** 151 $\mu g/m^3$

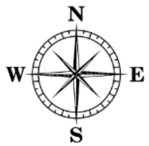
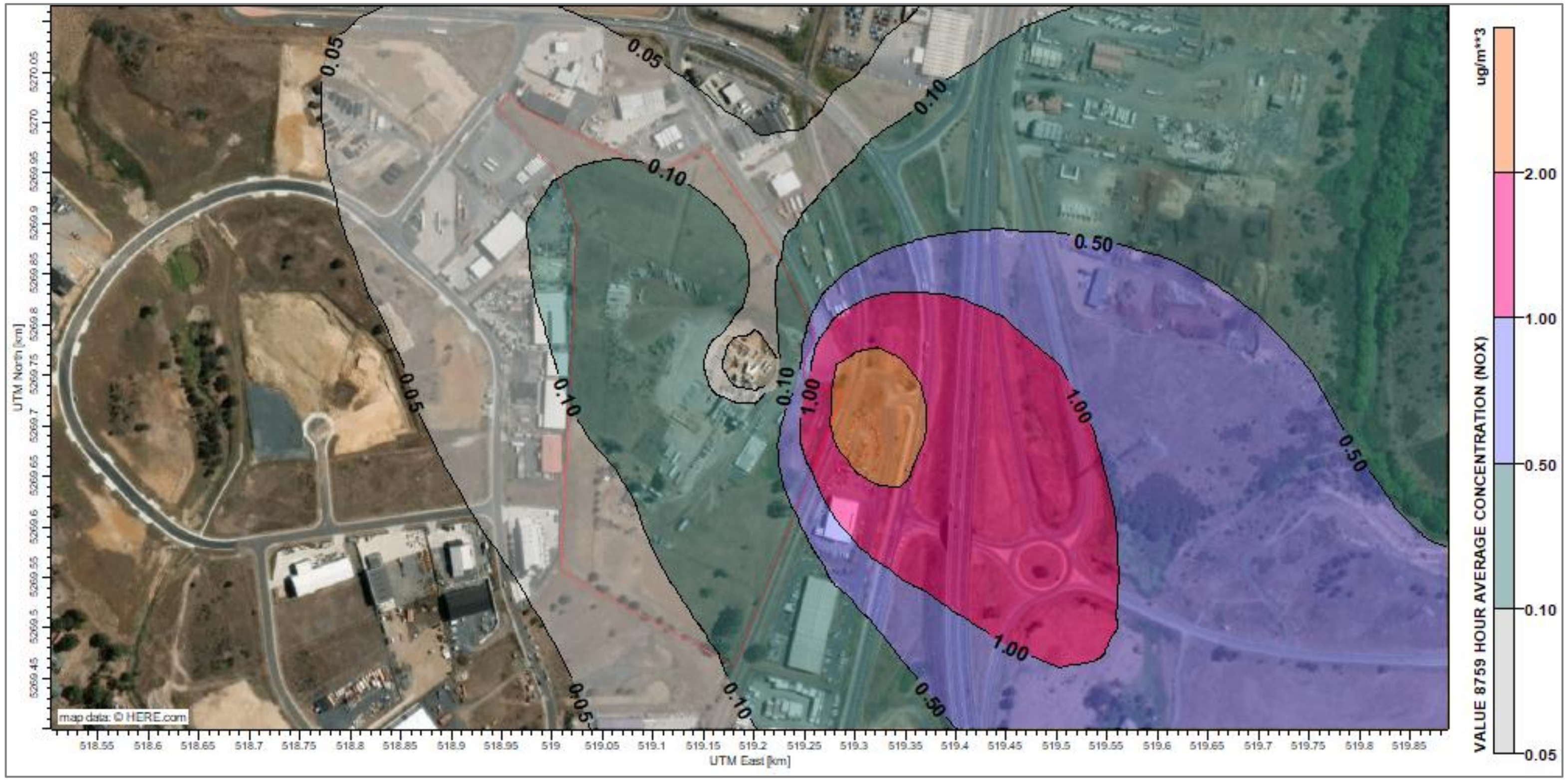


Figure 35: Predicted NO_2 GLCs for Daily Operations – Natural Gas



Pollutant: NO_2 **Period:** Annual **Percentile:** 100^{th} **Criteria:** 28 $\mu g/m^3$

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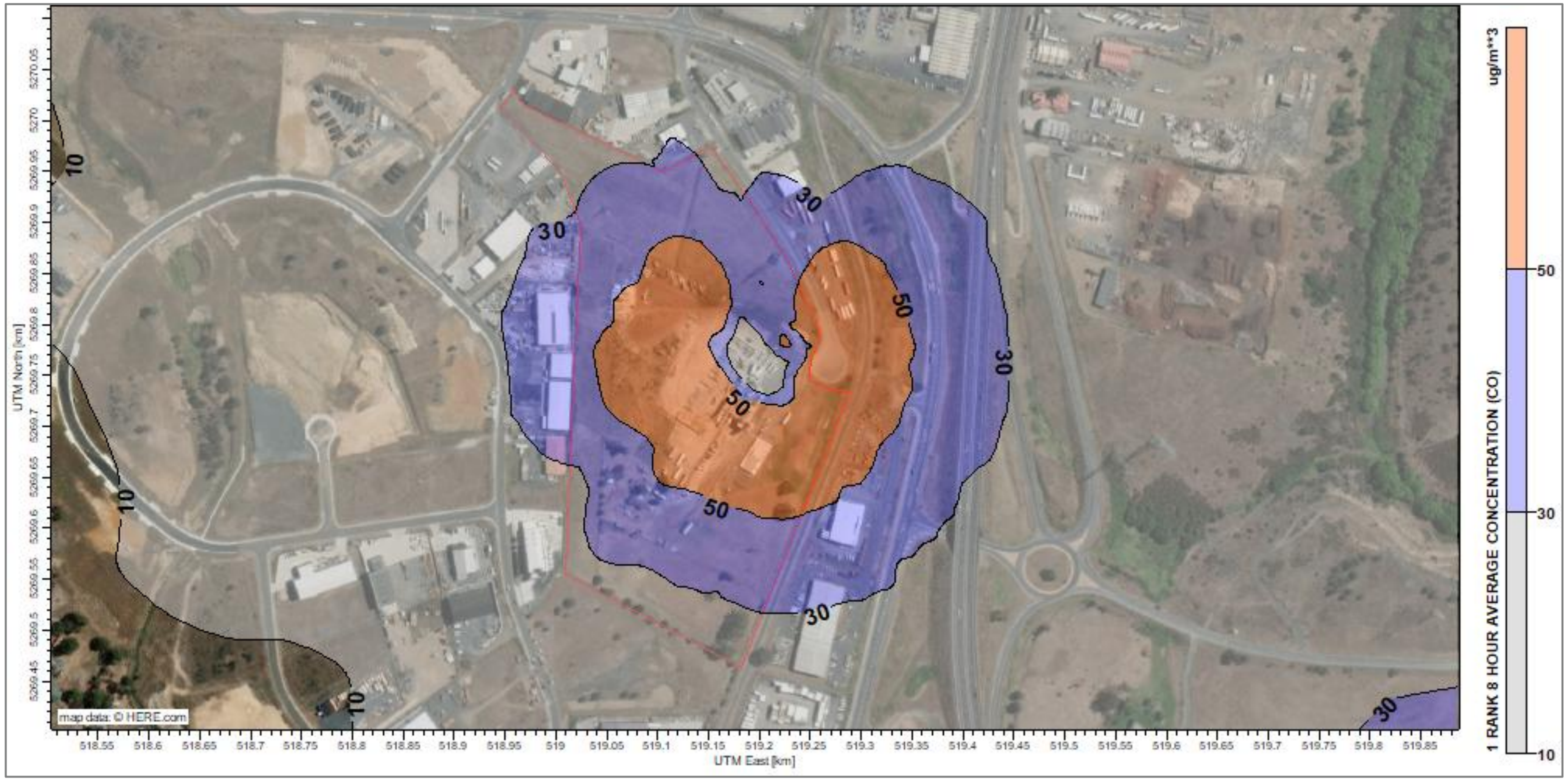
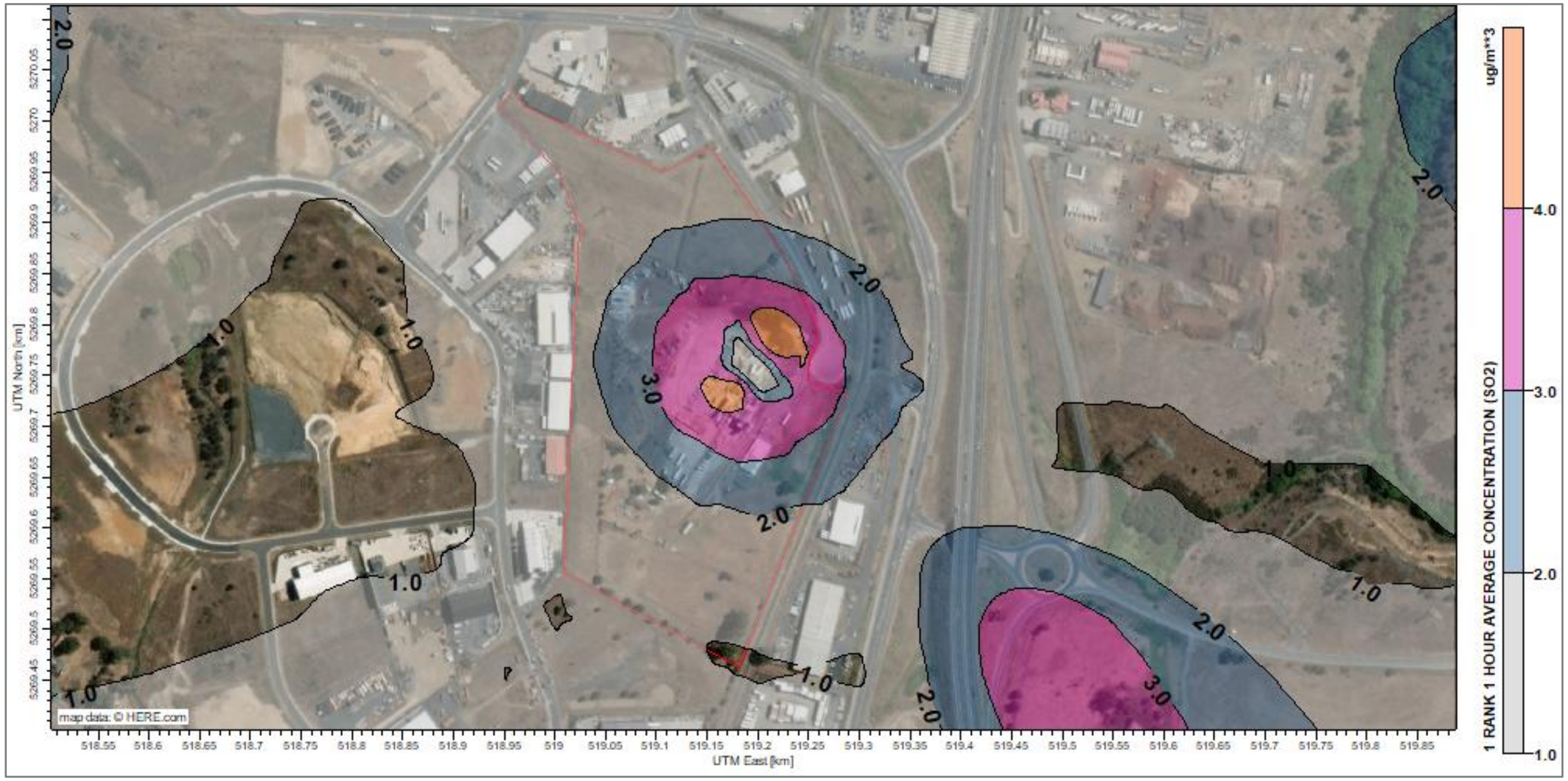
Figure 36: Predicted NO_2 GLCs for Daily Operations – Natural Gas



Pollutant: CO **Period:** 8-Hour **Percentile:** 100th **Criteria:** 10,310 µg/m³

Figure 37: Predicted CO GLCs for Daily Operations – Natural Gas

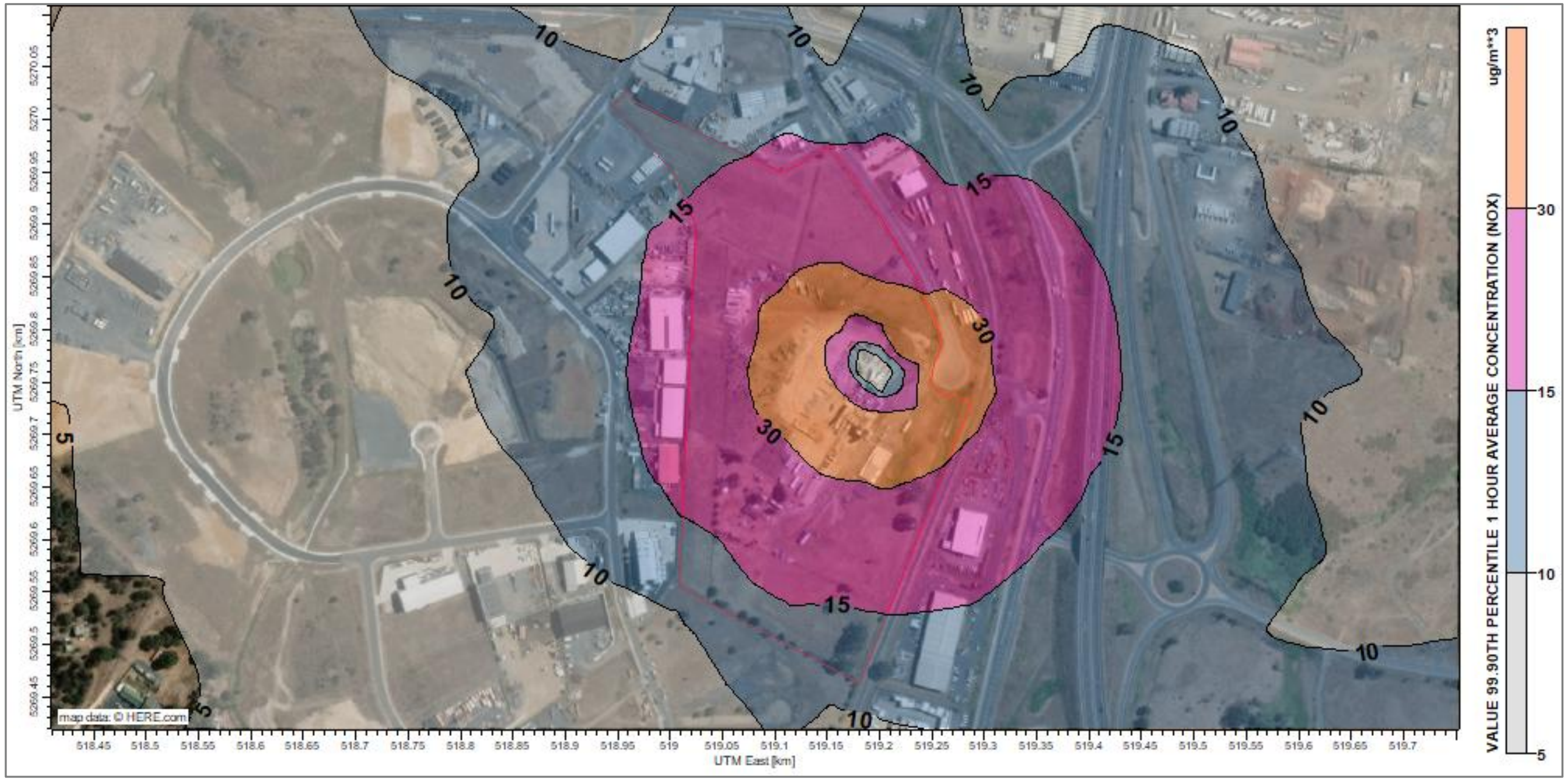


Pollutant: SO_2 **Period:** 1-Hour **Percentile:** 100^{th} **Criteria:** 197 $\mu g/m^3$

Figure 38: Predicted SO_2 GLCs for Daily Operations – Natural Gas

Pollutant: SO_2 **Period:** 24-Hour **Percentile:** 100^{th} **Criteria:** 52 $\mu g/m^3$

Figure 39: Predicted SO_2 GLCs for Daily Operations – Natural Gas



Pollutant: NO_2 **Period:** 1-Hour **Percentile:** 99.9th **Criteria:** 151 µg/m^3

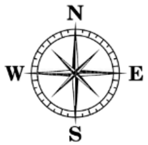
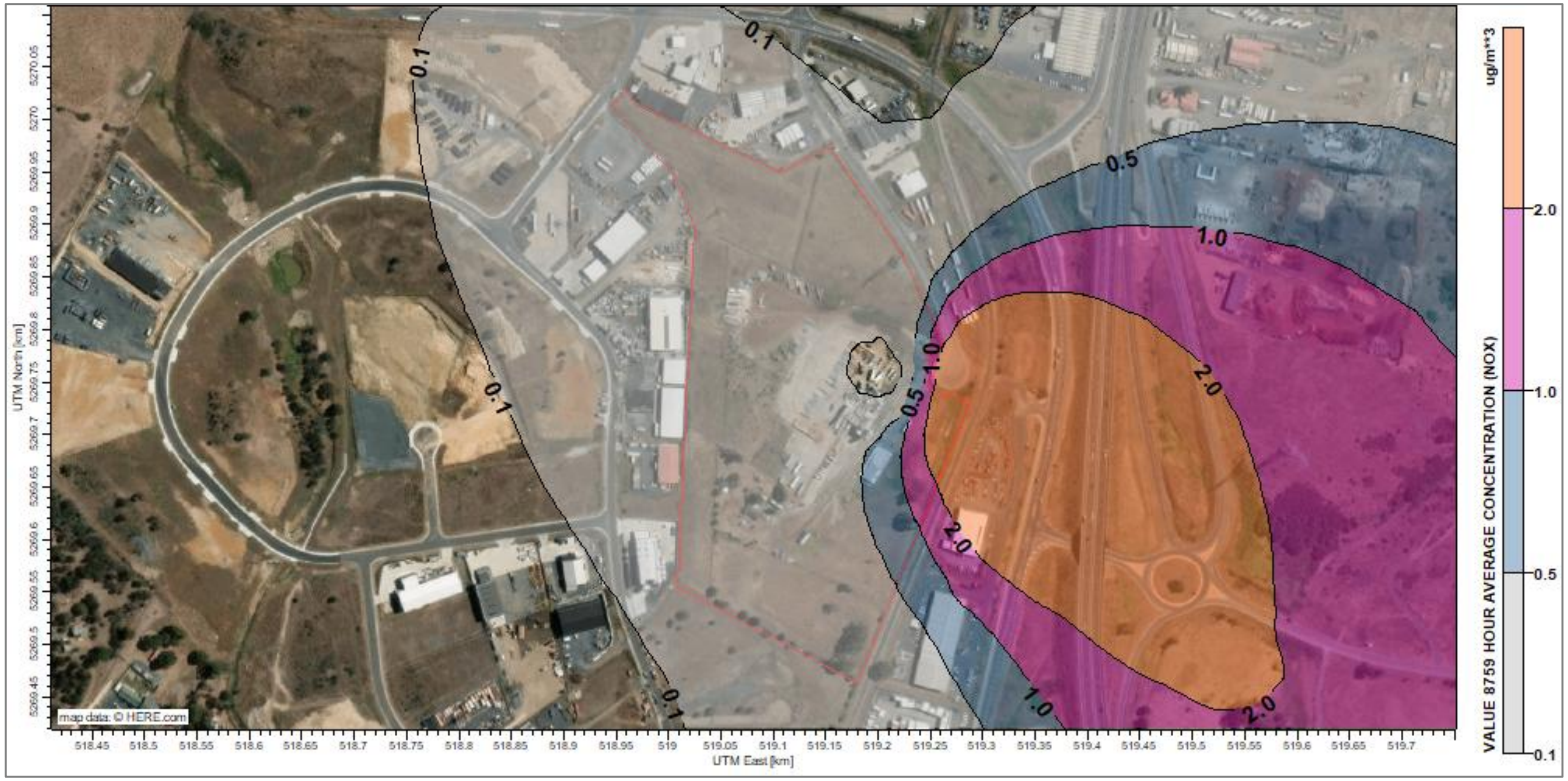
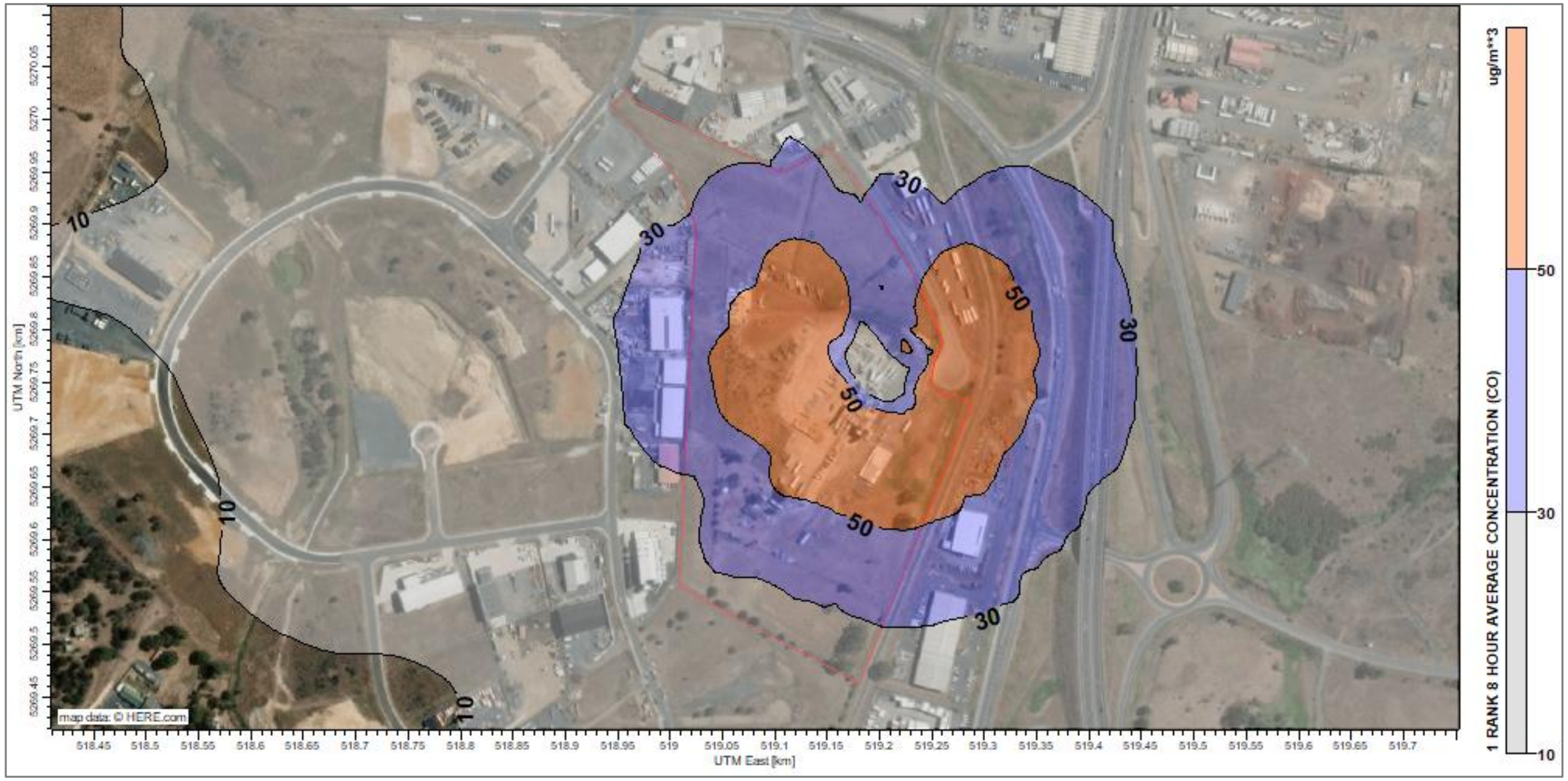


Figure 40: Predicted NO_2 GLCs for Daily Operations – Diesel



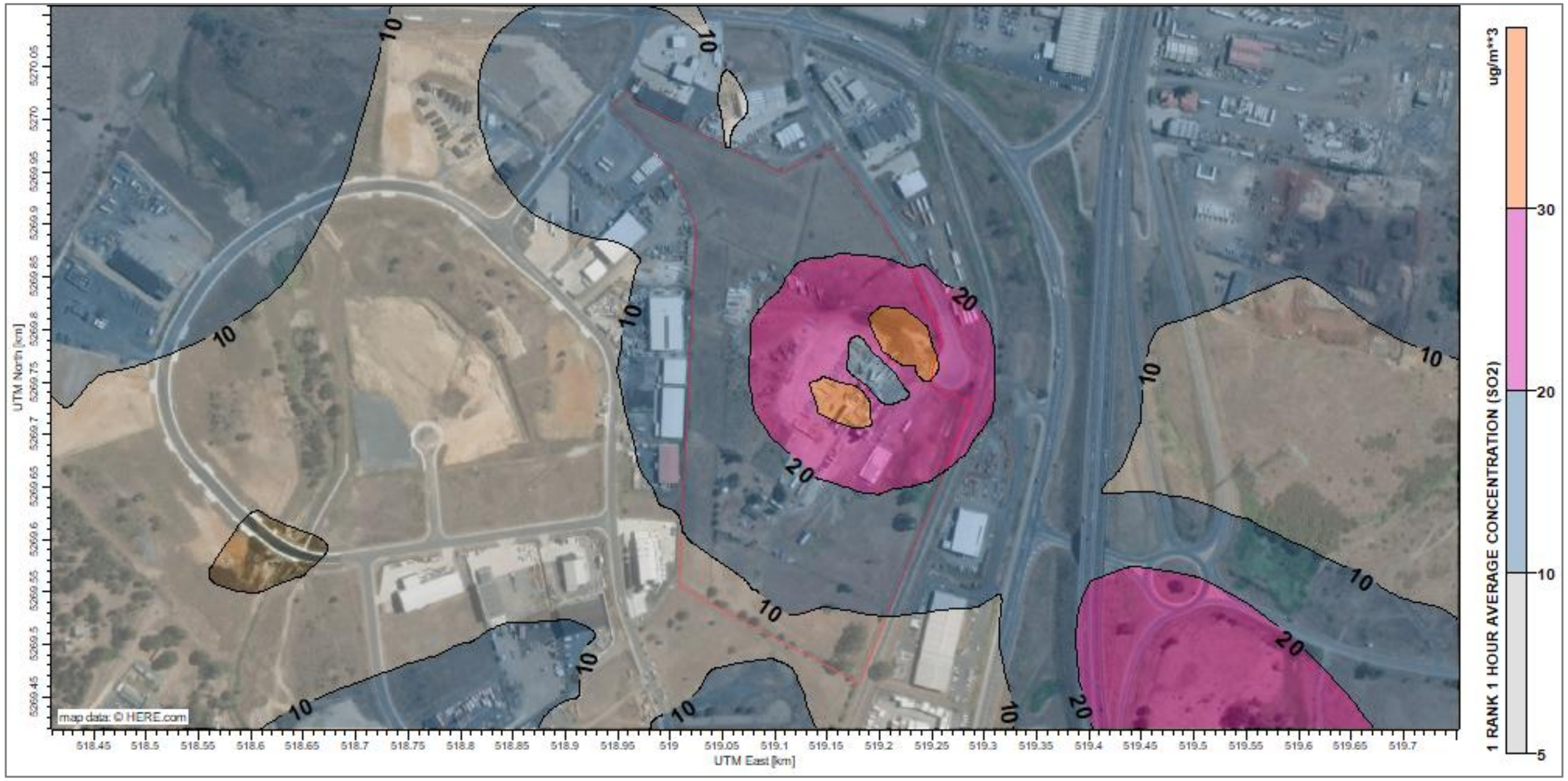
Pollutant: NO_2 **Period:** Annual **Percentile:** 100th **Criteria:** 28 µg/m³

Figure 41: Predicted NO_2 GLCs for Daily Operations – Diesel



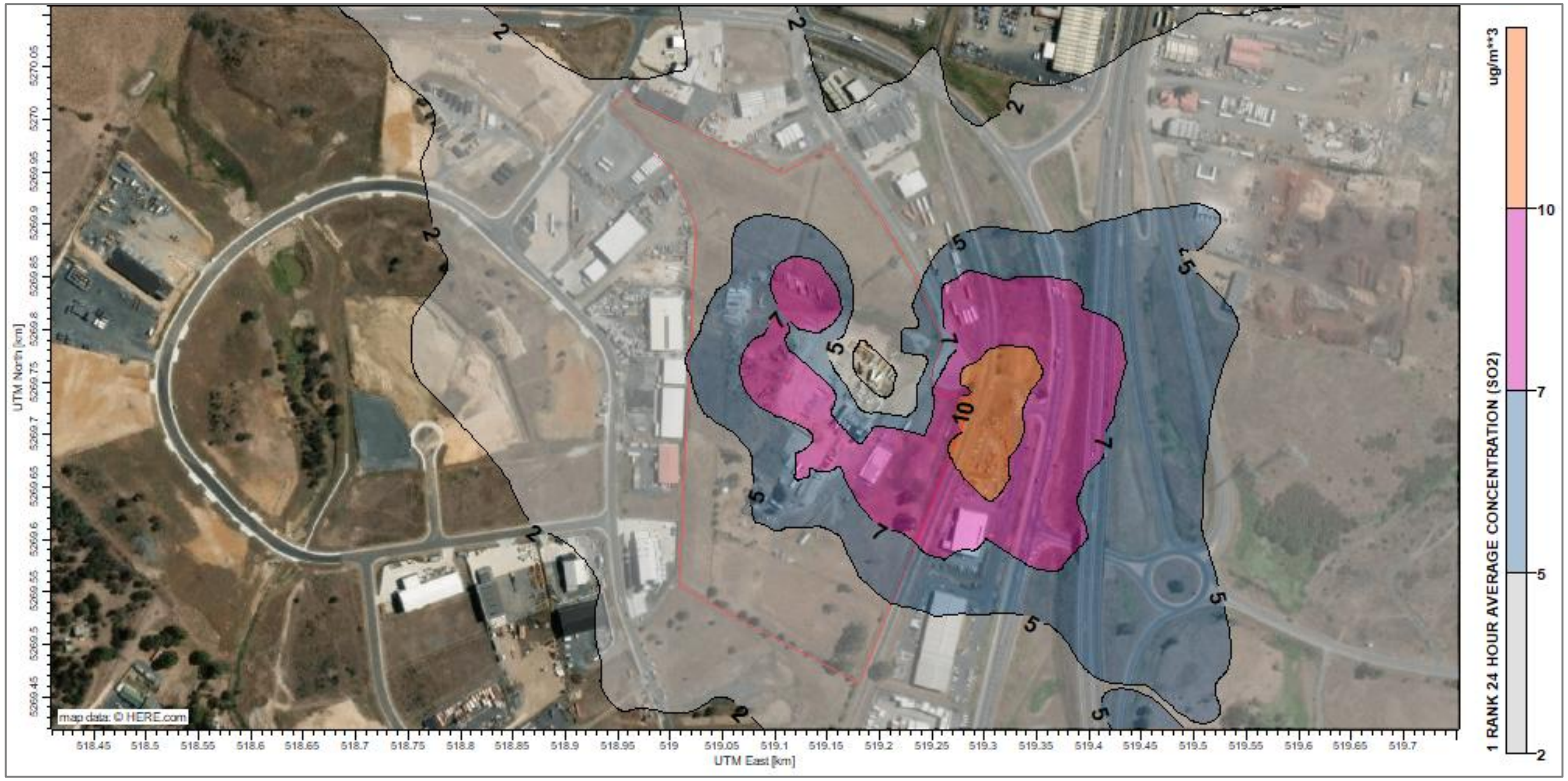
Pollutant: CO **Period:** 8-Hour **Percentile:** 100th **Criteria:** 10,310 µg/m³

Figure 42: Predicted CO GLCs for Daily Operations – Diesel



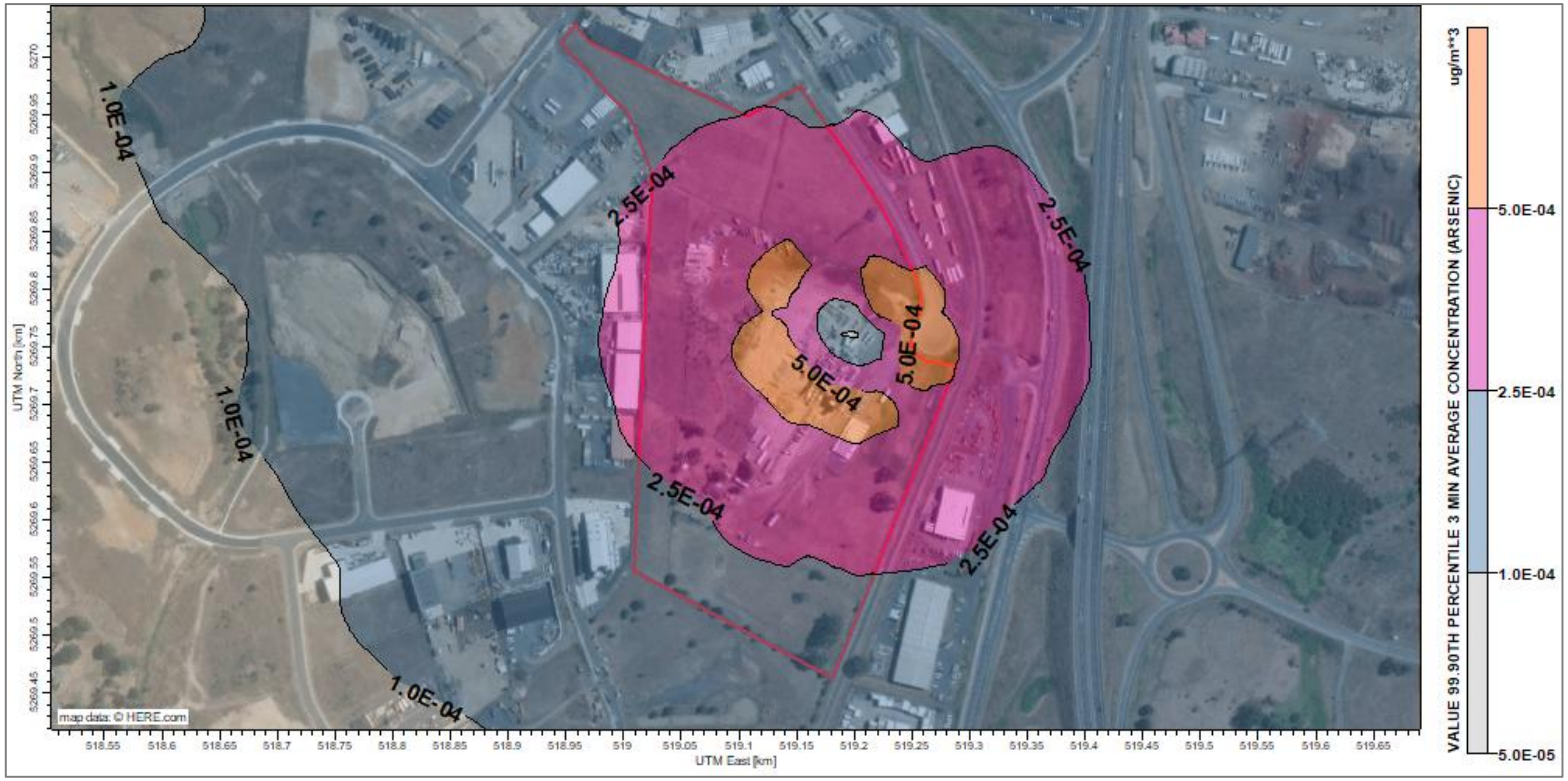
Pollutant: SO_2 **Period:** 1-Hour **Percentile:** 100th **Criteria:** 197 µg/m³

Figure 43: Predicted SO_2 GLCs for Daily Operations – Diesel



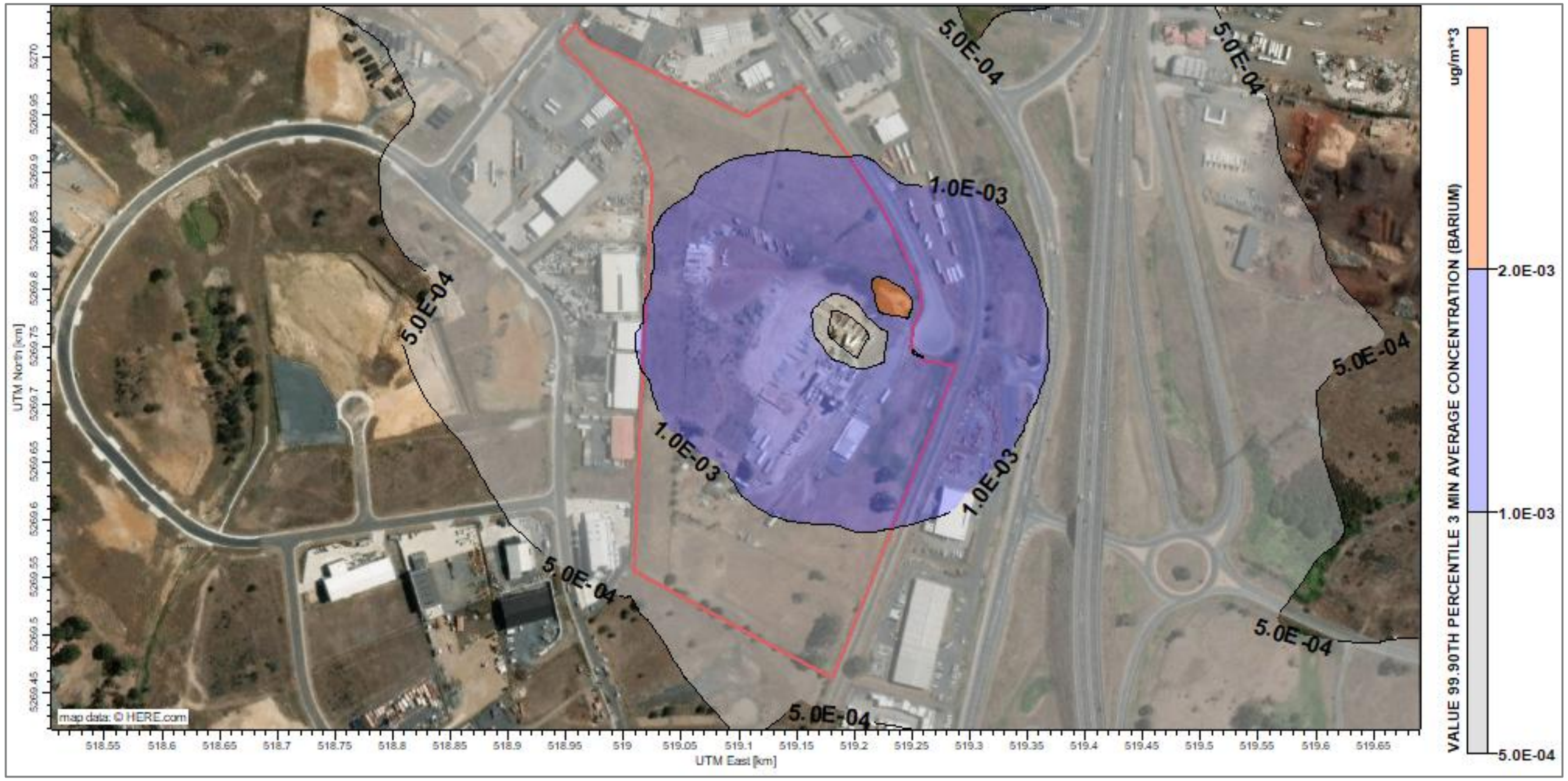
Pollutant: SO_2 **Period:** 24-Hour **Percentile:** 100^{th} **Criteria:** 52 $\mu g/m^3$

Figure 44: Predicted SO_2 GLCs for Daily Operations – Diesel



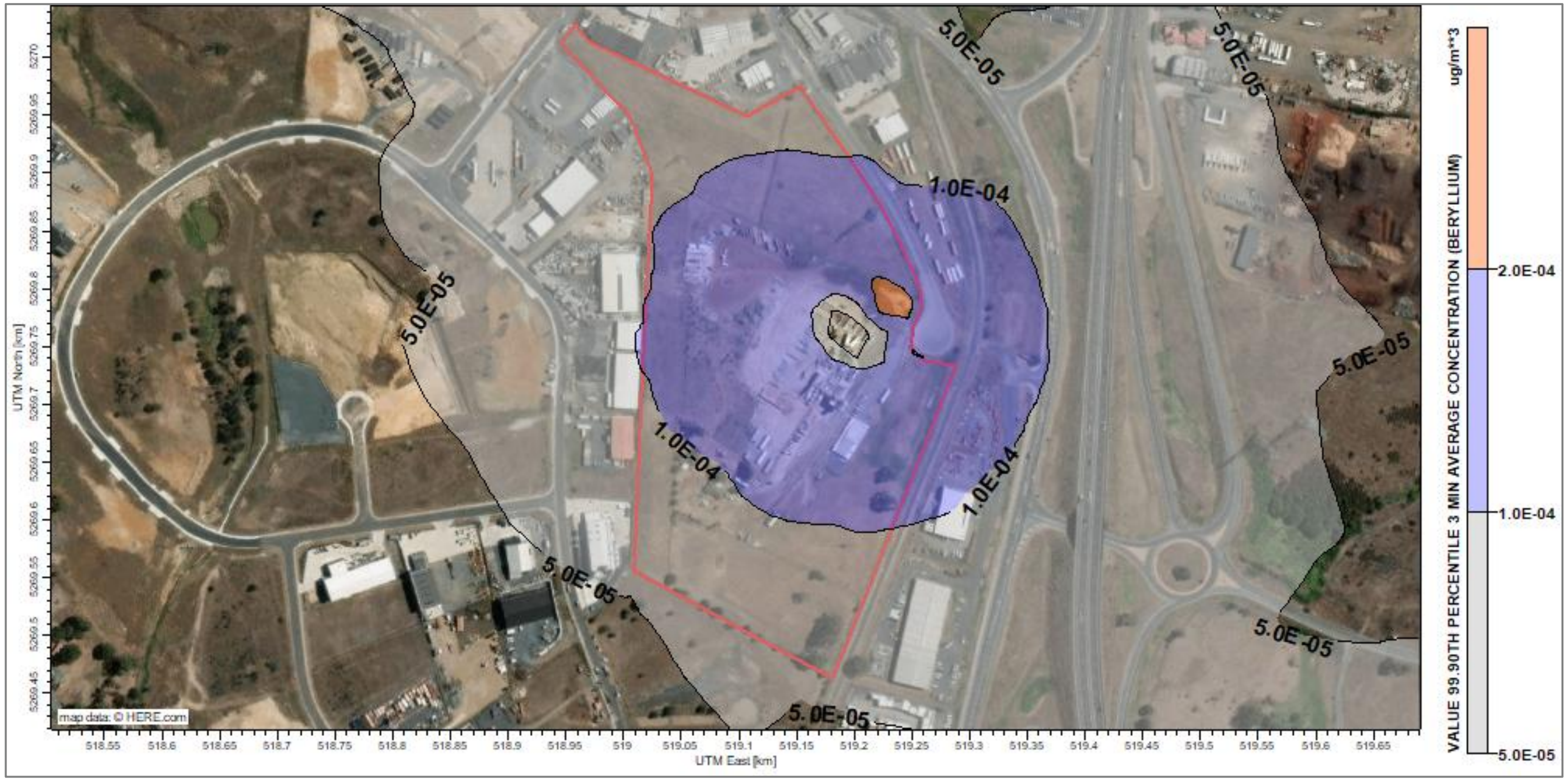
Pollutant: Arsenic **Period:** 3-Minutes **Percentile:** 99.9th **Criteria:** 0.17 μg/m³

Figure 45: Predicted Arsenic GLCs for Daily Operations



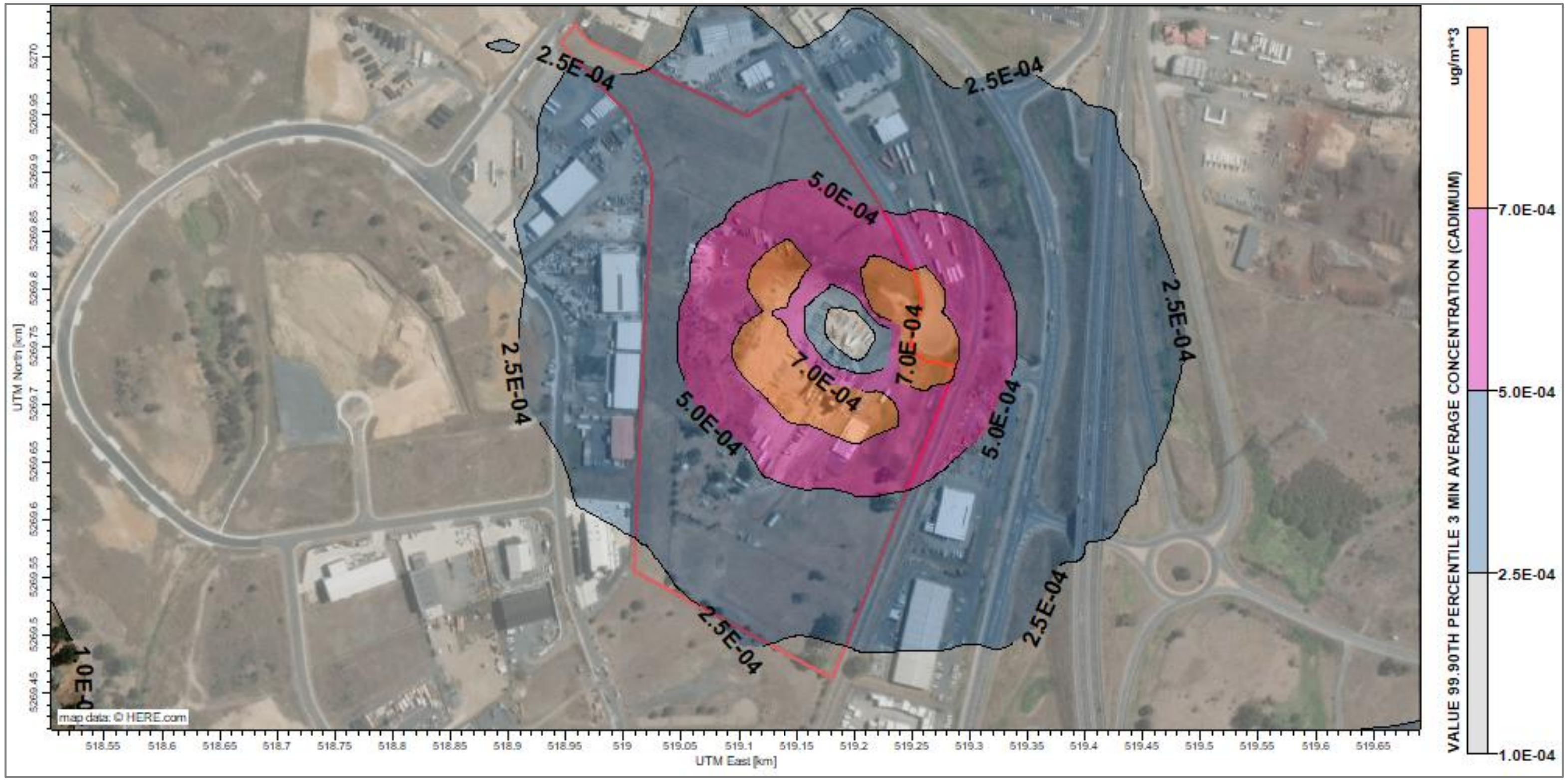
Pollutant: Barium **Period:** 3-Minutes **Percentile:** 99.9th **Criteria:** 17 µg/m³

Figure 46: Predicted Barium GLCs for Daily Operations



Pollutant: Beryllium **Period:** 3-Minutes **Percentile:** 99.9th **Criteria:** 0.07 µg/m^3

Figure 47: Predicted Beryllium GLCs for Daily Operations



Pollutant: Cadmium **Period:** 3-Minutes **Percentile:** 99.9th **Criteria:** 0.033 μg/m^3

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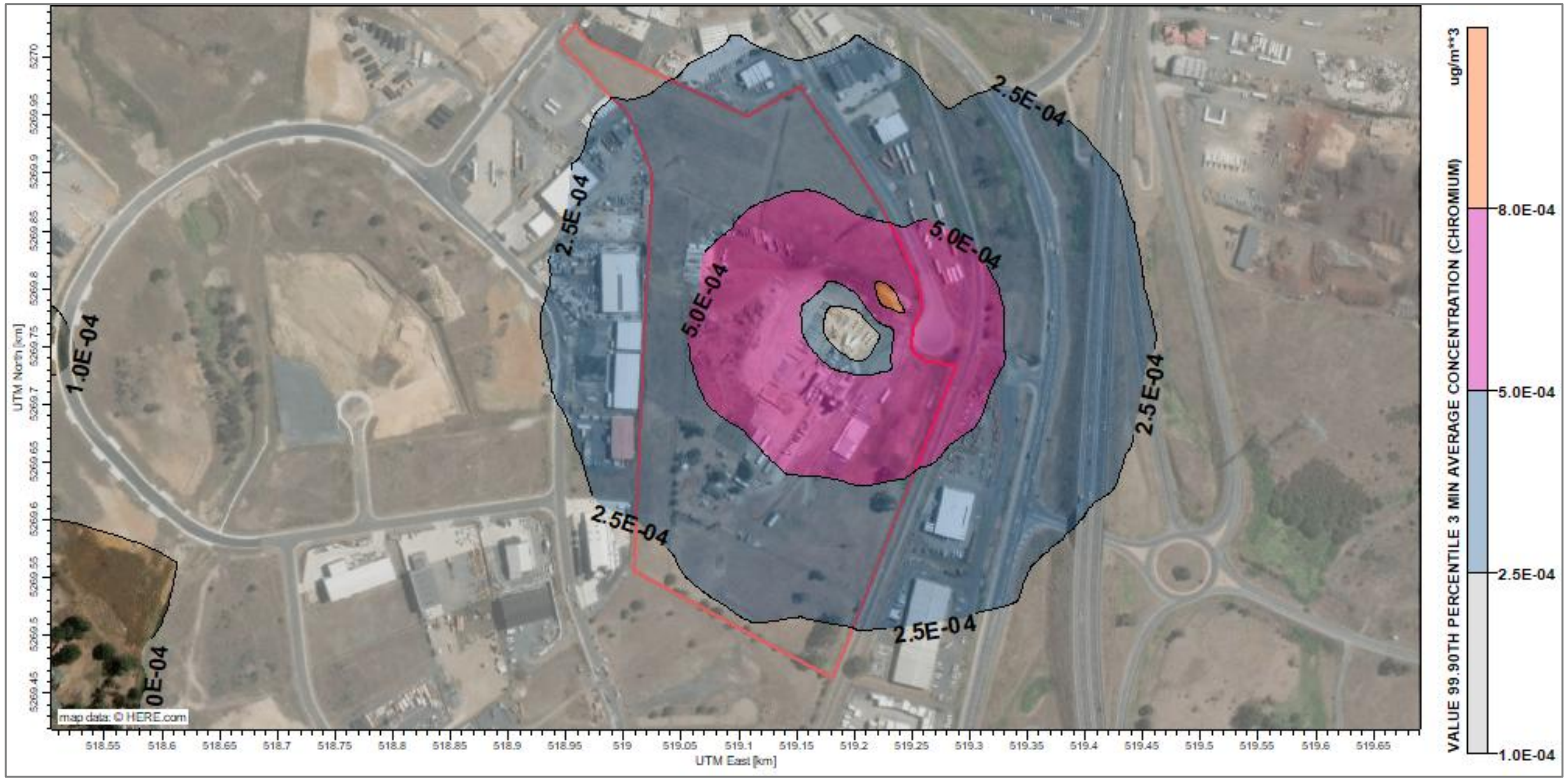
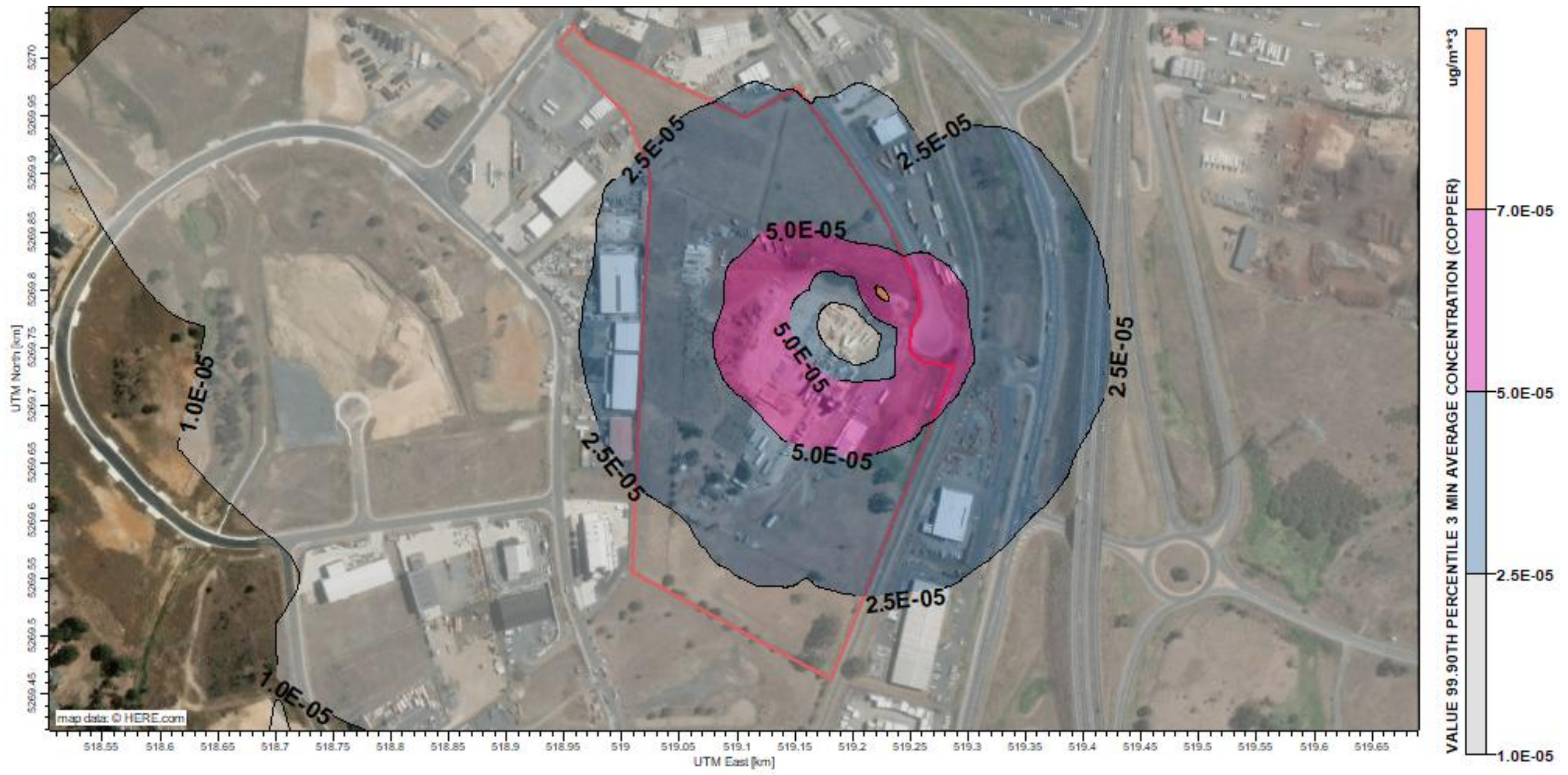
Figure 48: Predicted Cadmium GLCs for Daily Operations



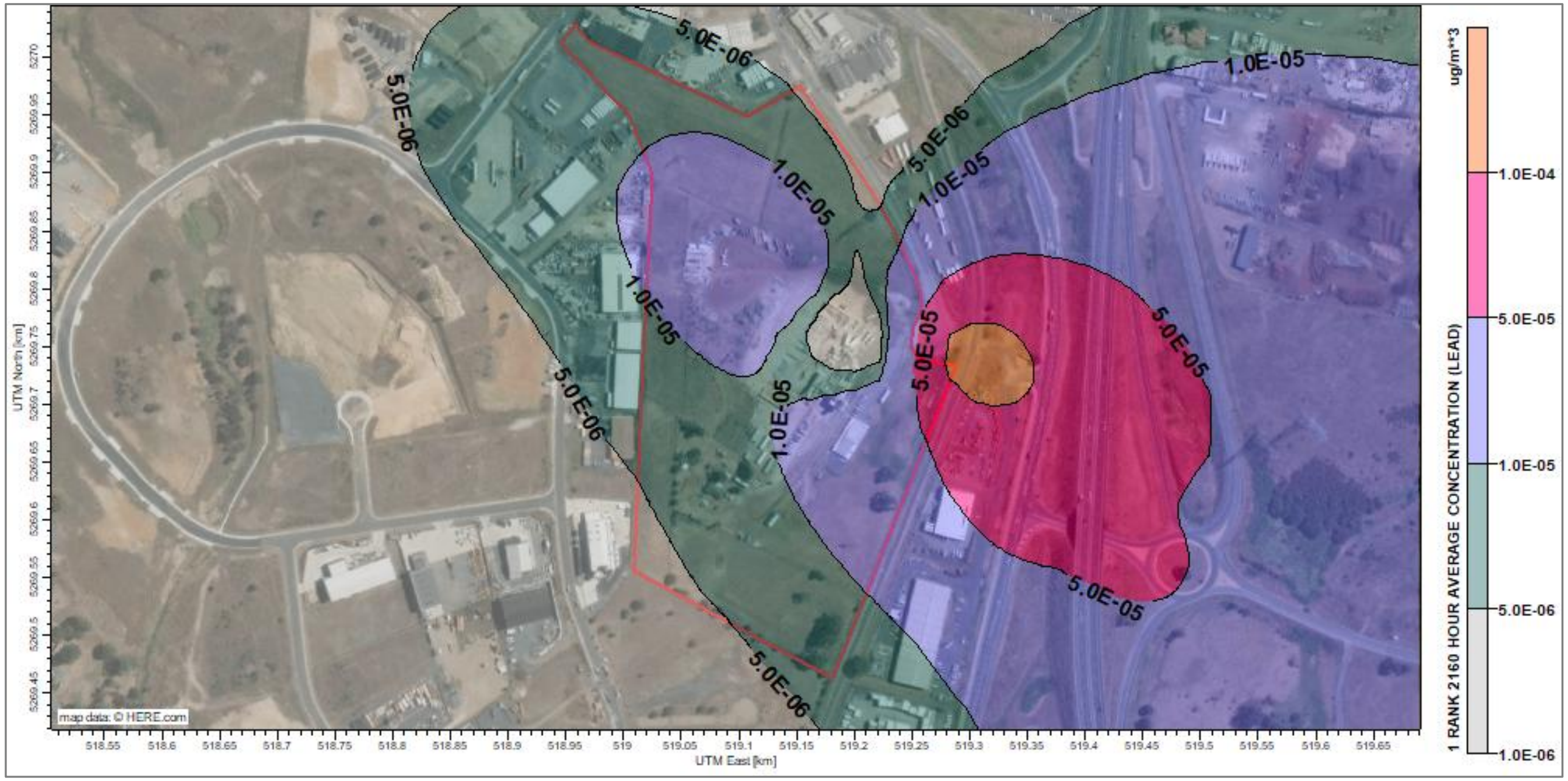
Pollutant: Chromium **Period:** 3-Minutes **Percentile:** 99.9th **Criteria:** 17 µg/m^3

Figure 49: Predicted Chromium GLCs for Daily Operations



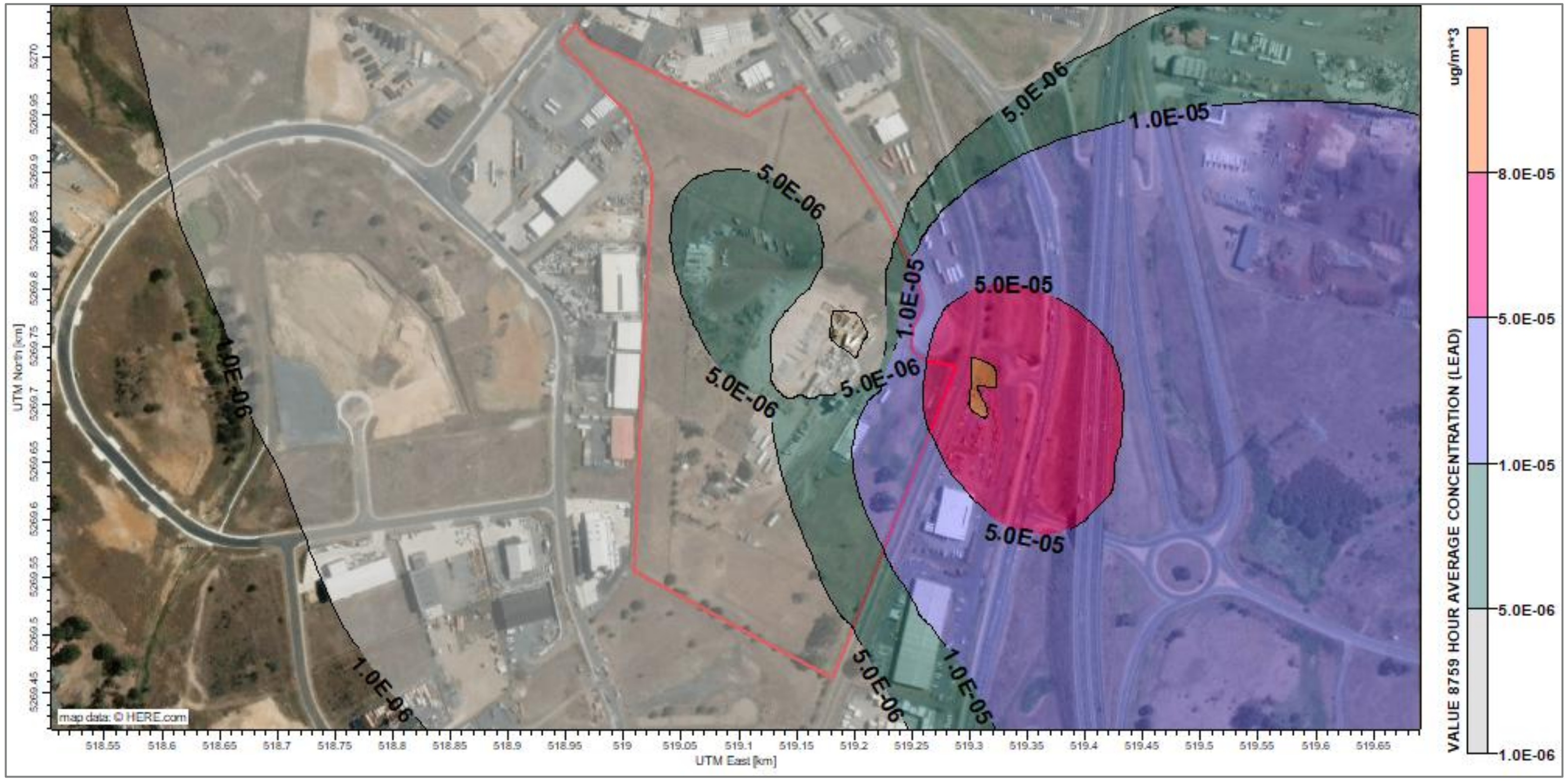
Pollutant: Copper **Period:** 3-Minutes **Percentile:** 99.9th **Criteria:** 6.7 µg/m³

Figure 50: Predicted Copper GLCs for Daily Operations



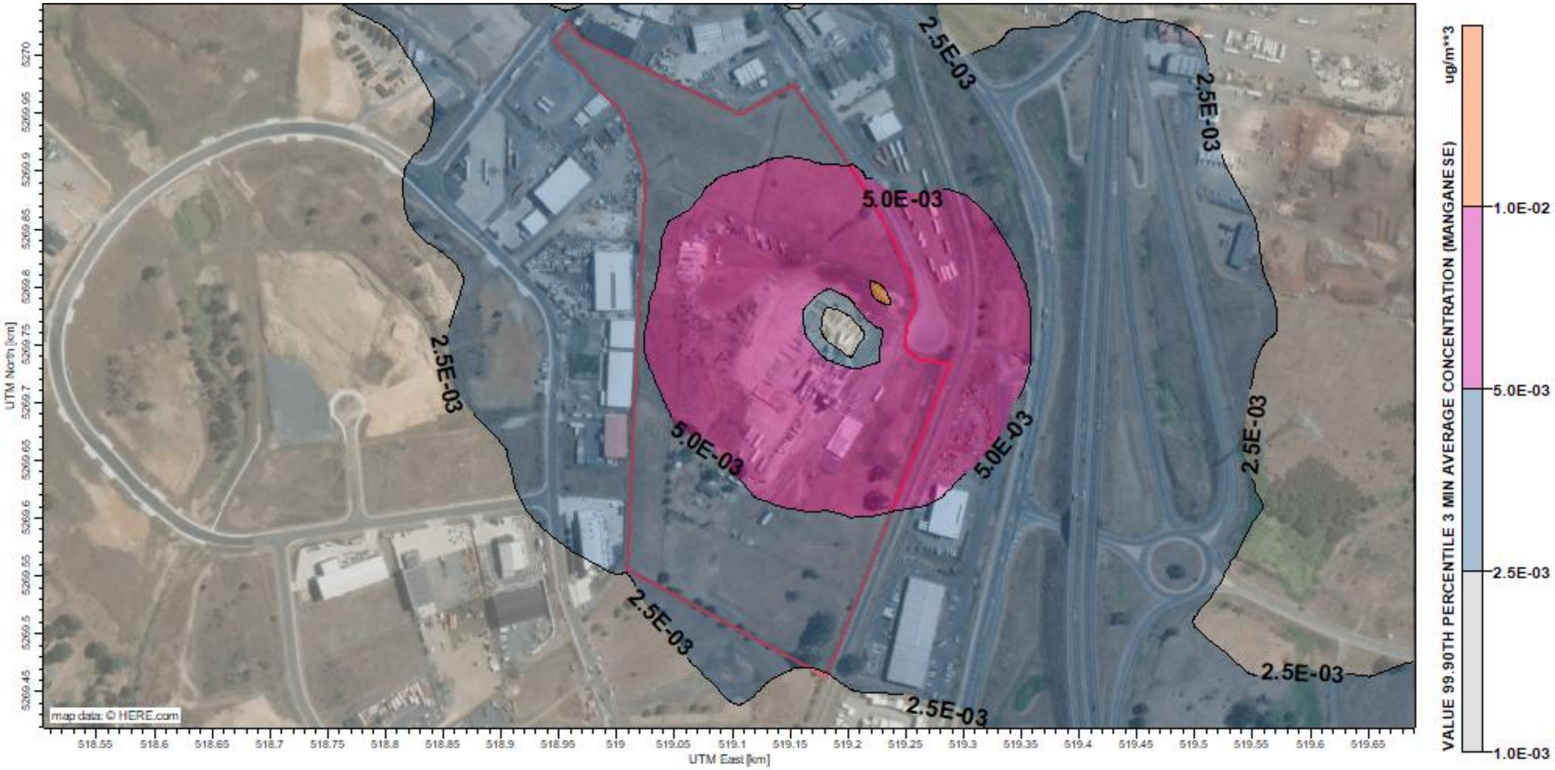
Pollutant: Lead **Period:** 90 Days **Percentile:** 100th **Criteria:** 1.5 µg/m³

Figure 51: Predicted Lead GLCs for Daily Operations



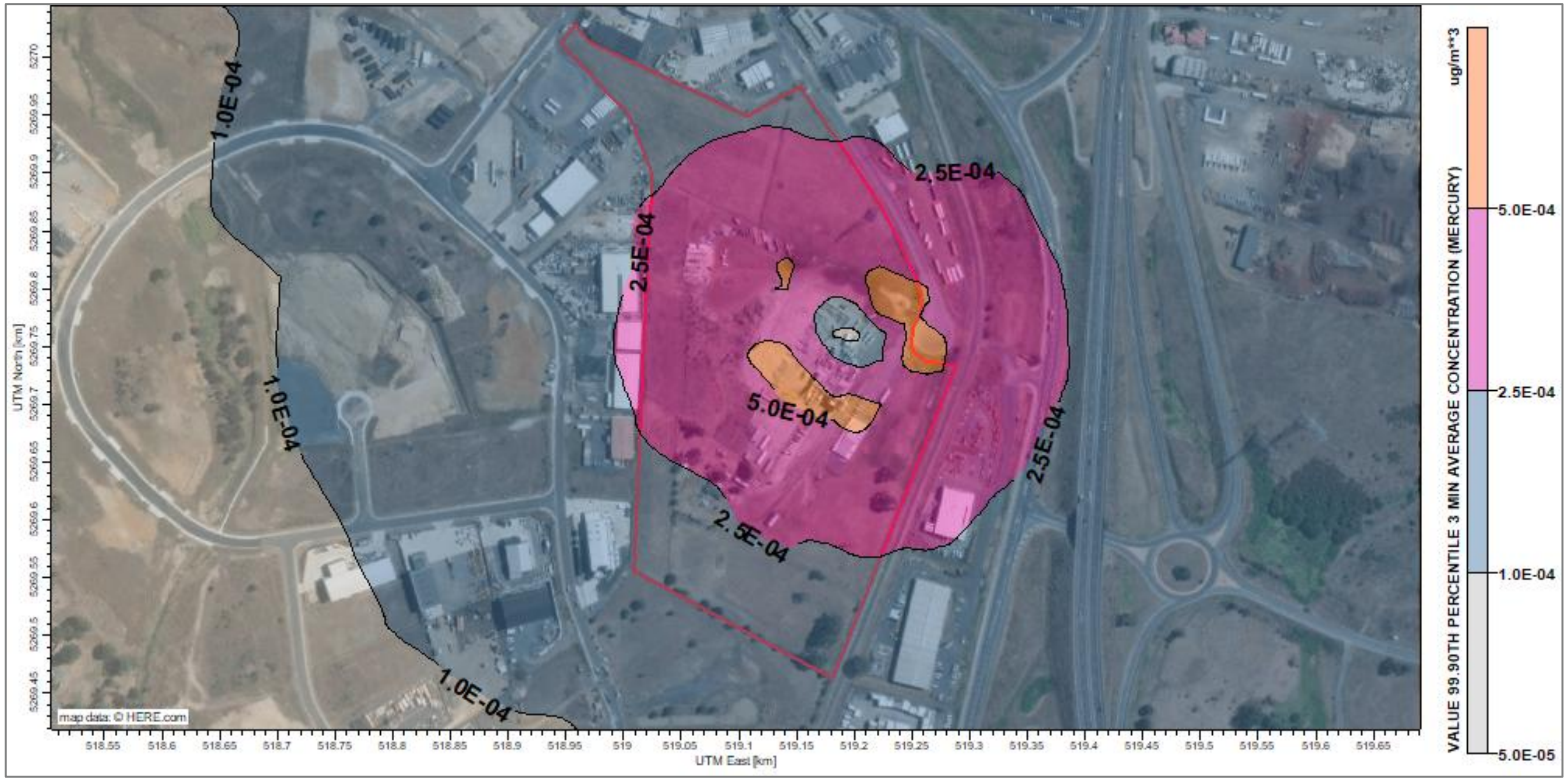
Pollutant: Lead **Period:** Annual **Percentile:** 100th **Criteria:** 0.5 µg/m3

Figure 52: Predicted Lead GLCs for Daily Operations



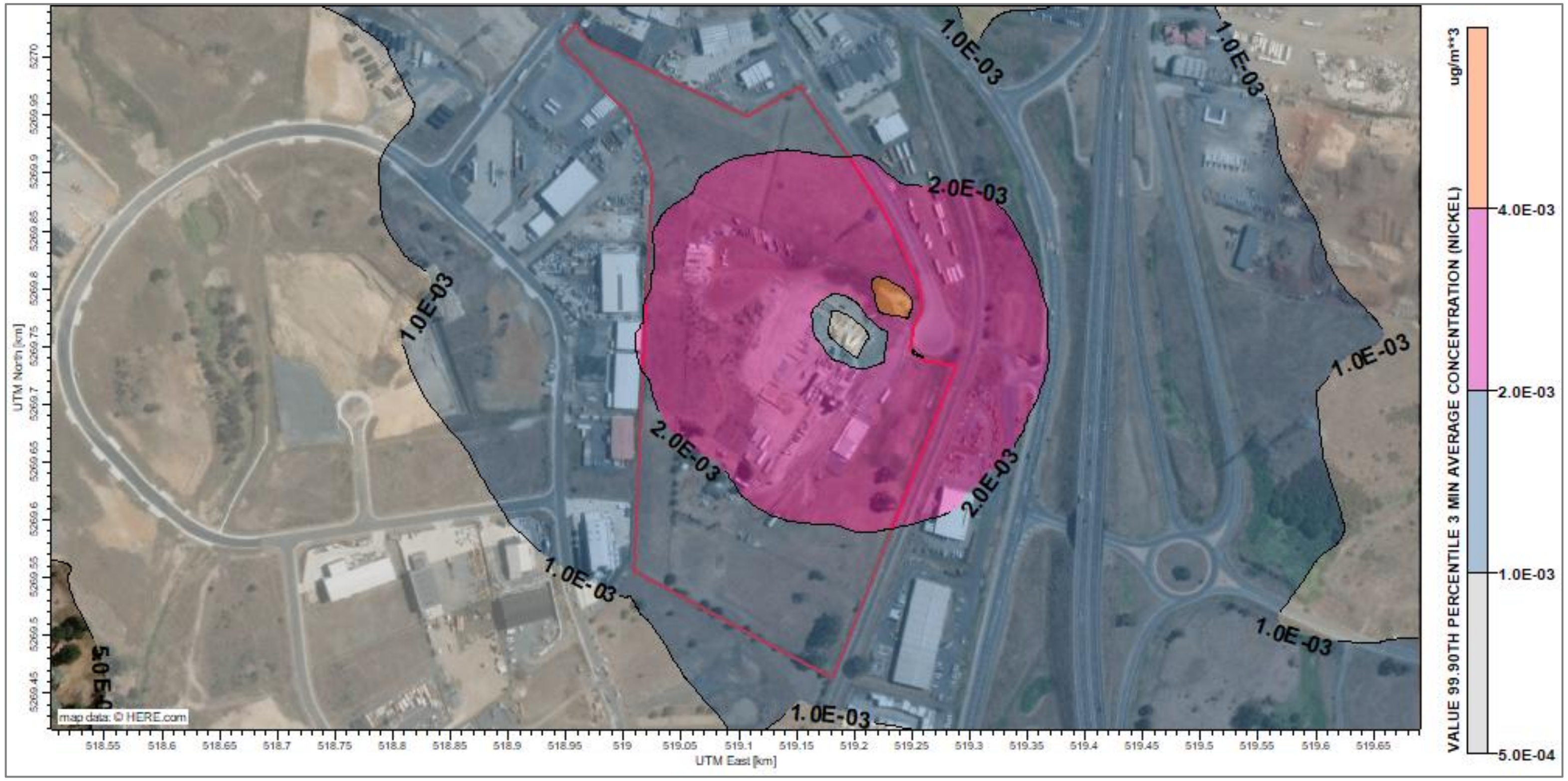
Pollutant: Manganese **Period:** 3-Minutes **Percentile:** 99.9th **Criteria:** 33 µg/m^3

Figure 53: Predicted Manganese GLCs for Daily Operations



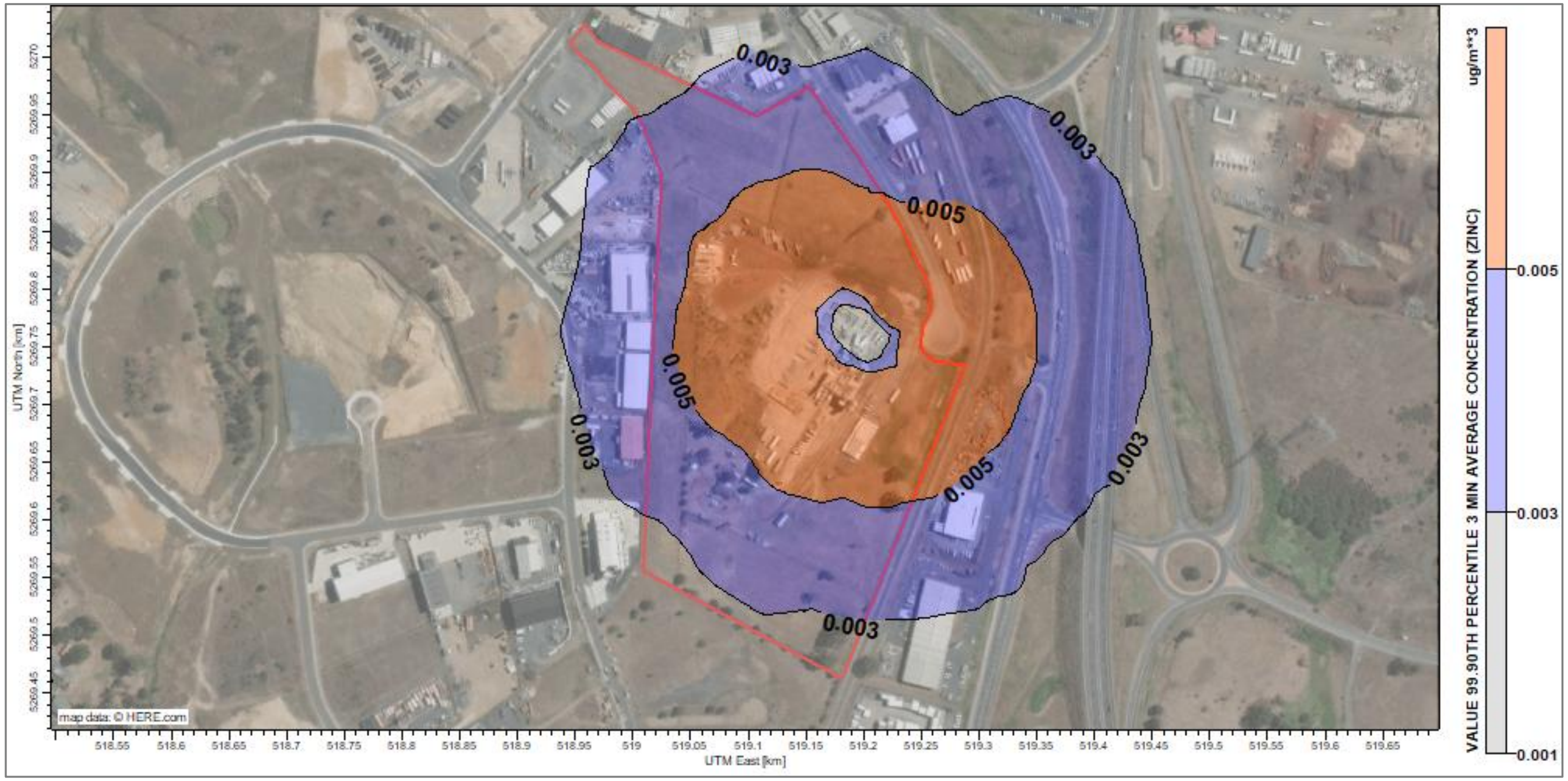
Pollutant: Mercury **Period:** 3-Minutes **Percentile:** 99.9th **Criteria:** 17 µg/m³

Figure 54: Predicted Mercury GLCs for Daily Operations



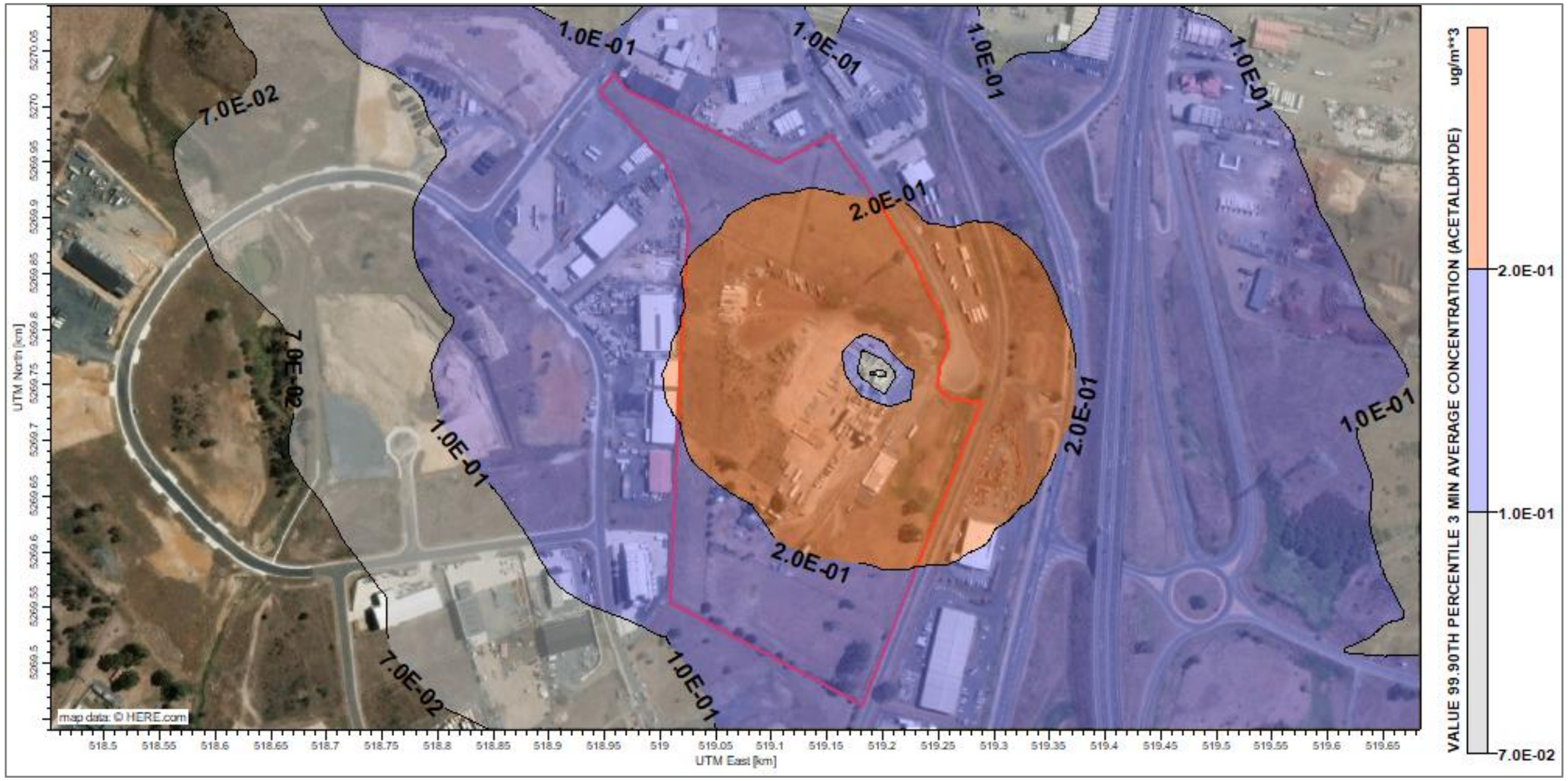
Pollutant: Nickel **Period:** 3-Minutes **Percentile:** 99.9th **Criteria:** 0.33 μg/m^3

Figure 55: Predicted Nickel GLCs for Daily Operations



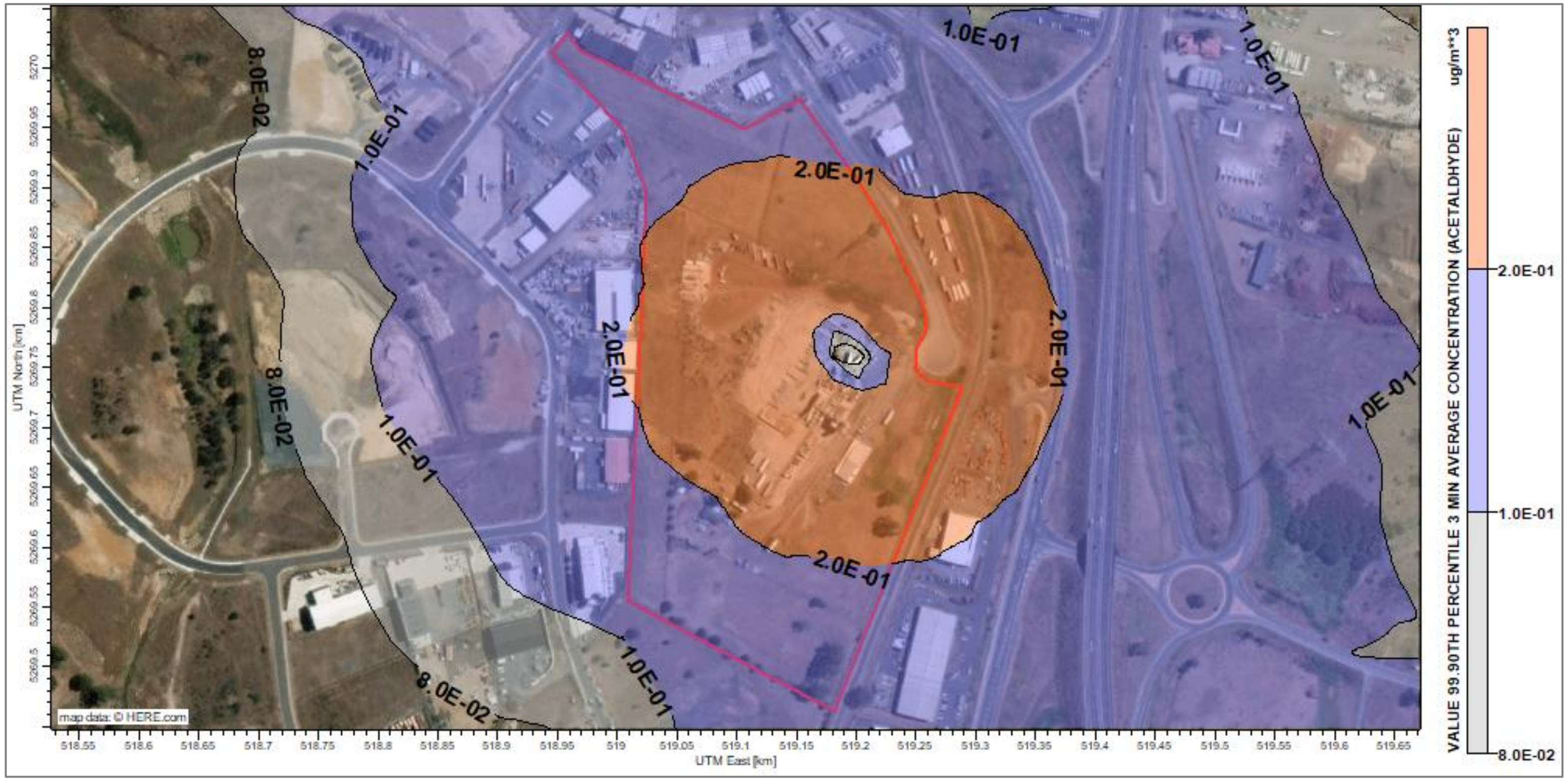
Pollutant: Zinc **Period:** 3-Minutes **Percentile:** 99.9th **Criteria:** 170 µg/m³

Figure 56: Predicted Zinc GLCs for Daily Operations



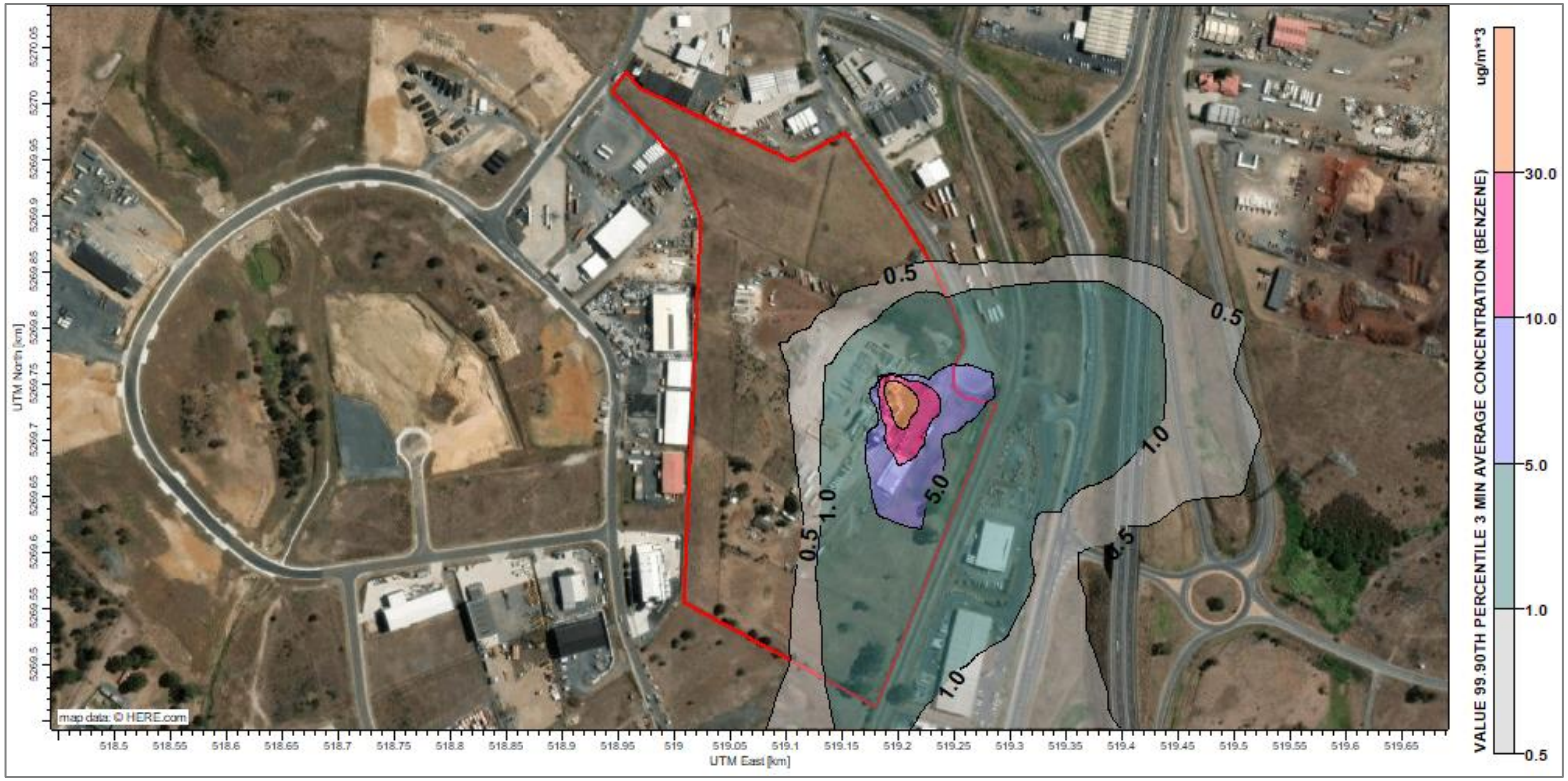
Pollutant: Acetaldehyde **Period:** 3-Minutes **Percentile:** 99.9th **Criteria:** 76 µg/m^3

Figure 57: Predicted Acetaldehyde GLCs for Daily Operations (Scenario 1)



Pollutant: Acetaldehyde **Period:** 3-Minutes **Percentile:** 99.9th **Criteria:** 76 µg/m³

Figure 58: Predicted Acetaldehyde GLCs for Daily Operations (Scenario 2)



Pollutant: Benzene **Period:** 3-Minutes **Percentile:** 99.9th **Criteria:** 100 µg/m³

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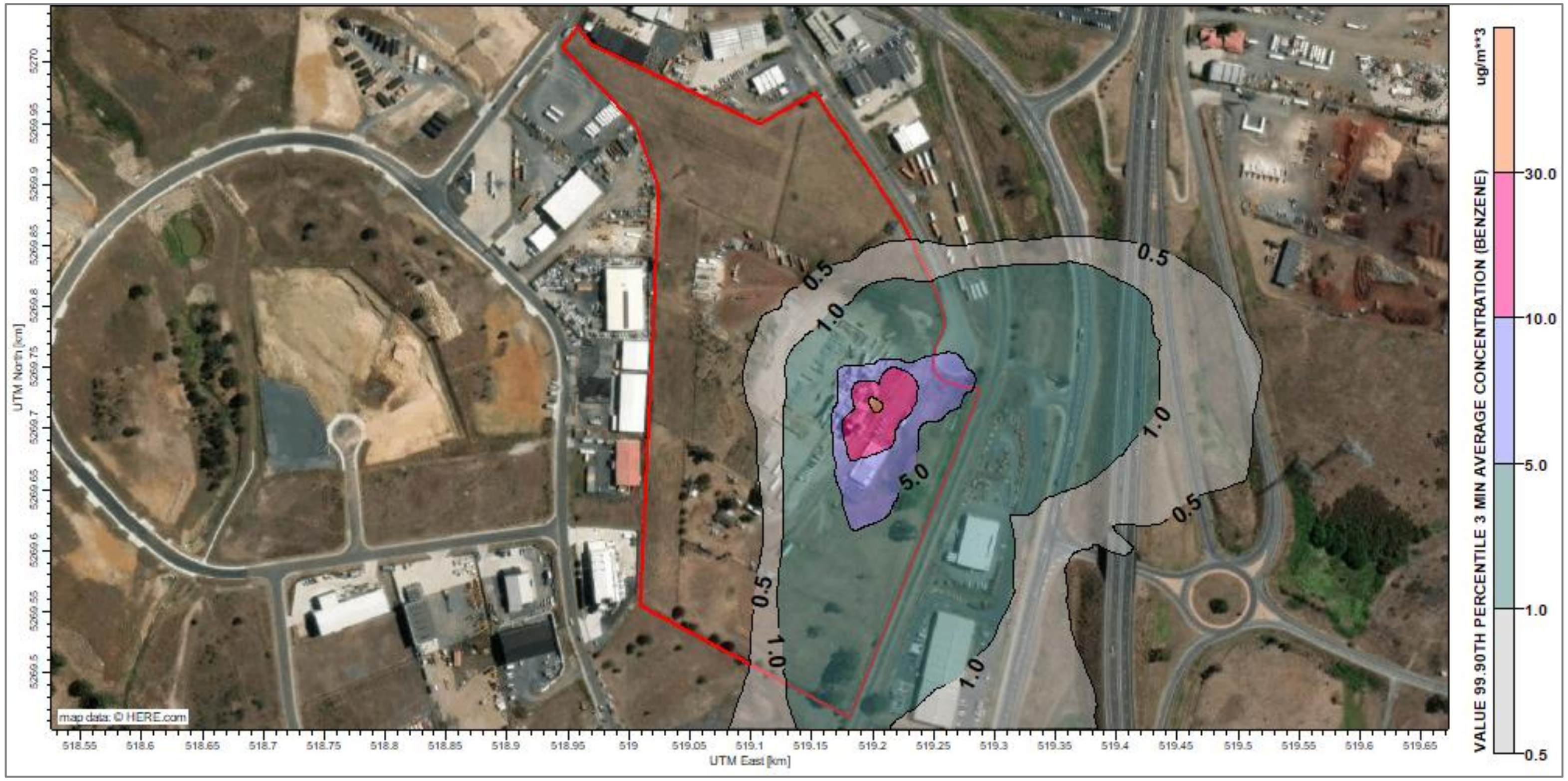
Figure 59: Predicted Benzene GLCs for Daily Operations (Scenario 1)



Pollutant: Benzene **Period:** 3-Minutes **Percentile:** 99.9th **Criteria:** **100** µg/m^3

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W E
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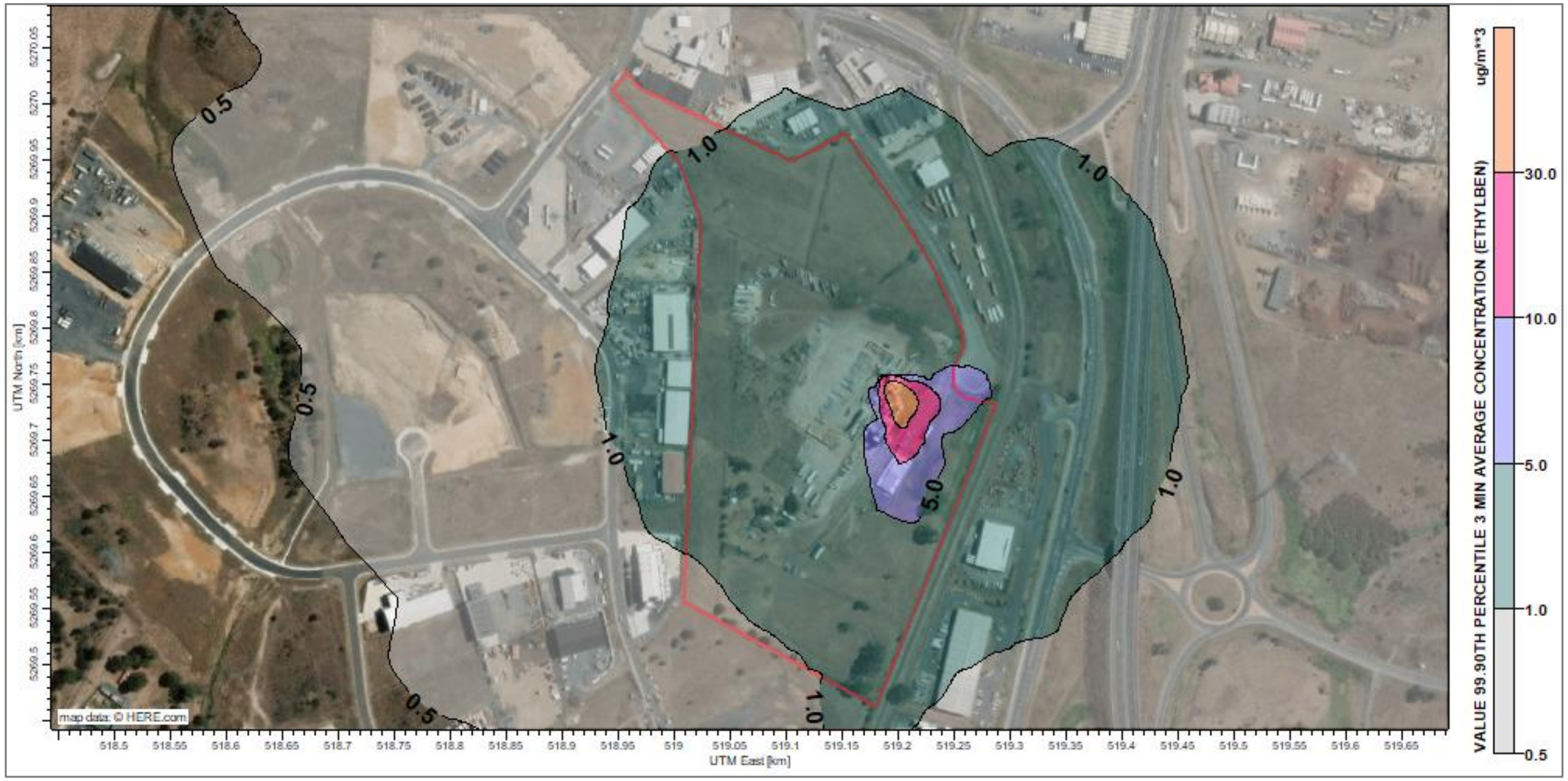
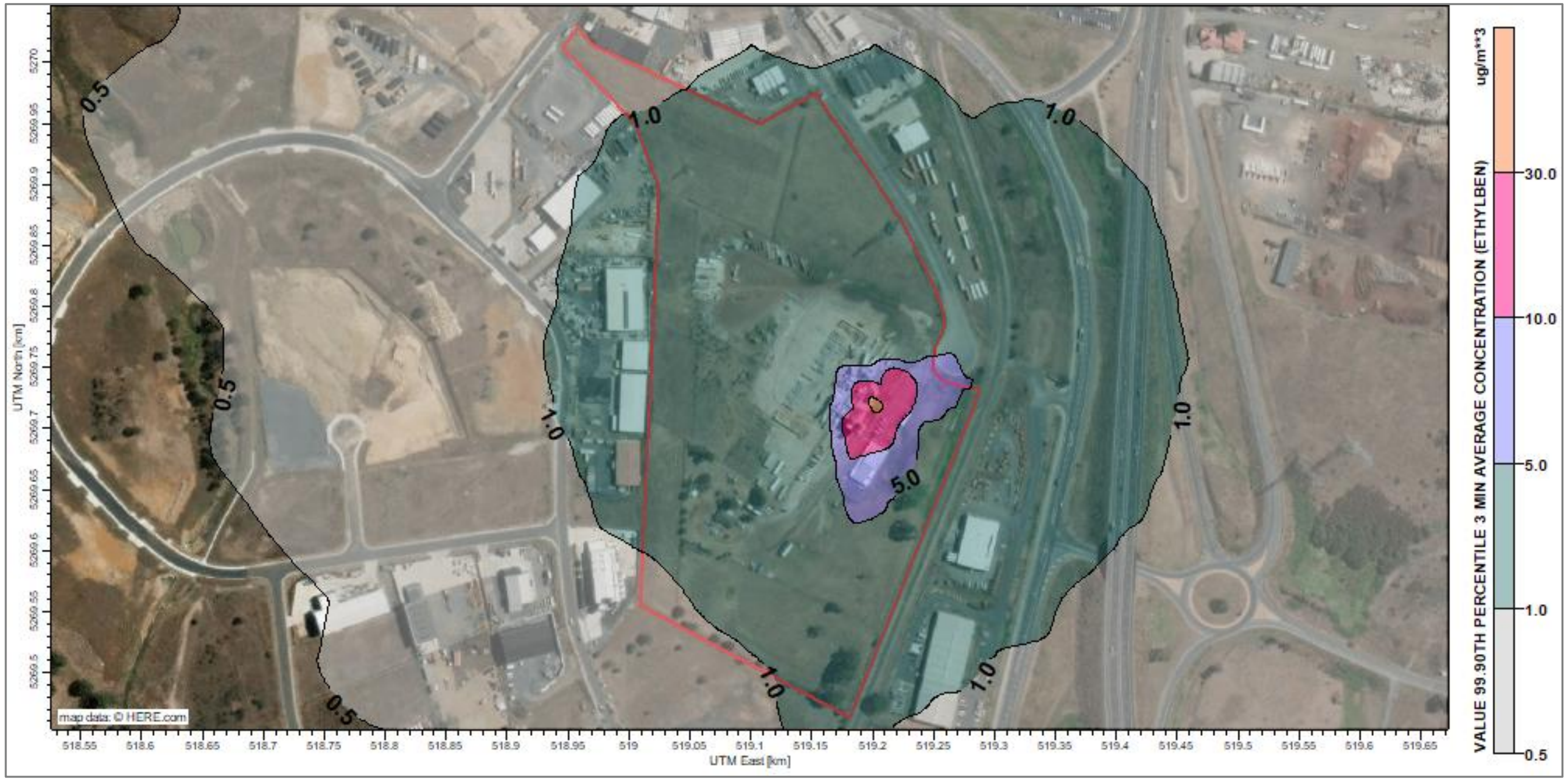
Figure 60: Predicted Benzene GLCs for Daily Operations (Scenario 2)



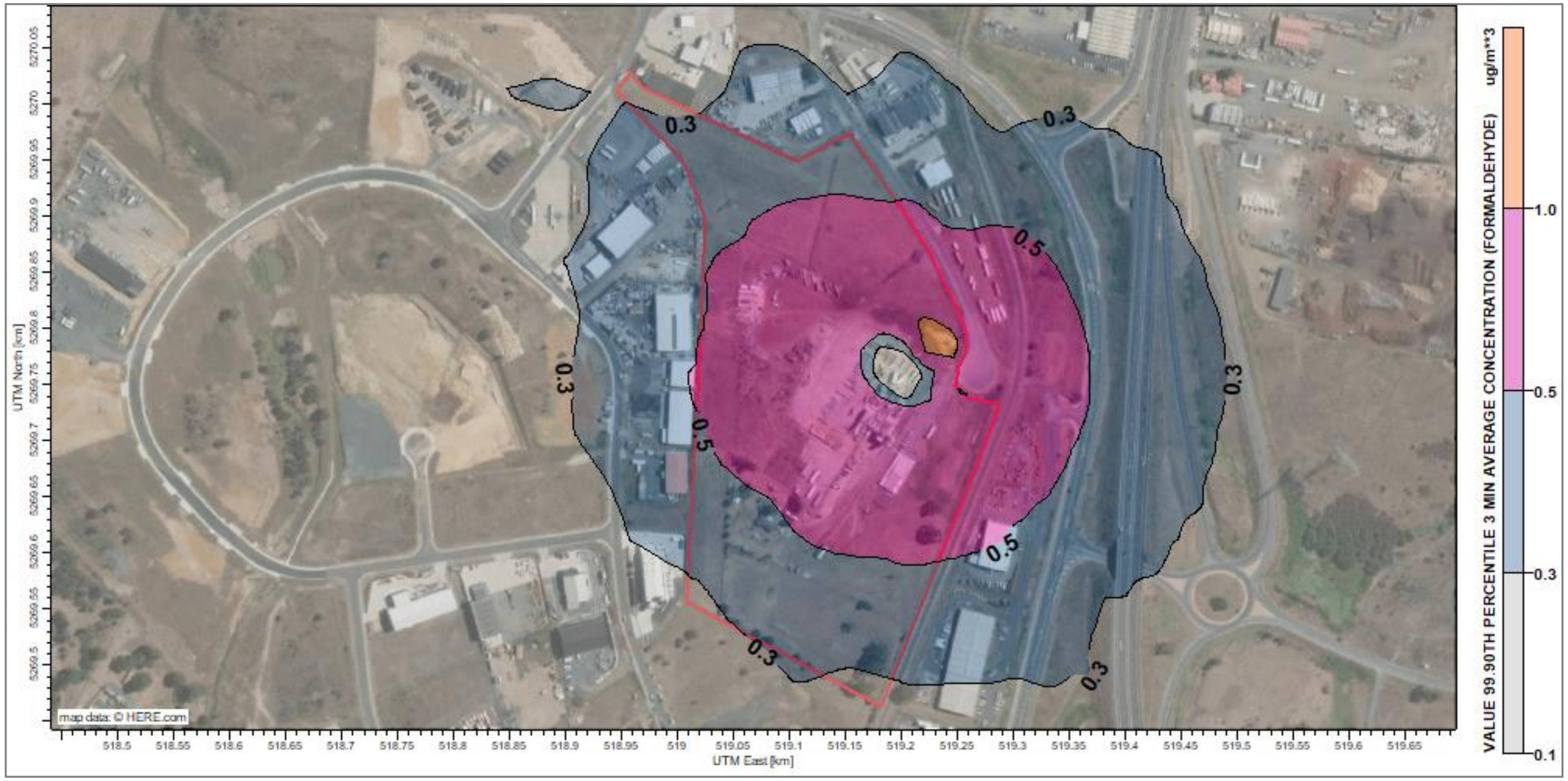
Pollutant: Ethylbenzene **Period:** 3-Minutes **Percentile:** 99.9th **Criteria:** 14500 μg/m³

Figure 61: Predicted Ethylbenzene GLCs for Daily Operations (Scenario 1)



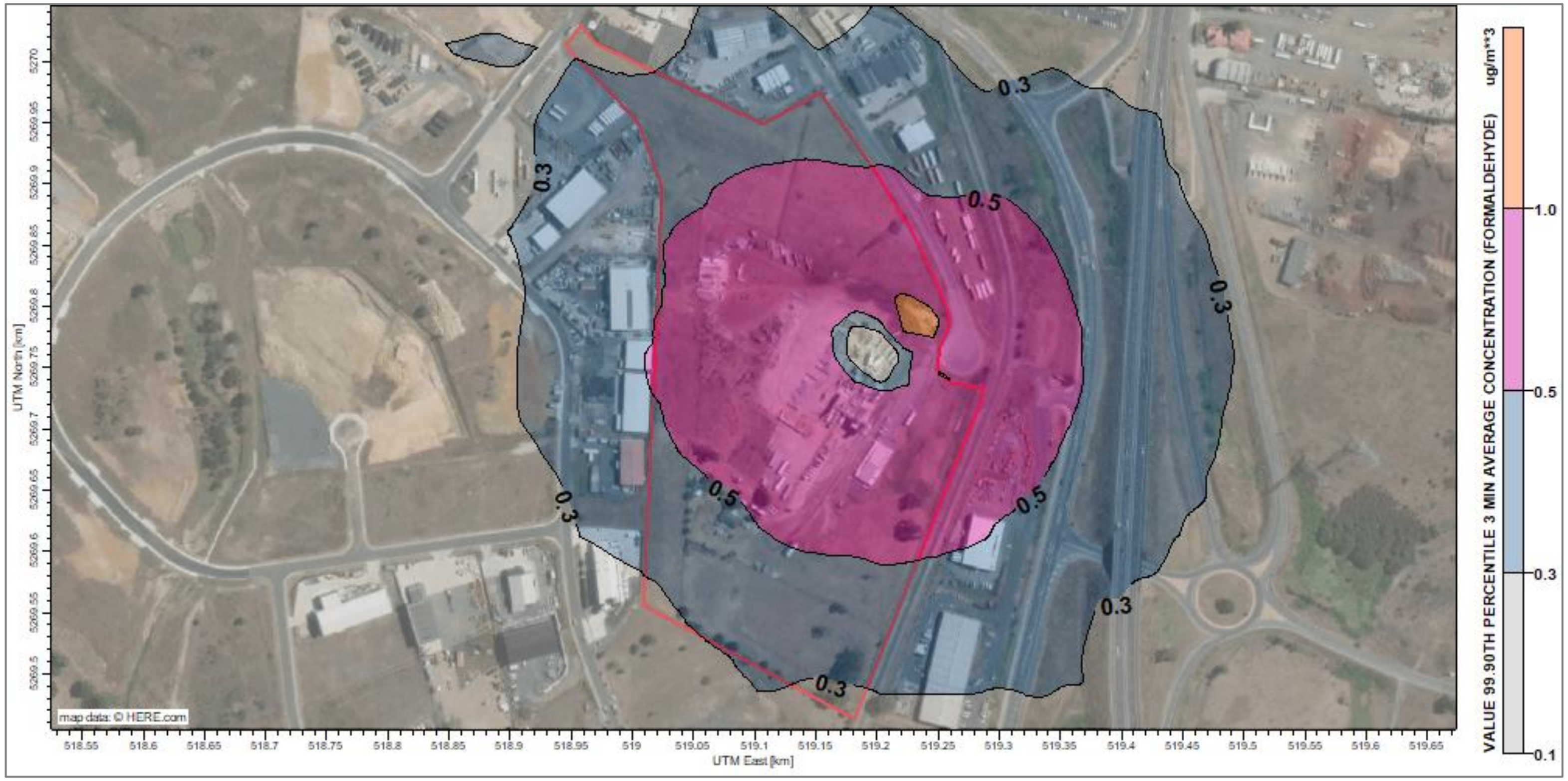
Pollutant: Ethylbenzene **Period:** 3-Minutes **Percentile:** 99.9th **Criteria:** 14500 µg/m³

Figure 62: Predicted Ethylbenzene GLCs for Daily Operations (Scenario 2)



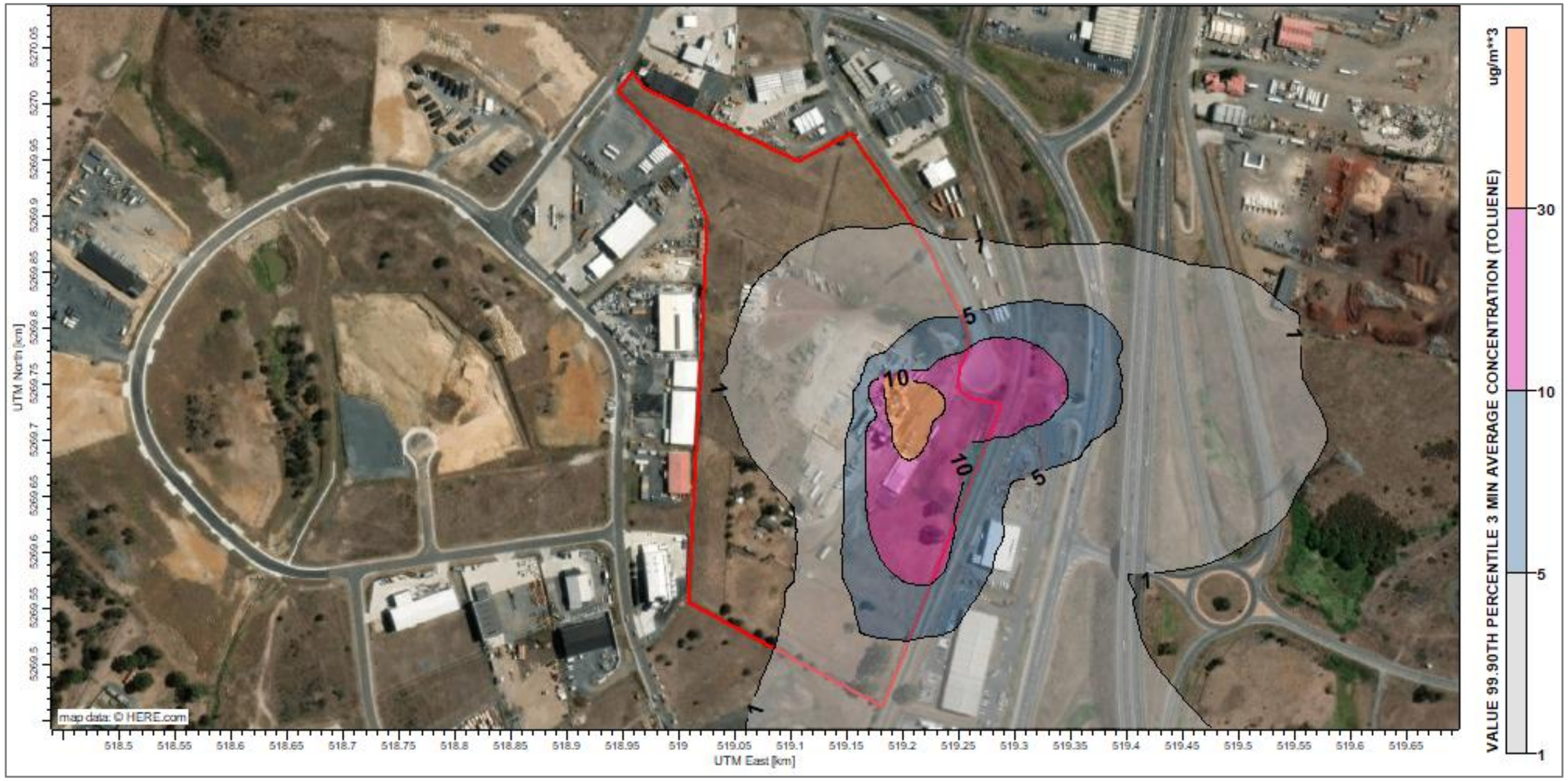
Pollutant: Formaldehyde **Period:** 3-Minutes **Percentile:** 99.9th **Criteria:** 50 µg/m³

Figure 63: Predicted Formaldehyde GLCs for Daily Operations (Scenario 1)



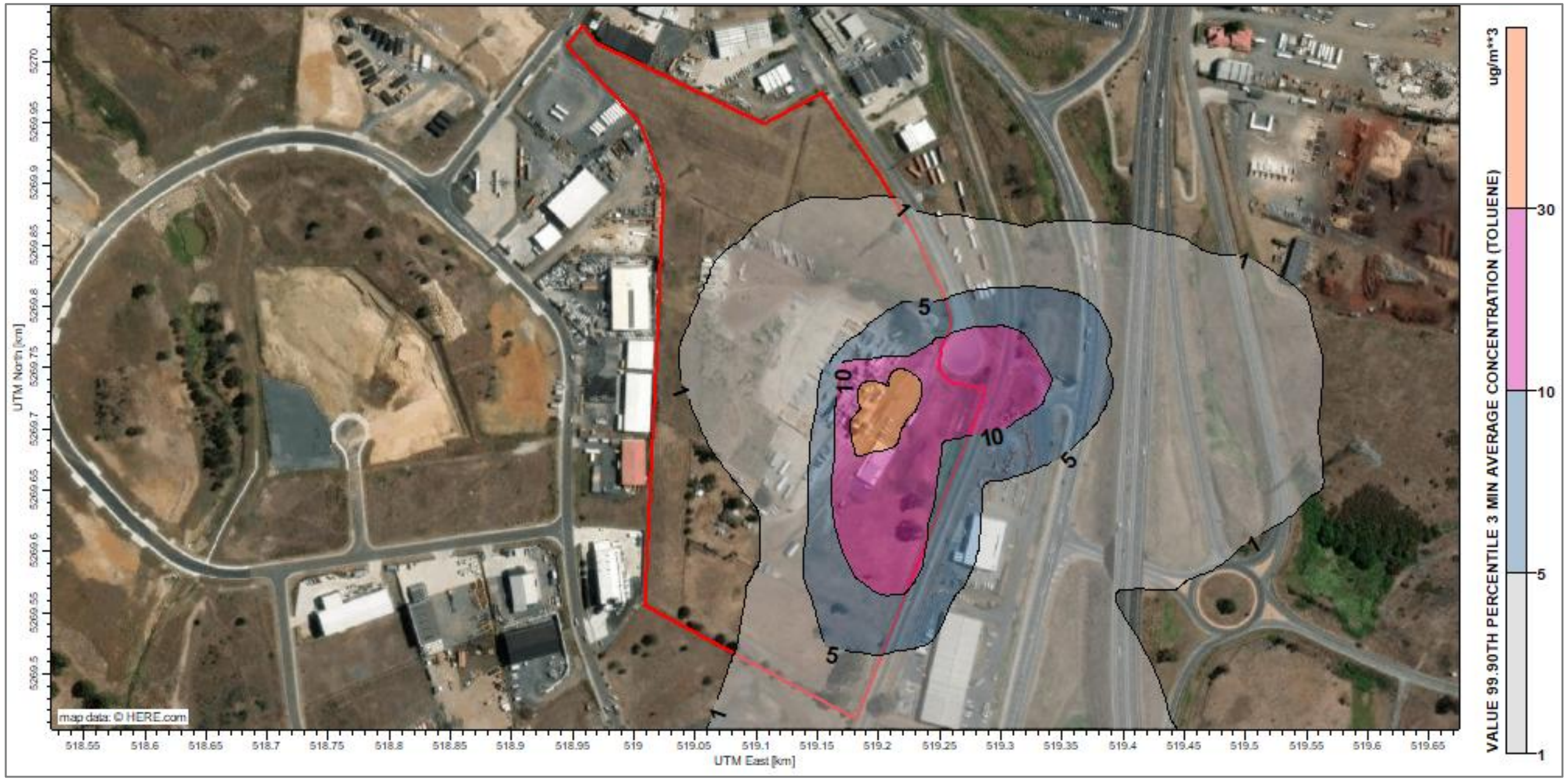
Pollutant: Formaldehyde **Period:** 3-Minutes **Percentile:** 99.9th **Criteria:** 50 µg/m³

Figure 64: Predicted Formaldehyde GLCs for Daily Operations (Scenario 2)



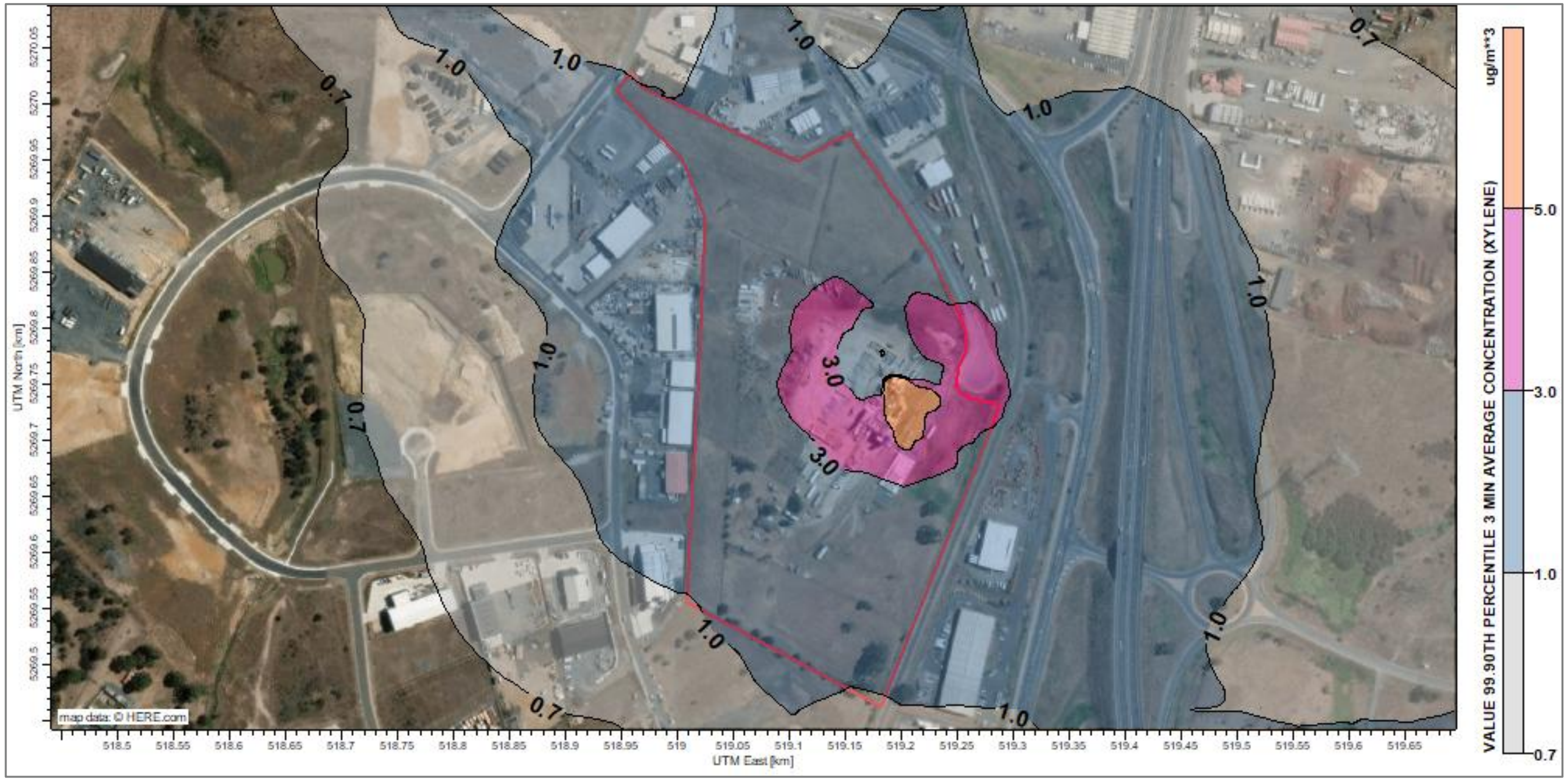
Pollutant: Toluene **Period:** 3-Minutes **Percentile:** 99.9th **Criteria:** 650 µg/m³

Figure 65: Predicted Toluene GLCs for Daily Operations (Scenario 1)



Pollutant: Toluene **Period:** 3-Minutes **Percentile:** 99.9th **Criteria:** 650 µg/m3

Figure 66: Predicted Toluene GLCs for Daily Operations (Scenario 2)

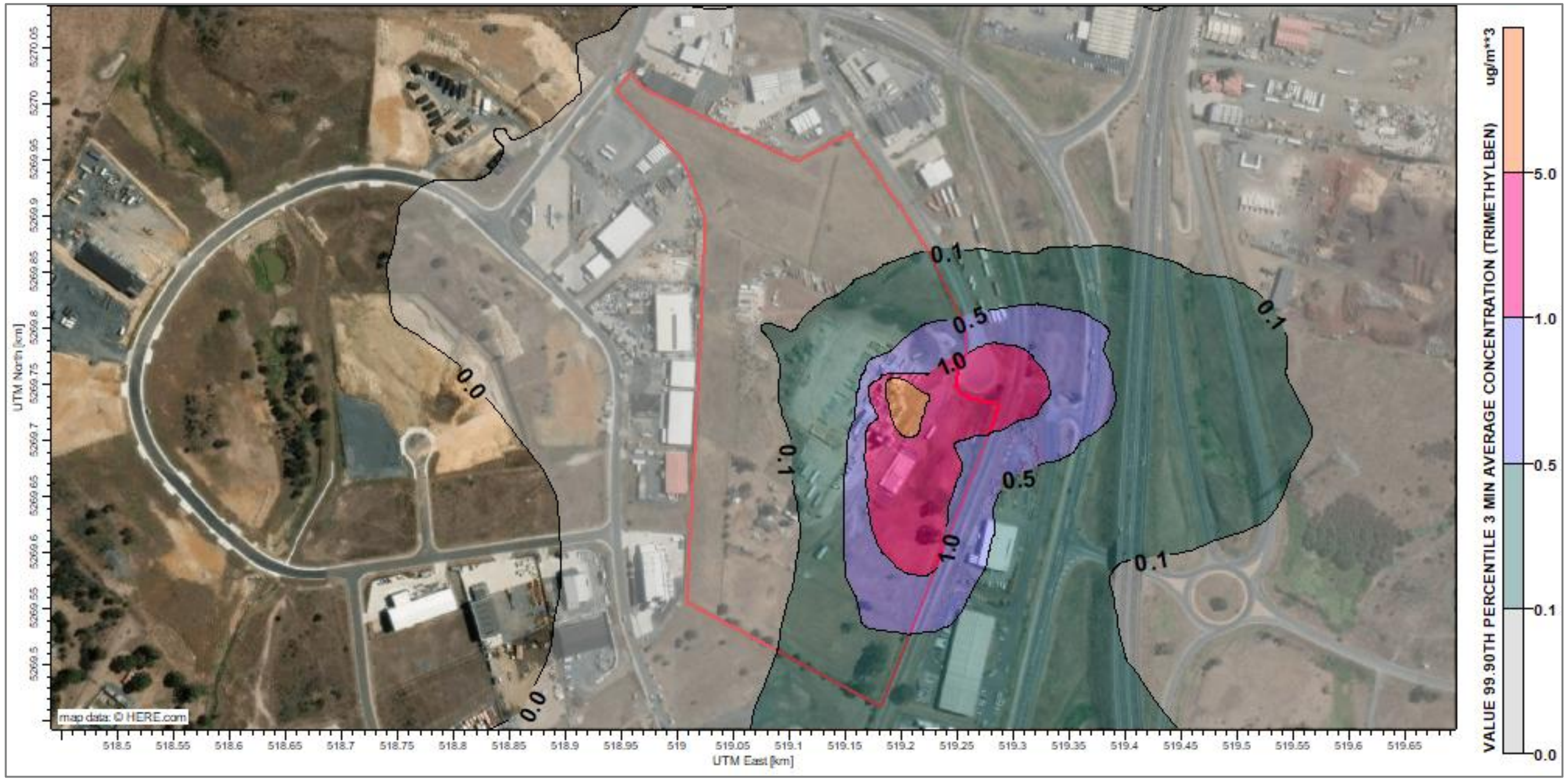


Pollutant: Xylenes **Period:** 3-Minutes **Percentile:** 99.9th **Criteria:** 350 µg/m³

Figure 67: Predicted Xylenes GLCs for Daily Operations (Scenario 1)

Pollutant: Xylenes **Period:** 3-Minutes **Percentile:** 99.9th **Criteria:** 350 µg/m^3

Figure 68: Predicted Xylenes GLCs for Daily Operations (Scenario 2)

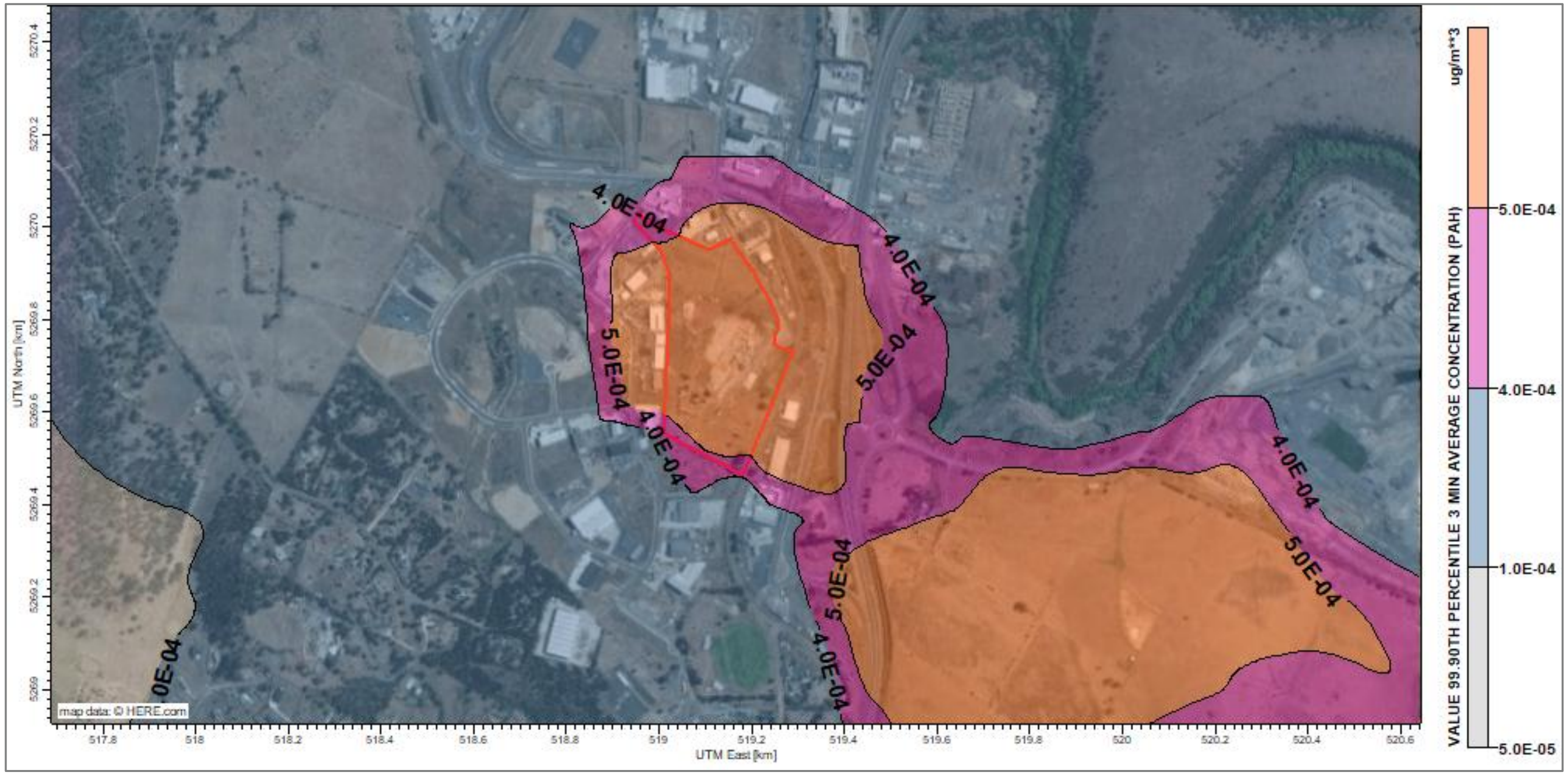


Pollutant: Trimethylbenzene **Period:** 3-Minutes **Percentile:** 99.9th **Criteria:** 4000 µg/m^3

Figure 69: Predicted Trimethylbenzene GLCs for Daily Operations (Scenario 1)

Pollutant: Trimethylbenzene **Period:** 3-Minutes **Percentile:** 99.9th **Criteria:** 4000 µg/m³

Figure 70: Predicted Trimethylbenzene GLCs for Daily Operations (Scenario 2)



Pollutant: PAHs as Benzo(a)pyrene

Period: 3-Minutes

Percentile: 99.9th

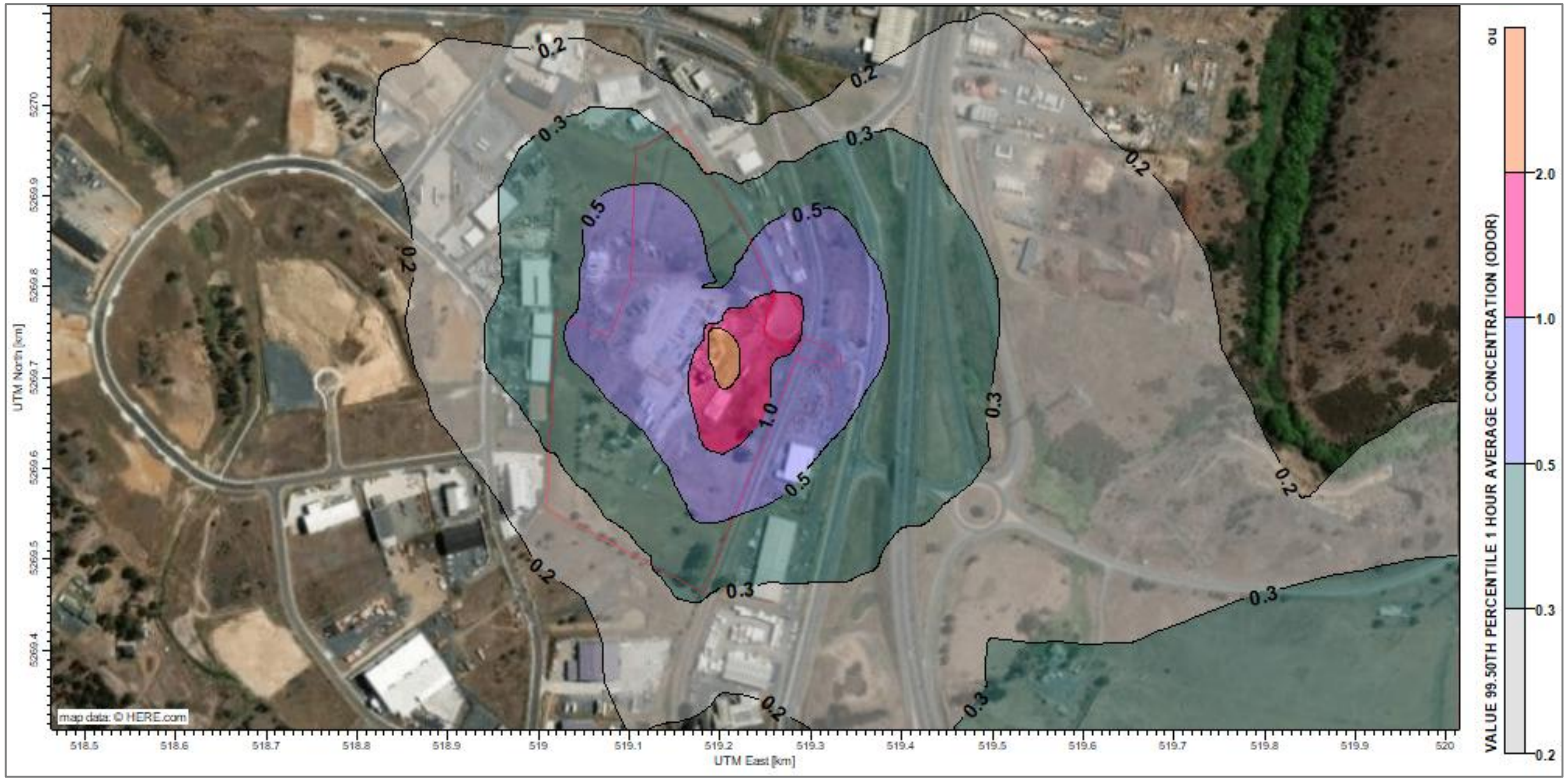
Criteria: 0.73 µg/m³

Figure 71: Predicted PAHs as Benzo(a)pyrene GLCs for Daily Operations

APPENDIX G: PREDICTED POLLUTANT GLC ISOPLETHS – POTENTIEL FUTURE BOUNDARY

This Appendix presents the predicted ground level concentrations from daily peak production rates from both the asphalt plant and the concrete batch plant. Due to the interpolation of the gridded results, there may be slight discrepancies with the discrete receptors.

Receptors were not placed within the small rectangular parcel immediately east of the site boundary, as it was not included in the originally provided plan. As the concentration contours demonstrate, the highest ground-level values do not occur within that parcel; therefore, its omission from the modelling runs has no effect on the maximum reported results.



Pollutant: Odour **Period:** 1 Hour **Percentile:** 99.5th **Criteria:** 2 OU

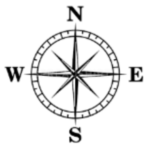
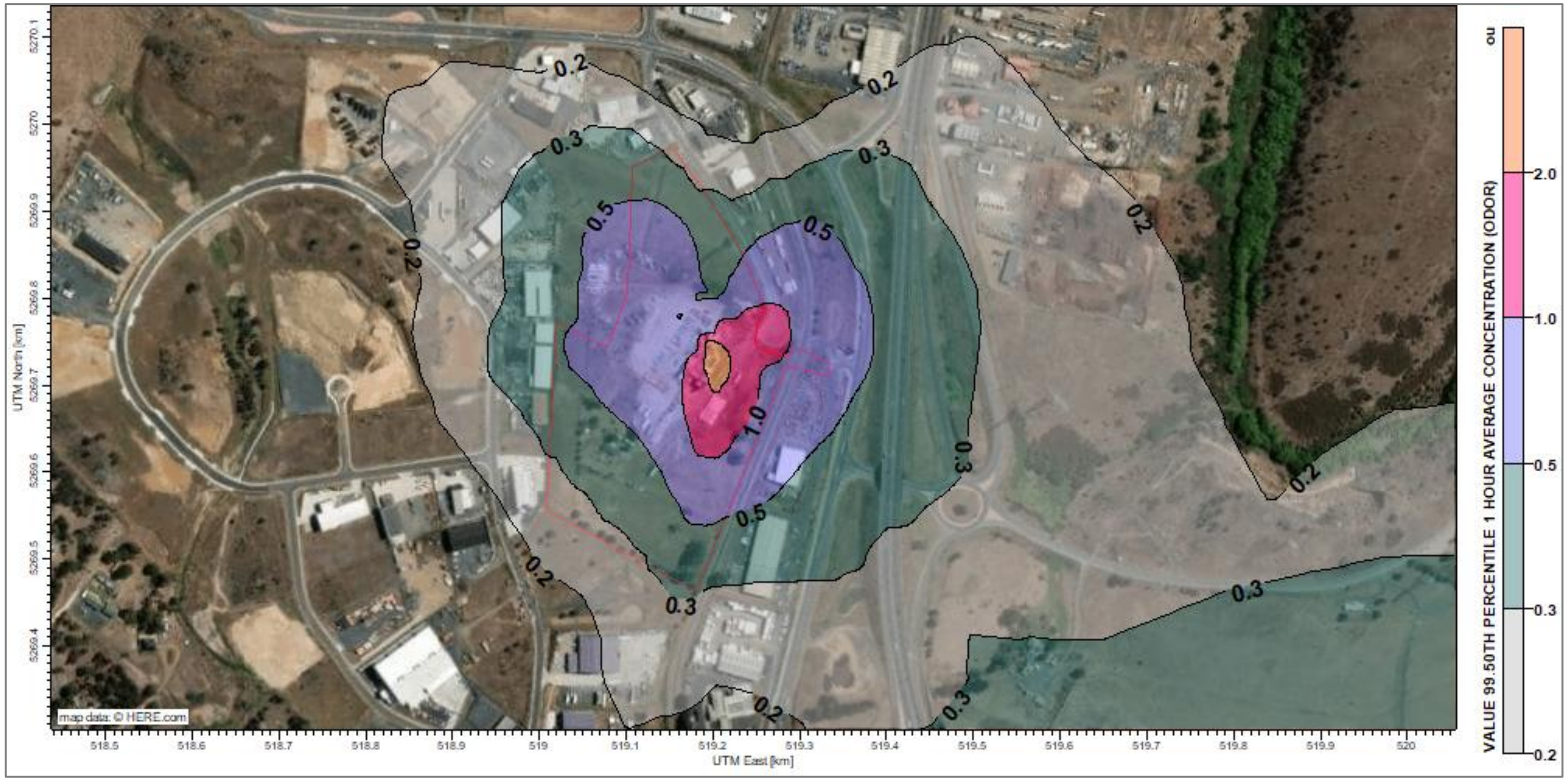
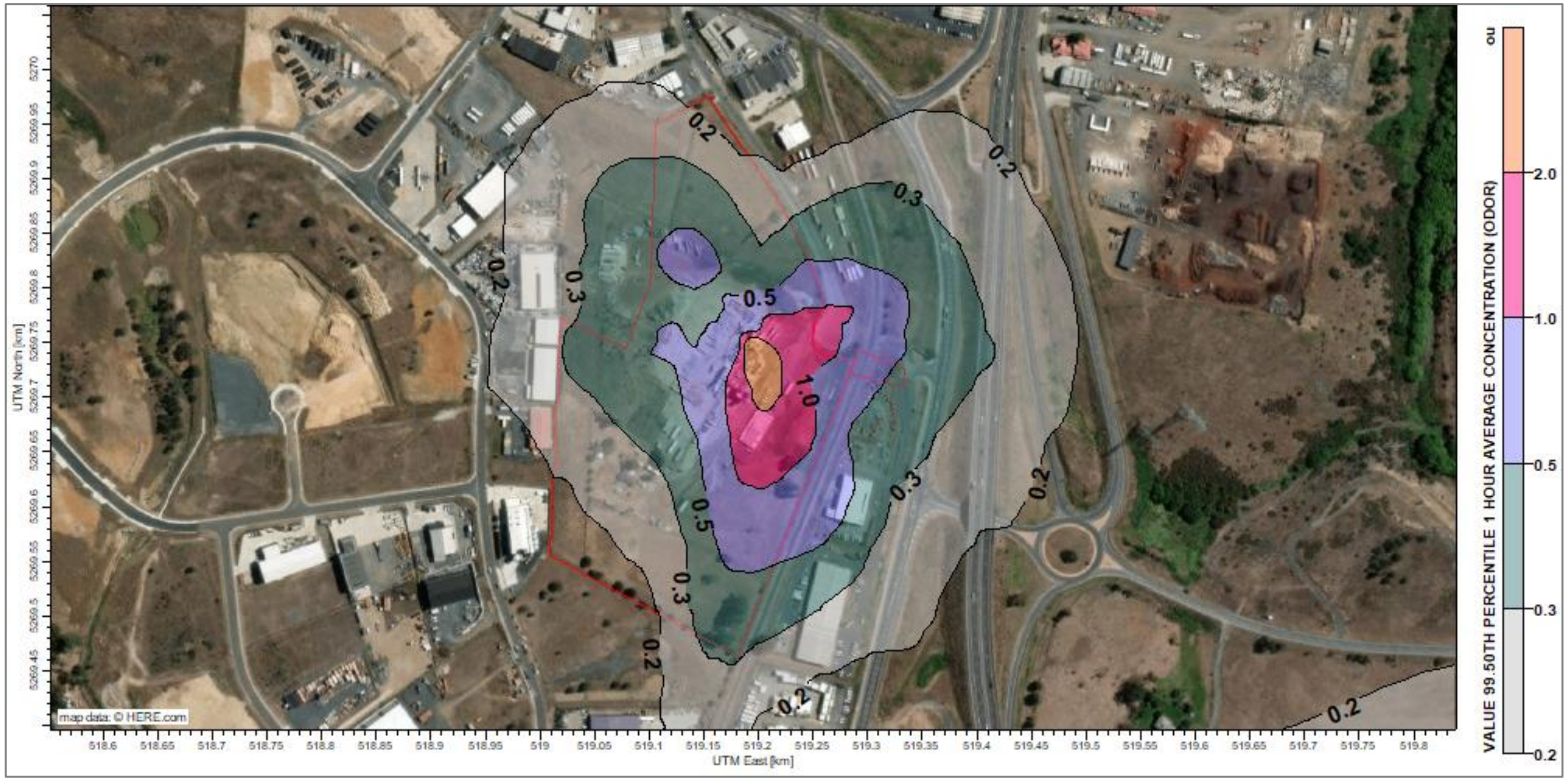


Figure 72: Predicted Odour GLCs for Daily Operations (Scenario 1)



Pollutant: Odour **Period:** 1 Hour **Percentile:** 99.5th **Criteria:** 2 OU

Figure 73: Predicted Odour GLCs for Daily Operations (Scenario 2)



Pollutant: Odour **Period:** 1 Hour **Percentile:** 99.5th **Criteria:** 2 OU

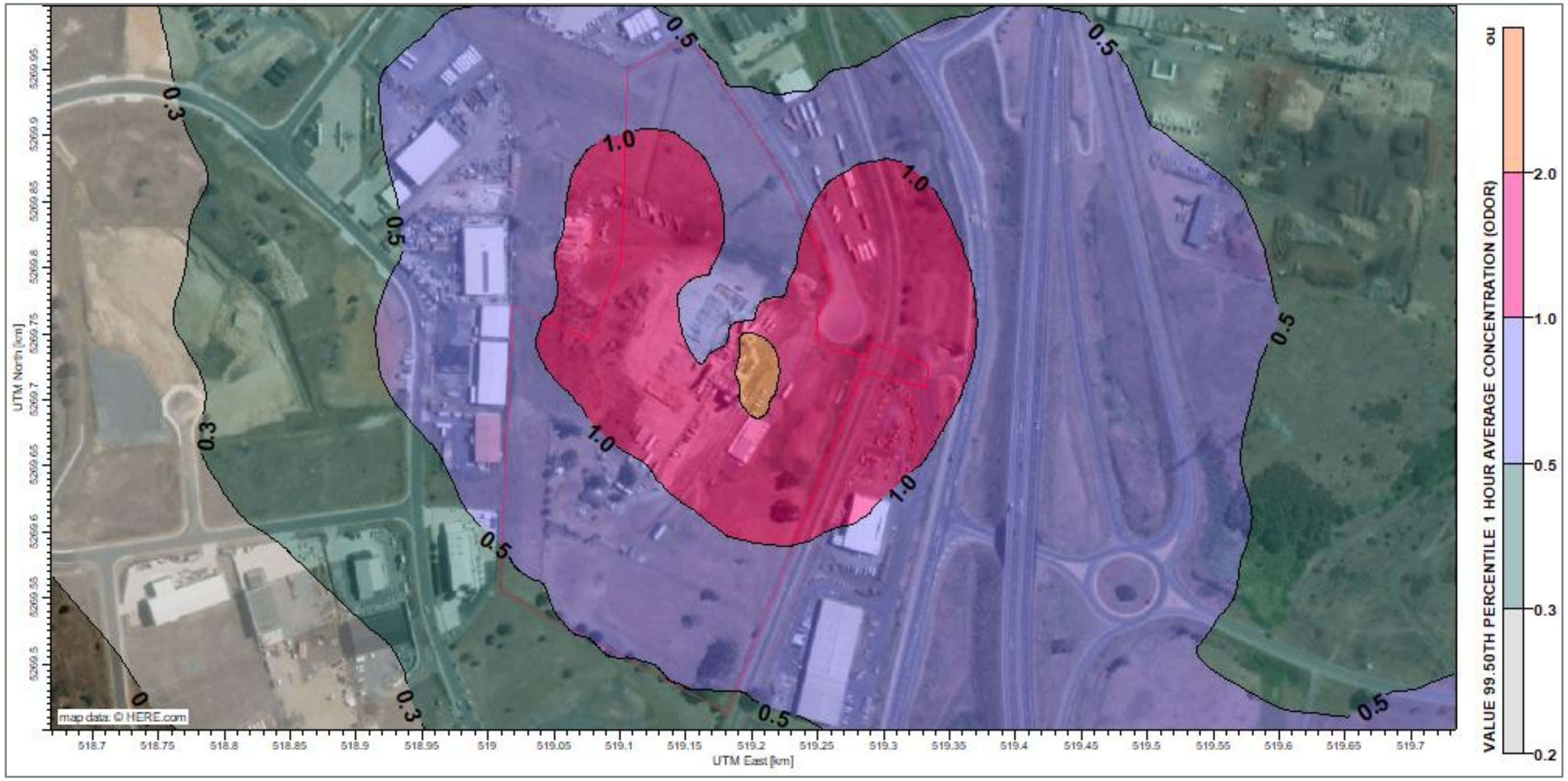
Figure 74: Predicted Odour GLCs for Daily Operations (Scenario 3)

Pollutant: Odour **Period:** 1 Hour **Percentile:** 99.5th **Criteria:** 2 OU

Figure 75: Predicted Odour GLCs for Daily Operations (Scenario 4)

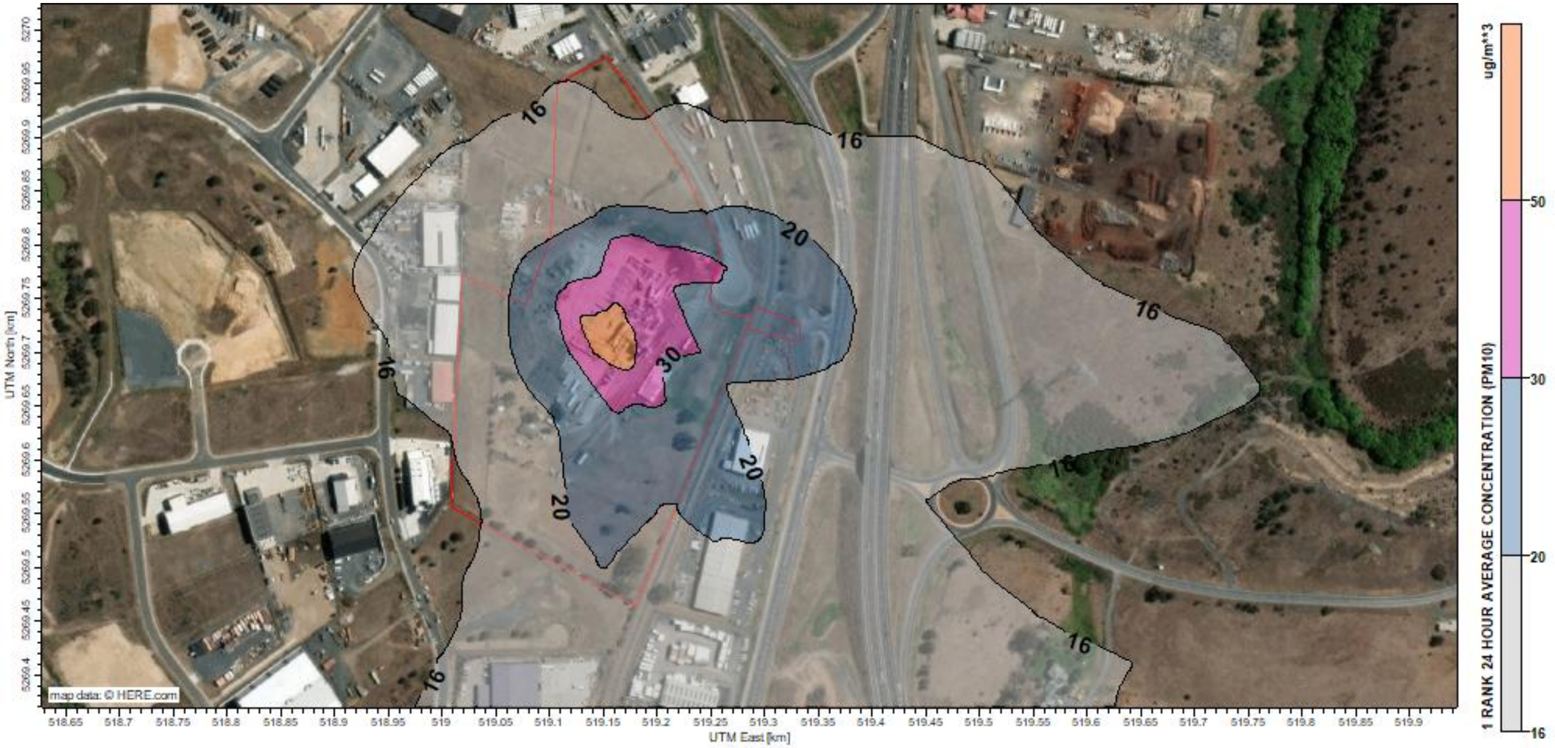
Pollutant: Odour **Period:** 1 Hour **Percentile:** 99.5th **Criteria:** 2 OU

Figure 76: Predicted Odour GLCs for Daily Operations (Scenario 5)



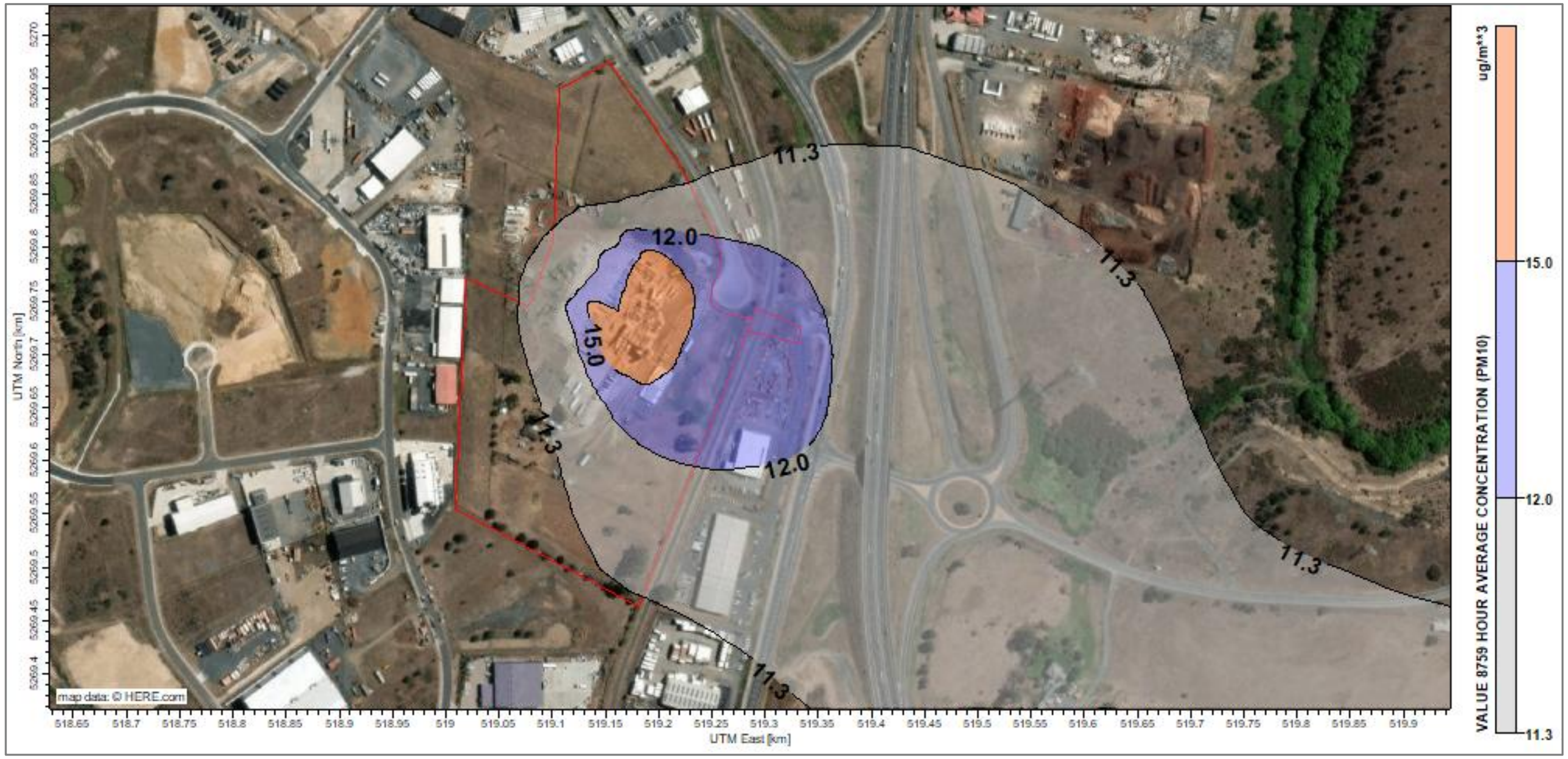
Pollutant: Odour **Period:** 1 Hour **Percentile:** 99.5th **Criteria:** 2 OU

Figure 77: Predicted Odour GLCs for Daily Operations (Scenario 6)



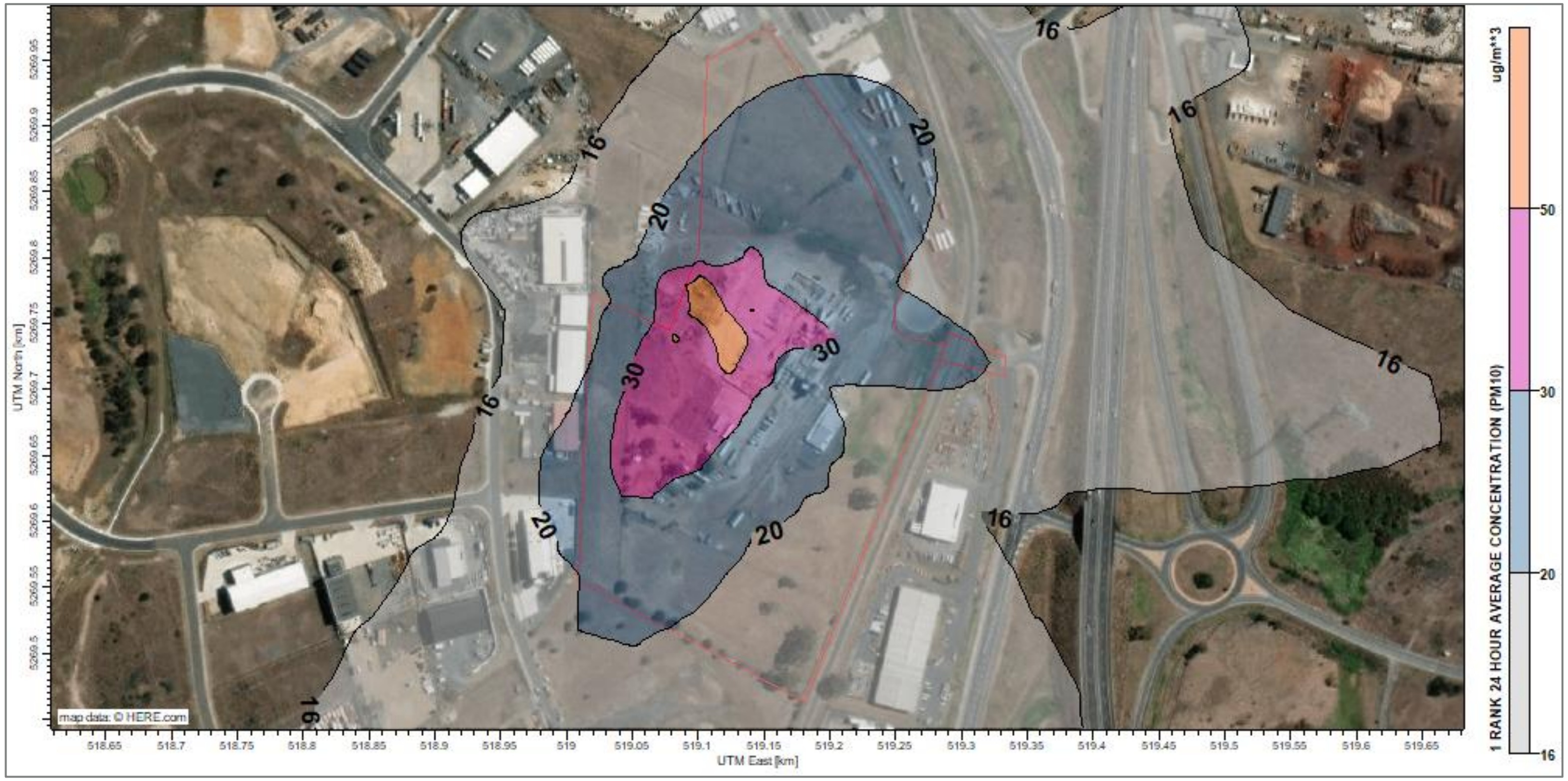
Pollutant: PM_{10} **Period:** 24 Hours **Percentile:** 100^{th} **Criteria:** 50 $\mu g/m^3$

Figure 78: Predicted PM_{10} GLCs for Cumulative Impact (Asphalt Plant and Background)



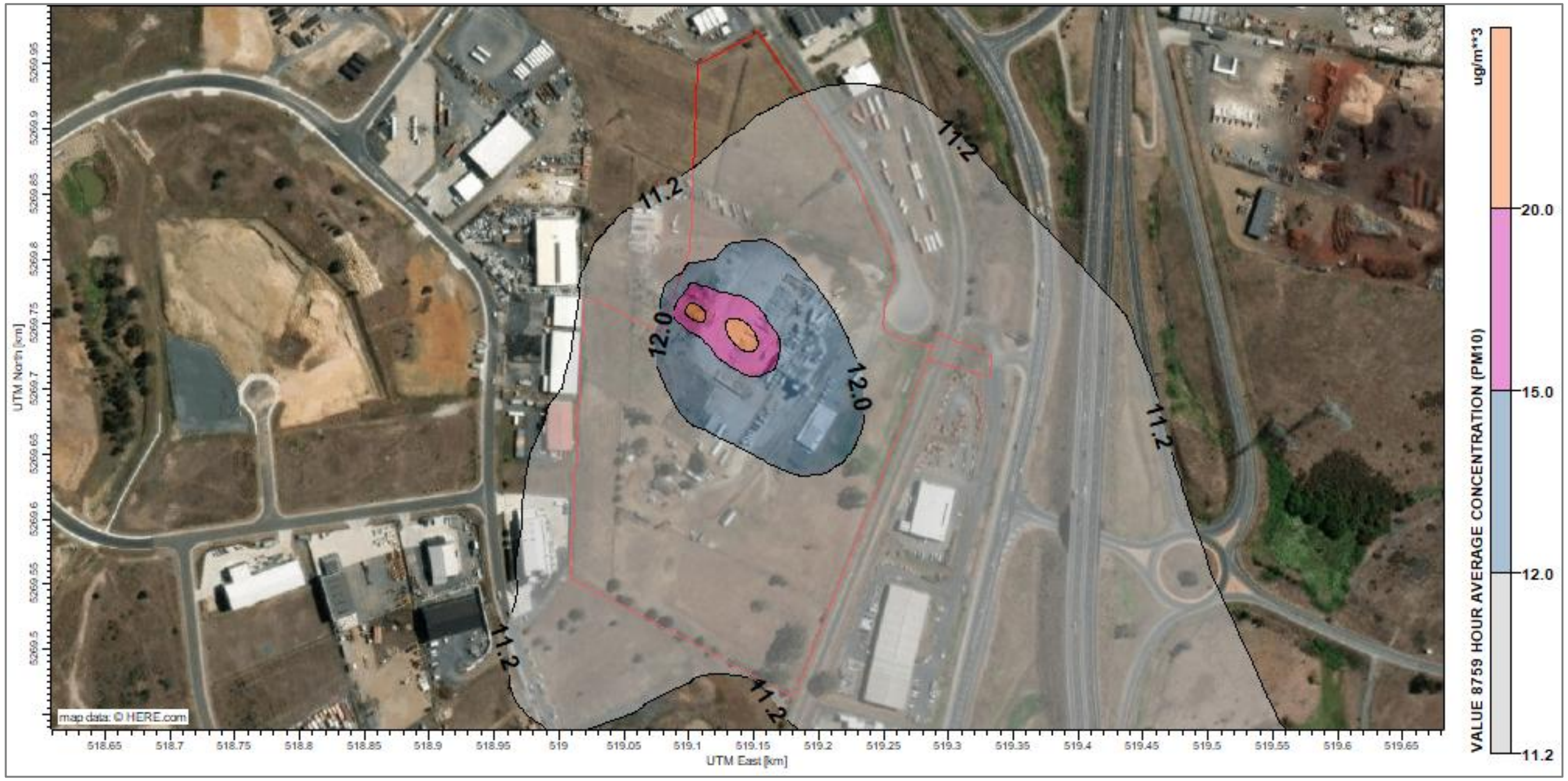
Pollutant: PM_{10} **Period:** Annual **Percentile:** 100^{th} **Criteria:** 25 μg/m^3

Figure 79: Predicted PM_{10} GLCs for Cumulative Impact (Asphalt Plant and Background)



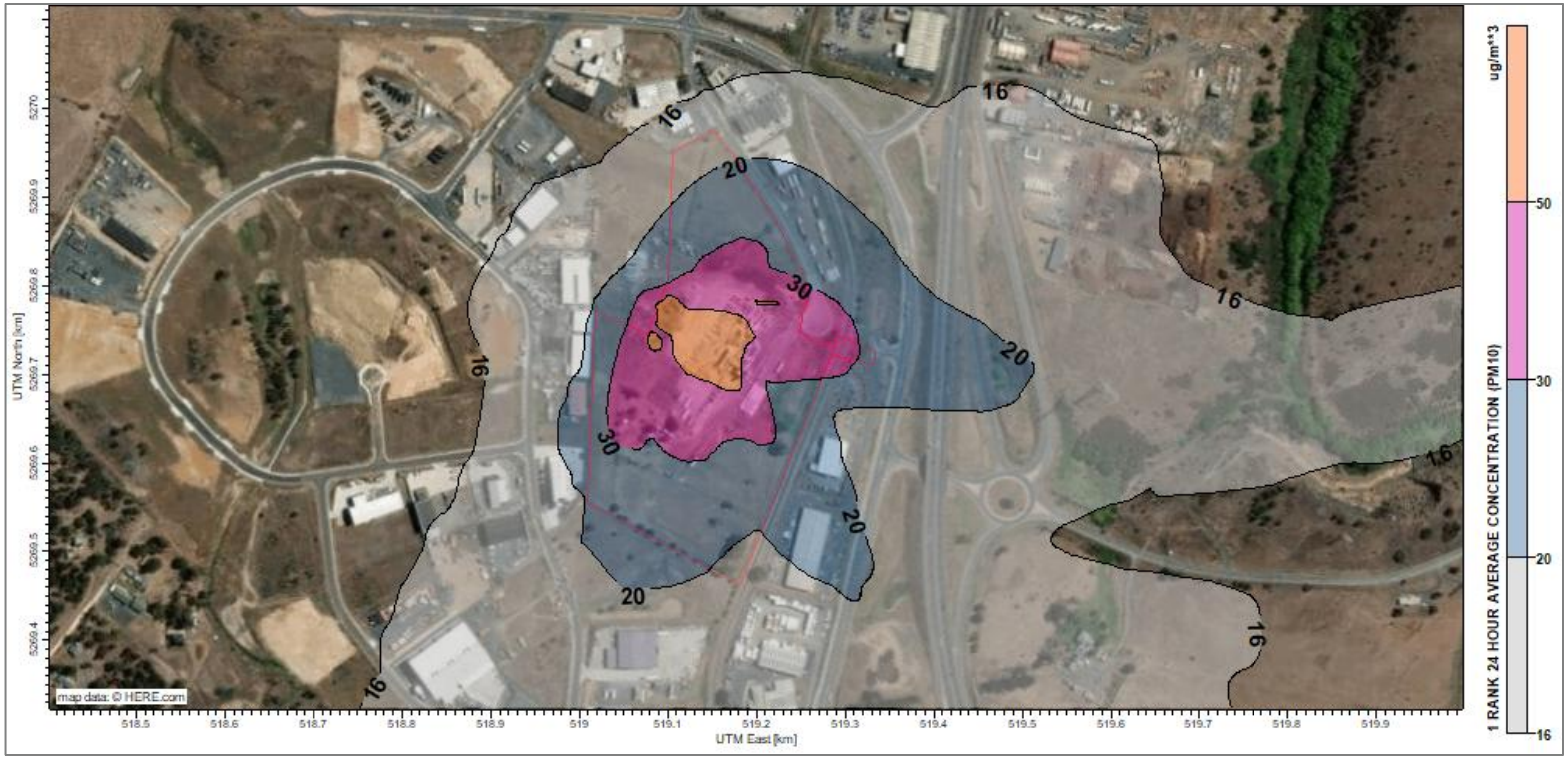
Pollutant: PM_{10} **Period:** 24 Hours **Percentile:** 100th **Criteria:** 50 μg/m^3

Figure 80: Predicted PM_{10} GLCs for Cumulative Impact (Concrete Batch Plant and Background)



Pollutant: PM_{10} **Period:** Annual **Percentile:** 100^{th} **Criteria:** 25 $\mu g/m^3$

Figure 81: Predicted PM_{10} GLCs for Cumulative Impact (Concrete Batch Plant and Background)

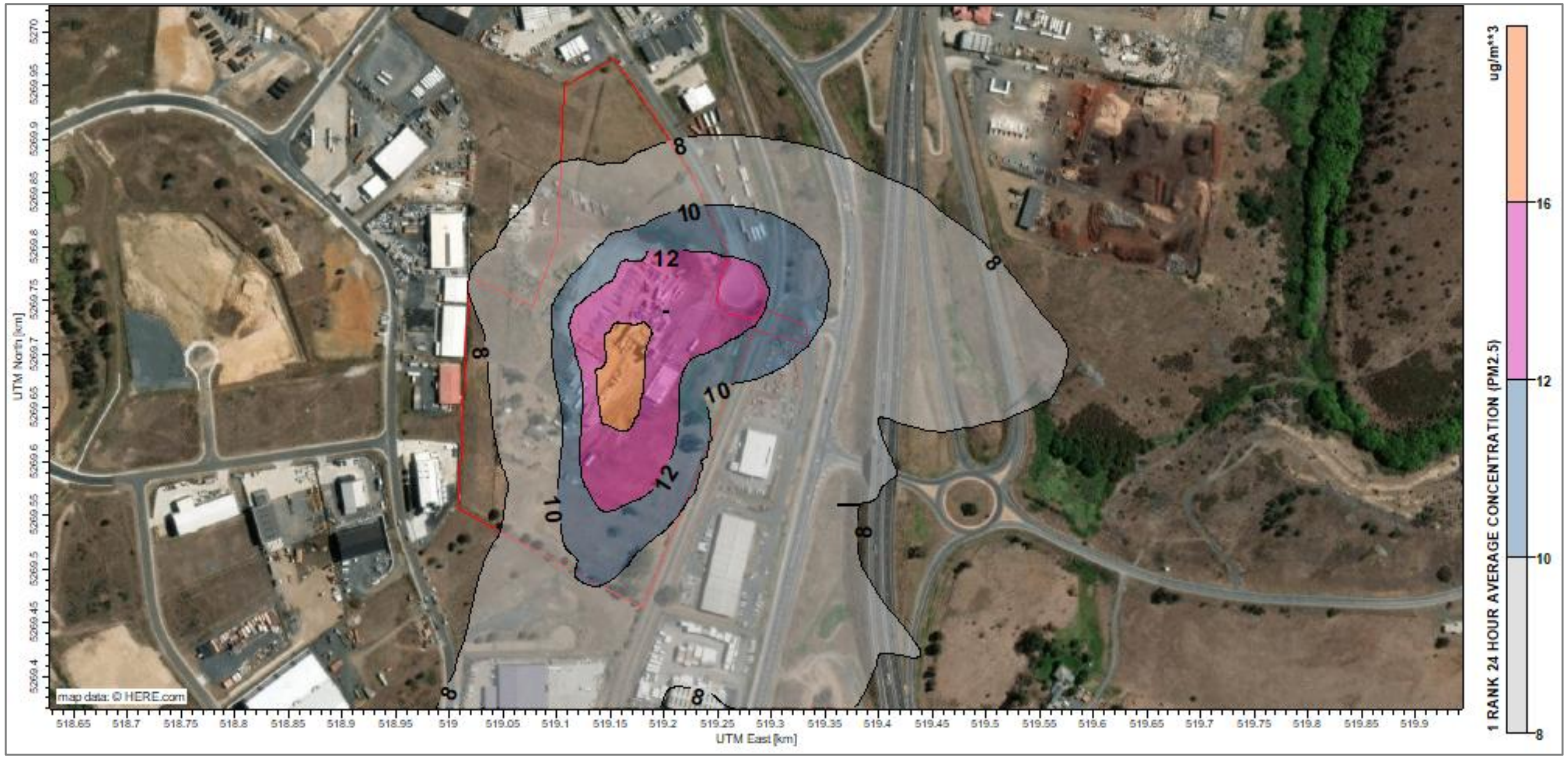


Pollutant: PM_{10} **Period:** 24 Hours **Percentile:** 100^{th} **Criteria:** 50 $\mu g/m^3$

Figure 82: Predicted PM10 GLCs for Cumulative Impact (Asphalt Plant, Concrete Batch Plant and Background)

Pollutant: PM_{10} **Period:** Annual **Percentile:** 100^{th} **Criteria:** 25 µg/m^3

Figure 83: Predicted PM_{10} GLCs for Cumulative Impact (Asphalt Plant, Concrete Batch Plant and Background)



Pollutant: $PM_{2.5}$ **Period:** 24 Hours **Percentile:** 100^{th} **Criteria:** 20 µg/m^3

Figure 84: Predicted $PM_{2.5}$ GLCs for Cumulative Impact (Asphalt Plant and Background)

Pollutant: $PM_{2.5}$ **Period:** Annual **Percentile:** 100th **Criteria:** 7 µg/m^3

Figure 85: Predicted $PM_{2.5}$ GLCs for Cumulative Impact (Asphalt Plant and Background)

Pollutant: $PM_{2.5}$ **Period:** 24 Hours **Percentile:** 100^{th} **Criteria:** 20 $\mu g/m^3$

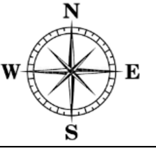
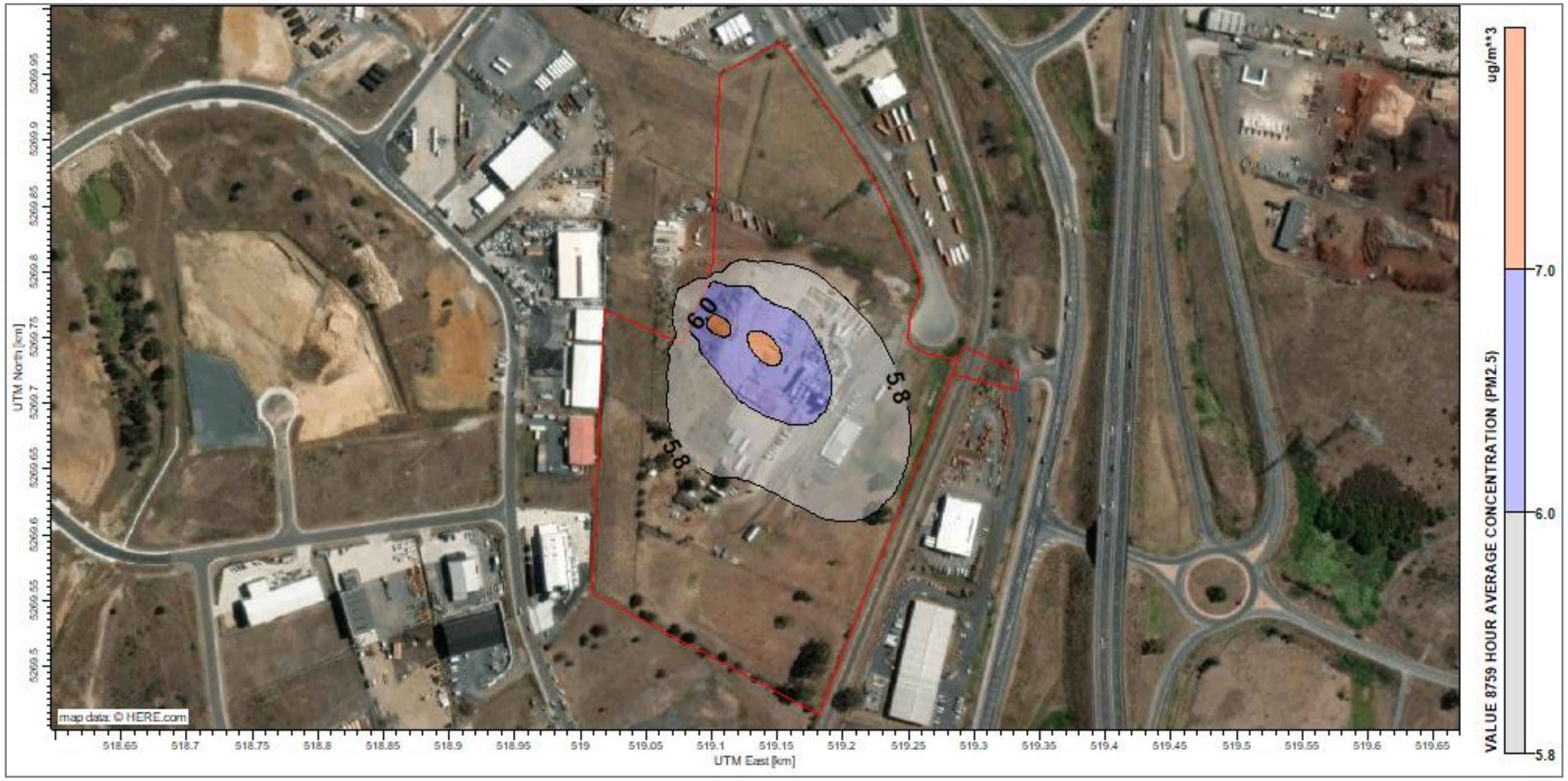
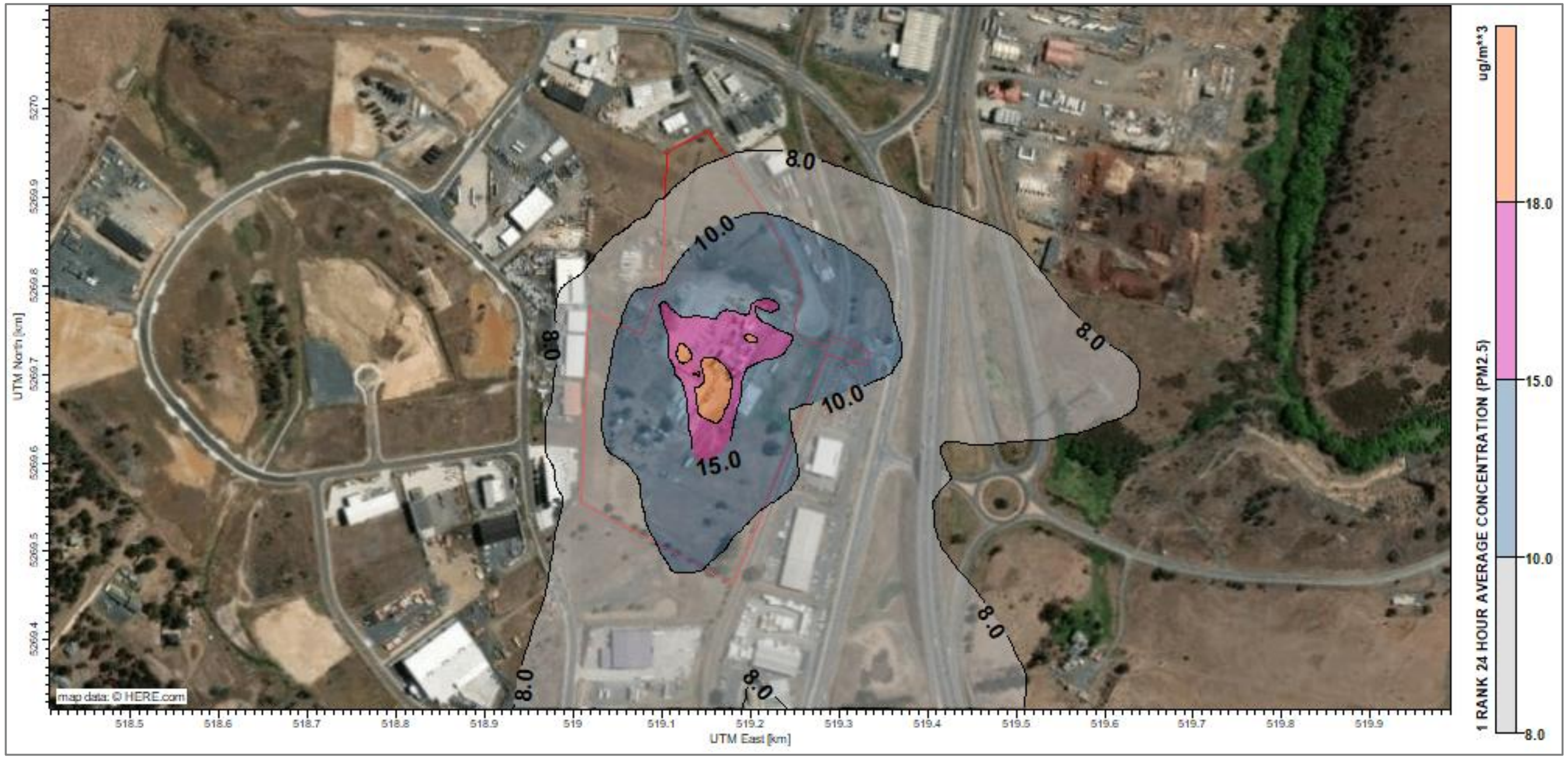


Figure 86: Predicted $PM_{2.5}$ GLCs for Cumulative Impact (Concrete Batch Plant and Background)



Pollutant: $PM_{2.5}$ **Period:** Annual **Percentile:** 100th **Criteria:** 7 µg/m³

Figure 87: Predicted $PM_{2.5}$ GLCs for Cumulative Impact (Concrete Batch Plant and Background)



Pollutant: $PM_{2.5}$ **Period:** 24 Hours **Percentile:** 100th **Criteria:** 20 µg/m^3

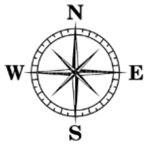
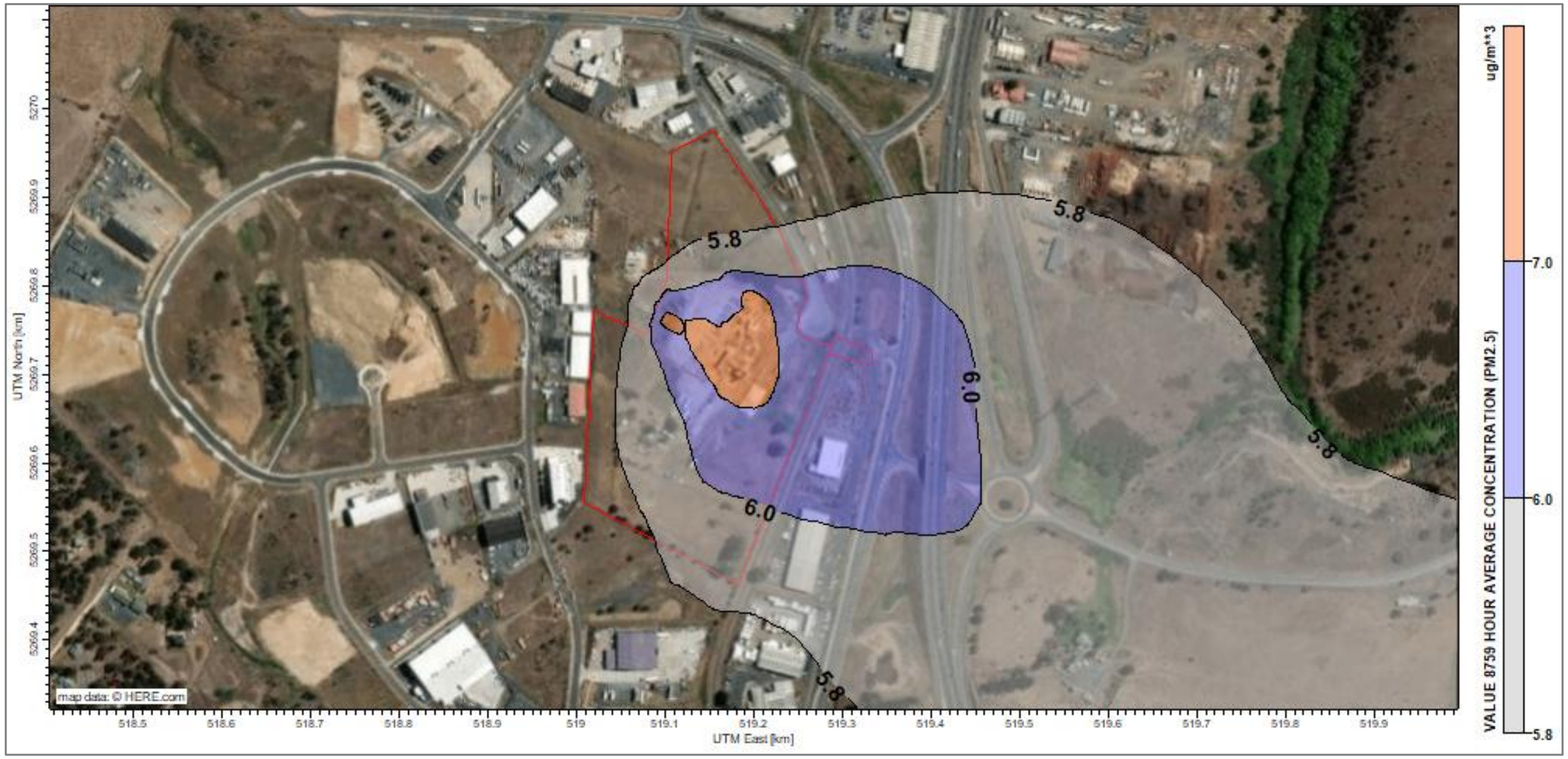
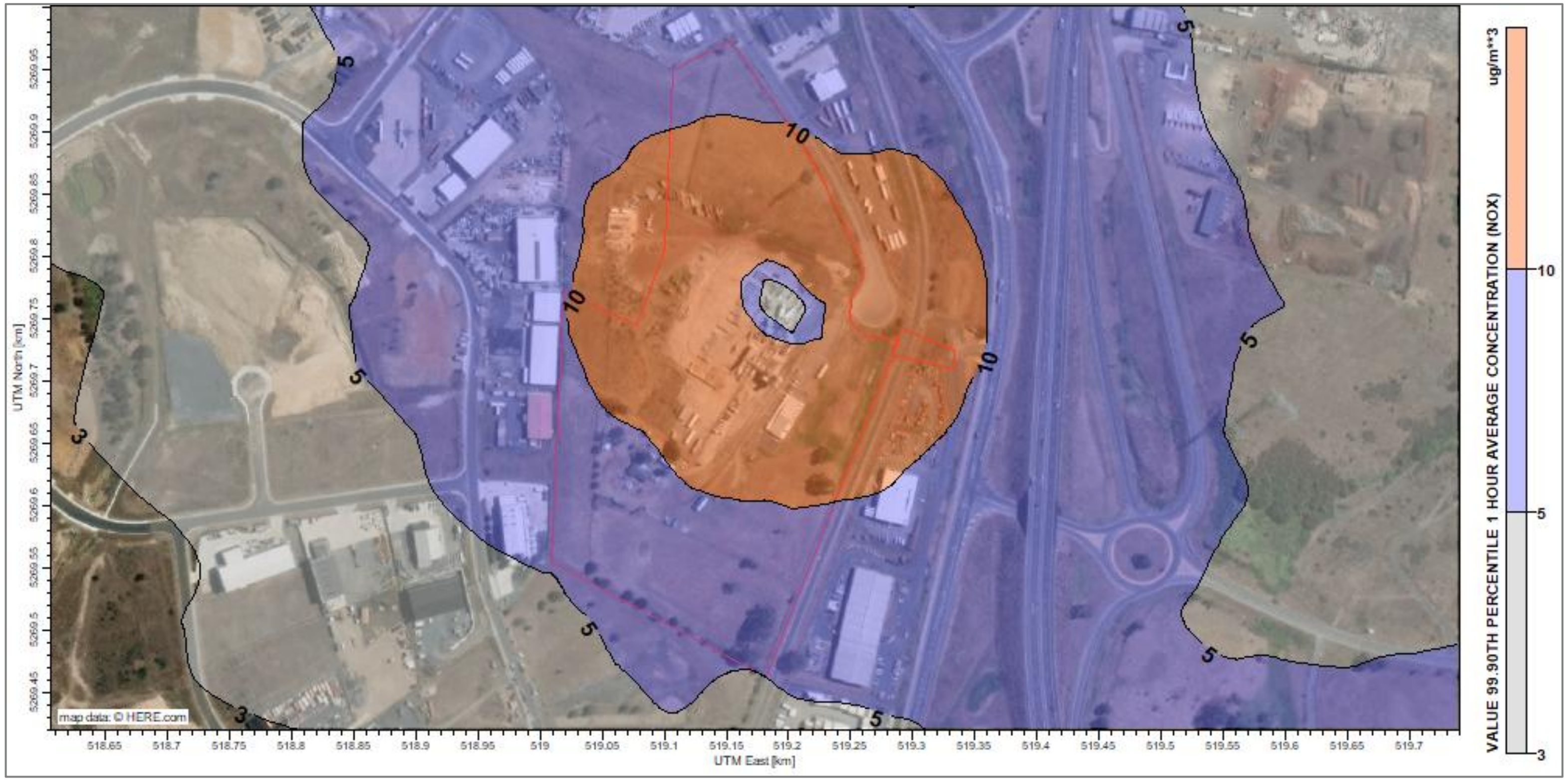


Figure 88: Predicted $PM_{2.5}$ GLCs for Cumulative Impact (Asphalt Plant, Concrete Batch Plant and Background)



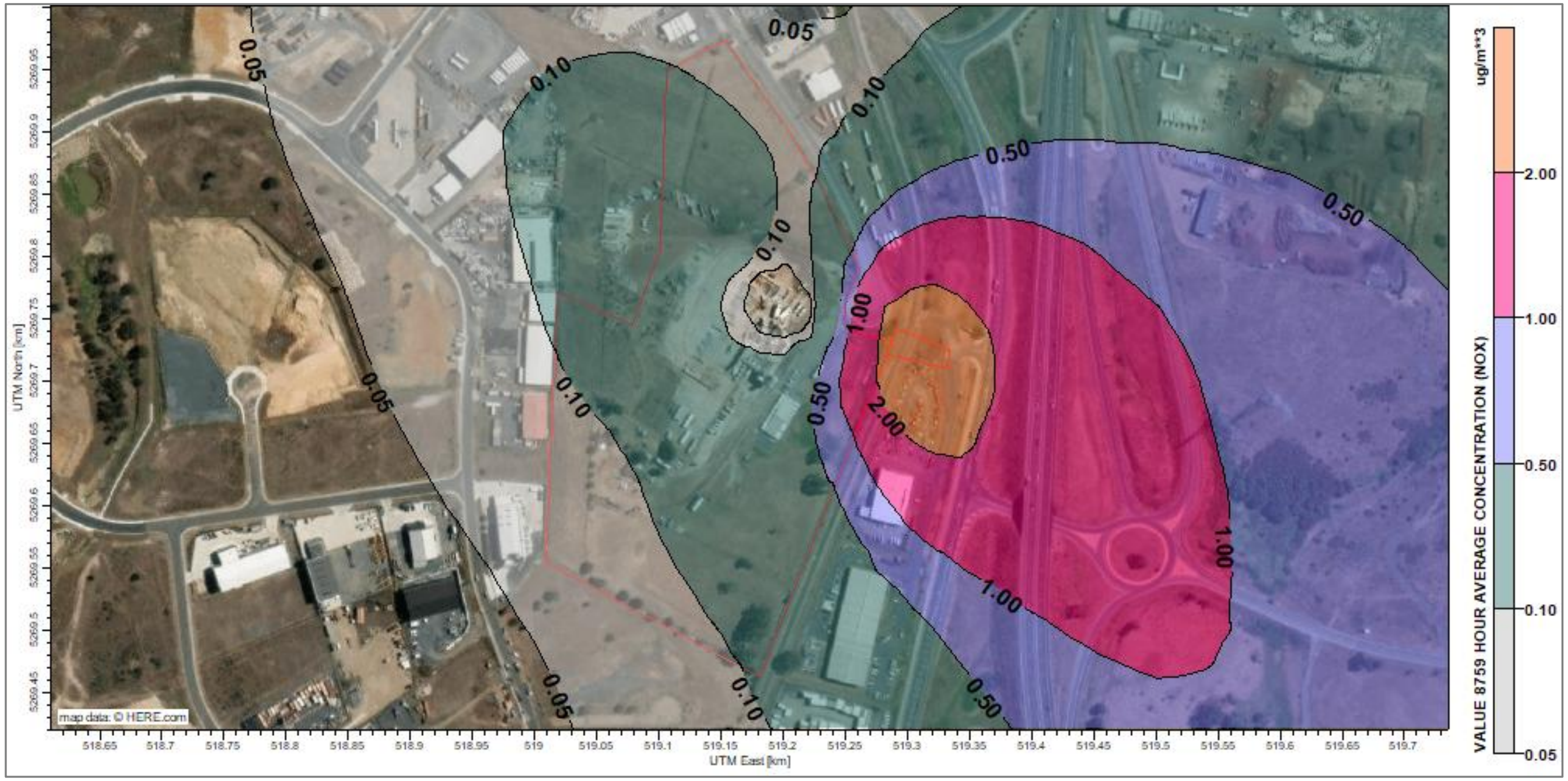
Pollutant: $PM_{2.5}$ **Period:** Annual **Percentile:** 100th **Criteria:** 7 µg/m^3

Figure 89: Predicted $PM_{2.5}$ GLCs for Cumulative Impact (Asphalt Plant, Concrete Batch Plant and Background)



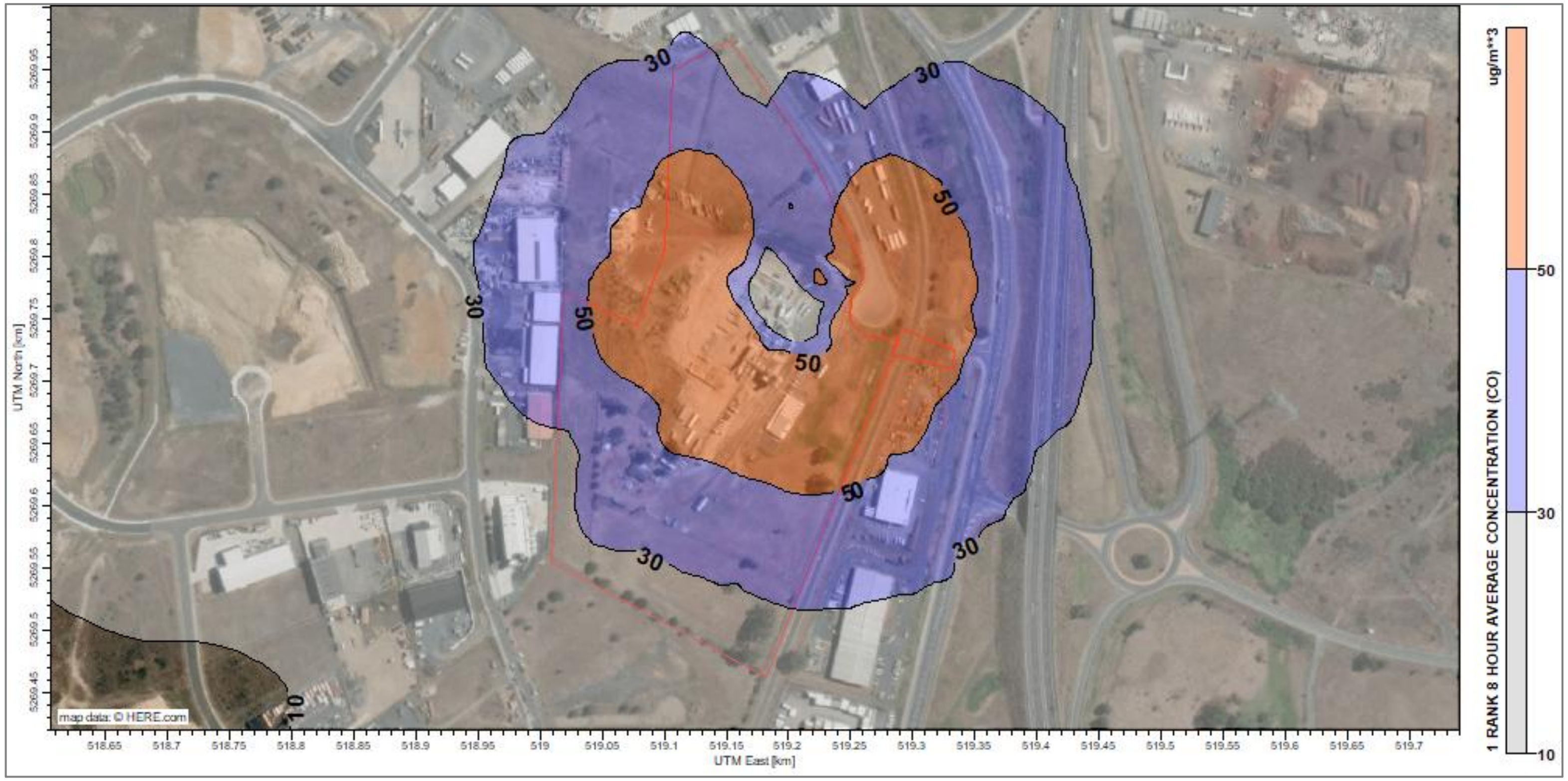
Pollutant: NO_2 **Period:** 1-Hour **Percentile:** 99.9th **Criteria:** 151 µg/m^3

Figure 90: Predicted NO_2 GLCs for Daily Operations – Natural Gas



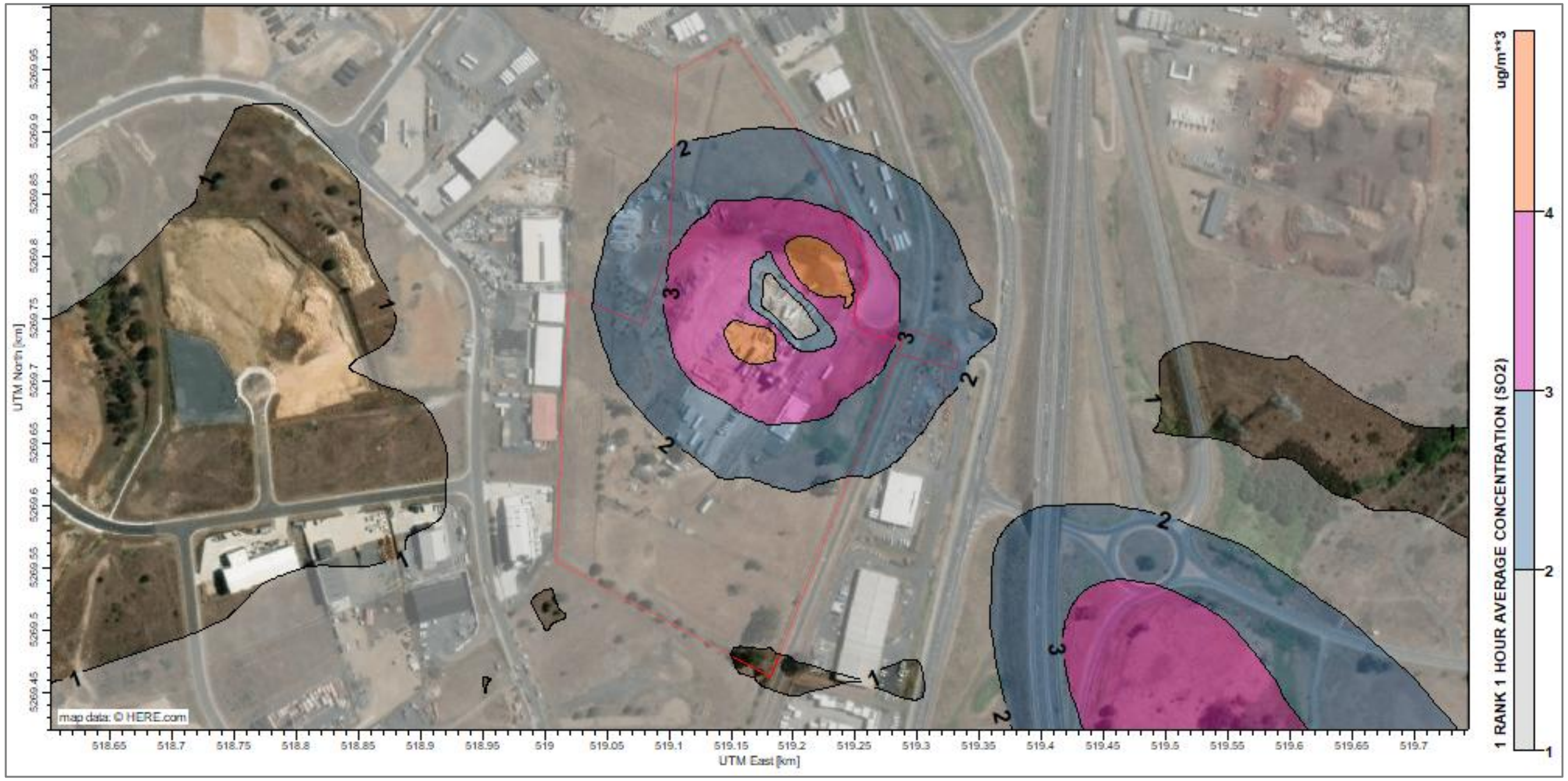
Pollutant: NO_2 **Period:** Annual **Percentile:** 100th **Criteria:** 28 µg/m³

Figure 91: Predicted NO_2 GLCs for Daily Operations – Natural Gas



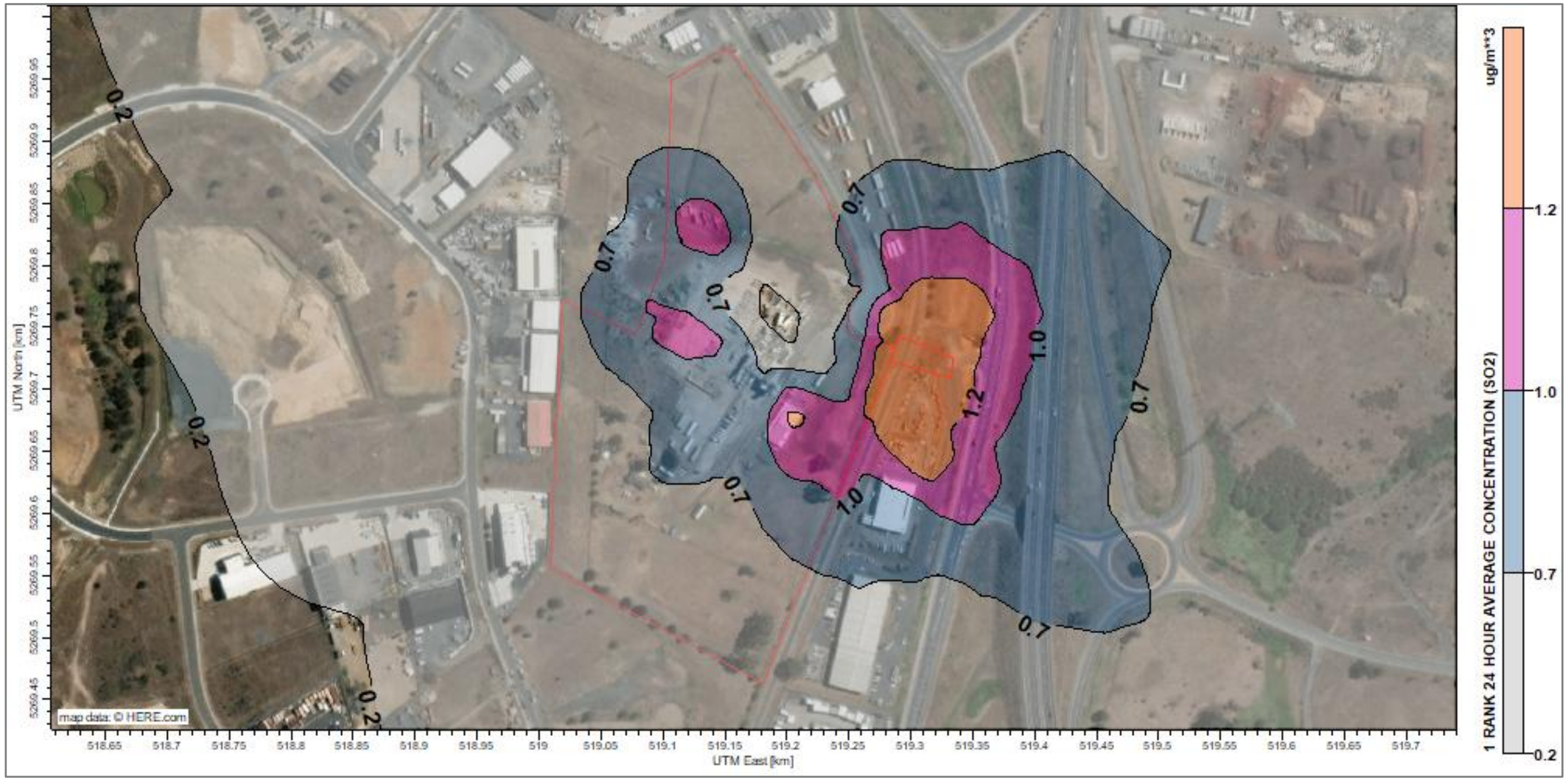
Pollutant: CO **Period:** 8-Hour **Percentile:** 100^{th} **Criteria:** 10,310 µg/m^3

Figure 92: Predicted CO GLCs for Daily Operations – Natural Gas



Pollutant: SO_2 **Period:** 1-Hour **Percentile:** 100^{th} **Criteria:** 197 $\mu g/m^3$

Figure 93: Predicted SO_2 GLCs for Daily Operations – Natural Gas



Pollutant: SO_2 **Period:** 24-Hour **Percentile:** 100^{th} **Criteria:** 52 µg/m^3

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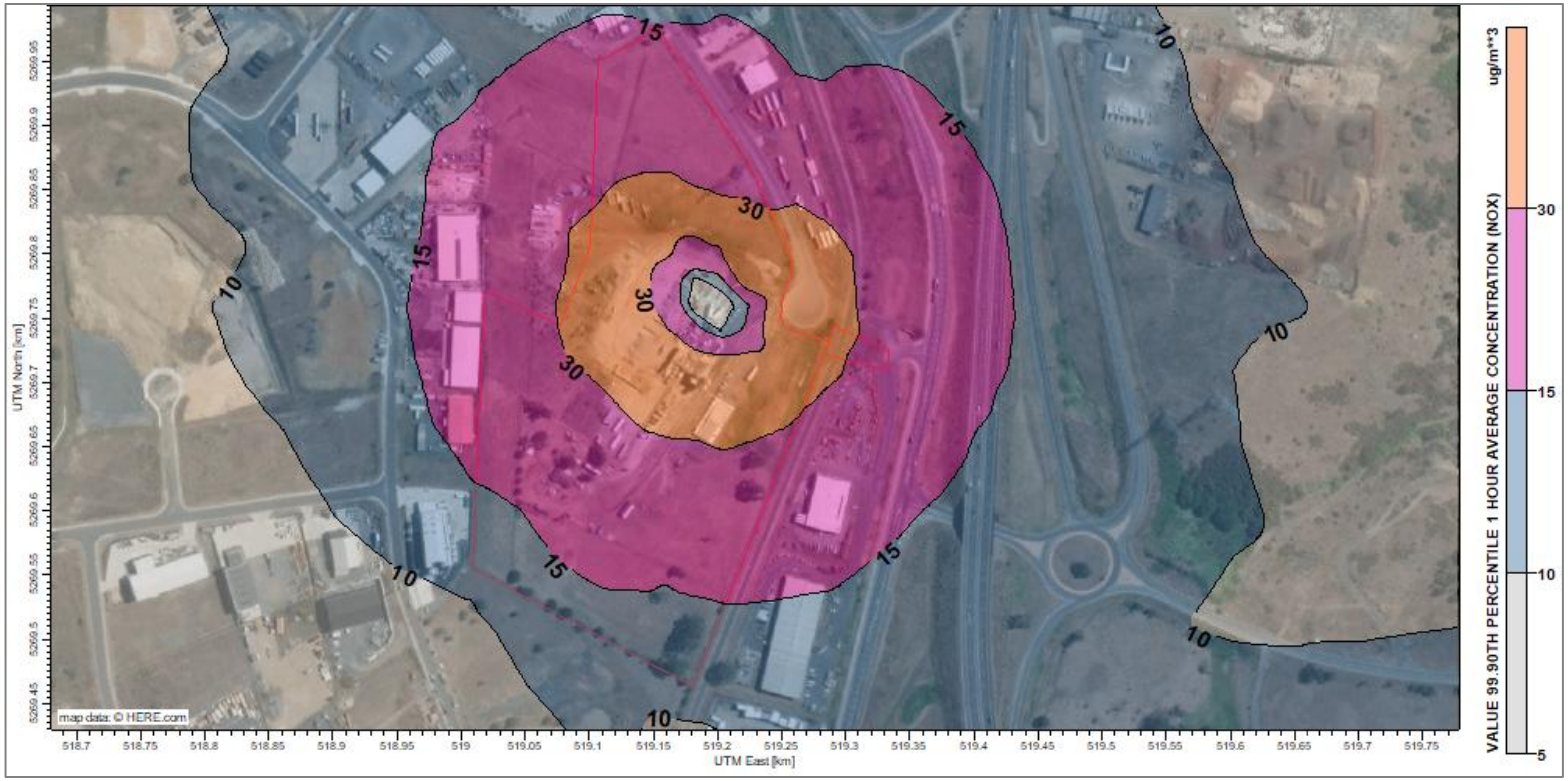
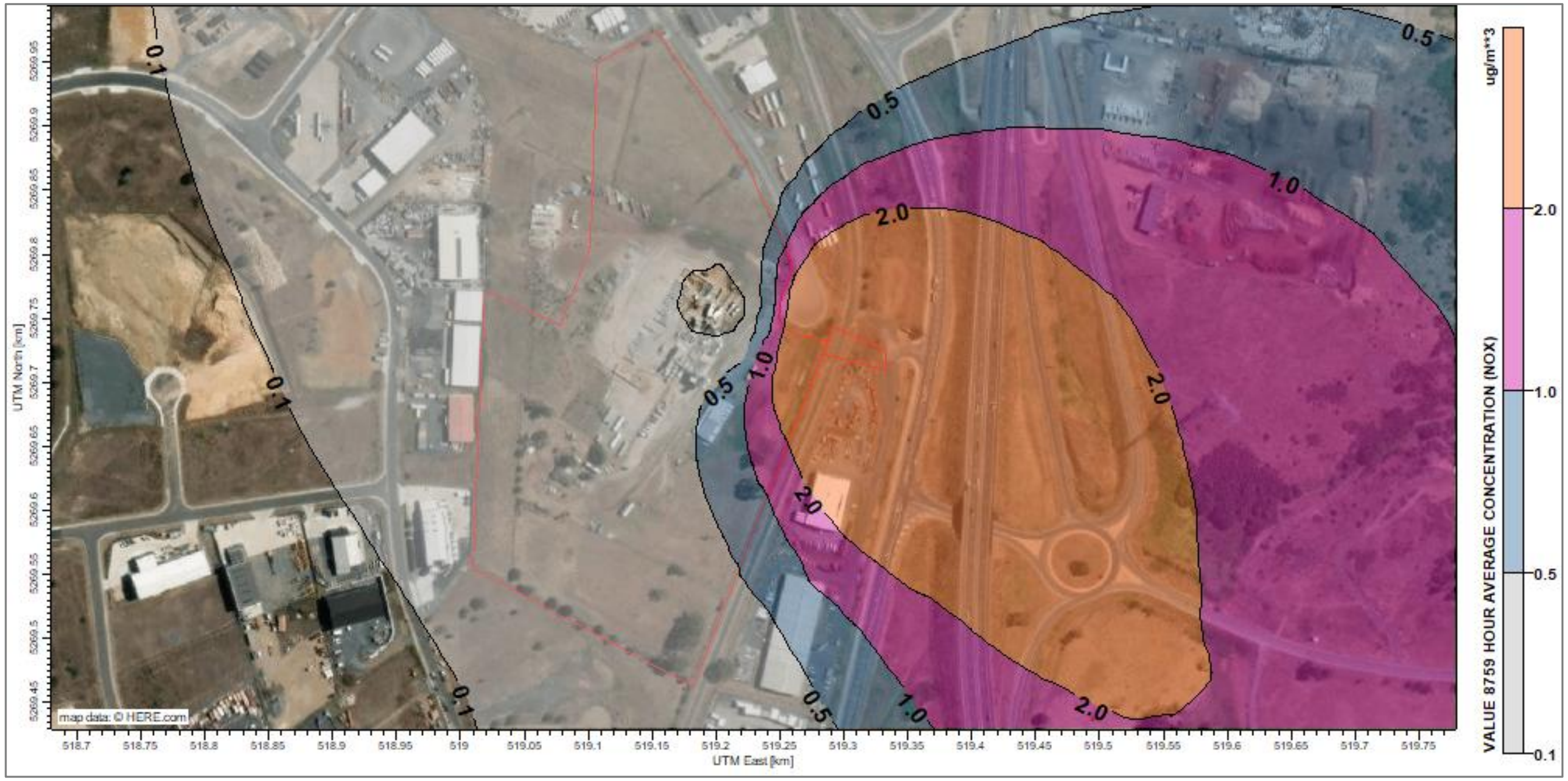
Figure 94: Predicted SO_2 GLCs for Daily Operations – Natural Gas



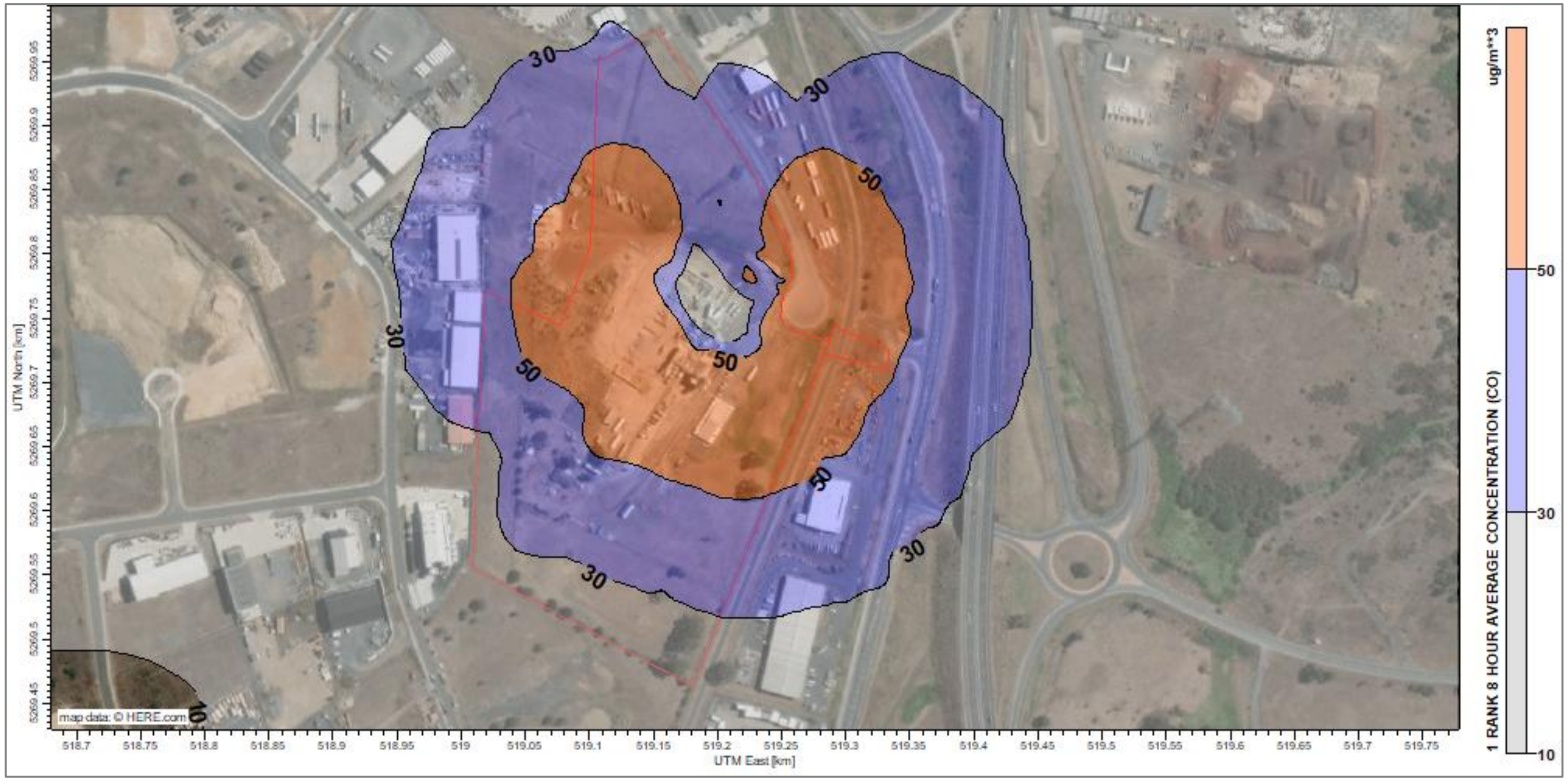
Pollutant: NO_2 **Period:** 1-Hour **Percentile:** 99.9th **Criteria:** 151 µg/m³

Figure 95: Predicted NO_2 GLCs for Daily Operations – Diesel



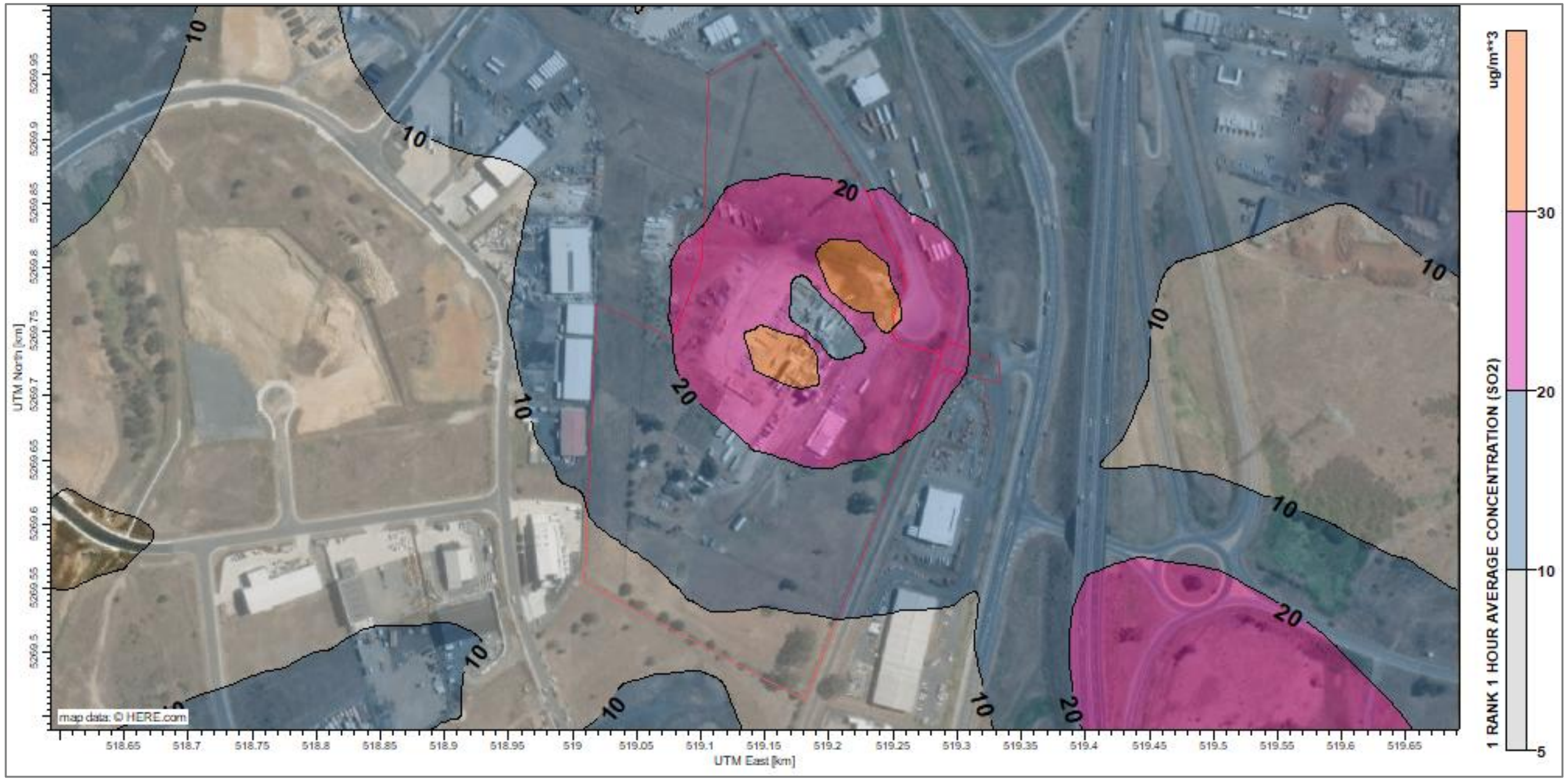
Pollutant: NO_2 **Period:** Annual **Percentile:** 100th **Criteria:** 28 µg/m^3

Figure 96: Predicted NO_2 GLCs for Daily Operations – Diesel



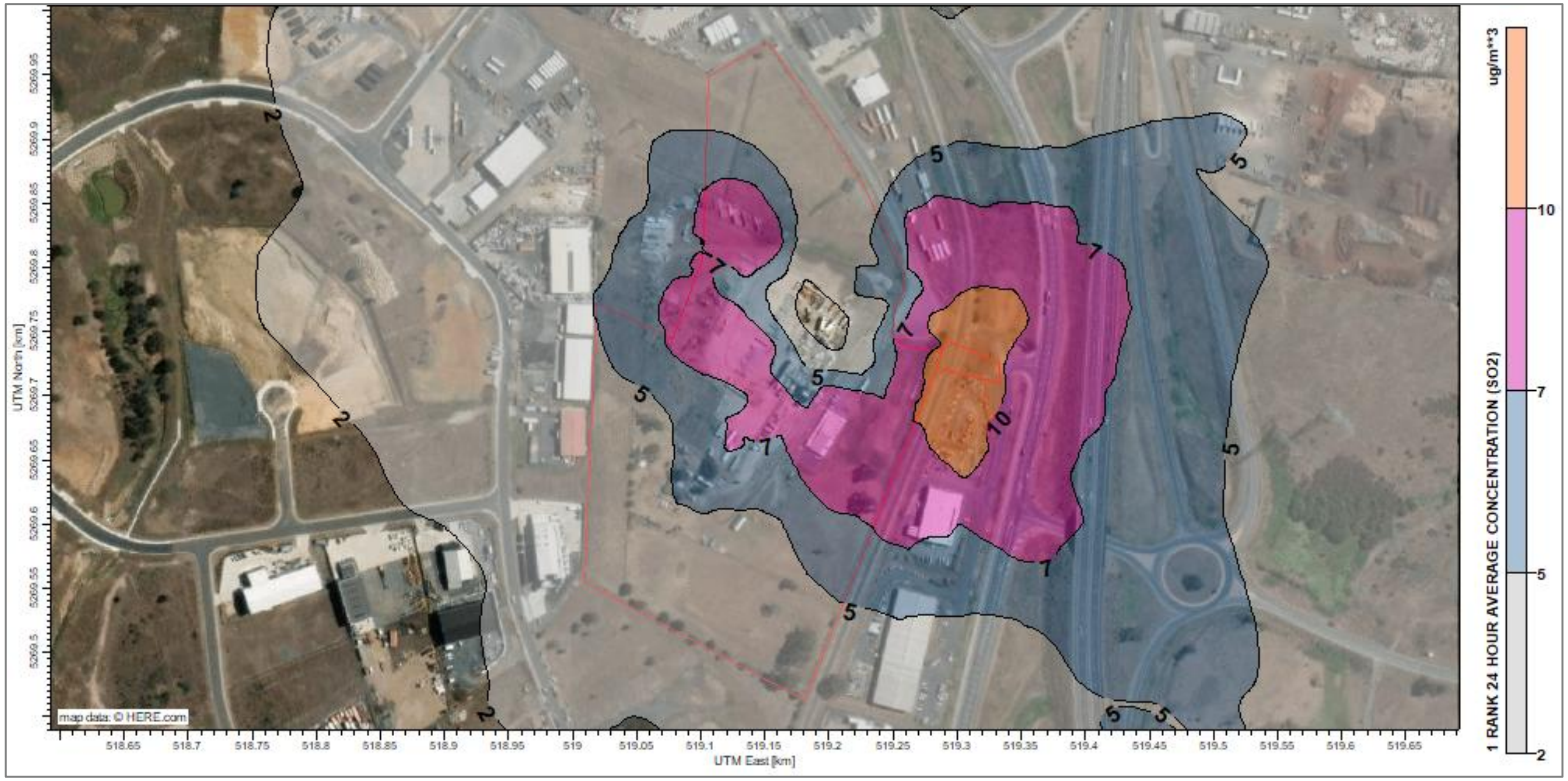
Pollutant: CO **Period:** 8-Hour **Percentile:** 100th **Criteria:** 10,310 μg/m^3

Figure 97: Predicted CO GLCs for Daily Operations – Diesel



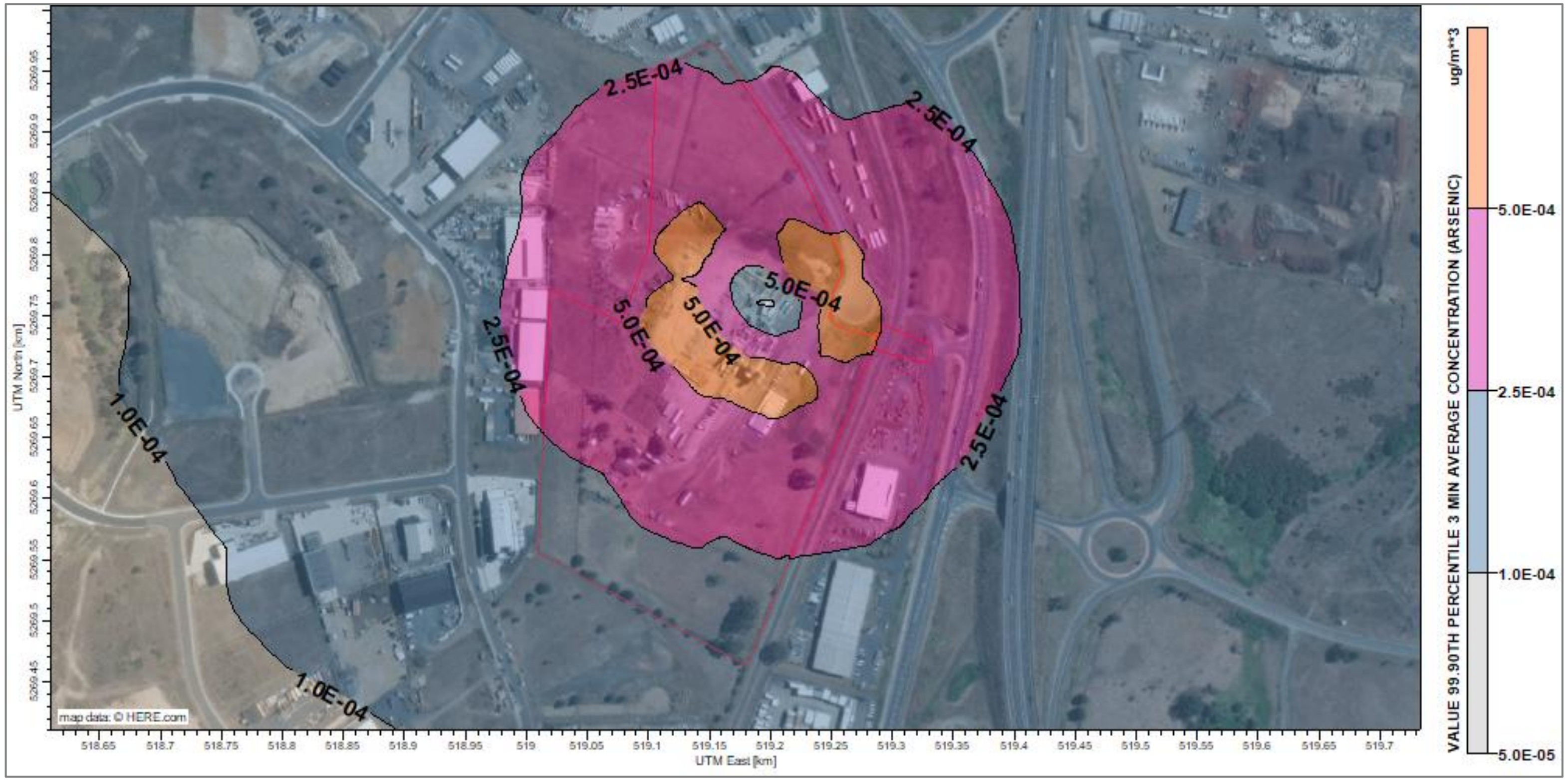
Pollutant: SO_2 **Period:** 1-Hour **Percentile:** 100^{th} **Criteria:** 197 $\mu g/m^3$

Figure 98: Predicted SO_2 GLCs for Daily Operations – Diesel



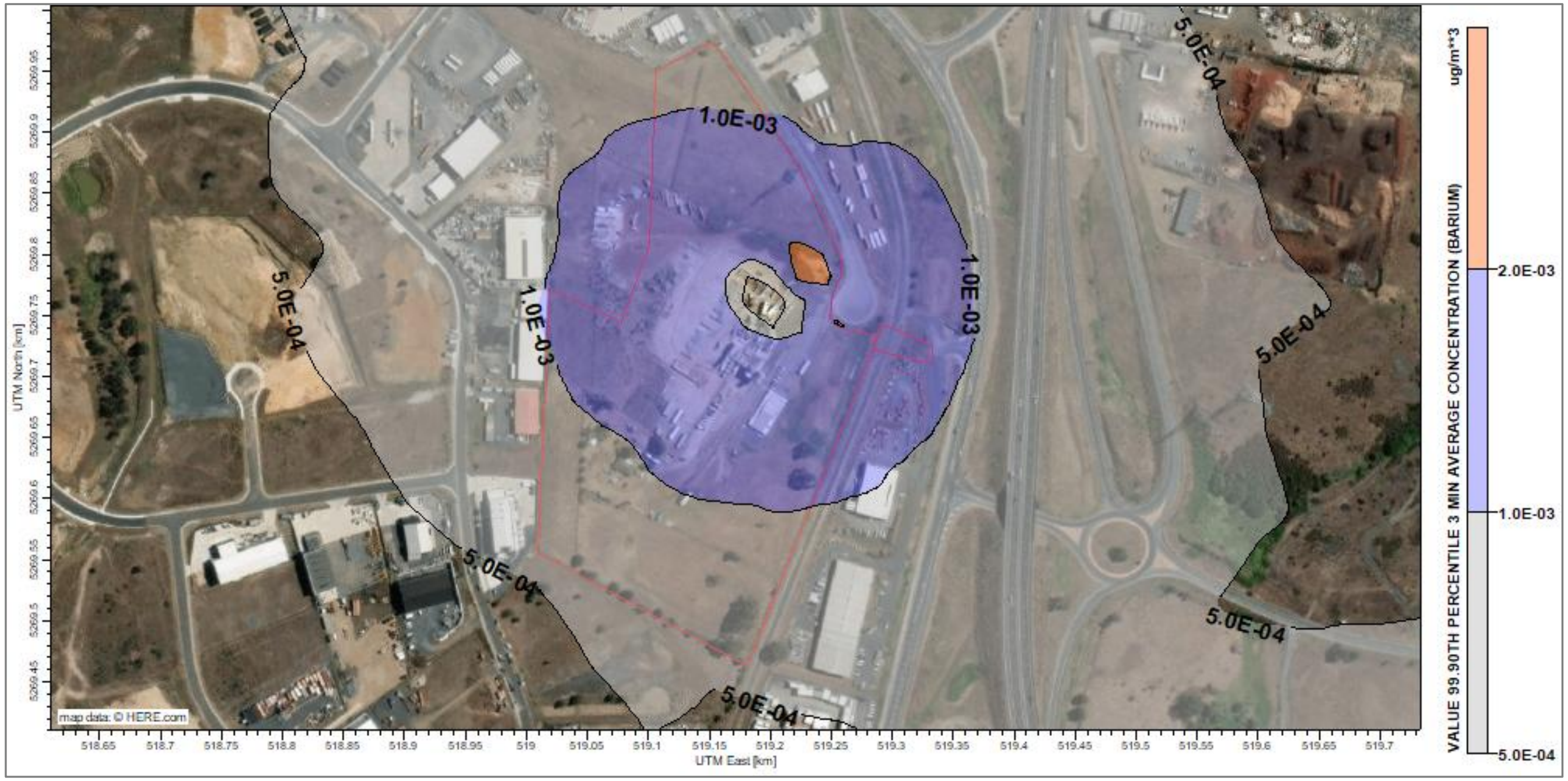
Pollutant: SO_2 **Period:** 24-Hour **Percentile:** 100^{th} **Criteria:** 52 µg/m^3

Figure 99: Predicted SO_2 GLCs for Daily Operations – Diesel



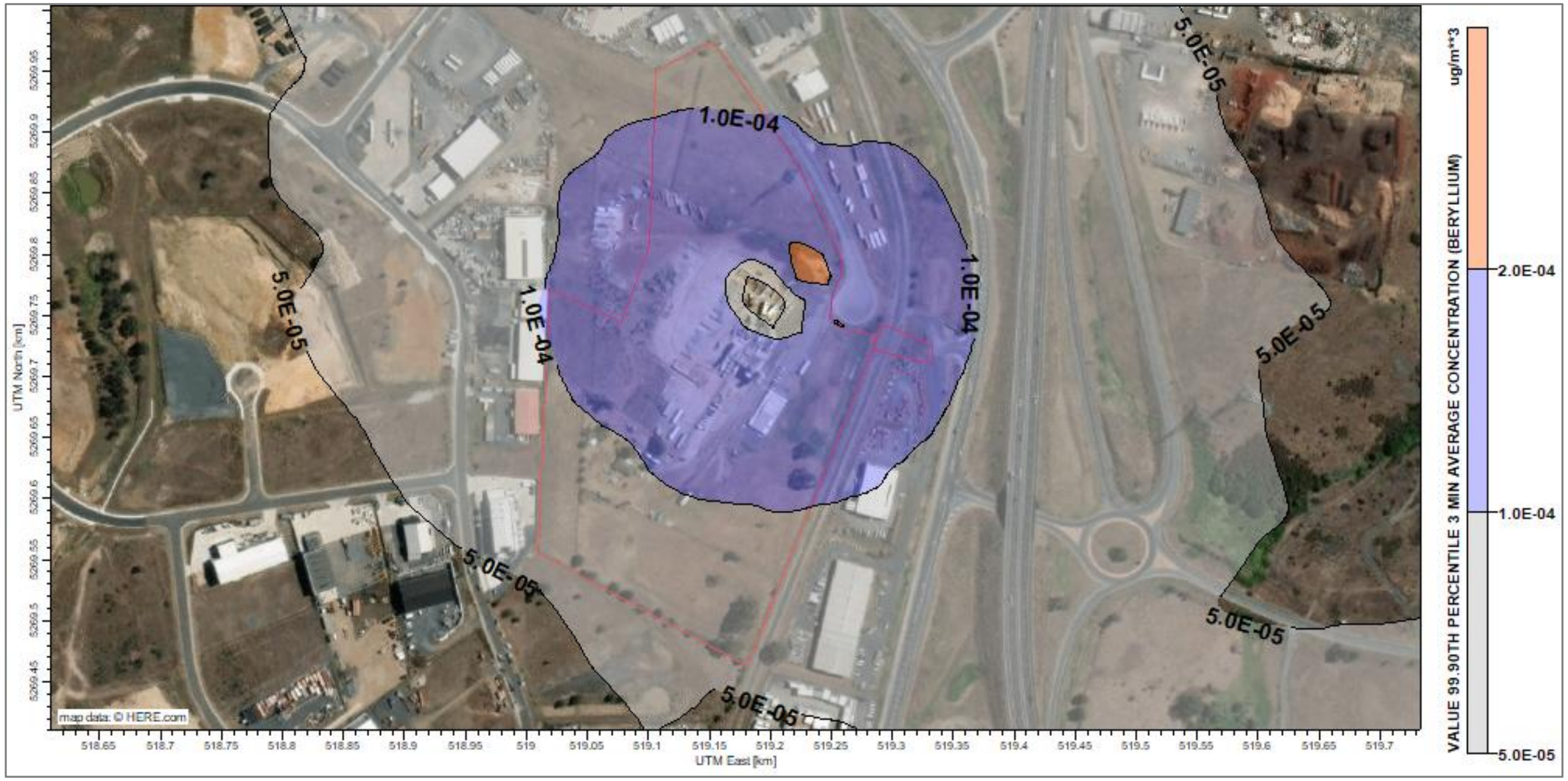
Pollutant: Arsenic **Period:** 3-Minutes **Percentile:** 99.9th **Criteria:** 0.17 μg/m^3

Figure 100: Predicted Arsenic GLCs for Daily Operations



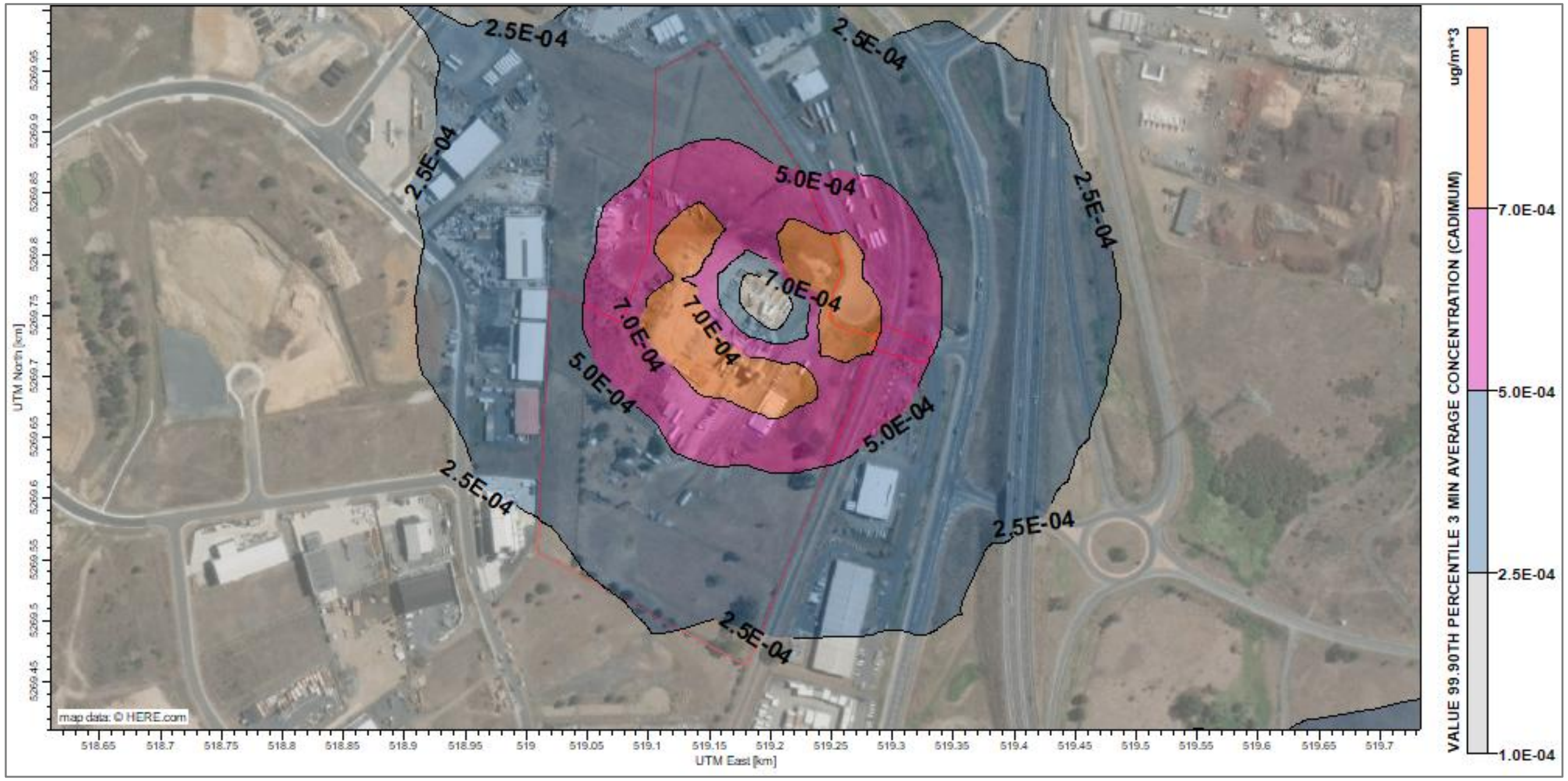
Pollutant: Barium **Period:** 3-Minutes **Percentile:** 99.9th **Criteria:** 17 µg/m³

Figure 101: Predicted Barium GLCs for Daily Operations



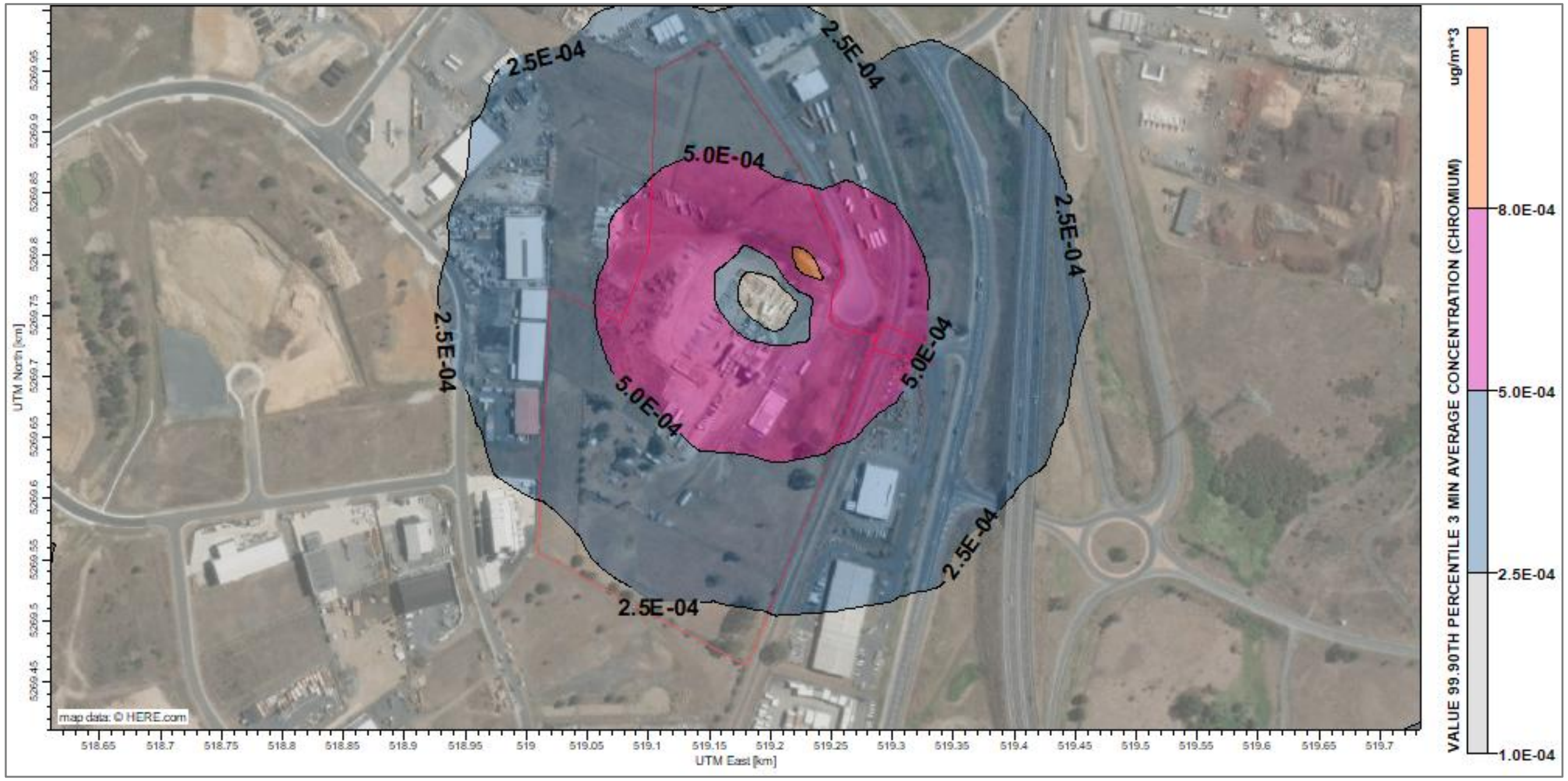
Pollutant: Beryllium **Period:** 3-Minutes **Percentile:** 99.9th **Criteria:** 0.07 µg/m³

Figure 102: Predicted Beryllium GLCs for Daily Operations



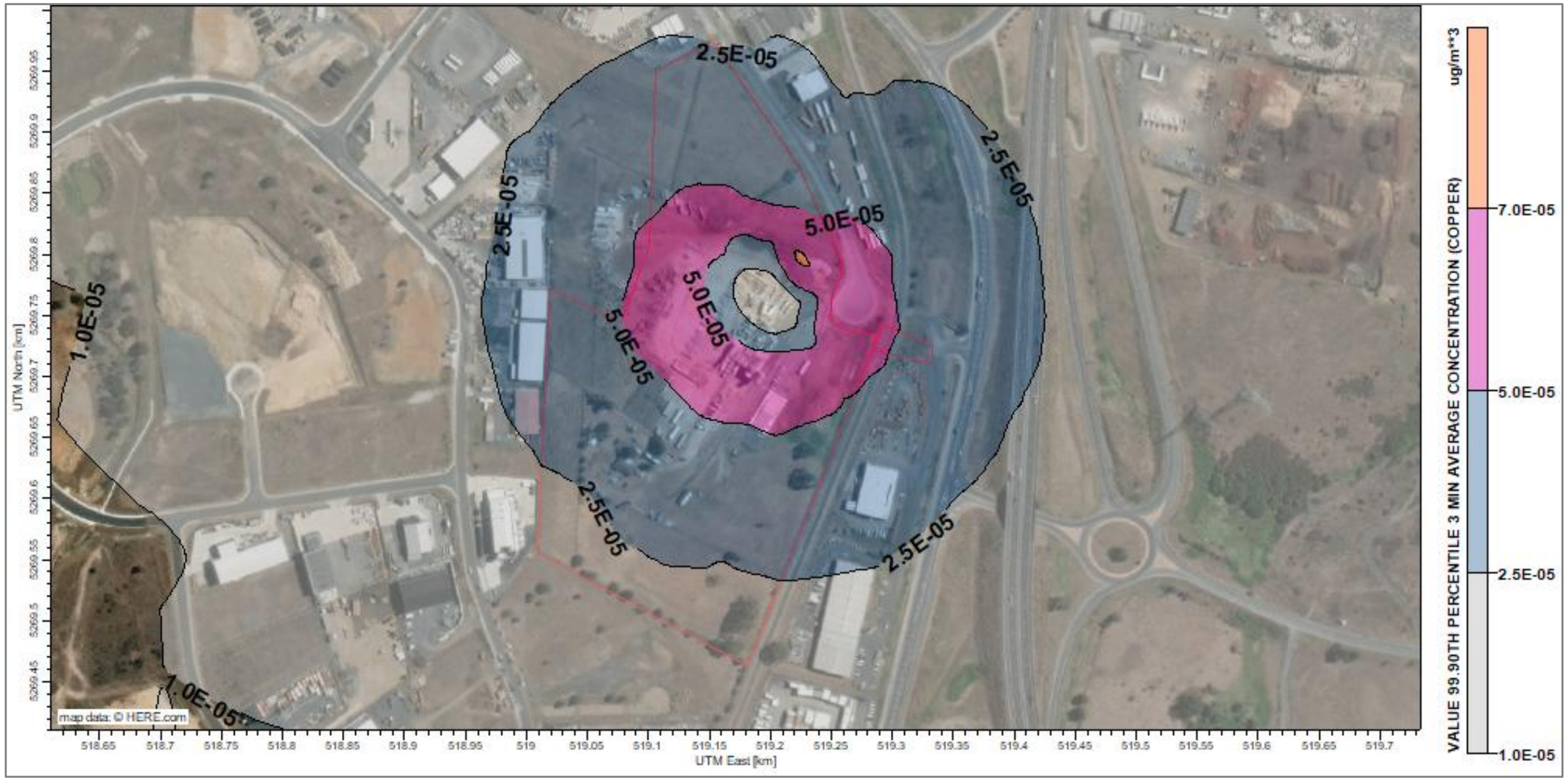
Pollutant: Cadmium **Period:** 3-Minutes **Percentile:** 99.9th **Criteria:** 0.033 μg/m^3

Figure 103: Predicted Cadmium GLCs for Daily Operations



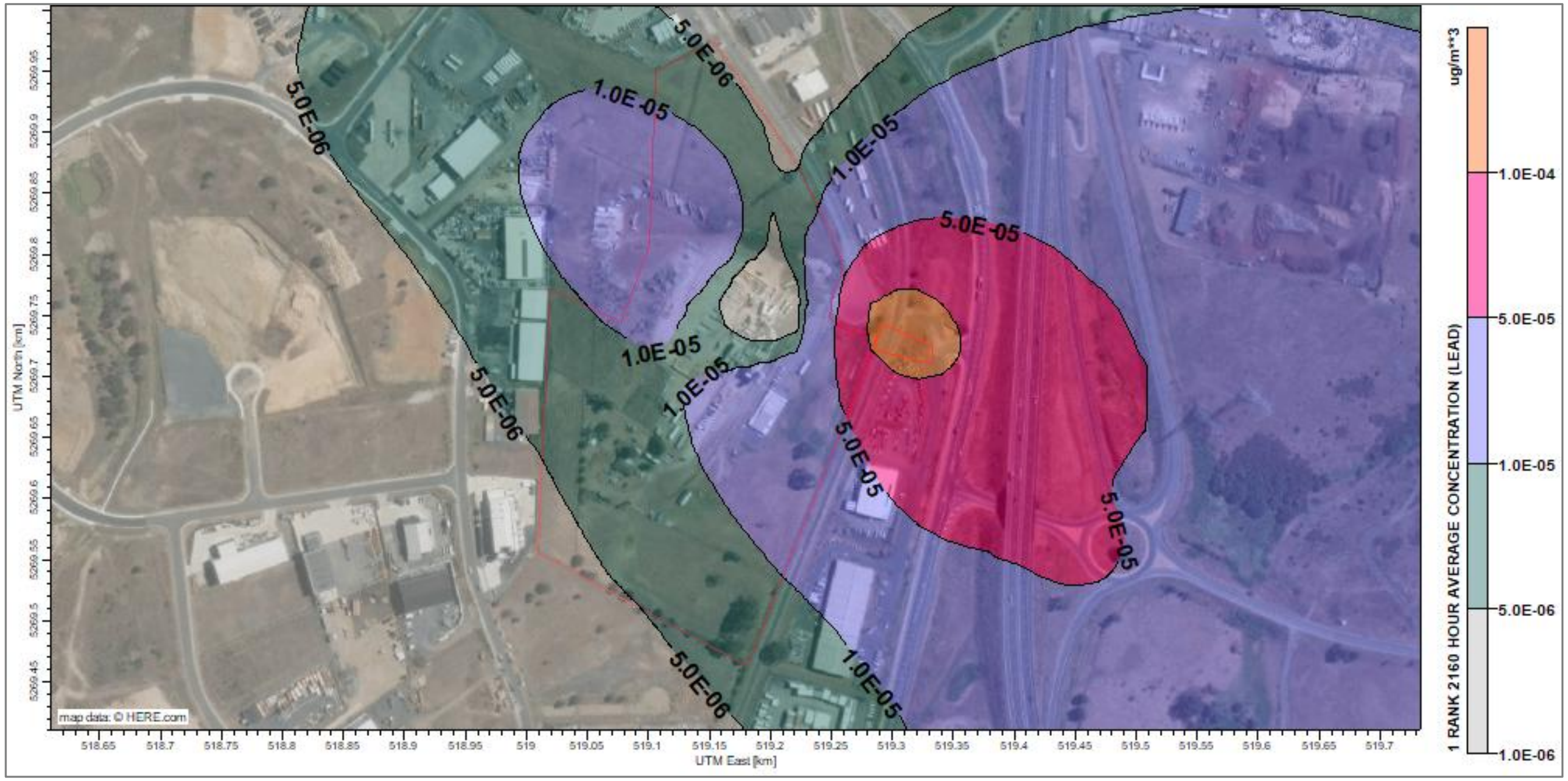
Pollutant: Chromium **Period:** 3-Minutes **Percentile:** 99.9th **Criteria:** 17 µg/m^3

Figure 104: Predicted Chromium GLCs for Daily Operations



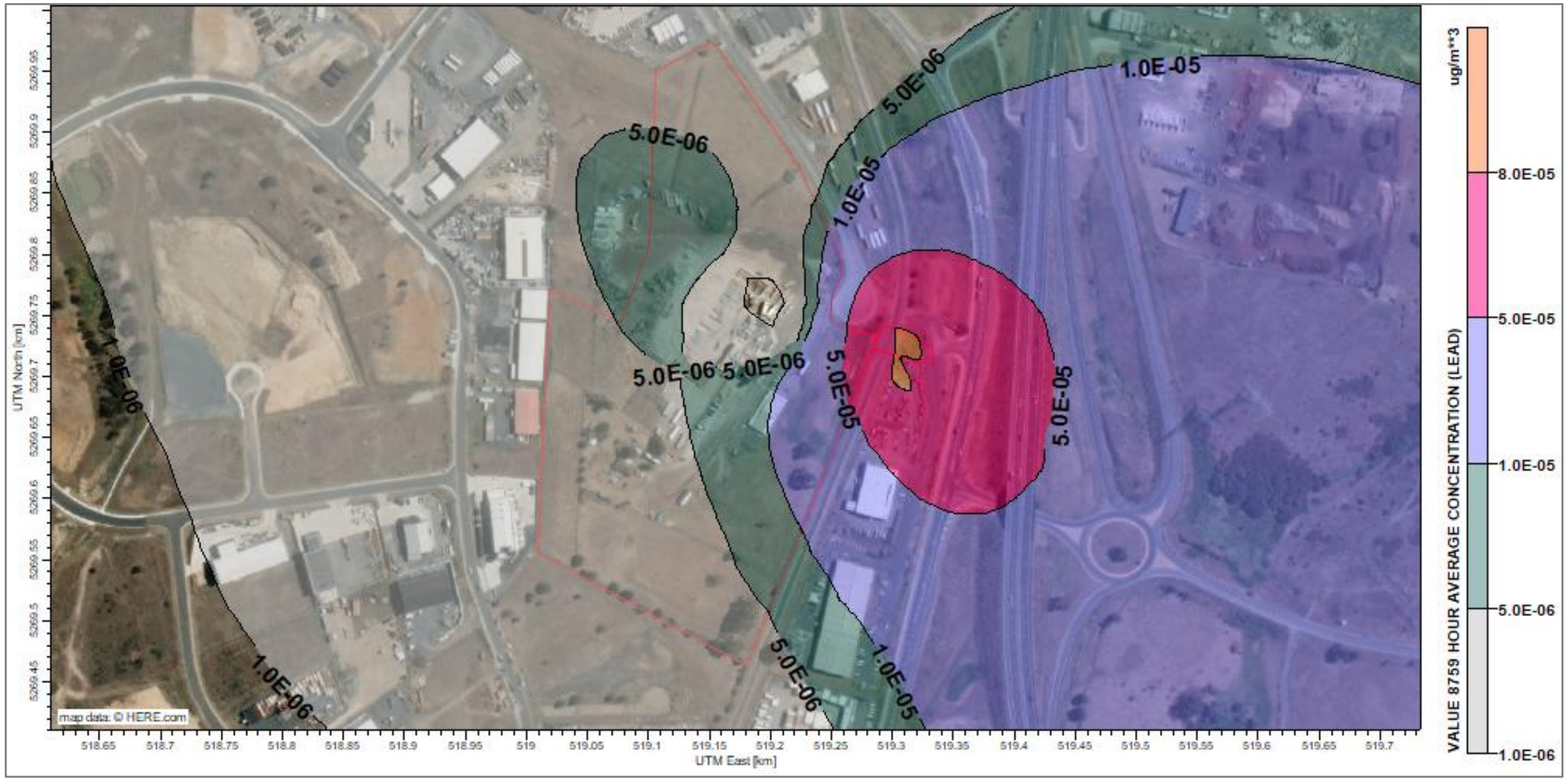
Pollutant: Copper **Period:** 3-Minutes **Percentile:** 99.9th **Criteria:** 6.7 µg/m³

Figure 105: Predicted Copper GLCs for Daily Operations



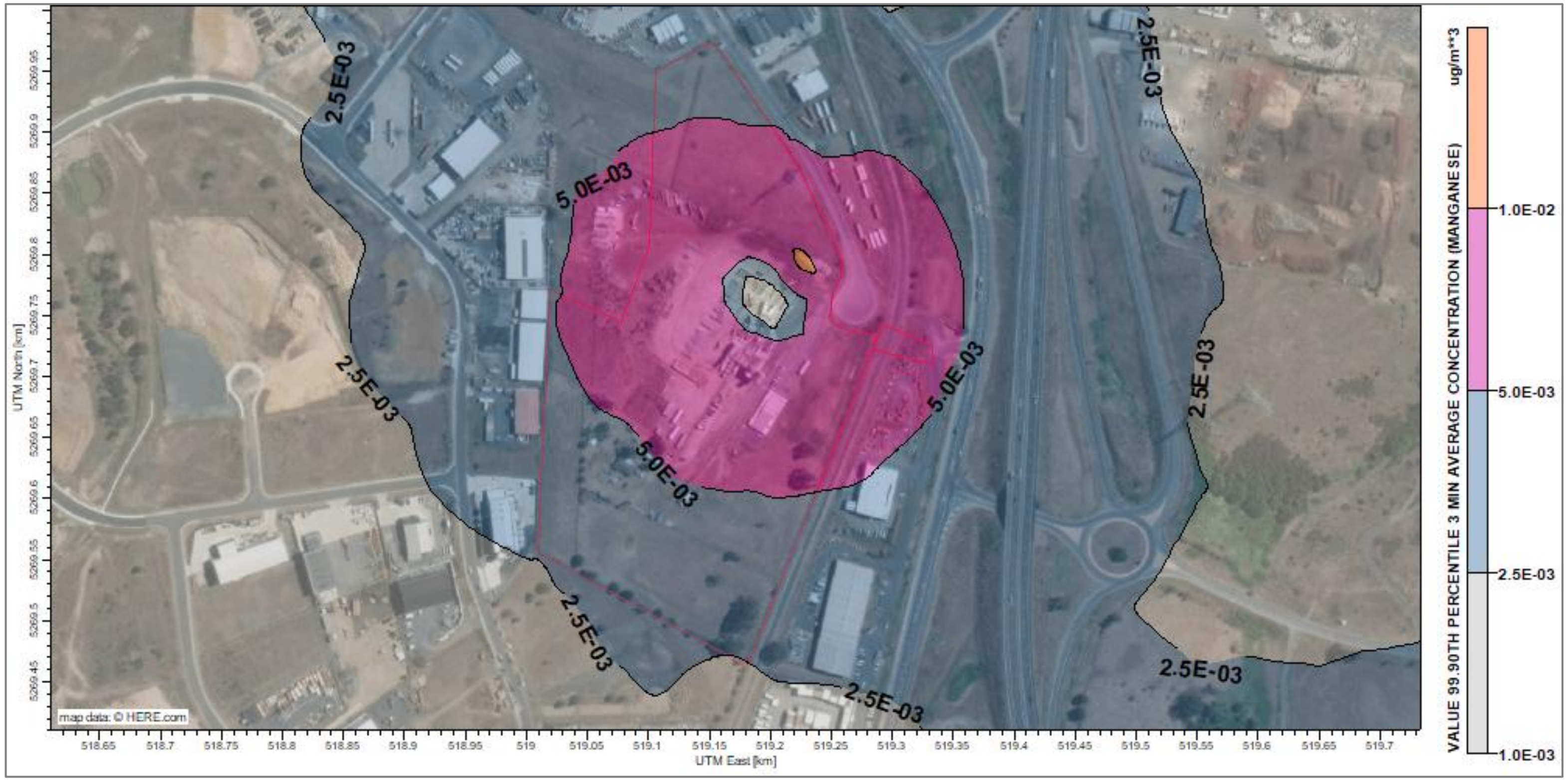
Pollutant: Lead **Period:** 90 Days **Percentile:** 100th **Criteria:** 1.5 µg/m³

Figure 106: Predicted Lead GLCs for Daily Operations



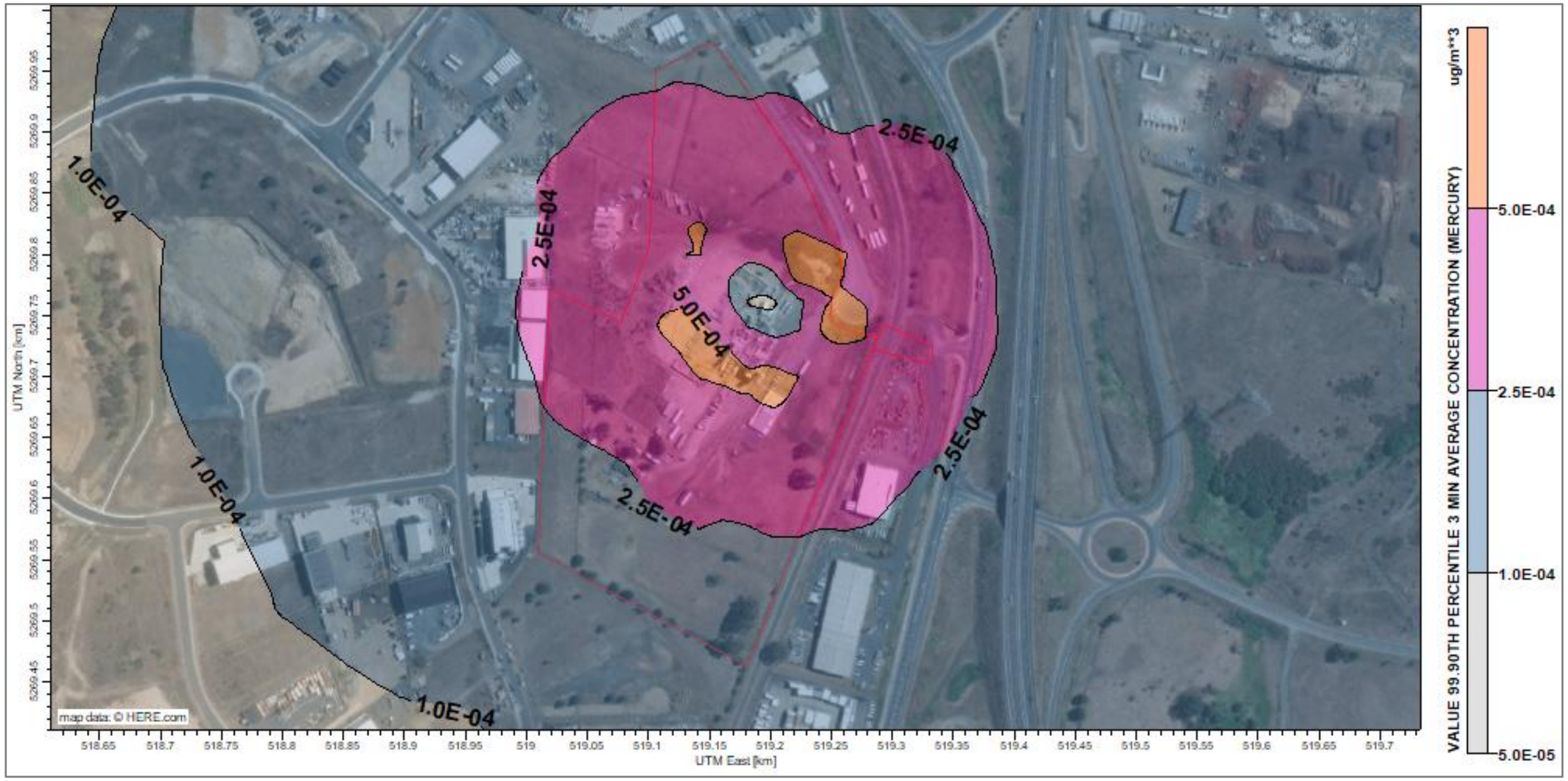
Pollutant: Lead **Period:** Annual **Percentile:** 100th **Criteria:** 0.5 µg/m³

Figure 107: Predicted Lead GLCs for Daily Operations



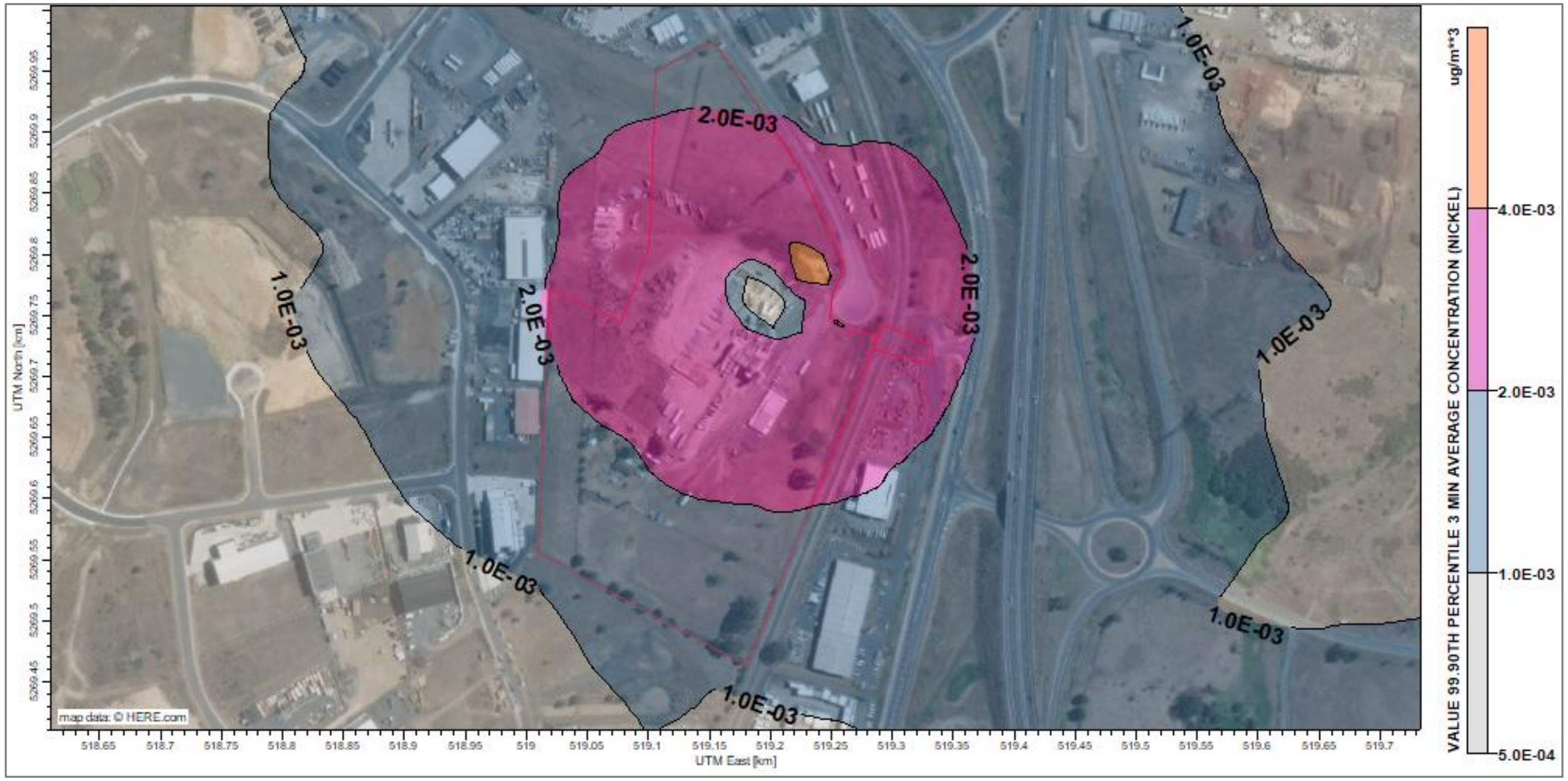
Pollutant: Manganese **Period:** 3-Minutes **Percentile:** 99.9th **Criteria:** 33 µg/m^3

Figure 108: Predicted Manganese GLCs for Daily Operations



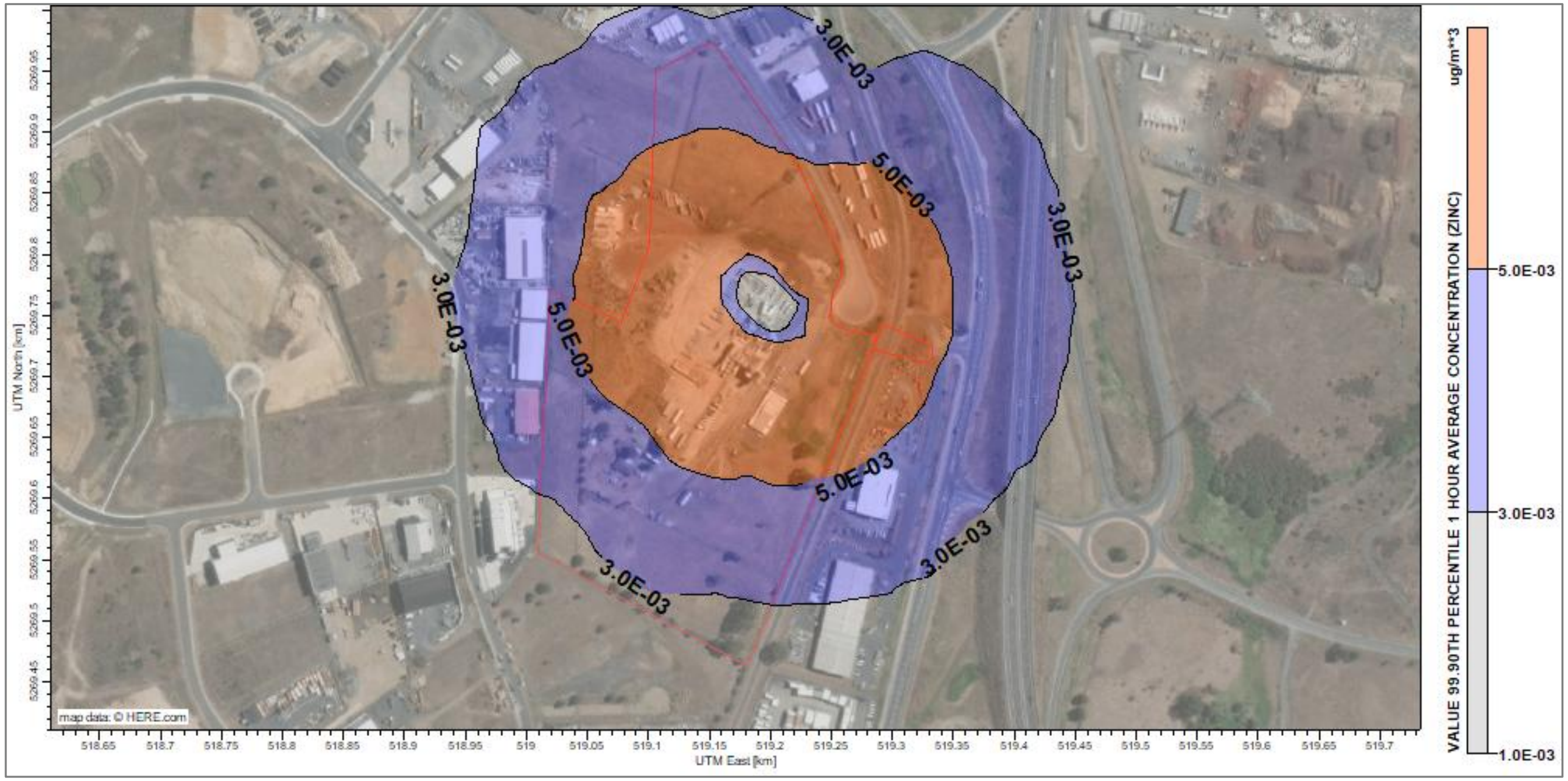
Pollutant: Mercury **Period:** 3-Minutes **Percentile:** 99.9th **Criteria:** 17 μg/m3

Figure 109: Predicted Mercury GLCs for Daily Operations



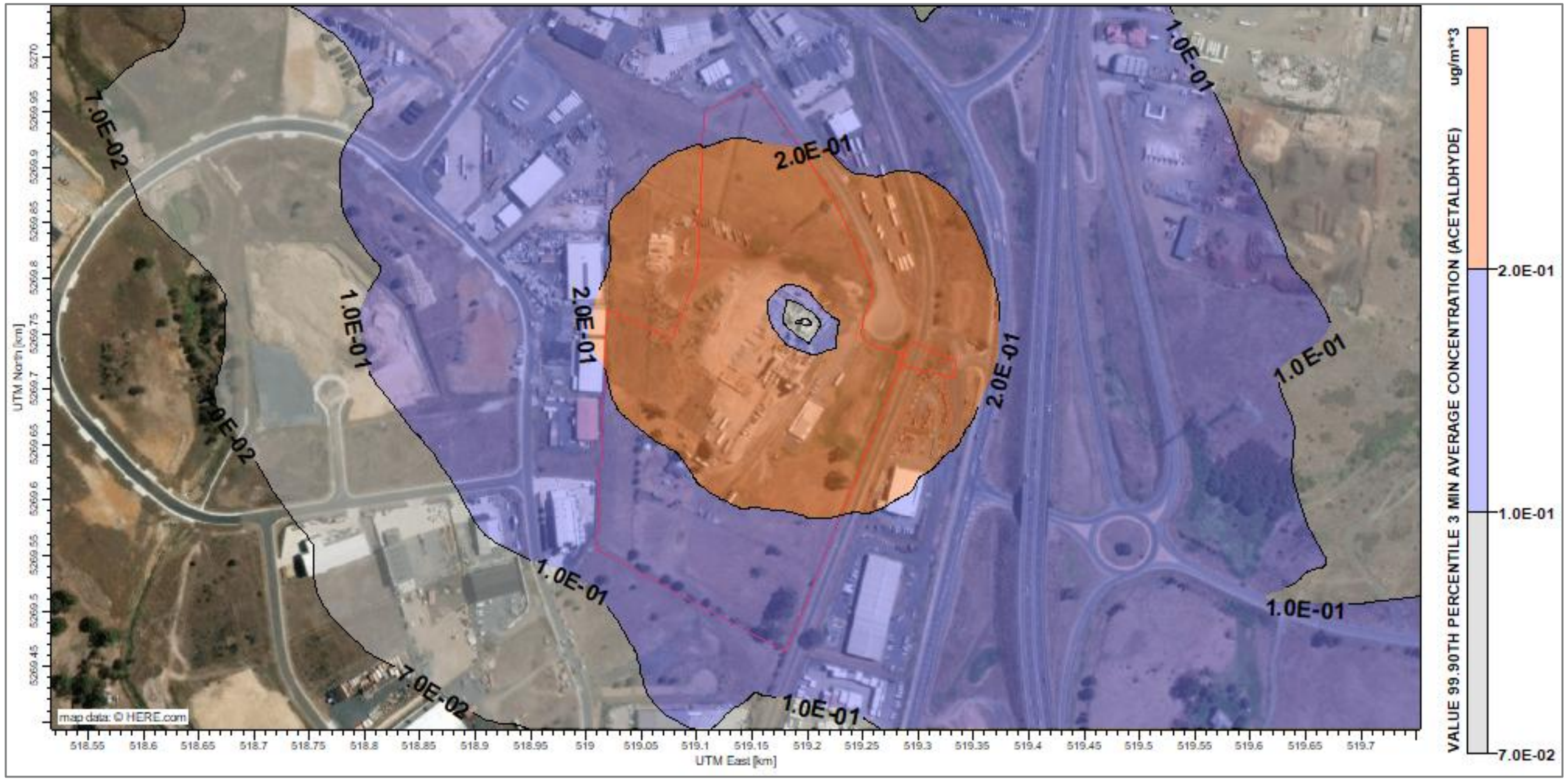
Pollutant: Nickel **Period:** 3-Minutes **Percentile:** 99.9th **Criteria:** 0.33 µg/m³

Figure 110: Predicted Nickel GLCs for Daily Operations



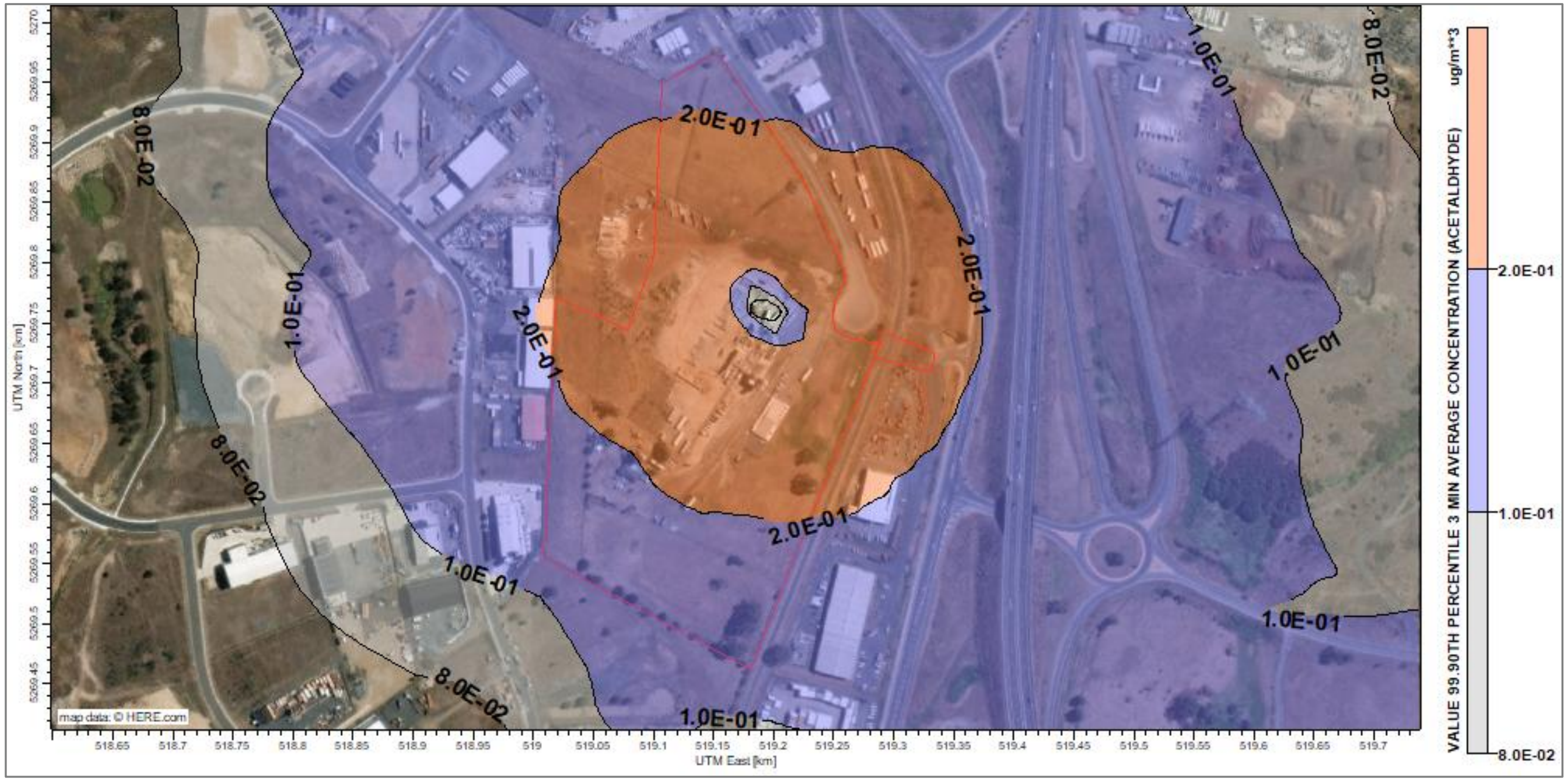
Pollutant: Zinc **Period:** 3-Minutes **Percentile:** 99.9th **Criteria:** 170 µg/m³

Figure 111: Predicted Zinc GLCs for Daily Operations



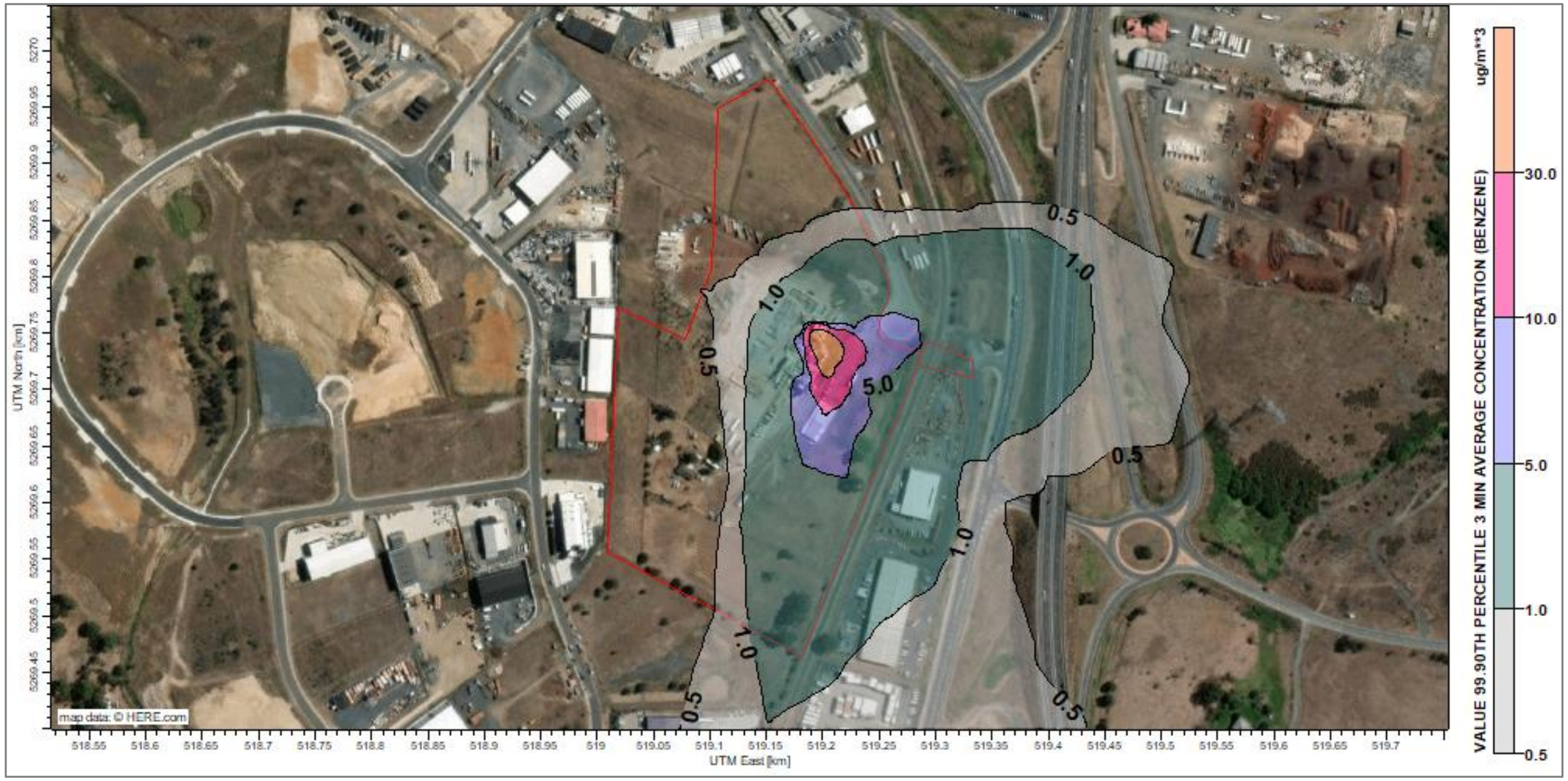
Pollutant: Acetaldehyde **Period:** 3-Minutes **Percentile:** 99.9th **Criteria:** 76 µg/m³

Figure 112: Predicted Acetaldehyde GLCs for Daily Operations (Scenario 1)



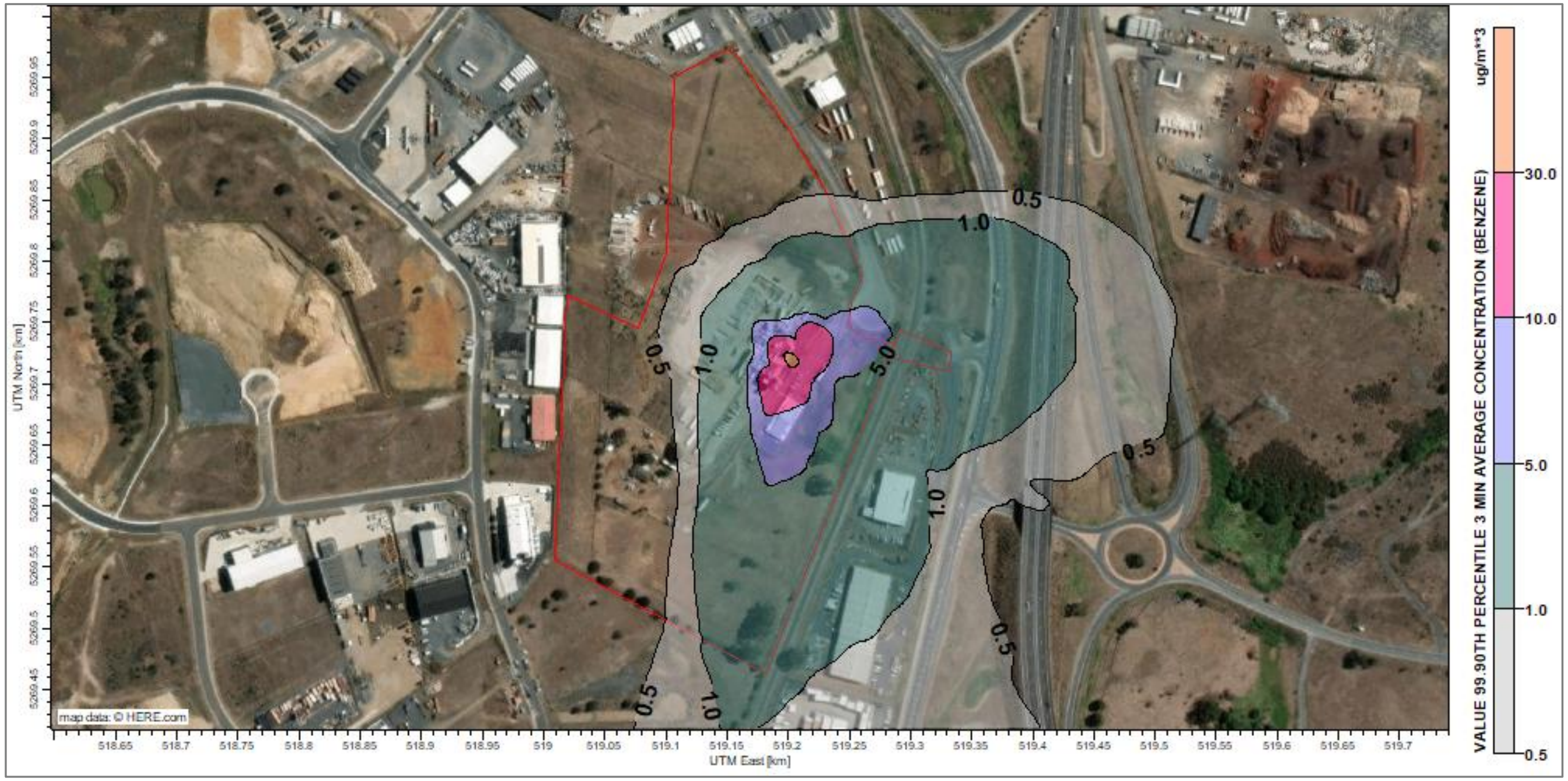
Pollutant: Acetaldehyde **Period:** 3-Minutes **Percentile:** 99.9th **Criteria:** 76 µg/m³

Figure 113: Predicted Acetaldehyde GLCs for Daily Operations (Scenario 2)



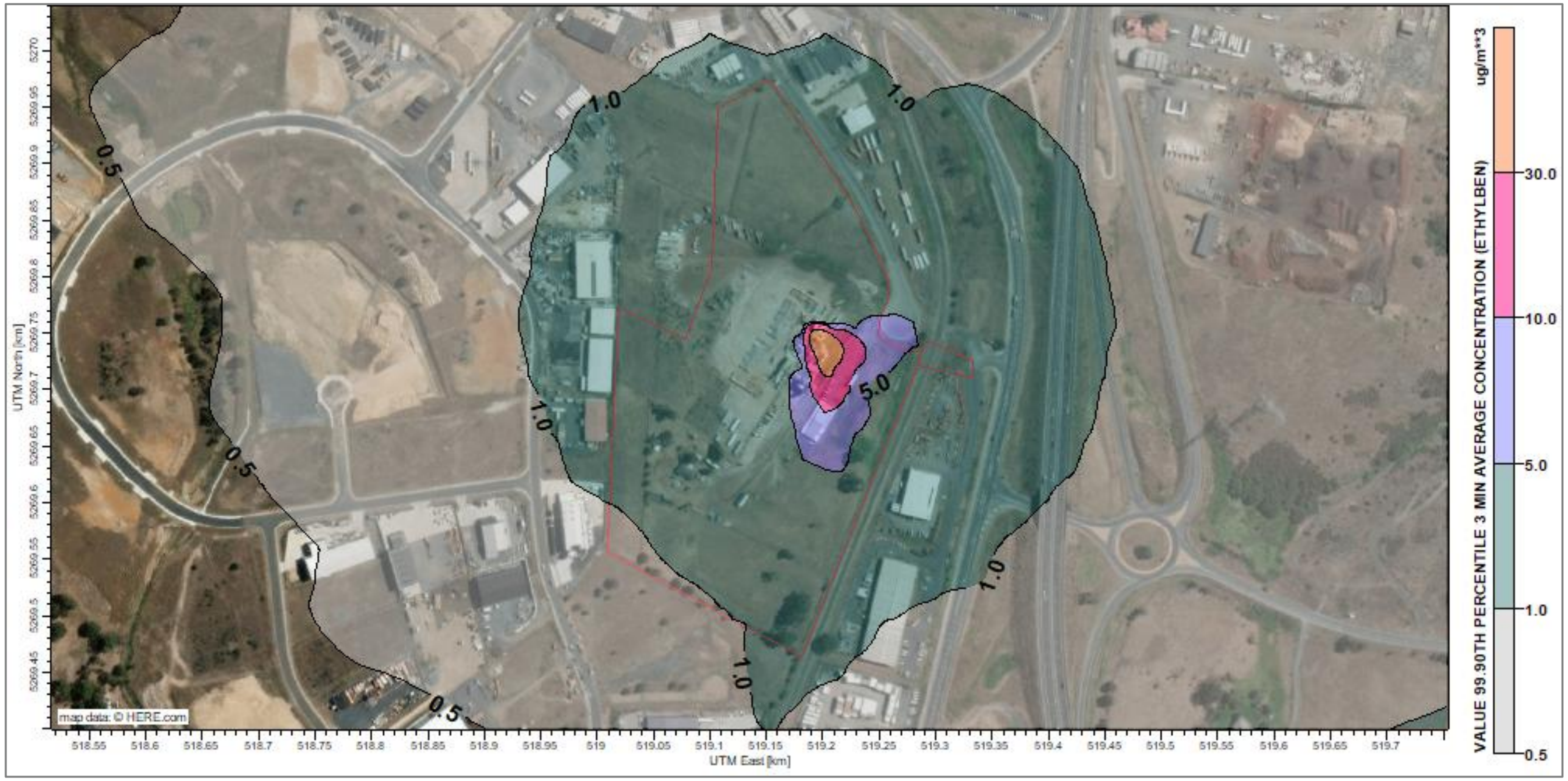
Pollutant: Benzene **Period:** 3-Minutes **Percentile:** 99.9th **Criteria:** 100 µg/m³

Figure 114: Predicted Benzene GLCs for Daily Operations (Scenario 1)



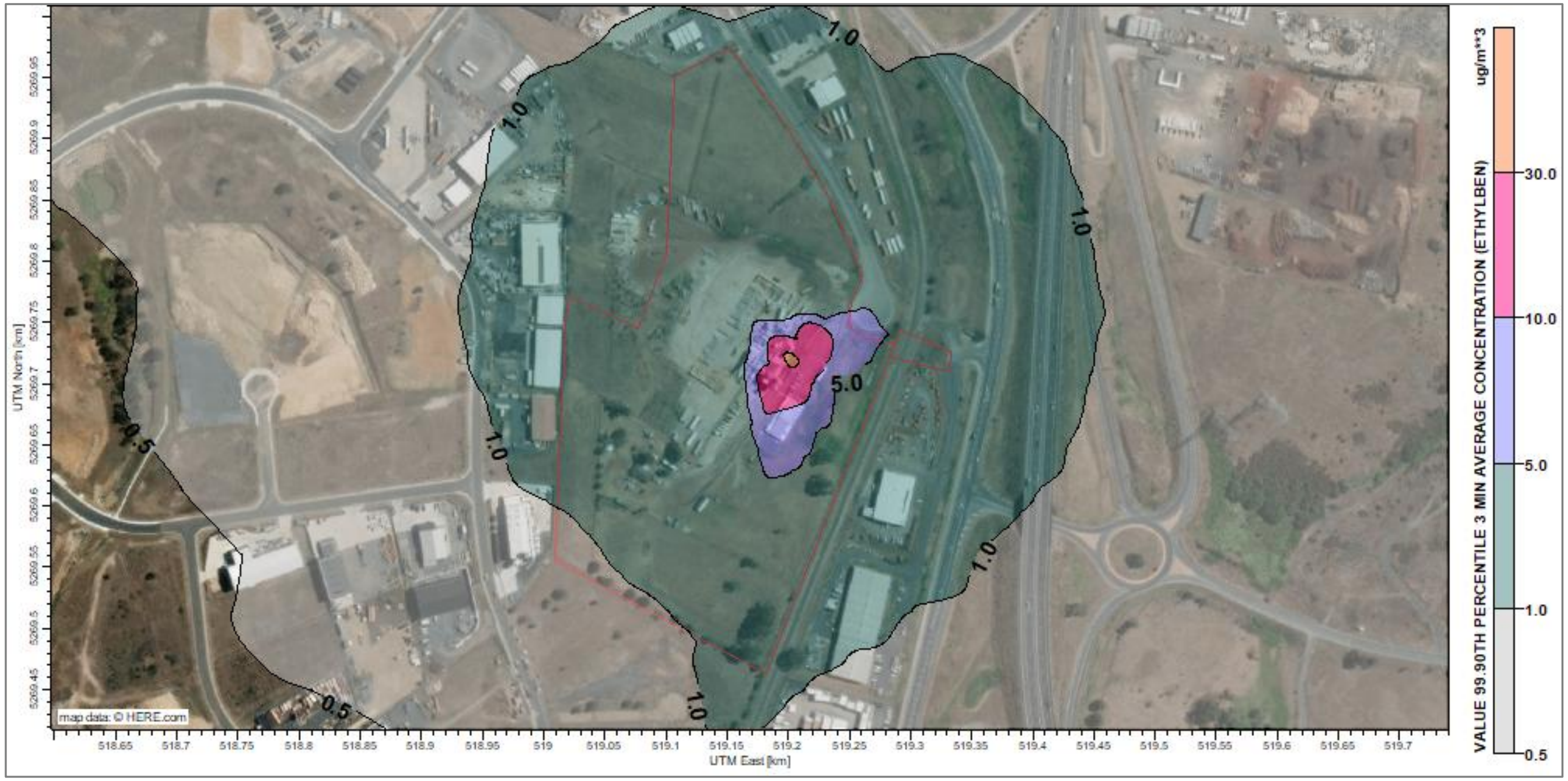
Pollutant: Benzene **Period:** 3-Minutes **Percentile:** 99.9th **Criteria:** **100** µg/m³

Figure 115: Predicted Benzene GLCs for Daily Operations (Scenario 2)



Pollutant: Ethylbenzene **Period:** 3-Minutes **Percentile:** 99.9th **Criteria:** 14500 µg/m^3

Figure 116: Predicted Ethylbenzene GLCs for Daily Operations (Scenario 1)



Pollutant: Ethylbenzene **Period:** 3-Minutes **Percentile:** 99.9th **Criteria:** 14500 µg/m³

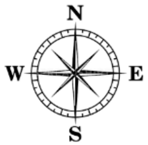
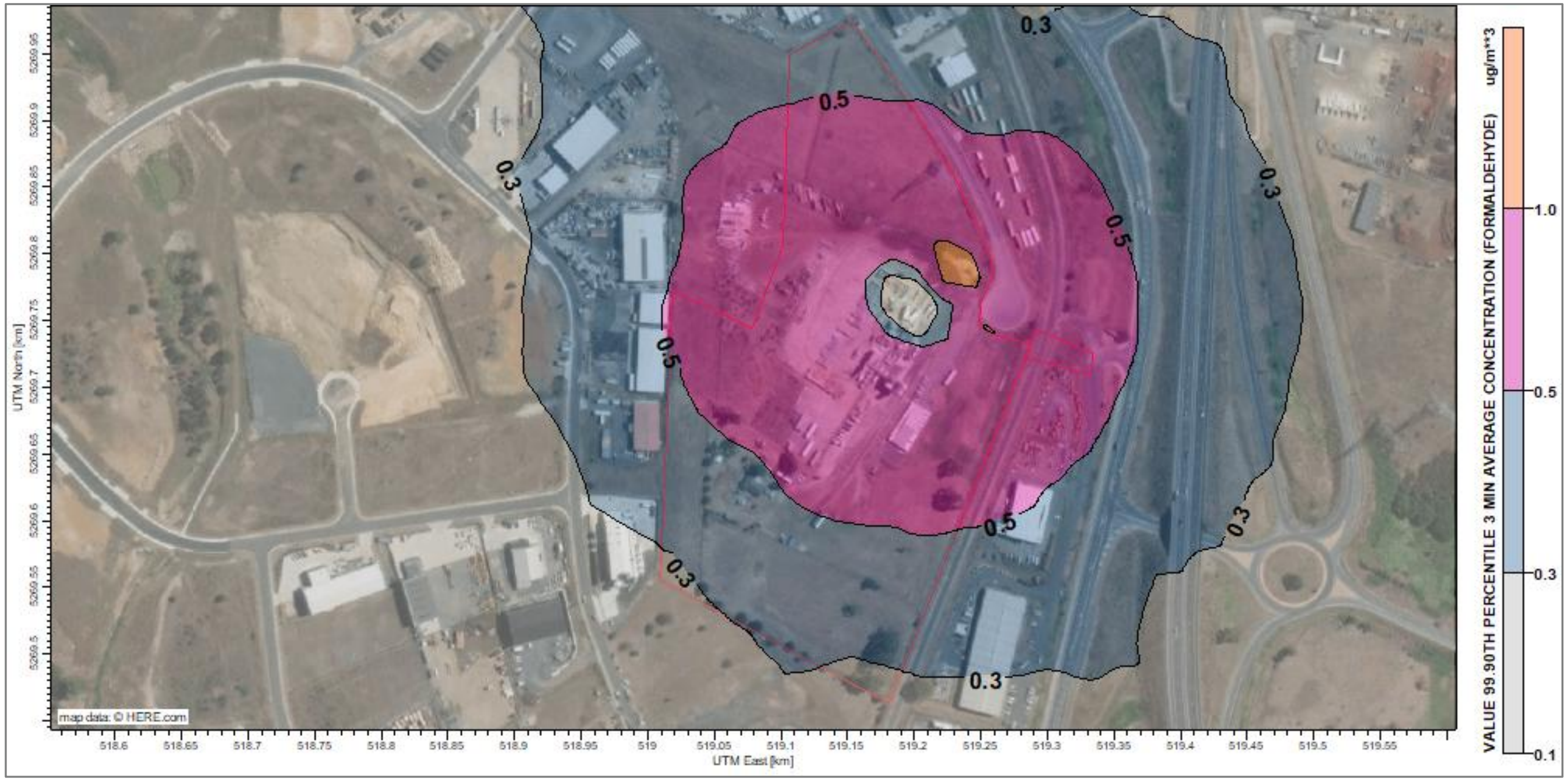
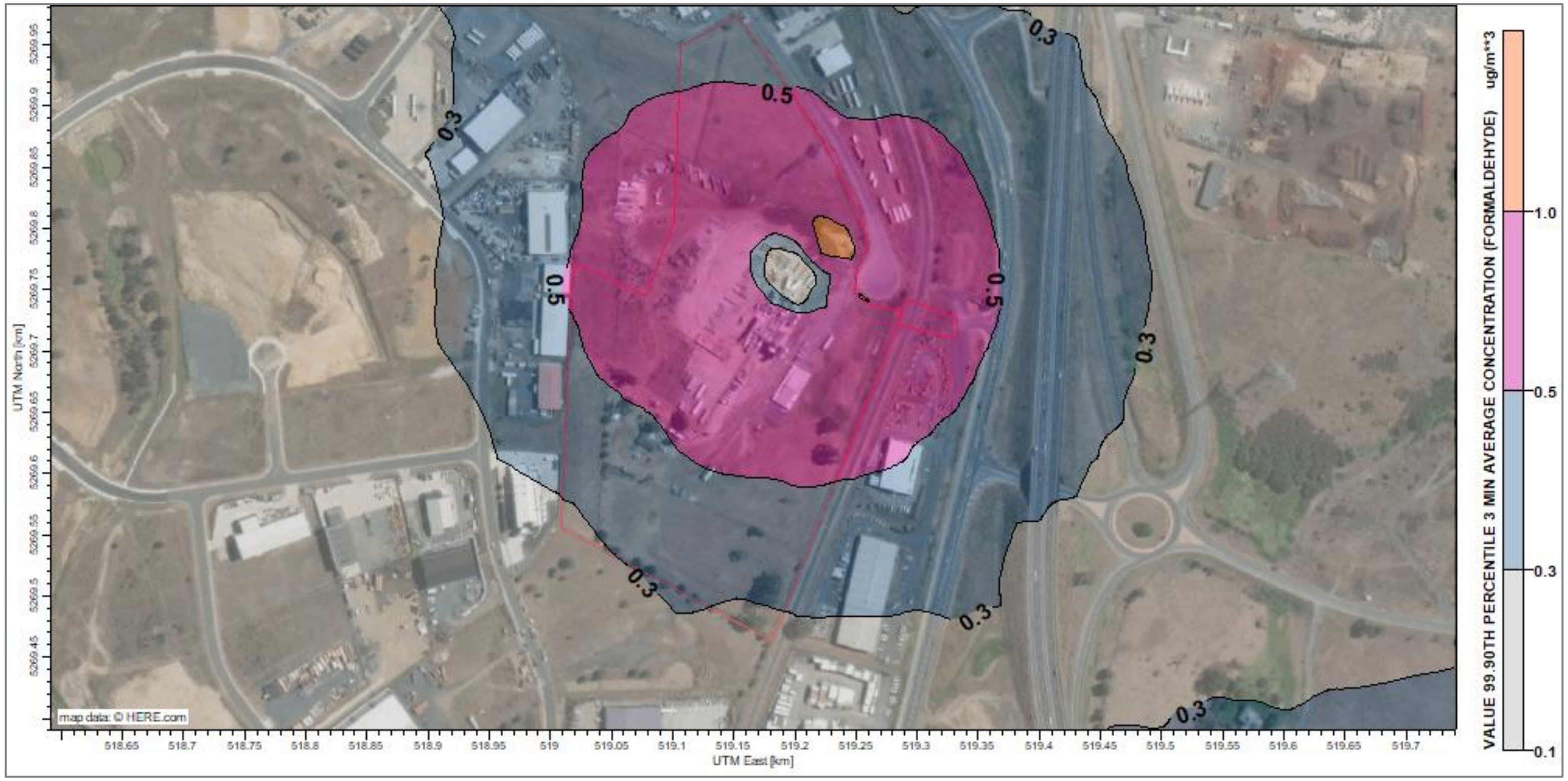


Figure 117: Predicted Ethylbenzene GLCs for Daily Operations (Scenario 2)



Pollutant: Formaldehyde **Period:** 3-Minutes **Percentile:** 99.9th **Criteria:** 50 µg/m^3

Figure 118: Predicted Formaldehyde GLCs for Daily Operations (Scenario 1)

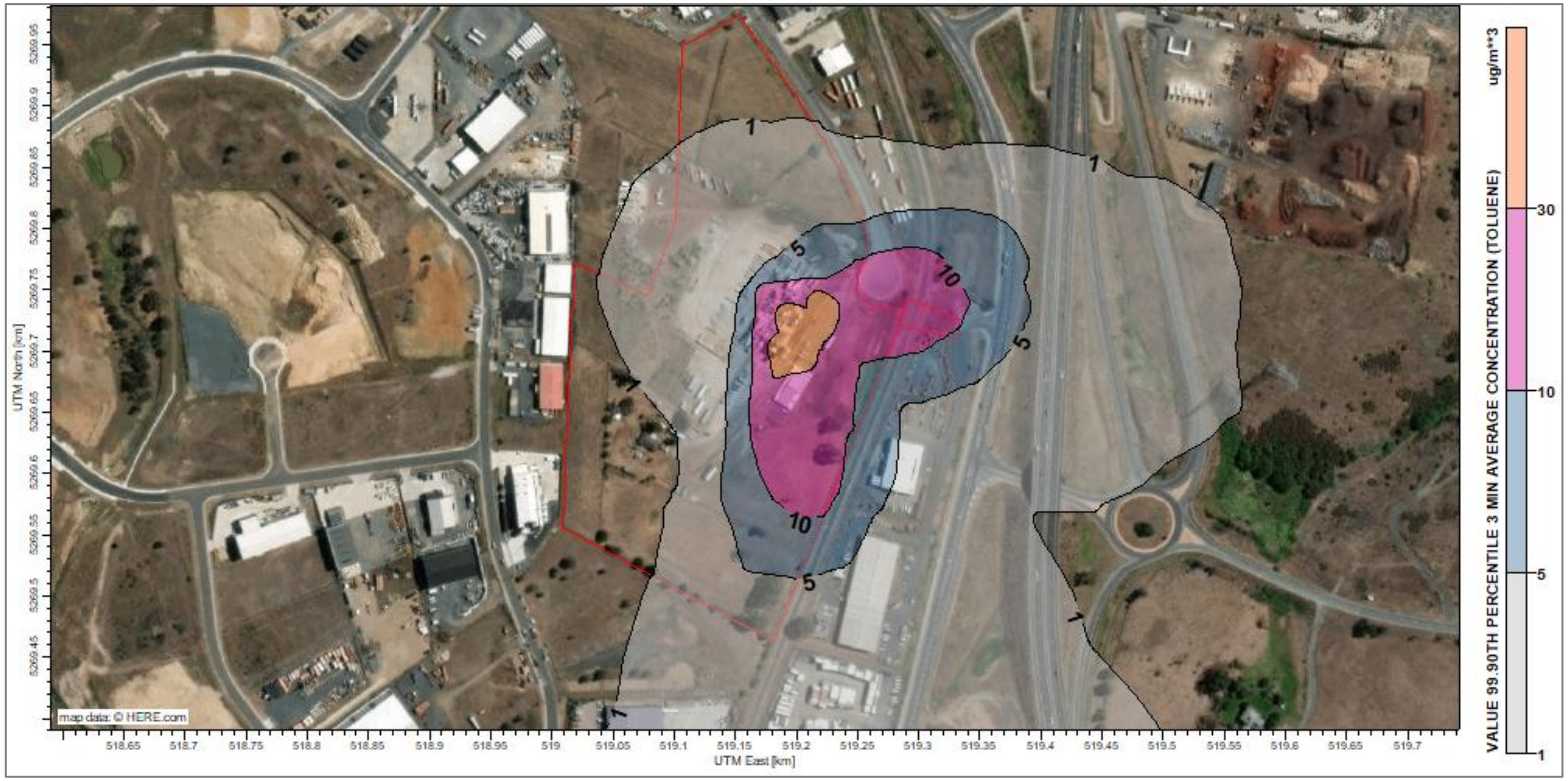


Pollutant: Formaldehyde **Period:** 3-Minutes **Percentile:** 99.9th **Criteria:** 50 µg/m³

Figure 119: Predicted Formaldehyde GLCs for Daily Operations (Scenario 2)

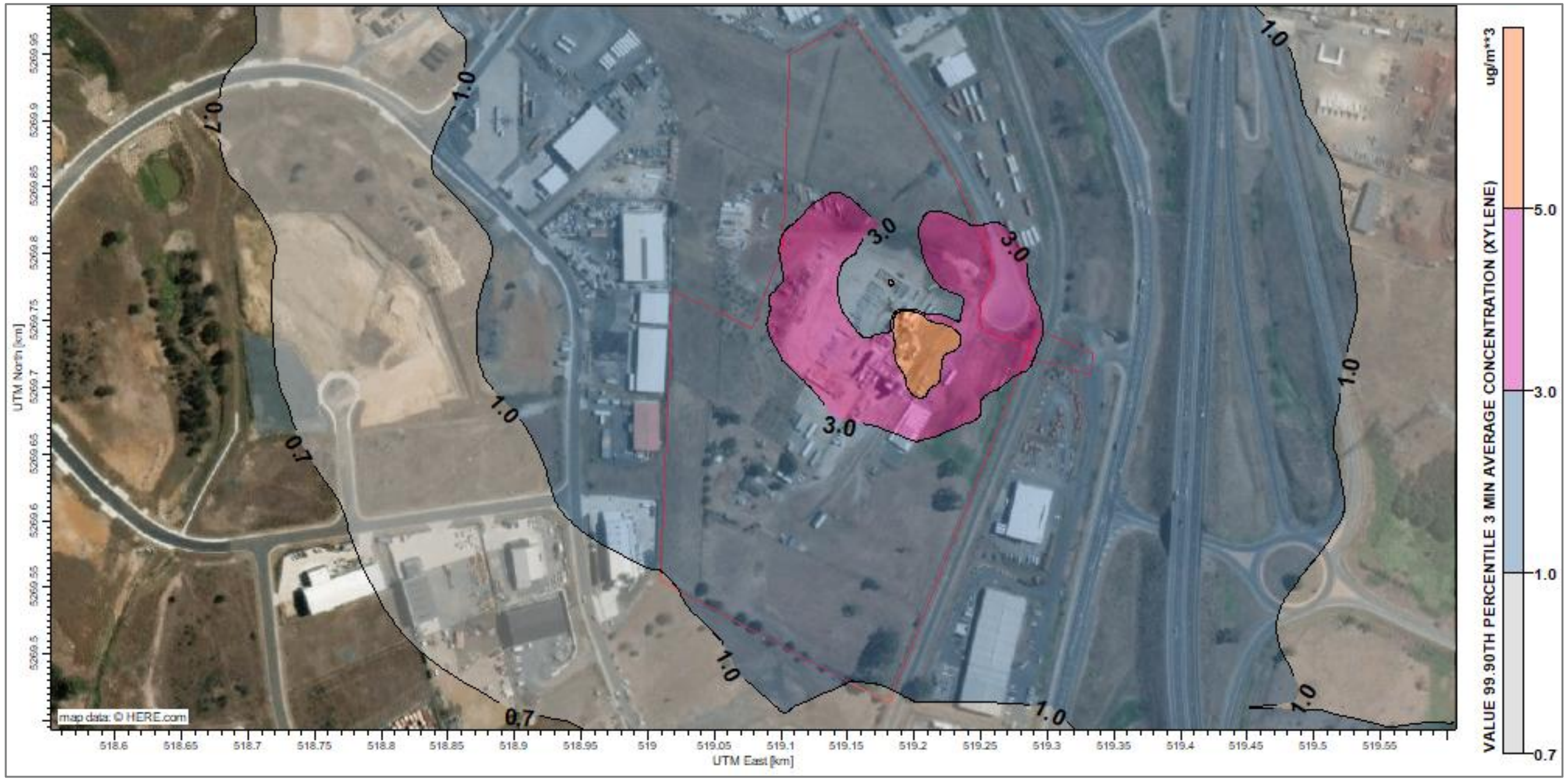
Pollutant: Toluene **Period:** 3-Minutes **Percentile:** 99.9th **Criteria:** 650 µg/m³

Figure 120: Predicted Toluene GLCs for Daily Operations (Scenario 1)



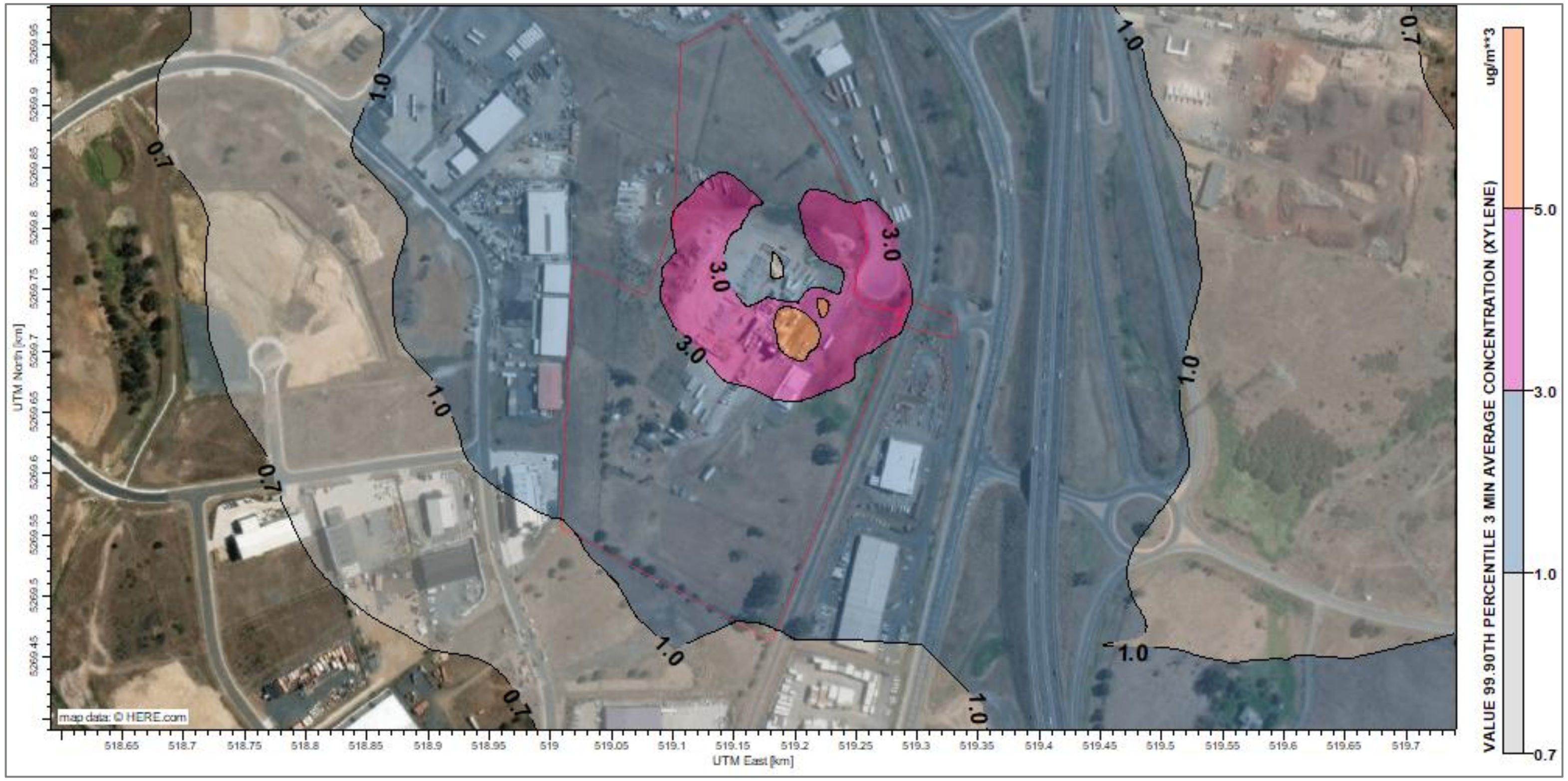
Pollutant: Toluene **Period:** 3-Minutes **Percentile:** 99.9th **Criteria:** 650 µg/m³

Figure 121: Predicted Toluene GLCs for Daily Operations (Scenario 2)



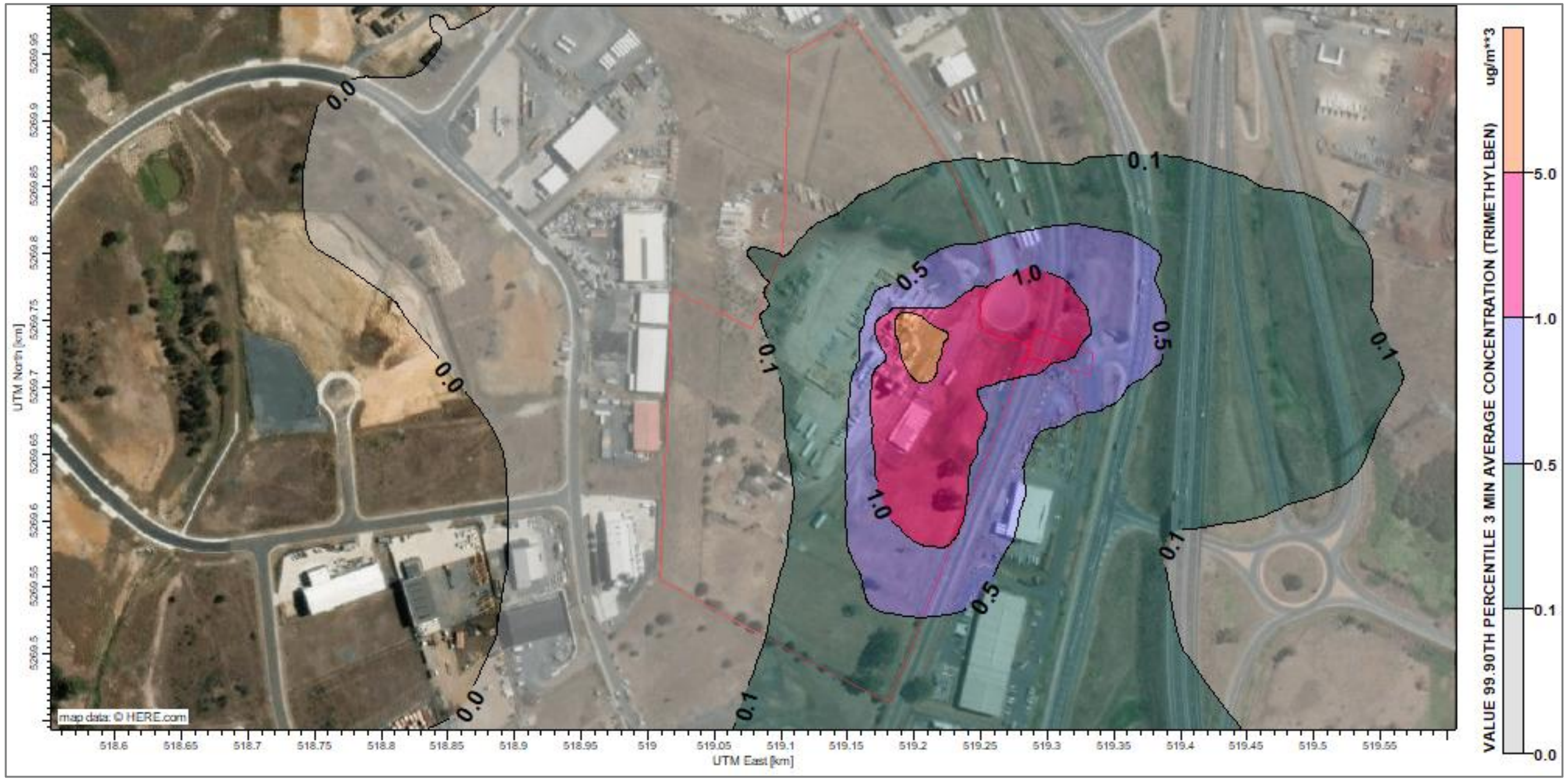
Pollutant: Xylenes **Period:** 3-Minutes **Percentile:** 99.9th **Criteria:** 350 µg/m³

Figure 122: Predicted Xylenes GLCs for Daily Operations (Scenario 1)



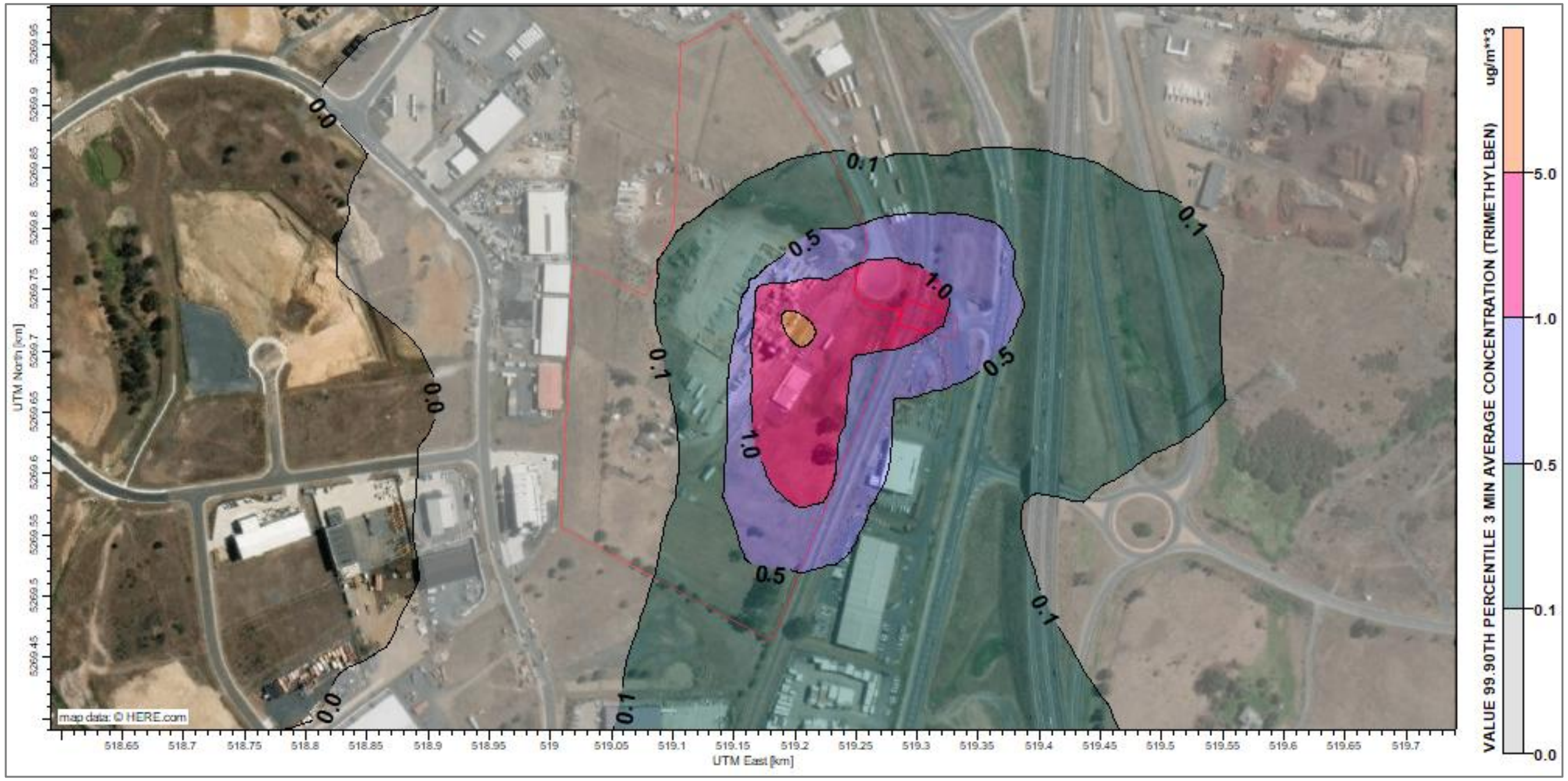
Pollutant: Xylenes **Period:** 3-Minutes **Percentile:** 99.9th **Criteria:** 350 µg/m³

Figure 123: Predicted Xylenes GLCs for Daily Operations (Scenario 2)



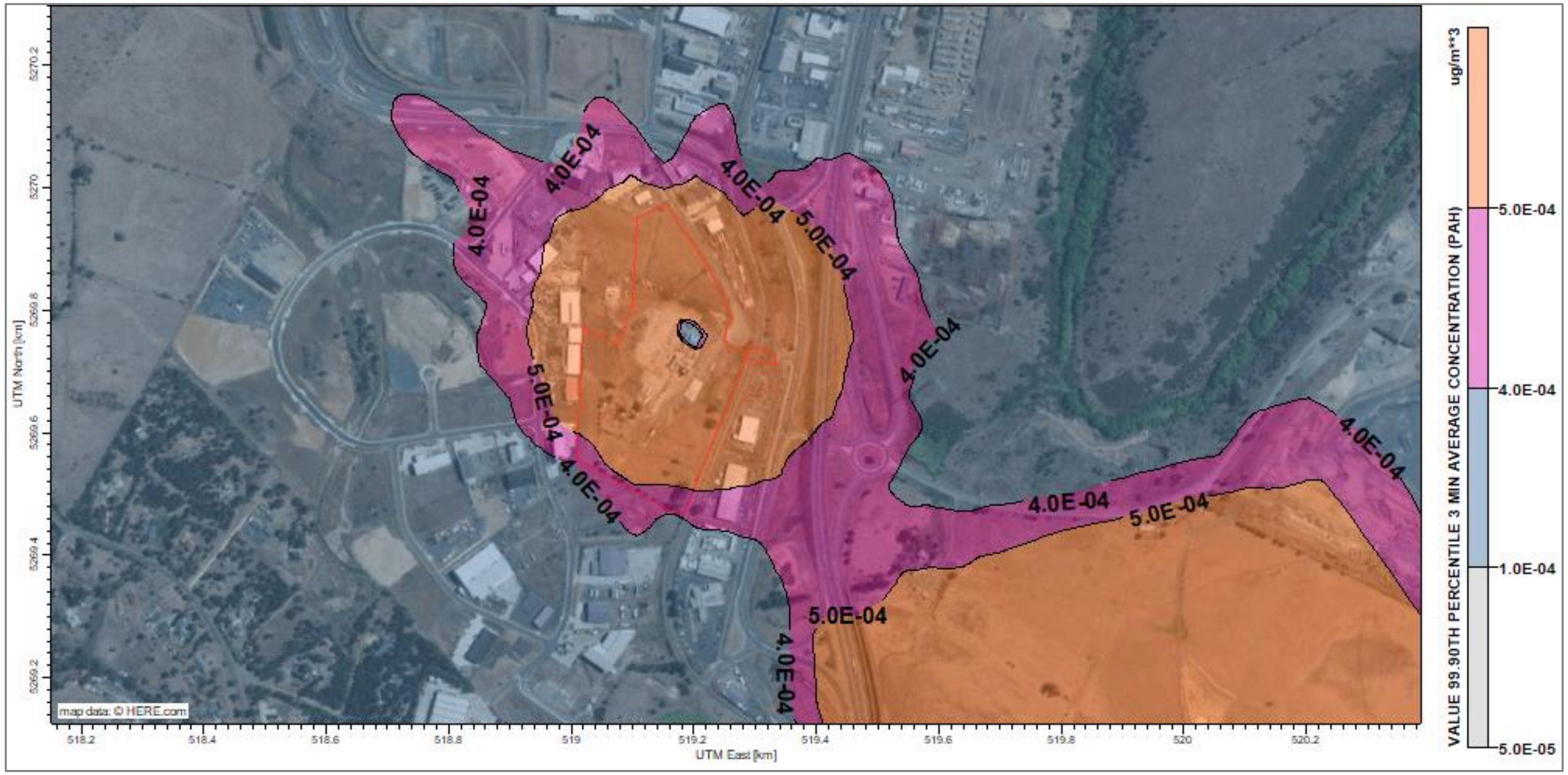
Pollutant: Trimethylbenzene **Period:** 3-Minutes **Percentile:** 99.9th **Criteria:** 4000 μg/m³

Figure 124: Predicted Trimethylbenzene GLCs for Daily Operations (Scenario 1)



Pollutant: Trimethylbenzene **Period:** 3-Minutes **Percentile:** 99.9th **Criteria:** 4000 µg/m³

Figure 125: Predicted Trimethylbenzene GLCs for Daily Operations (Scenario 2)



Pollutant: PAHs as Benzo(a)pyrene

Period: 3-Minutes

Percentile: 99.9th

Criteria: 0.73 µg/m^3

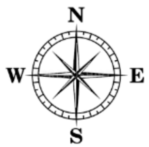


Figure 126: Predicted PAHs as Benzo(a)pyrene GLCs for Daily Operations

APPENDIX H: PREDICTED POLLUTANT AT THE SENSTIVE RECEPTORS

This Appendix presents the predicted ground level concentrations from daily peak production rates from both the asphalt plant and the concrete batch plant at the sensitive receptors.

Table 42: Predicted 1-hour Average, 99.5th Percentile Odour Concentrations at Sensitive Receptors (OU)

Receptor	Predicted Odour Concentration (OU, 1-hour average, 99.5th percentile)					
	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5	Scenario 6
R1	0.26	0.26	0.16	0.16	0.49	0.49
R2	0.11	0.11	0.09	0.09	0.20	0.20
R3	0.11	0.11	0.08	0.08	0.19	0.19
R4	0.10	0.10	0.08	0.08	0.18	0.18
R5	0.11	0.11	0.08	0.08	0.21	0.21
R6	0.09	0.09	0.07	0.07	0.15	0.15
R7	0.08	0.08	0.06	0.06	0.13	0.13
R8	0.08	0.08	0.06	0.06	0.12	0.12
R9	0.08	0.08	0.06	0.06	0.13	0.13
R10	0.07	0.07	0.06	0.06	0.13	0.13
R11	0.06	0.06	0.04	0.04	0.11	0.11
R12	0.05	0.05	0.04	0.04	0.10	0.10
R13	0.05	0.05	0.04	0.04	0.09	0.09
R14	0.06	0.06	0.04	0.04	0.11	0.11
R15	0.06	0.06	0.04	0.04	0.11	0.11
R16	0.05	0.05	0.03	0.03	0.09	0.09
R17	0.05	0.05	0.03	0.03	0.09	0.09
R18	0.05	0.05	0.03	0.03	0.09	0.09
R19	0.06	0.06	0.04	0.04	0.11	0.11
R20	0.05	0.05	0.03	0.03	0.09	0.09
R21	0.04	0.04	0.03	0.03	0.08	0.08
R22	0.05	0.05	0.03	0.03	0.09	0.09
R23	0.05	0.05	0.03	0.03	0.09	0.09
R24	0.04	0.04	0.03	0.03	0.08	0.08

Table 43: Predicted 24-Hours PM_{10} Average Concentrations at Sensitive Receptors (µg/m³)

Receptor	Predicted Concentration (µg/m³) from Activity		
	Asphalt Plant	Concrete Batch Plant	Cumulative (Including Background)
R1	1.3	0.44	16.4
R2	0.98	0.85	16.5
R3	0.92	0.79	16.4
R4	0.86	0.73	16.3
R5	0.98	0.70	16.5
R6	0.57	0.62	16.0
R7	0.76	0.48	16.0
R8	0.69	0.49	15.8
R9	0.51	0.58	15.7
R10	0.51	0.57	15.7
R11	0.32	0.87	15.8
R12	0.40	1.0	16.2
R13	0.47	0.87	16.1
R14	0.29	0.58	15.5
R15	0.28	0.44	15.3
R16	0.35	0.72	15.7
R17	0.33	0.69	15.6
R18	0.31	0.54	15.4
R19	0.26	0.31	15.2
R20	0.22	0.23	15.2
R21	0.22	0.26	15.2
R22	0.25	0.32	15.2
R23	0.28	0.41	15.3
R24	0.26	0.38	15.3

Table 44: Predicted Annual PM_{10} Average Concentrations at Sensitive Receptors (µg/m^3)

Receptor	Predicted Concentration (µg/m^3) from Activity		
	Asphalt Plant	Concrete Batch Plant	Cumulative (Including Background)
R1	0.32	0.10	11.5
R2	0.05	0.05	11.2
R3	0.05	0.04	11.2
R4	0.04	0.04	11.2
R5	0.05	0.05	11.2
R6	0.03	0.02	11.2
R7	0.03	0.02	11.1
R8	0.03	0.02	11.1
R9	0.03	0.03	11.2
R10	0.03	0.03	11.2
R11	0.01	0.03	11.1
R12	0.02	0.03	11.1
R13	0.02	0.02	11.1
R14	0.01	0.01	11.1
R15	0.01	0.01	11.1
R16	0.01	0.02	11.1
R17	0.01	0.01	11.1
R18	0.01	0.01	11.1
R19	0.01	0.01	11.1
R20	0.01	0.004	11.1
R21	0.01	0.004	11.1
R22	0.01	0.01	11.1
R23	0.01	0.01	11.1
R24	0.01	0.01	11.1

Table 45: Predicted 24-hours $PM_{2.5}$ Average Concentrations at Sensitive Receptors (µg/m^3)

Receptor	Predicted Concentration (µg/m^3) from Activity		
	Asphalt Plant	Concrete Batch Plant	Cumulative (Including Background)
R1	0.68	0.07	7.8
R2	0.51	0.13	7.7
R3	0.49	0.12	7.7
R4	0.46	0.11	7.7
R5	0.49	0.11	7.7
R6	0.33	0.09	7.5
R7	0.43	0.07	7.6
R8	0.40	0.08	7.5
R9	0.30	0.09	7.5
R10	0.30	0.09	7.5
R11	0.19	0.13	7.4
R12	0.30	0.15	7.5
R13	0.31	0.13	7.5
R14	0.14	0.09	7.3
R15	0.13	0.07	7.3
R16	0.18	0.11	7.4
R17	0.14	0.10	7.3
R18	0.12	0.08	7.3
R19	0.13	0.05	7.3
R20	0.15	0.03	7.2
R21	0.11	0.04	7.2
R22	0.11	0.05	7.2
R23	0.12	0.06	7.3
R24	0.12	0.06	7.3

Table 46: Predicted Annual $PM_{2.5}$ Average Concentrations at Sensitive Receptors ($\mu g/m^3$)

Receptor	Predicted Concentration ($\mu g/m^3$) from Activity		
	Asphalt Plant	Concrete Batch Plant	Cumulative (Including Background)
R1	0.21	0.01	5.9
R2	0.03	0.01	5.7
R3	0.03	0.01	5.7
R4	0.03	0.01	5.7
R5	0.03	0.01	5.7
R6	0.02	0.003	5.7
R7	0.02	0.003	5.7
R8	0.02	0.003	5.7
R9	0.02	0.004	5.7
R10	0.02	0.004	5.7
R11	0.009	0.004	5.7
R12	0.01	0.004	5.7
R13	0.01	0.003	5.7
R14	0.005	0.002	5.7
R15	0.004	0.001	5.7
R16	0.007	0.003	5.7
R17	0.005	0.002	5.7
R18	0.004	0.001	5.7
R19	0.004	0.001	5.7
R20	0.004	0.001	5.7
R21	0.003	0.001	5.7
R22	0.004	0.001	5.7
R23	0.004	0.001	5.7
R24	0.005	0.001	5.71

Table 47: Predicted Pollutant Concentrations at Sensitive Receptors from Natural Gas-Powered Burner (µg/m³)

Receptor	NO_2 (as 100% NOx)		CO	SO_2	
	1-hour	Annual	8-hours	1-hour	24-hours
R1	5.9	0.90	26	3.3	0.63
R2	2.9	0.07	9.1	1.5	0.17
R3	2.8	0.06	9.2	1.4	0.17
R4	2.8	0.06	9.1	1.4	0.16
R5	3.3	0.07	12	1.4	0.20
R6	2.7	0.04	8.2	1.0	0.14
R7	2.5	0.03	6.9	1.0	0.12
R8	2.5	0.03	6.0	1.1	0.10
R9	2.4	0.04	5.5	1.2	0.11
R10	2.3	0.04	5.4	1.2	0.11
R11	2.1	0.02	7.2	1.6	0.11
R12	2.0	0.02	6.4	1.0	0.11
R13	1.9	0.02	5.3	0.82	0.09
R14	2.4	0.02	7.4	1.2	0.12
R15	2.2	0.02	7.8	0.93	0.11
R16	2.1	0.02	6.8	1.8	0.10
R17	2.2	0.02	5.5	1.4	0.10
R18	2.1	0.02	6.4	1.4	0.10
R19	2.0	0.02	7.8	0.85	0.10
R20	2.2	0.02	6.4	1.5	0.14
R21	1.9	0.01	6.2	1.0	0.10
R22	1.7	0.01	6.5	0.73	0.09
R23	1.8	0.02	6.5	1.1	0.09
R24	2.6	0.02	9.2	1.7	0.11

Table 48: Predicted Pollutant Concentrations at Sensitive Receptors from Diesel Powered Burner ($\mu g/m^3$)

Receptor	NO_2 (as 100% NOx)		CO	SO_2	
	1-hour	Annual	8-hours	1-hour	24-hours
R1	12	1.9	26	26	5.0
R2	6.2	0.14	9.1	12	1.4
R3	5.9	0.13	9.2	11	1.3
R4	5.8	0.12	9.1	11	1.3
R5	7.0	0.15	12	11	1.6
R6	5.7	0.07	8.2	7.8	1.1
R7	5.3	0.07	6.9	8.2	0.91
R8	5.2	0.07	6.0	8.4	0.81
R9	5.1	0.07	5.5	9.2	0.88
R10	4.8	0.07	5.4	9.1	0.86
R11	4.4	0.04	7.2	13	0.85
R12	4.1	0.04	6.4	8.0	0.83
R13	3.9	0.03	5.3	6.5	0.73
R14	5.1	0.04	7.4	9.8	0.93
R15	4.6	0.04	7.8	7.3	0.90
R16	4.3	0.04	6.8	14	0.82
R17	4.7	0.04	5.5	11	0.81
R18	4.5	0.04	6.4	11	0.79
R19	4.2	0.04	7.8	6.7	0.83
R20	4.5	0.03	6.4	12	1.1
R21	4.0	0.03	6.2	8.1	0.76
R22	3.7	0.03	6.5	5.8	0.69
R23	3.8	0.03	6.5	9.0	0.74
R24	5.5	0.03	9.2	14	0.85

Table 49: Maximum Predicted Ground Level Concentration (GLC) of Heavy Metals and PAH at Sensitive Receptors (µg/m^3)

Pollutant	Averaging Period	Maximum Predicted GLC (µg/m^3)
Heavy Metals		
Arsenic and compounds	3 min	1.8E-04
Barium	3 min	6.2E-04
Beryllium	3 min	6.2E-05
Cadmium and cadmium compounds	3 min	2.5E-04
Chromium (total)	3 min	2.4E-04
Copper fume	3 min	2.0E-05
Lead	90 days	4.2E-05
	Annual	3.1E-05
Manganese and compounds	3 min	0.003
Mercury (inorganic)	3 min	1.7E-04
Nickel and nickel compounds	3 min	0.001
Zinc oxide fume	3 min	0.003
PAHs		
Benzo(a)pyrene	3 min	4.7E-04

Table 50: Maximum Predicted Ground Level Concentration (GLC) of VOCs at Sensitive Receptors (µg/m^3)

Pollutant	Averaging Period	Maximum Predicted GLC (µg/m^3)	
		Scenario 1	Scenario 2
Acetaldehyde	3 min	0.13	0.13
Benzene	3 min	0.28	0.28
Ethylbenzene	3 min	0.93	0.93
Formaldehyde	3 min	0.31	0.31
Toluene	3 min	0.77	0.79
Trimethylbenzene	3 min	0.07	0.07
Xylenes	3 min	1.1	1.1

Appendix 3 Stormwater management plan

Prepared for
Hazell Bros Civil Contracting Pty Ltd

1/13 Crooked Billet Drive Bridgewater TAS 7030

STORMWATER MANAGEMENT PLAN

FE_24063
03 September 2024

flüssig Engineers

L4/ 116 BATHURST ST
HOBART TASMANIA 7000
ABN: 16 639 276 181

Document Information

Title	Client	Document Number	Project Manager
1/13 Crooked Billet Dr, Bridgewater TAS 7030 **SWMP Report**	Hazell Bros Civil Contracting Pty Ltd	FE _24063	**Max W. Möller** *BEng, FIEAust, EngExec, CPEng, NER, APEC Engineer, IntPE (Aus)*

Document Initial Revision

REVISION 00	Staff Name	Signature	Date
Prepared by	Max W. Moller ***Principal Hydraulic Engineer***		15/08/2024
Prepared by	Ash Perera ***Senior Hydraulic Engineer***		15/08/2024
Prepared by	Manuri Alwis ***Civil Engineer***		19/08/2024
GIS Mapping	Damon Heather ***GIS Specialist***		20/08/2024
Reviewed by	Christine Keane ***Senior Water Resources Analyst***		03/09/2024
Authorised by	Max W. Moller ***Principal Hydraulic Engineer***		03/09/2024

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1. Introduction

Flüssig Engineers have been engaged by Hazell Bros Civil Contracting Pty Ltd to undertake a site-specific Stormwater Management Plan (SWMP) for 1 Crooked Billet Dr, Bridgewater including, but not limited to, lot drainage analysis including stormwater drainage and MUSIC Modelling to stated stormwater quality standards. The purpose of this report is to determine the hydraulic characteristics and stormwater infrastructure capacity of a 1% AEP + CC storm event and treatment on the existing and post-development scenarios.

1.1 Scope

This assessment has been undertaken to determine the stormwater detention and treatment requirements for the proposed development in accordance with Council's requirement that post development discharge does not exceed the permissible site discharge for the 2% AEP + CC event. The study quantifies the additional runoff generated by the development and identifies the storage volume necessary to contain the 1% AEP + CC event while restricting outflow to the 2% AEP + CC limit.

The scope includes hydrologic and hydraulic modelling using Structural Tool Kit and InfoWorks ICM, the application of ARR 2019 design rainfall incorporating the SSP3-7.0 climate change factor 1.66, and identification of the critical storm duration using median temporal pattern analysis. The model assesses inflows, storage behaviour, outflow control, and the interaction between the detention pond and the downstream bio retention swale.

2. Site Characteristics

2.1 Site Location

1 Crooked Billet Dr, Bridgewater Tasmania (Title Reference 158010/1) is in the municipality of the **Brighton Council.** The site is approximately 78,650 m^2 with the proposed asphalt batching plant. The site and its immediate areas are zoned General Industrial, with some areas of Rural zoning to the south and west of the site, including Agricultural and Environmental Management areas also in the surrounding region.

Figure 1. Approximate development location, 1 Crooked Billet Drive

2.2 Survey Data

All survey data was supplied by the client as a processed AutoCAD file. The provided data has been incorporated into various software to undertake the analysis.

2.3 Topography

The proposed development site is approximately 78,650 m^2 in area, draining from approximately 52.00 mAHD to 44.00 mAHD.

As can be seen by the topography in Figure 2, pre-development terrain gently slopes in a south-east direction towards the Midland Highway.

Figure 2. 1 m DEM (hill shade) of lot area and surrounds

3. Proposal

3.1 Proposed Development

The proposed development consists of a commercial asphalt batching plant, comprising of large, concreted areas. The design of the development was undertaken by 6ty˚, as detailed in the "24.140 C30.pdf" shown in Figure 3. For detailed design refer to civil and architectural drawings by others.

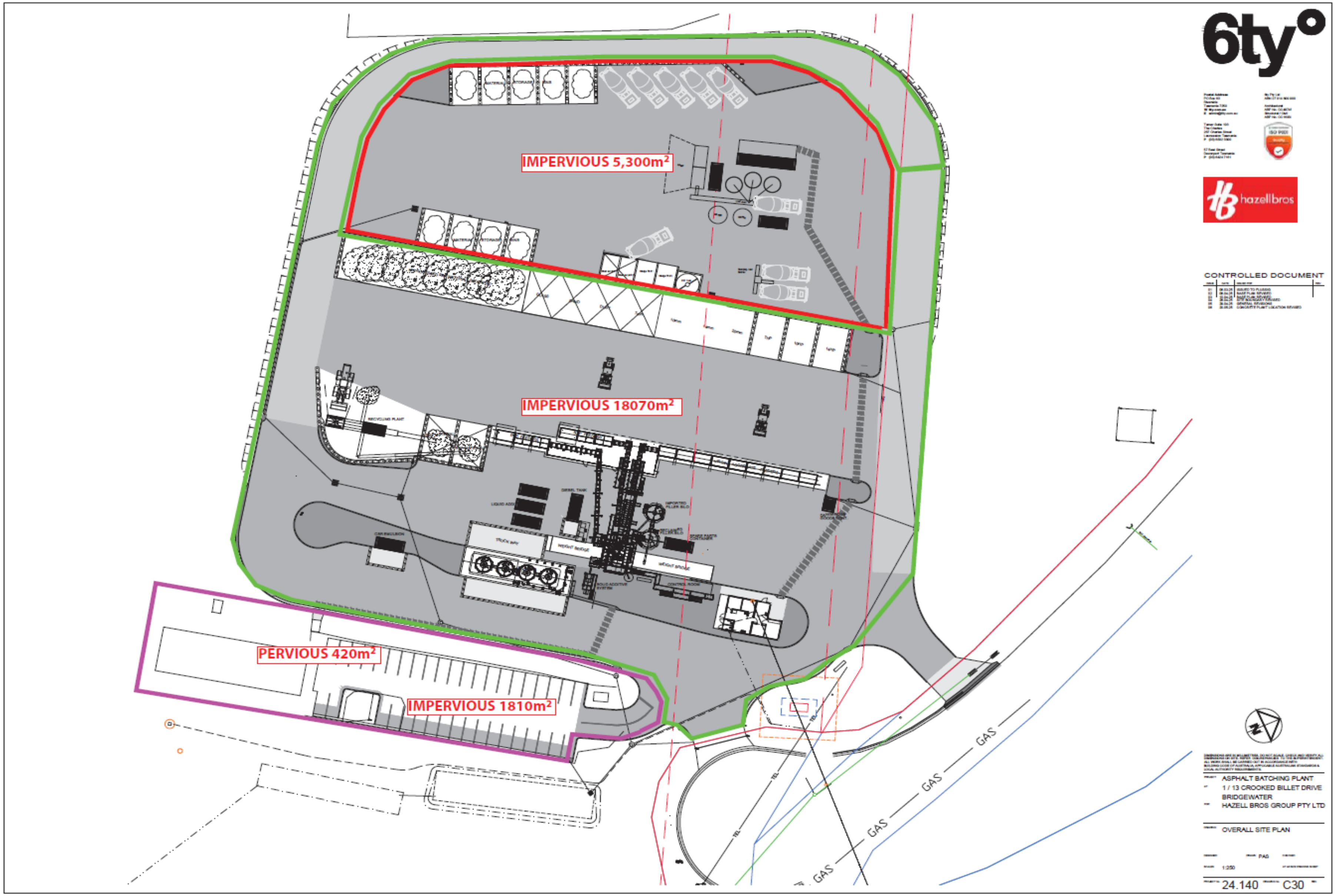


Figure 3. Planning design of development (6ty˚ Architecture Surveying Engineering)

4. Stormwater Quantity

4.1 Catchment Analysis

The catchment was modelled using RAFTS Hydrology software within Infoworks ICM. RAFTS software uses the Laurenson runoff-routing method to calculate runoff using the catchment properties including size, slope and % impervious. This method is accepted within ARR2019 for areas larger than a single dwelling lot.

4.2 Catchment Conditions

The contributing catchment for 1 Crooked Billet Drive, Bridgewater is approximately 8.5 ha as shown on Figure 4. The proposed development lies within a catchment area that extends from the north-western side of the lot to the south-eastern boundary of the site. The soil onsite is predominately black soils overlain on tertiary basalt bedrock. This allows for drainage directly to a stream or piped infrastructure.

Figure 4. Contributing approximate catchment, 1 Crooked Billet Drive

4.3 Design Intensity Storms

Design storm durations and temporal pattern were calculated using Australian Rainfall and Runoff 2019 (ARR19) guidelines, running ten temporal pattern events through each duration to determine the worst-case storm using the median temporal pattern. Figure 5 below shows the 1% AEP rainfall event as the 10-minute storm event.

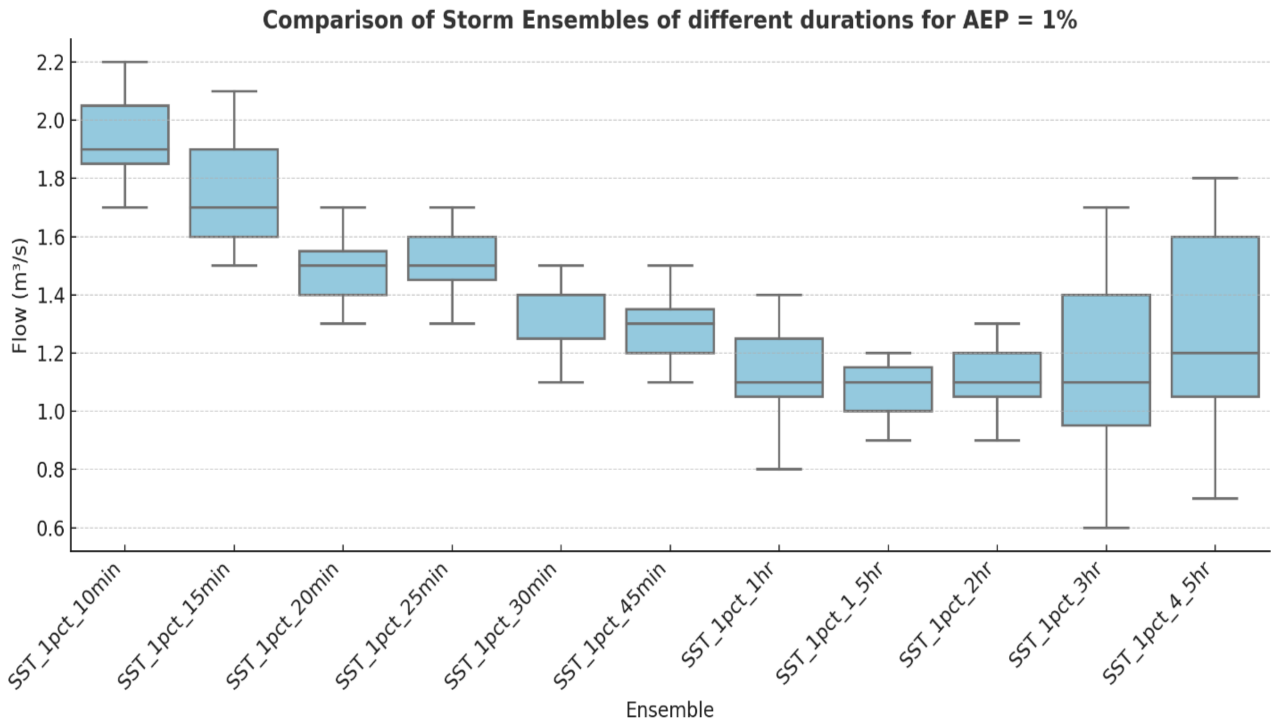


Figure 5. 1% AEP Temporal Storms Box and Whisker Plot

4.4 Land use

We have used the impervious and pervious areas provided by the client that reflect the current on site conditions, rather than the older sale yard figures. This gives a more accurate representation of what is actually on site. Even if the concrete plant were removed in the future, it is likely that the remaining surfaces would still be similar in extent to the previous sale yard layout. To remain conservative, we have applied runoff coefficients that allow for the higher proportion of impervious area.

Land use for the site, both pre- and post-development, were derived from plans and aerial imagery.

Land use values are as follows in Table 1.

Table 1. Land Use Area

	Pre-Development		Post-Development	
Land Use	**Area (m^2)**	**% Total land**	**Area (m^2)**	**% Total land**
Total Impervious	23,098	90.3	25,180	98.3
Total Pervious	2,502	9.7	420	1.7

4.5 Manning's n and losses

Losses for this catchment were derived from ARR19 data hub. As per ARR2019, losses were taken at 60% of prescribed value to account for effective impervious area. See Table 2 for loss values.

Manning's n values were taken directly from best practice manuals as shown in Table 3.

Table 2. Runoff coefficients

Surface	Initial losses (IL) mm	Continuing Losses (CL) mm/ hr
Pervious	20	2
Impervious	1	0

Table 3. Manning's N coefficients

Land Use	Manning's n
Swale Channel	0.025
Road	0.018
Gravel	0.025
Urban Yards	0.045
Buildings	0.3

4.6 Stormwater runoff Coefficient (C)

See Table 4 for stormwater runoff coefficient (C) values were taken directly from best practices.

Table 4. Stormwater runoff Coefficients

Land Use	C
Road/Driveway	0.9
Open Channel	0.3
Roof	1.0
Gravel/ timber deck	0.5

4.7 Development Runoff

Stormwater runoff from the development site has been assessed under pre- and post-development models to determine the potential impact the development at 1 Crooked Billet Drive has on the immediate local flows. As per planning guidelines it is a requirement that this does not worsen from pre to post development.

Using the above parameters, the site was calculated using Infoworks ICM software and ARR2019 best practice manuals. Site characteristics for the pre- and post-development model are summarised in Table 5, where, as the majority of the development is proposed over existing impervious areas, there is little variation in total land use, so pervious/impervious values only have minor variations.

Table 5. Site Characteristics

Catchment	Maximum Slope (%)	Total Land use pervious/ impervious (ha)	Storm duration and pattern
Pre-Development	4.0	0.25 / 2.3	1% 10-min storm pattern 7
Post-Development	4.0	0.04 / 2.5	1% 10-min storm pattern 7

4.8 Model Results

The pre development and post development scenarios were assessed using InfoWorks ICM to ensure a consistent and robust comparison of flood behaviour. Both scenarios were modelled for the 2% AEP and 1% AEP + climate change event, applying the SSP3 7.0 rainfall increase factor of 1.66 as recommended in ARR 2019. This factor accounts for projected rainfall intensification under future climate conditions and ensures that the hydraulic model reflects a resilient design standard.

The storm durations were selected using the ARR 2019 median temporal pattern analysis, where multiple durations are tested and the critical duration is identified. For both rainfall events, the pre development and post development cases, the worst case outcome occurred under the 10-minute storm duration, indicating that short duration bursts dominate the catchment response for this site.

The resulting hydrographs are presented in Figure 6 and illustrate the difference in peak discharge between the two scenarios. As shown, the post development scenario produces a higher peak flow compared with existing conditions. This increase reflects the higher proportion of impervious surfaces and the more rapid concentration of runoff introduced by the development footprint.

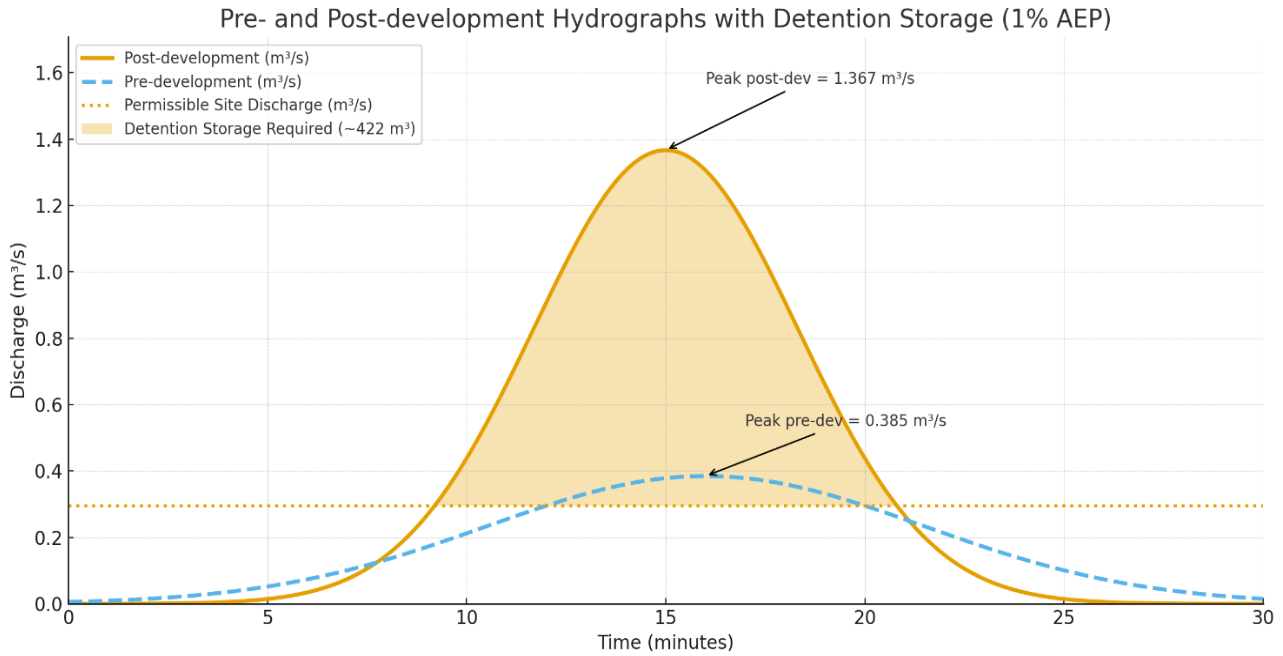


Figure 6. Site Discharge Curves Pre vs post-development

The post development allowable site discharge must not exceed the pre development site discharge.

Council have requested that the detention pond be sized to detain the 1% AEP + CC event while limiting the outflow to the permissible site discharge from the 2% AEP + CC event. This means the site must detain the difference in volume through an onsite stormwater detention system.

Table 6. Discharge volume rates and required detention of pre-post scenarios

Design Event (AEP)	Discharge Volume (m^3/s)			Required Detention (m^3)
	Pre-Development	Peak post-Development	Permissible Site Discharge (2% AEP)	
1%	0.385	1.367	0.294	**422**
2%	0.295	0.952	0.294	146

The required 422m^3 storage is the difference between the pre- and post-development curves with the restricted 2% AEP + CC PSD shown in Figure 6 above. This area between the curve equates to a storage requirement which can be seen in Table 6. The site discharge increase due to development needs to be treated or otherwise agreed. The sections below outline the requirements for the new buildings and concrete areas. Further detail is provided in Appendix B Calculations.

4.9 On-Site Detention sizing and configuration

Runoff from the future impervious areas will be collected through a series of stormwater pits and conveyed to the new detention pond. The detention pond has been designed to restrict the outflow for the 2% AEP + CC event. The controlled low flow discharge will leave the pond through a DN150 outlet pipe and will be directed to the bio retention swale to allow the system to meet its water quality treatment targets.

Once the bio retention pond fills to its full capacity, it will begin to overflow through the DN300 outlet pipe. However, the actual discharge will still be limited by the amount of water the DN150 pipe can deliver from the detention basin. For this reason, an additional overflow is required to act as an emergency spillway when the detention basin approaches its maximum level. A simple weir overflow that directs water into the paddock would be the most suitable option. Further information on system upkeep and asset longevity is outlined in Section 6.6 Maintenance.

4.10 1% AEP Overland Flow Path (OFP)

As per Brighton Council requirements, runoff for the 1% AEP is required to be captured by infrastructure and detained onsite in an OSD. The 1% AEP storm must be able to drain through the site and not cause additional impedance on the neighbouring lots or future residents. Refer attached "APPENDIX A – SITE PLAN" which shows the post - development overland flow path for the site in the event of a 1% AEP event.

4.11 Quantity Summary

The SWMP quantity report has been designed from the Tasmanian Planning Scheme and best practice design and guidelines. The following is a summary of the requirements for stormwater management for the development at the Asphalt Batching Plant.

1. The proposed development will be required to detain runoff from impervious areas to pre-development discharge quantities, as per Brighton Council requirements.
2. The 1% AEP runoff overland flow paths can be directed from the development site via proposed impervious concrete areas. Internal driveways are graded away, directing overland flow paths away from habitable areas.

5. Water Quality

Water quality modelling for the site has been undertaken with the urban stormwater improvement conceptualisation software MUSIC. The modelling conducted in MUSIC has been done in accordance with MUSIC Modelling Guidelines and the Tasmanian State Stormwater Strategy. This document provides a guide to water quality modelling methodology and outlines the assumptions that should be made when selecting input parameters.

Recommendations for the improvement of the water quality on site would include the diversion of stormwater flows from the development to primary treatment system (treatment train). This would reduce the pollutants in the receiving waters further and be a safe design option if future usage of this sub catchment provides higher pollutant storm water runoff.

5.1 Stormwater Quality Treatment (construction phase)

During construction, many pollutants are generated from various sources. These pollutants can easily be captured in stormwater runoff and introduced into the downstream receiving environment polluting the waterways. Listed below are some of the main construction phase pollutants:

- Litter from construction – material packaging, paper, plastic, food packaging, off cuts etc.
- Sediment erosion and transports from excavated material and fresh surfaces.
- Hydrocarbons – equipment and machinery
- Toxic material – cement, solvents, paints, cleaning agents etc.
- pH altering substances – cement, cleaning agents etc.

Construction phase pollutants should be planned and mitigated for by a designed site-specific SWMP as part of the drawing set. This should detail controls including but not limited to:

- Diversion of upslope water (where applicable)
- Stabilised exit/ entry points
- Minimise site disturbance where possible
- Implement sediment control along downslope boundaries

- Appropriate location and protection for stockpiles
- Capture on-site runoff that may contain pollutants
- Maintain control measures
- Stabilise site after disturbance (revegetate etc.)

5.2 Stormwater Quality Modelling

Stormwater pollutant modelling for the 1 Crooked Billet Drive development was undertaken using Model for Urban Stormwater Improvement Conceptualisation (MUSIC) software, version 6.3.0, under the guidelines of the State Stormwater Strategy and Tasmanian Planning Scheme.

This model splits the catchment into the following typical areas:

- Roof Catchment
- Internal impervious Catchment

The following fraction impervious land areas has been adopted in the modelling as per the concept design measurements. See Table 7 below for fraction imperviousness (fi).

Table 7. Adopted Fraction Impervious

Catchment Area (m^2)	impervious areas		Roof	
	Area (m^2)	fi	Area (m^2)	fi
25,600	24,590	0.9	590	1.0

5.3 Council Planning Quality Removal Standards

The Tasmanian Planning Scheme has adopted the pollutant removal targets and best practice from the State Stormwater Strategy 2010. See Table 8 for target removal rates.

Table 8. State Stormwater Strategy Pollutant Removal Targets

Parameter	Result Pollutant Retention on Developed Site
Total Suspended Solids (TSS)	80%
Total Phosphorous (TP)	45%
Total Nitrogen (TN)	45%
Gross Pollutants (GP)	90%

5.4 Treatment Train

To achieve stormwater pollutant removal targets outlined above and considering site constraints, this model utilised a bioretention swale (Figure 7). The treatment train consists of structures and concrete impervious area draining through stormwater infrastructure to a 150m^2, 500mm deep bio-retention swale within the property boundaries.

Resultant pollutant removal values can be seen in Figure 8 below. Should an alternative similar system be selected it needs to have equal or greater removal properties.

A cross-section of the bioretention swale and its relevant depth layers are shown below in Figure 7 and Table 9.

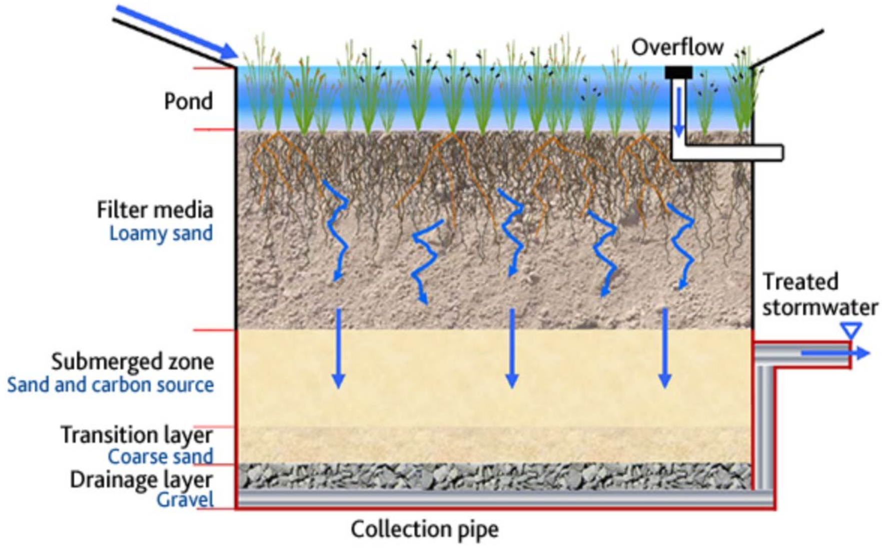


Figure 7. Bioretention Swale Cross-Section

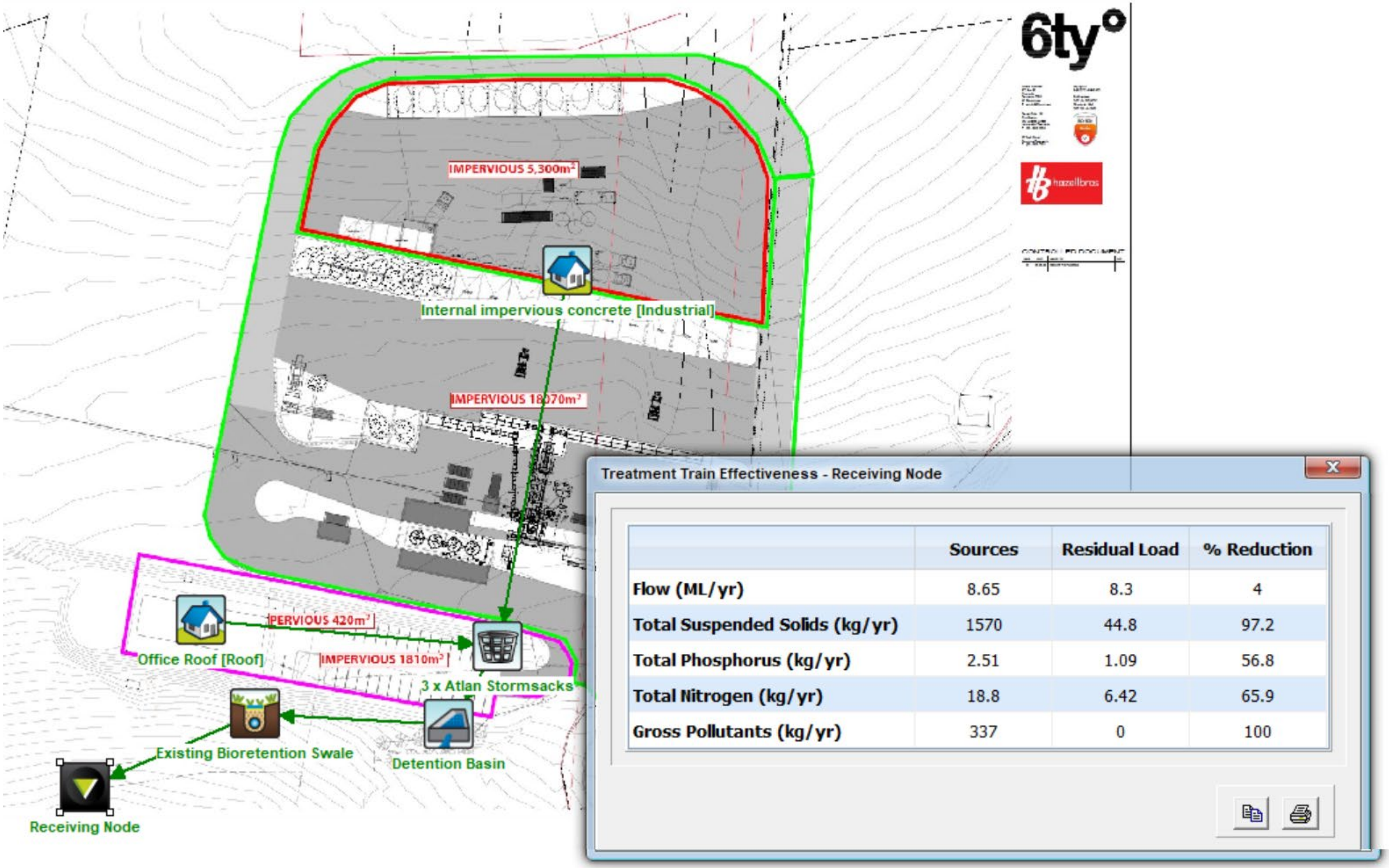
Table 9. Depth of swale components

Swale component	Depth (mm)
Filter media	250
Submerged zone	150
Drainage layer	100

The provided diagram illustrates a stormwater biofiltration system, which is designed to treat stormwater runoff by filtering it through multiple layers of media. The system ensures effective removal of contaminants before discharging treated water.

Below is a detailed breakdown of its components:

1. Pond (Surface Layer):
    - Captures incoming stormwater before it infiltrates the filter media.
    - Supports vegetation that enhances nutrient uptake and biological treatment.
    - Includes an overflow system to manage excess stormwater during high rainfall events.
2. Filter Media (Loamy Sand Layer):
    - Provides primary filtration by removing suspended solids, pollutants, and organic matter.
    - Supports plant growth, which aids in further pollutant breakdown through root interactions.
3. Submerged Zone (Sand and Carbon Source):
    - Contains a mix of sand and carbon to promote biological activity.
    - Facilitates denitrification, helping remove excess nitrogen from the water.
4. Transition Layer (Coarse Sand):
    - Prevents clogging and ensures smooth water percolation.
    - Acts as an intermediate filter between the fine filter media and the drainage layer.
5. Drainage Layer (Gravel):
    - Provides structural stability and allows free drainage of treated water.
    - Ensures consistent water movement towards the collection system.
6. Collection Pipe:
    - Captures treated stormwater and directs it towards an outflow for safe discharge.
    - Prevents prolonged water retention, reducing the risk of clogging or stagnation.



	Sources	Residual Load	% Reduction
Flow (ML/yr)	8.65	8.3	4
Total Suspended Solids (kg/yr)	1570	44.8	97.2
Total Phosphorus (kg/yr)	2.51	1.09	56.8
Total Nitrogen (kg/yr)	18.8	6.42	65.9
Gross Pollutants (kg/yr)	337	0	100

Figure 8. MUSIC Treatment Train Effectiveness Result

5.5 Quality Results

The MUSIC pollutant load reductions are detailed in Table 10 below. As can be seen when comparing the MUSIC results to the required state stormwater strategy target load reductions, the specified treatment train outlined above and as seen in Figure 8 show that all targets either meet or exceed state reduction targets.

Table 10. Pollutant Removal Achieved vs Targets.

Parameter (kg/year)	Target Load Reduction (%)	MUSIC Results	SW Targets Achieved (Y/N)
Total Suspended Solids (TSS)	80.0	97.2	Y
Total Phosphorous (TP)	45.0	56.8	Y
Total Nitrogen (TN)	45.0	65.9	Y
Total Pollutants (GP)	90.0	100.0	Y

Based on the water quality assessment using the MUSIC software, it is found that the pollutant reduction improvement can be achieved by adopting the Stormwater Quality Improvement Devices (SQIDs) specified in Table 11.

Table 11. Required SQIDS

SQID	Quantity
Bioretention swale	1 unit
Atlan StormSack or Similar	3 units

5.6 SQID Maintenance

To ensure ongoing operation of all treatment systems, the developer would be required to perform regular maintenance on all treatment devices to ensure they remain in good working order. This would include, but not be limited to, the information described in Table 12.

Table 12. Concept Maintenance Plan

Task	Action	Frequency
General Cleaning	Clear all debris/pollutants from gutters and tank filters, ensure operational	Every 3 months
Specialised cleaning and inspection	Inspect all gutters, downpipes, inflow, and outflow – clean and flush if required. Visually inspect all filters and main device/tank for defects. Replace if required.	Yearly
Maintenance	Perform detailed inspection and maintenance of tanks, and associated infrastructure by a qualified person.	Every 5 years

The above maintenance plan is generic and based on removal rates and best practice advice. Specific maintenance plans should be created for each specific device upon purchasing or confirmation of design.

5.7 Quality Summary

Flüssig Engineers recommends the following to be undertaken to ensure the ongoing stormwater quality from the developed site:

1. Construction quality control should be implemented to prevent pollution during construction.
2. Installation of treatment devices; 3 x Atlan StormSacks (or similar) and bioretention swale (or similar) in the order specified as per this document (Figure 8).
3. Maintenance plans need to be created and adhered to ensure the ongoing operation of the systems.

Flüssig Engineers note that some of the specified treatment products are proprietary products and although suitable in this instance, does not limit the developer to this product. However, any product selected by the developer should meet removal properties of these products for the MUSIC model to be valid.

Flüssig Engineers notes that if the installation of SQIDs may not be feasible due to site restrictions. Should this be the case, Flüssig Engineers recommends a contribution to council for improvements to public stormwater treatment systems downstream be made in lieu of the installation of SQIDs.

6. Conclusion

The post-development quantity and quality scenarios for the Stormwater Management Plan for the proposed asphalt batching plant at 1 Crooked Billet Drive, Bridgewater have been investigated. Post-development quantity and quality have been assessed against the Brighton Council Stormwater guidelines, Tasmanian Planning Scheme and the State Stormwater Strategy to ensure the post-development flows meet specified standards.

The following conclusions were derived in this report:

1. A comparison of the post-development peak flows for the 2% AEP and 1% AEP + climate change SSP3-7.0 factor of 1.66 storm event was undertaken against the pre-development flows and found to increase site discharge.
2. A minimum detention volume of 422 m^3 is required for the new asphalt batching plant. This allows storage of the 1% AEP + CC event while restricting the outflow to the permissible site discharge (PSD) for the 2% AEP + CC.
3. DN150 pipe outlet from the pond into the existing bio-retention swale from the detention pond.
4. New DN375 pipe outlet for the 2% AEP + CC PSD from the detention pond
5. New DN450 Overflow pipe outlet from the detention pond for the 1% AEP + CC PSD. The combined outlet flow for the Bio retention and Detention pond to not exceed an equivalent of 407mm orifice plate.
6. The existing 150 m^2 bio-retention swale, with a depth of 500 mm, provides sufficient capacity to manage the site's stormwater quality treatment requirements.
7. The 1% OFP was assessed through the site and shown that any changes in flow can directed away from neighbouring properties and critical infrastructure on site.
8. A bioretention swale designed and sized using MUSIC can achieve required pollutant removal through passive treatment.
9. SQID's designed and sized using MUSIC can achieve required pollutant removal through the installation of treatment devices.
10. Refer to civil and architectural drawings by others for the final detailed design of the detention pond and bio-retention pond.

Based in the Stormwater Management Plan, the development site will meet the current specified standards for both quantity and quality control, and the system will perform as intended provided all recommendations and assumptions in this report are implemented effectively.

7. Limitations

Flüssig Engineers were engaged by **Hazell Bros Civil Contracting Pty Ltd** in representation of the developer of 1 Crooked Billet Drive, Bridgewater development for the purpose of a site-specific stormwater management plan as per stormwater management best practices. This study is deemed suitable for purpose at the time of undertaking the study. If conditions of the development change, the plan will need to be reviewed against all changes.

This report is to be used in full and may not be used in part to support any other objective other than what has been outlined within, unless specific written approval to do otherwise is granted by Flüssig Engineers.

Flüssig Engineers accepts no responsibility for the accuracy of third-party documents supplied for the purpose of this stormwater management plan.