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Member of the Surbana Jurong Group

SMEC INTERNAL REF. 30033831

**Gladstone State Development Area**
**Development Permit**

# Substantial Change to a Material Change of Use for Medium Impact Industry (Electrolyser Production Facility)

Client Reference No. 30033831
Prepared for: FFI
23 February 2024

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# Executive Summary

Fortescue Future Industries is seeking to amend the approved and recently built Gladstone Electrolyser Facility (GEF) (formerly known as Gladstone Electrolyser Manufacturing (GEM) Facility) to allow for the testing of Electrolysers manufactured onsite. The GEF has been previously approved as a Material Change of Use (MCU) for Medium Impact Industry (Electrolyser Manufacturing Facility) under AP2021/006, with earthworks and construction having been completed at the time of writing.

The GEF facility is anticipated to manufacture 2000, 1 MW PEM electrolysers, per year. After assembly, each electrolyser needs to be tested functionally to confirm the electrolyser generates hydrogen at the specified output rate, and pressure, within the rated temperature, and with no system warnings or alarms tested prior to shipment. The electrolyser assembly building (enclosed area approx. 12,990m$^2$) and associated infrastructure and hardstand has been constructed and is currently undergoing some operational readiness and commissioning activities prior to commencement of use. Accordingly, this substantial change involves the development of an electrolyser Function Test Stations (FTS) in a separate building (1,282m$^2$) to the rear of the main electrolyser assembly building.

For the first stage of this project four 1 MW PEM electrolyser Function Test Stations (FTS) shall be supplied by Greenlight Innovation with capacity to test 2000 1 MW PEM electrolysers per year. These FTSs vent the produced hydrogen and oxygen gases from electrolysis to atmosphere.

To enable the construction of this facility, a Substantial Change application is required to ensure the facility can be granted the necessary MCU planning approval including changes to the SDA conditions of approval to facilitate the testing of electrolysers.

The proposed development is seeking to comply with the required assessment outcomes and has provided a host of supporting information to demonstrate this compliance.

In general, this development represents changes to an existing approved project of great potential, with the ability to generate large amounts of green hydrogen, greatly contributing to the State Government's renewable energy targets, and it is hoped that the assessing bodies will be in favour of this proposed development.

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# Introduction

In accordance with Section 84D of the State Development and Public Works Organisation Act 1971, this application is submitted seeking approval under legislative guidelines for a modification to an existing 'State Development Area' (SDA) approval.

The State Development and Public Works Organisation Act 1971 defines change to an SDA as:

***change application—***

*(a) for a development approval—means a change application under the Planning Act for the approval; or*

*(b) for an SDA approval—see section 84F (1).*

The State Development and Public Works Organisation Act 1971 identifies two potential processes for a change application for an SDA approval to follow, depending on the nature of the change requested, being:

- **minor change application** means a change application for a minor change to a development approval, as defined in the Planning Act.
- **substantial change** to an SDA approval will follow the assessment process for an SDA application in accordance with the relevant development scheme.

The proposed change is inconsistent with the existing development approval; given the applicant seeks to include an additional building, increasing the gross floor area and produces emissions. These changes are not considered a Minor Change given the increase in GFA and the production of emissions. As such, the proposed works require lodgement for an 'substantial change' application.

This Town Planning Report has been prepared in support of a Change to an existing approved Development Application for a Material Change of Use to establish Medium Impact Industry (Electrolyser Production Facility) on Lot 4 on SP245936 (the Site), which is located within the Gladstone State Development Area. Refer Title Search in **Appendix A**.

This documentation has been prepared by SMEC for and on behalf of the Proposal Proponent. This Development Application has been made to the Office of the Coordinator General, Queensland (hereafter 'OCG'), who is the Assessment Manager for the Development Application, due to the Site's location within the Gladstone State Development Area. The 'Gladstone State Development Area Development Scheme' dated May 2022 is the higher order planning instrument for development within the Gladstone State Development Area.

Under the Development Scheme the subject site is identified as being located within High Impact Industry Precinct. Section 2.4.1 of the Development Scheme provides specific planning provisions for development within the High Impact Industry Precinct.

This application is seeking approval for Material Change of Use for Medium Impact Industry (Electrolyser Production Facility) defined as follows:

***Medium impact industry*** *means the use of premises for an industrial activity that:*

*(a) includes the manufacturing, producing, processing, repairing, altering, recycling, storing, distributing, transferring, or treating of products*

*(b) requires onsite controls for emissions, hazardous substances and dangerous goods risks*

*(c) has one or more of the following attributes:*

*(i) potential for noticeable impacts on sensitive land uses due to offsite emissions including aerosols, fumes, particles, smoke, odour, and noise*

*(ii) potential for noticeable offsite impacts in the event of fire, explosion, or toxic release*

*(iii) minimal traffic generation and heavy-vehicle usage*

*(iv) operations are primarily undertaken indoors, including any evening or night activities.*

Specific forms of development under the Development Scheme are 'regulated' pursuant to the State Development and Public Works Organisation Act 1971 (SDPWO Act). The Development Scheme sets out SDA Self-Assessable

Development and SDA Assessable Development. Within the High Impact Industry Precinct, Material Change of Use for Medium Impact Industry (Electrolyser Production Facility) is identified as SDA Assessable Development.

It is deemed that the necessary compulsory details outlined in the applicable Development Application (DA) forms, along with supplemental technical information, have been supplied to facilitate in granting approval for the proposed modification.


Figure 1-1 Photo of Built Medium Impact Industry

# 1. Overview – Substantial Change

This application seeks to modify an existing State Development Area (SDA) approval under Section 84F of the State Development and Public Works Organisation Act 1971. Specifically, the request pertains to the current development approval (AP2021/006) which has been constructed (but still undergoing internal fit out and commissioning). The proposed modifications are substantial, involving an additional building (approx. floor area 1,282m$^2$) accommodating four (4) functional (electrolyser) test stations, necessitating an adjustment to the SDA approval, as they go beyond minor alterations.

# 2. Site Details and Characteristics

The following sections 2.1 through to 2.10 include content consistent with previously provided development applications over Lot 4 on SP245936. Unfortunately, some of the imagery does not reflect the extent of the current constructed development on site. Accordingly, photos have also been included showing the current status of site development.

# 2.1 Site Details

## 2.1.1 Location

The property address is Euroa Circuit, Aldoga, Queensland. It is located approximately 20km west of the centre of Gladstone.


Figure 2-1 Location Plan (Source: OpenStreetMap).

## 2.1.2 Real Property Description

The Site's real property description is Lot 4 on Plan Number SP245936.

## 2.1.3 Shape, Size and Ownership

The overall area of the Site is 99.84 hectares, is generally regular in shape with a splayed north-west corner.

The Site is currently owned by the Minister for Economic Development Queensland. Land Owner's acknowledgement and consent for this Application is provided in **Appendix B.**

An easement comprising an area of 18.67 hectares dissects the northern extent of the Site. The easement is for the purpose of drainage.

## 2.1.4 Application Boundary

The approved Application boundary covers 4.0 hectares of the overall Site and relates to land directly fronting Euroa Circuit. It is in the north eastern corner of the Site. Given the proposed Gladstone Testing Facility is located outside the existing approved application boundary, the proposed development seeks to extent this boundary to encompass the GTF.

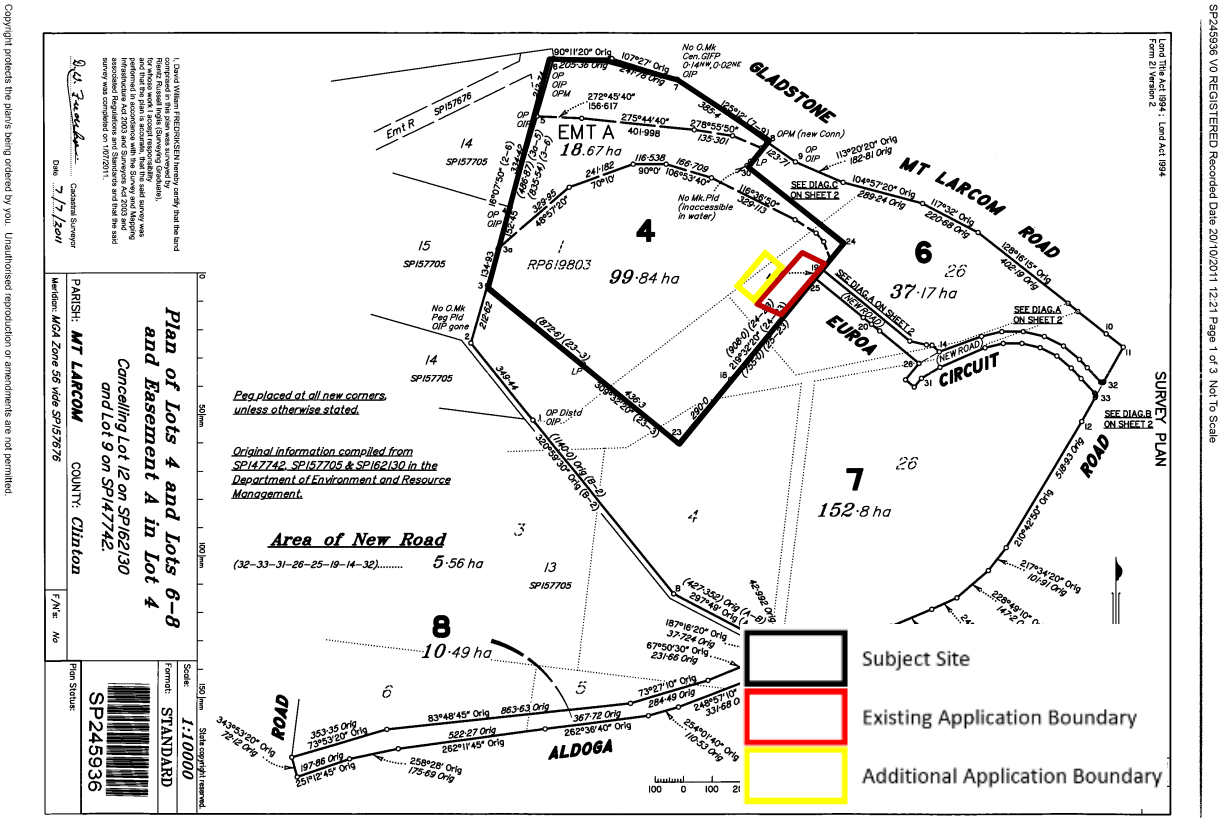


Figure 2-2 Title Plan

## 2.2 Site Characteristics

### 2.2.1 Current Use

The Site is currently vacant refer to Figure 2-3.

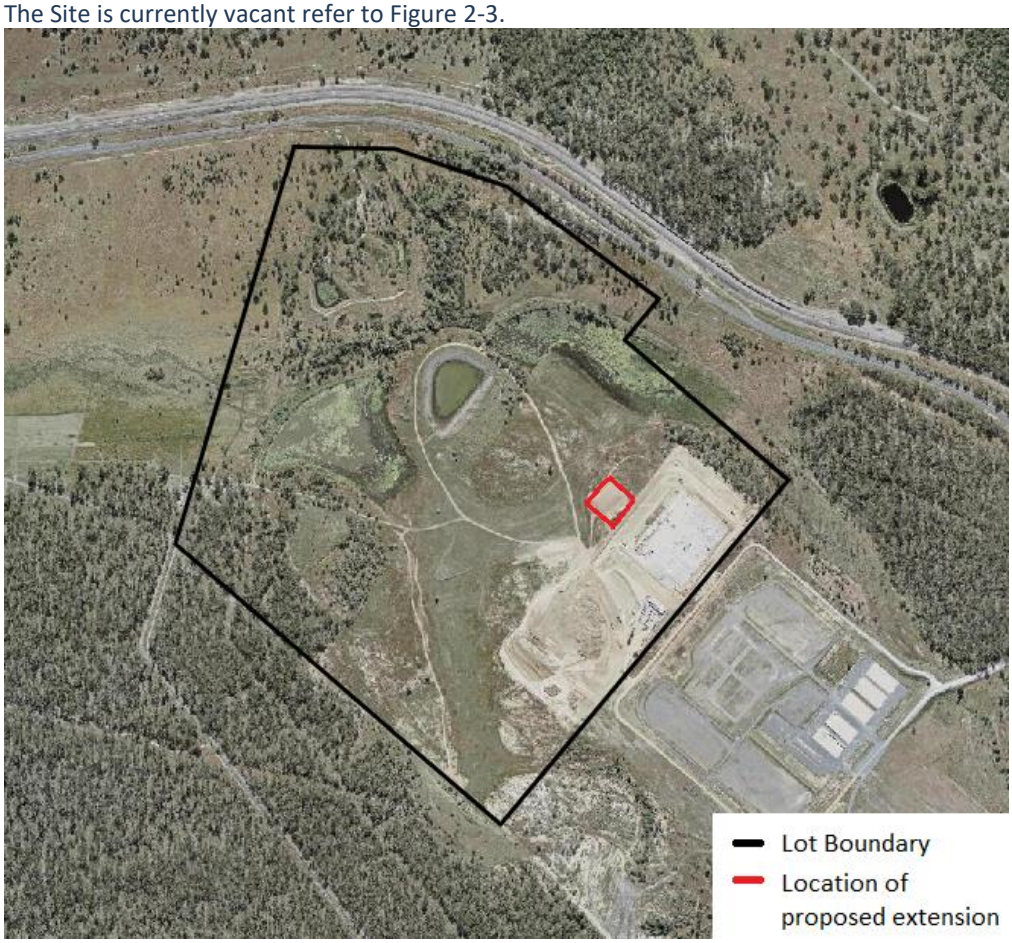


Figure 2-3 Aerial Photo (Source: Queensland Globe)

### 2.2.2 Road Frontages

The Site fronts onto Euroa Circuit along its south-east boundary and Unnamed Road runs along the Site's north-west and south-west boundaries (refer Figure 2-4).

Figure 2-4 Aerial site photo identifying road frontage

### 2.2.3 Vegetation

There is no vegetation within the Development Envelope. The proposed additional building is positioned in a portion of the site that has been previously cleared of any regrowth vegetation.

Some vegetation exists elsewhere on Lot 4 away from the proposed development in the north and north-east, primarily within the easement land. A small area of vegetation also exists in the south-west of the Site. The proposed works will be well separated from existing vegetation, ensuring these areas will not be disturbed.

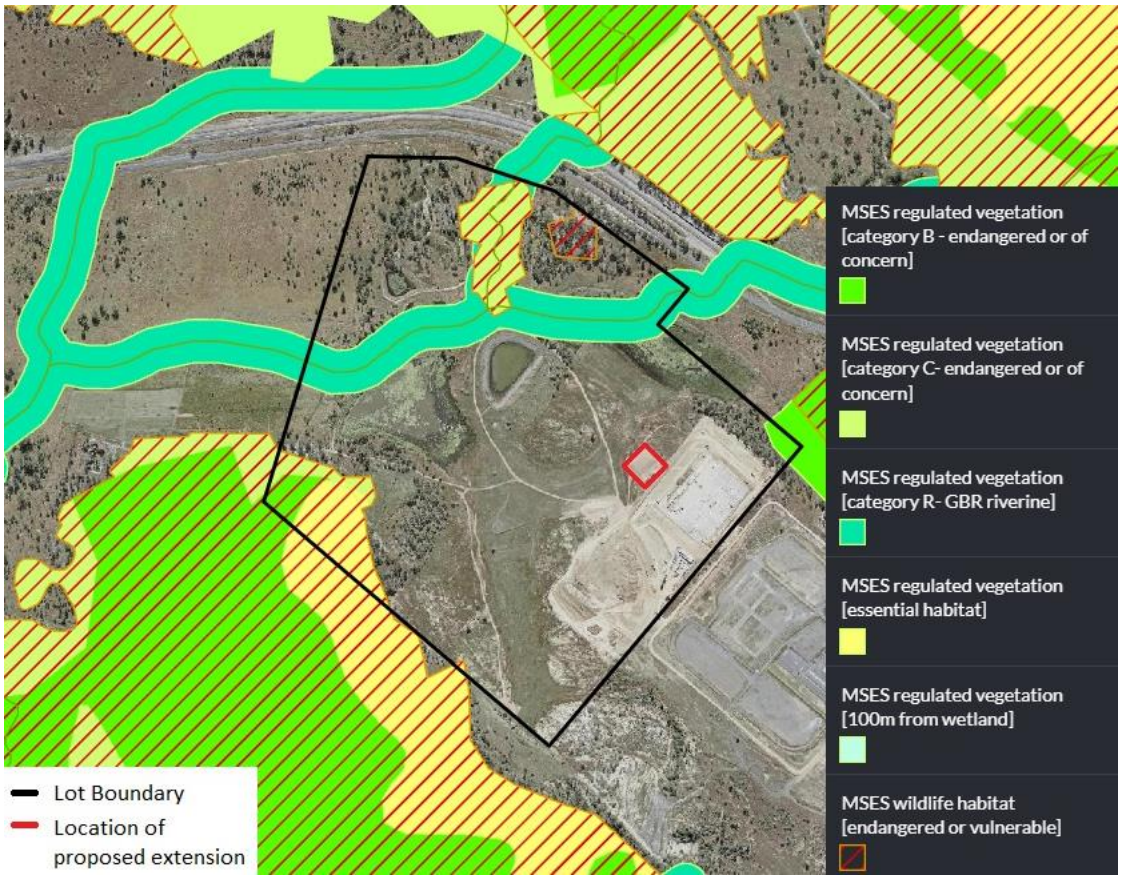


Figure 2-5 MSES Mapping (Source: Queensland Globe)

### 2.2.4 Waterway Values

The Queensland Globe Map indicates that there are three Lacustrine wetlands with habitat type artificial/ highly modified wetlands approximately 200m to the north/north-west of the boundary of the Site.

Mapped waterways for Queensland Waterway and Barrier works are located along the north and north-west side of the Site. According to State mapping the watercourses are not located near the proposed development, differing from the GRC mapping of the site (refer Figure 2-8). Current DES VMA mapping (September 2022) does not identify the presence of a watercourse on the southern side of the wetland (refer Figure 2-9). Therefore, the development proposed by this application does not interfere with the mapped waterways.

As the MSES value is not present either on-ground or within updated DES mapping, assessment against the benchmarks for *accepted development subject to requirements and assessable development* are not considered required, relative to the application.

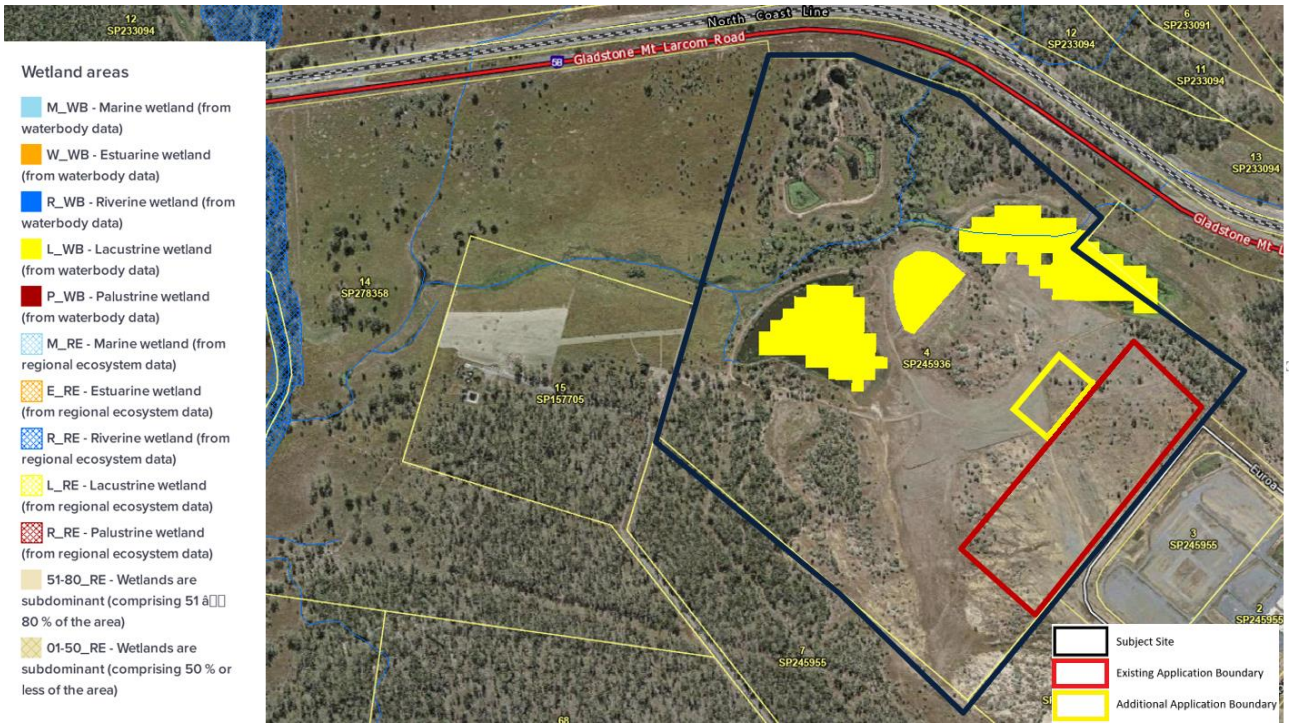


Figure 2-6 Wetlands area (Source: Queensland Globe Map)

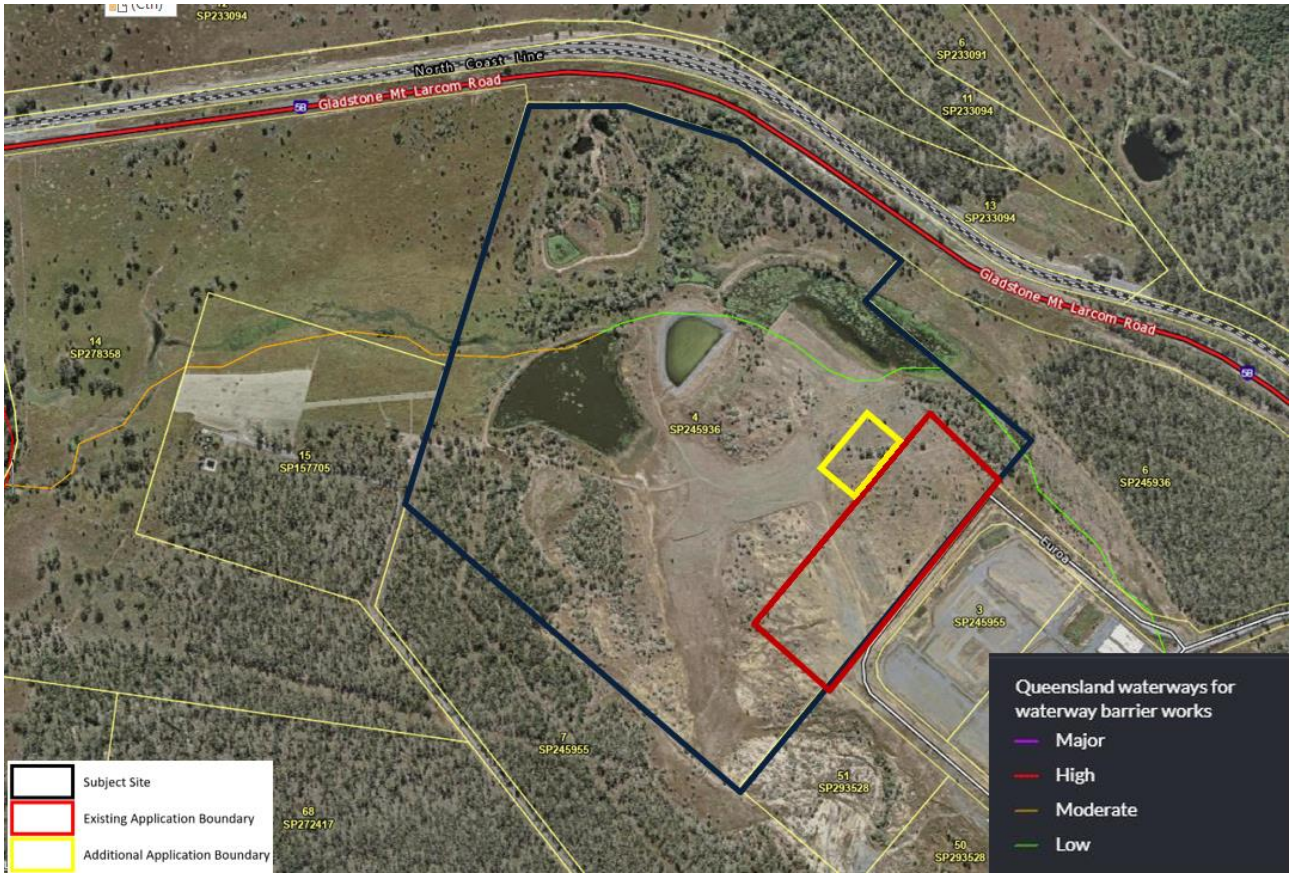


Figure 2-7 Queensland Waterways (Source: Queensland Globe)

Figure 2-8 GRC VMA spatial mapping watercourse (southern side of the wetland)


Figure 2-9 Current DES VMA spatial mapping

### 2.2.5 Topography

Previous earth works have been carried out across the central portion of the Site, including land within the existing approved Application Boundary. This means the majority of the Site the topography is relatively flat, with steeper areas in the north-east and southern corners of the Site. Refer to Figure 2-10 and **Appendix C**.

The Steep Land Overlay plan from the GRCPS (refer Figure 2-11) indicates that four small areas of steep land are identified around the Site but not within it.

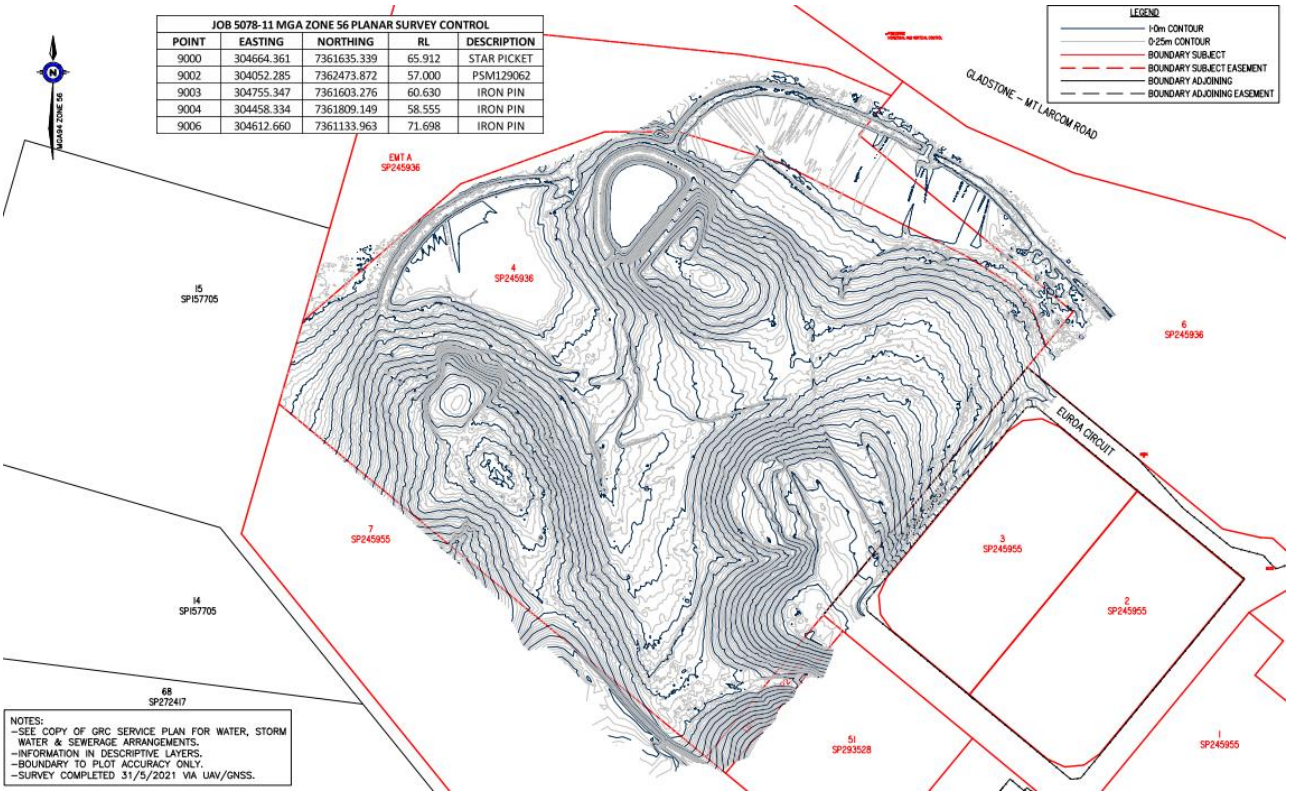


Figure 2-10 Site Survey (Source: Fredrickson, McClean Associates)

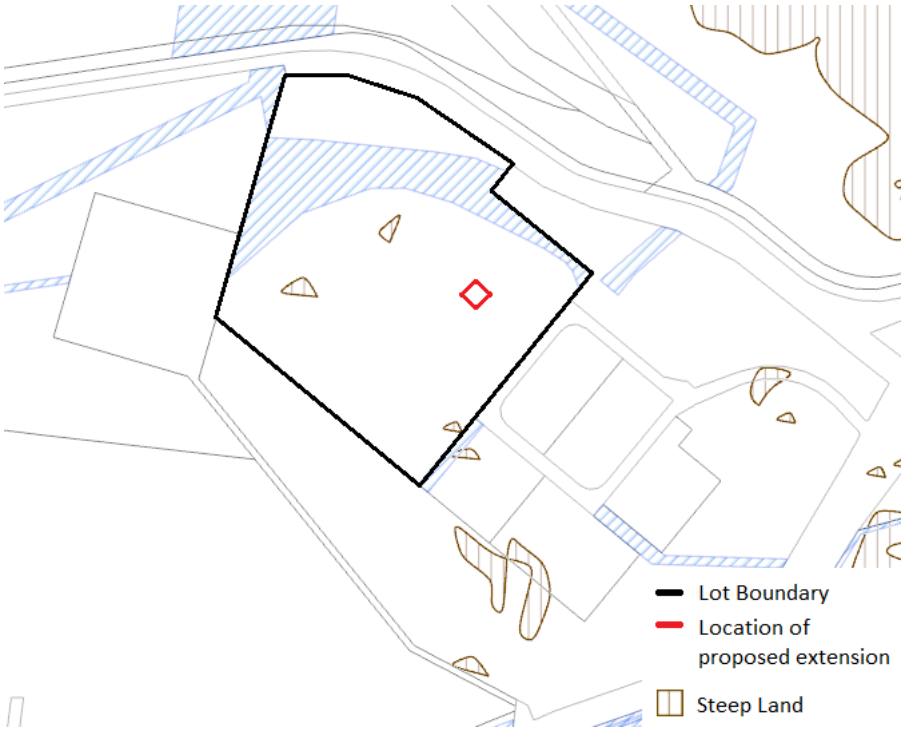


Figure 2-11 Steep land overlay (Source: GRCPS)

### 2.2.6 Geology

There are two dominant soil types on the Site: alluvium and residual soils. The alluvium generally consists of very stiff clay of high plasticity and dense sands and was found in the northern section of the Site. The residual material generally comprises a superficial surface layer of medium dense to dense sand overlying hard clay of high plasticity. Underlying this profile is bedrock.

### 2.2.7 Flooding Characteristics

The Site is not within a flood hazard area, as determined by reference to the Gladstone Regional Council Planning Scheme overlay for flood hazard.

### 2.2.8 Infrastructure Services

The proposed GTF will be supported by its associated balance of plant. The Site will be serviced by water and electricity to facilitate the requirements of the proposed development. The contains an existing approved onsite sewage treatment plant, this will be utilised for by the proposed GTF.

### 2.2.9 Surrounding Land Uses

The surrounding area is largely vacant, however there is a residue storage facility approximately 300m south-east of the Site. Given the industrial nature of the two facilities and the distance between them, it is anticipated that the proposed Medium Impact Industry (Electrolyser Production Facility) will have no adverse impacts upon the residue storage facility, nor will that facility have any adverse impacts upon the proposed development.

### 2.2.10 Gladstone State Development Area

The Site is within the Gladstone State Development Area (GSDA). In December 1993, approximately 6,800 hectares of land at Aldoga, north-west of Gladstone, was declared a state development area. The declaration followed an extensive review of land in the Gladstone region suitable for future large-scale industrial development. This land was considered broadly suitable for large-scale industrial development on the basis that it conformed to acceptable engineering, environment and social criteria, as identified in the Gladstone Industrial Land Use Study.

Over time, the GSDA has been amended and now comprises approximately 29,000 hectares. In December 2010, amendments were made to support industrial development and to protect the environmental values of the GSDA.

**Major industries currently established in the GSDA include:**

- Rio Tinto (formerly Comalco) Alumina refinery (RTA Yarwun) which was first operational in 2004;
- Orica Chemical Manufacturing complex which commenced operations in 1989; and
- Transpacific Industries Waste Management and Recycling facility.

# 3. Proposed Development

## 3.1 Background

Gladstone Fortescue Future Industries (the Principal) has developed an Electrolyser Manufacturing Facility known as the Gladstone Electrolyser Facility. To support the production of electrolysers, a dedicated testing facility, known as the GTF, will be constructed to accommodate the Functional Test Stations (FTS) and associated Balance of Plant (BOP). Factory acceptance testing will be conducted in the GTF to ensure quality standards are maintained. Facilities GEF and GTF are located at Lot 4, Euroa Circuit, Aldoga, Queensland 4694.

Figure 3-1 Site Render prepared by Elevation Architecture

Gladstone Fortescue Future Industries (FFI) (the Principal) has developed The Gladstone Electrolyser Facility referred to as the GEF. Approval of AP2021/006 was granted on November 12, 2021, for the Material Change of Use for the installation of an Electrolyser Production Facility. Approval was granted for the development of a 2GW Electrolyser Assembly Facility, Electrodes and Membranes Facility, an Office, and Main Facility Hardstand. Details regarding the facilities are outlined below in section 2.4 Built Form. To support the production of electrolysers, a dedicated testing facility, referred to as the GTF, is proposed, designed to accommodate the Functional Test Stations (FTS) and associated Balance of Plant (BOP) (refer to Appendix C).

Figure 3-2 Functional Test Stations and associated Balance of Plant renders prepared by Elevation Architecture

Factory acceptance testing will be conducted in the GTF to confirm that the electrolyser generates hydrogen at the specified output rate and pressure, within the rated temperature, and with no system warnings or alarms tested prior to shipment. For the first stage of this project, four 1 MW PEM electrolyser FTS shall be supplied by Greenlight Innovation, with the capacity to test 2000 1 MW PEM electrolysers per year. These FTSs vent the produced hydrogen and oxygen gases from electrolysis to the atmosphere. Facilities GEF and GTF are located at Lot 4, Euroa Circuit, Aldoga, Queensland 4694.

As such, this Town Planning Report has been prepared in support of a Substantial Change to an approved Development Application for a Material Change of Use to establish a Medium Impact Industry (Electrolyser Production Facility and GTF) on Lot 4 on SP245936 (the Site), which is located within the Gladstone State Development Area.

Figure 3-3 Functional Test Stations and associated Balance of Plant renders prepared by Elevation Architecture

## 3.2 Application Particulars

This Town Planning Report has been prepared in support of a Substantial Change to an approved Development Application for a Material Change of Use, seeking to establish a Medium Impact Industry, specifically an Electrolyser Production Facility and GTF, on Lot 4 on SP245936 (the Site). The Site is situated within the Gladstone State Development Area.

This documentation has been compiled by SMEC on behalf of the applicant, The Project Proponent. The Development Application has been submitted to the Office of the Coordinator General, Queensland (hereafter referred to as 'OCG'), who serves as the Assessment Manager for the Development Application. This designation is due to the Site's location within the Gladstone State Development Area. The 'Gladstone State Development Area Development Scheme,' dated May 2022, stands as the primary planning instrument governing development within the Gladstone State Development Area.

Under the Development Scheme the subject site is identified as being located within High Impact Industry Precinct. Section 2.4.2 of the Development Scheme provides specific planning provisions for development within the High Impact Industry Precinct.

This application is seeking approval for a change to an existing approved development seeking a Material Change of Use for Medium Impact Industry (Electrolyser Production Facility) defined as follows:

*Medium impact industry means the use of premises for an industrial activity that:*

> *(a) includes the manufacturing, producing, processing, repairing, altering, recycling, storing, distributing, transferring, or treating of products*
>
> *(b) requires onsite controls for emissions, hazardous substances and dangerous goods risks*
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> >
> > *(iii) minimal traffic generation and heavy-vehicle usage*
> >
> > *(iv) operations are primarily undertaken indoors, including any evening or night activities.*

Specific forms of development under the Development Scheme are 'regulated' pursuant to the State Development and Public Works Organisation Act 1971 (SDPWO Act). The Development Scheme sets out SDA Self-Assessable Development and SDA Assessable Development. Within the High Impact Industry Precinct, Material Change of Use for Medium Impact Industry (Electrolyser Production Facility) is identified as SDA Assessable Development.

## 3.3 Pre-lodgement Meeting.

FFI have held two pre-lodgement meetings for this Development Application which were facilitated by the Office of the Coordinator General. These occurred on the 27 July 2023 and 10 October 2023. These meetings included discussion on the scale of the change, position within the developed project footprint, emissions releases and expected changes to previous assessments (i.e. traffic assessment). All of these aspects are covered in this supporting report.

## 3.4 Proposal Description

The approved development encompasses a four (4) hectare site situated on Lot 4 of Plan Number SP245936.

The proposed 4.0-hectare development footprint will be positioned within a 200-meter setback from Euroa Circuit, in a specific location as seen in figures Figure 3-5 Aerial Built Gladstone Electrolyser Factory, dated April 2023.Figure 3-9 Bulk Earthworks Plan as Constructed..

The proposal involves a 2GW Automated Assembly Facility, which constitutes Stage 1 of the Precinct redevelopment, and a Testing Facility. The Automated Assembly Facility area is designated to receive components, assemble, and dispatch hydrogen electrolysers for various hydrogen projects. The estimated area of the Automated Assembly Facility

is approximately 12,990 sqm (14,450 sqm inclusive of external plant areas), and the GTF is estimated to be approximately 1,134 sqm. The proposal is referred to as "Medium Impact Industry (Electrolyser Production Facility)."

The Substantial Change Development includes the establishment of a GTF designed to support the production of electrolysers. The GTF is intended to accommodate the Functional Test Stations (FTS) and associated Balance of Plant (BOP). Factory acceptance testing will be conducted in the GTF to ensure quality standards are maintained. Facilities GEF and GTF are located at Lot 4, Euroa Circuit, Aldoga, Queensland 4694. Due to the nature of the GTF, hydrogen and brine will be produced as by-products. Hydrogen produced from the testing will be released into the atmosphere from the facility and dispersed. Dispersion modelling has confirmed that the release will not cause an impact on the surrounding developments. The Site will include 4 test stations, each capable of outputting approximately 18kg/hr. Assuming all test stations operate simultaneously, the test station peak flow will be approximately 90kg/hr. It is not expected that each test station will be operating simultaneously regularly.

Brine produced from the testing will be directed to the RO; the RO reject water will be relocated offsite to a suitable disposal facility.

Stormwater infrastructure was required to service the Site, and this infrastructure extends further into Lot 4, outside of the main 4.0-hectare site for the approved proposed development. Regarding the major change (GTF), the additional building area will direct clean runoff into the recently constructed site stormwater controls and has been designed to not impact or alter the existing on-site approved stormwater management plan.

**Unaffected Elements:**

- Onsite Stormwater Management Controls: The current plan for managing onsite stormwater remains in effect.
- Traffic Management: No changes to the level of on-site vehicle servicing or manoeuvring.
- ERA 63 for Sewage Treatment: Continuation of the existing approval.
- Water Supply Demand from GWAB (45ML/annum): No alterations to the approved water supply demand.
- Emergency Response Evacuation Plans: The existing facility evacuation plans remain unchanged; however, a new response plan will be introduced for the GTF.

Further details on stormwater infrastructure are provided in section 3.8.2 below.

Architectural Plans are at **Appendix D**.

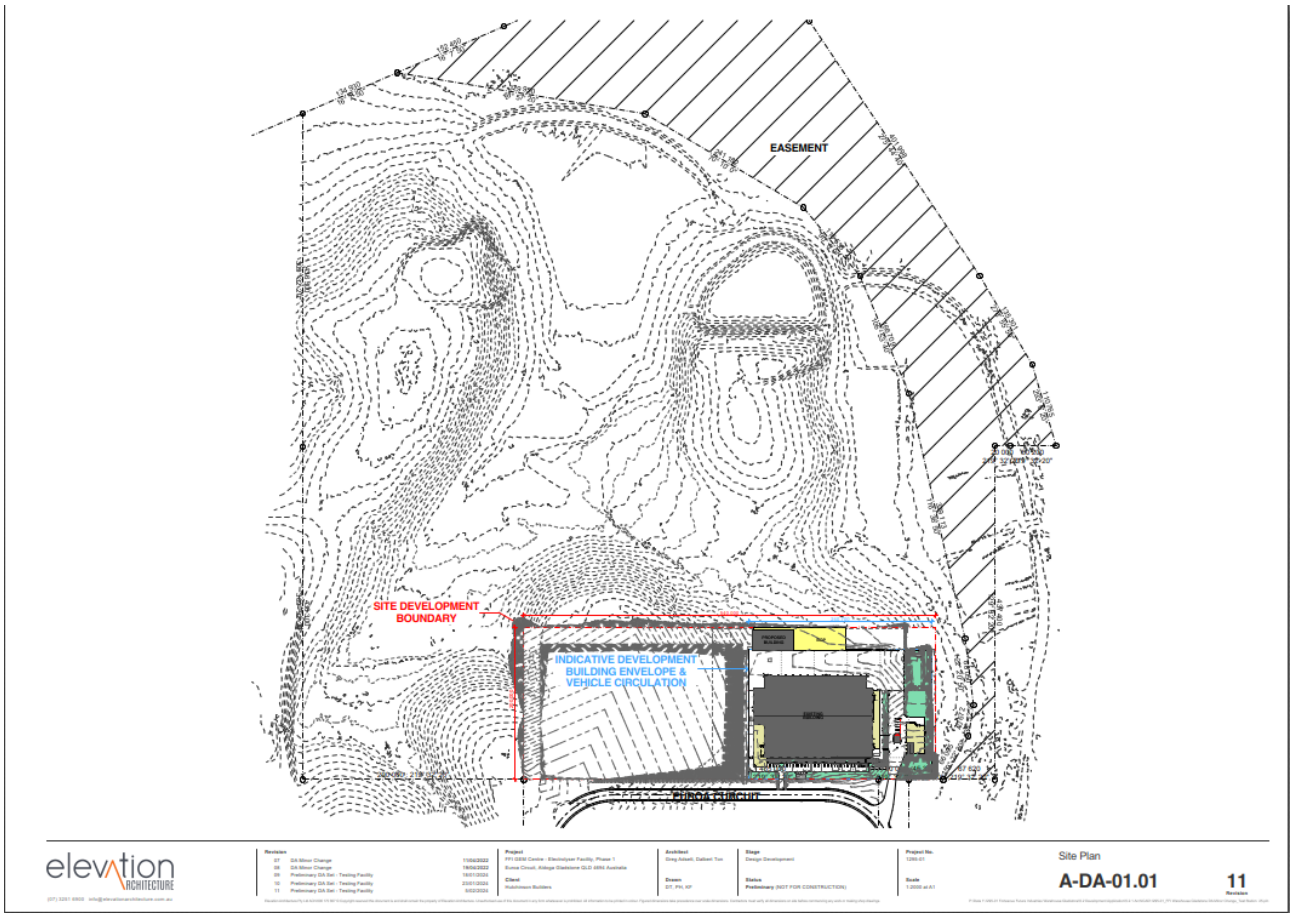



Figure 3-4 Overall Site Location Plan

## 3.5 Built Form

The previously approved GEF described within this planning report has since been constructed. The proposed GTF will be situated onsite adjacent to the existing GEF. The proposed GTF will not impact the existing built form of the GEF. Refer to Figures 4- to 4- for as constructed drawings.

Figure 3-5 Aerial Built Gladstone Electrolyser Factory, dated April 2023.

Figure 3-6 Built Gladstone Electrolyser Factory.

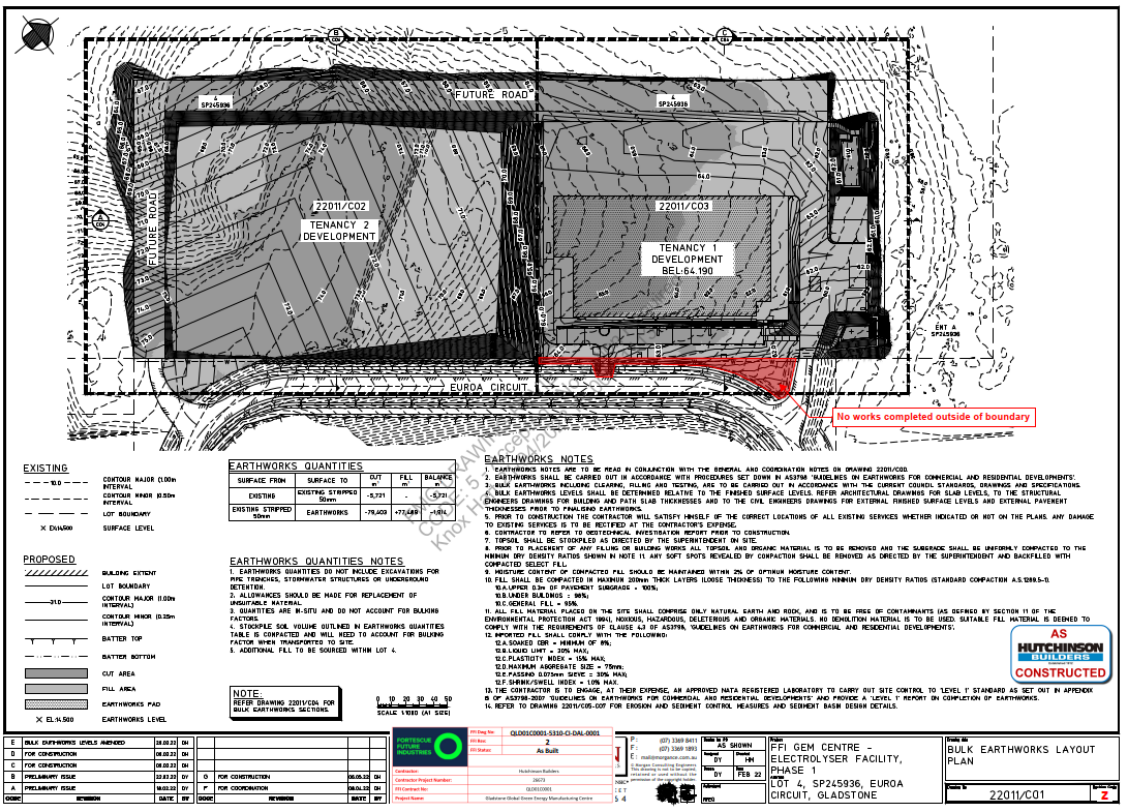



Figure 3-7 Bulk Earthworks Layout Plan as Constructed.

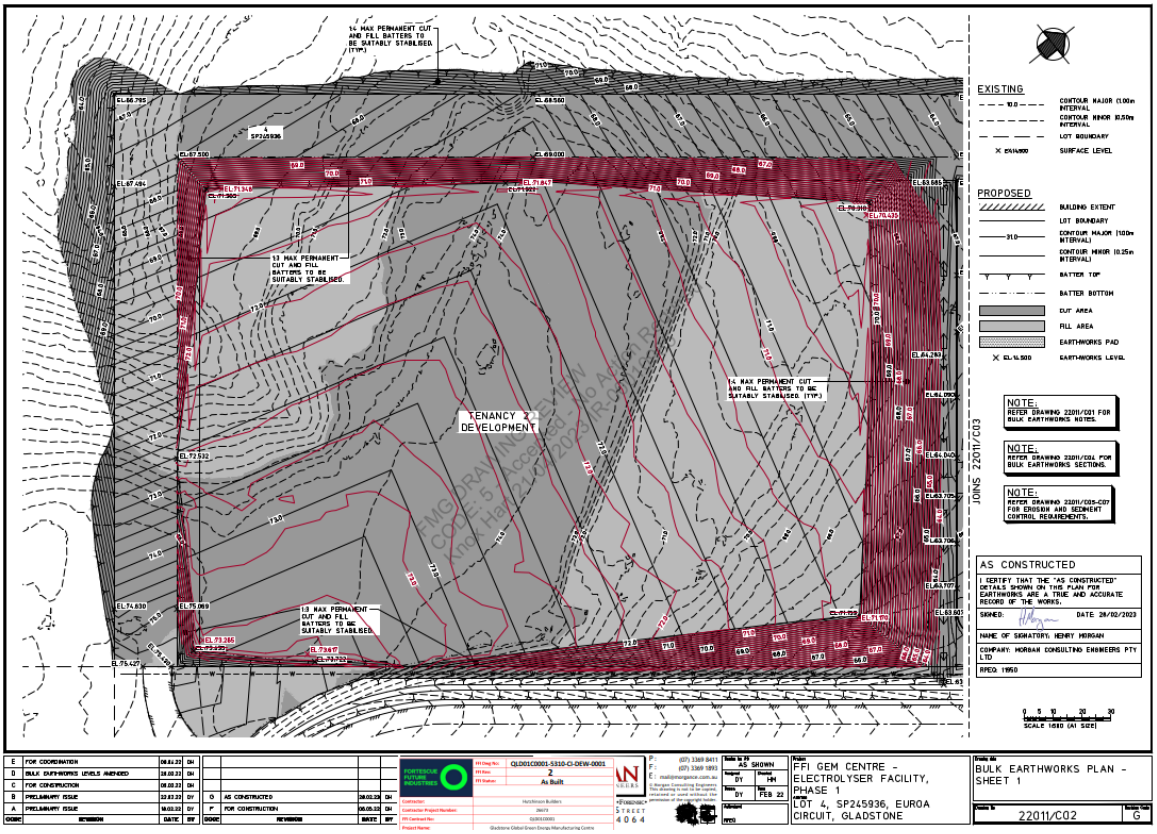



Figure 3-8 Bulk Earthworks Plan as Constructed.

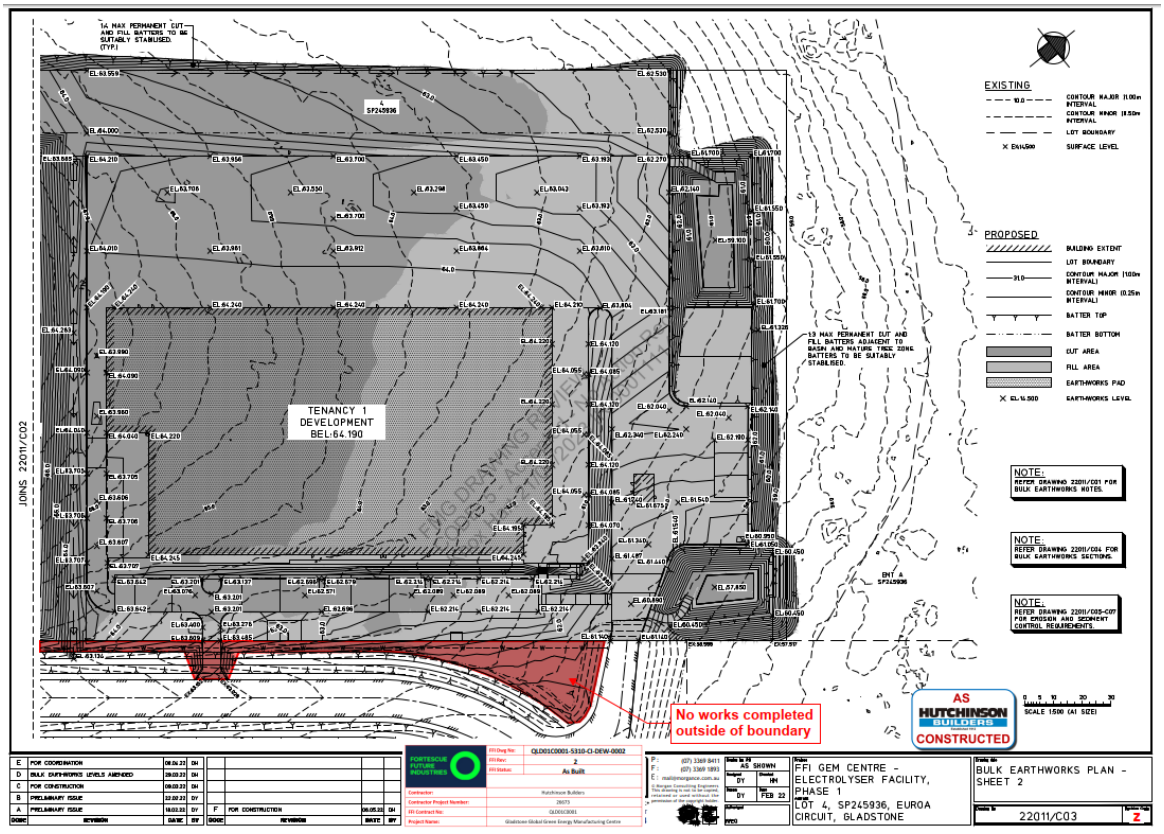



Figure 3-9 Bulk Earthworks Plan as Constructed.

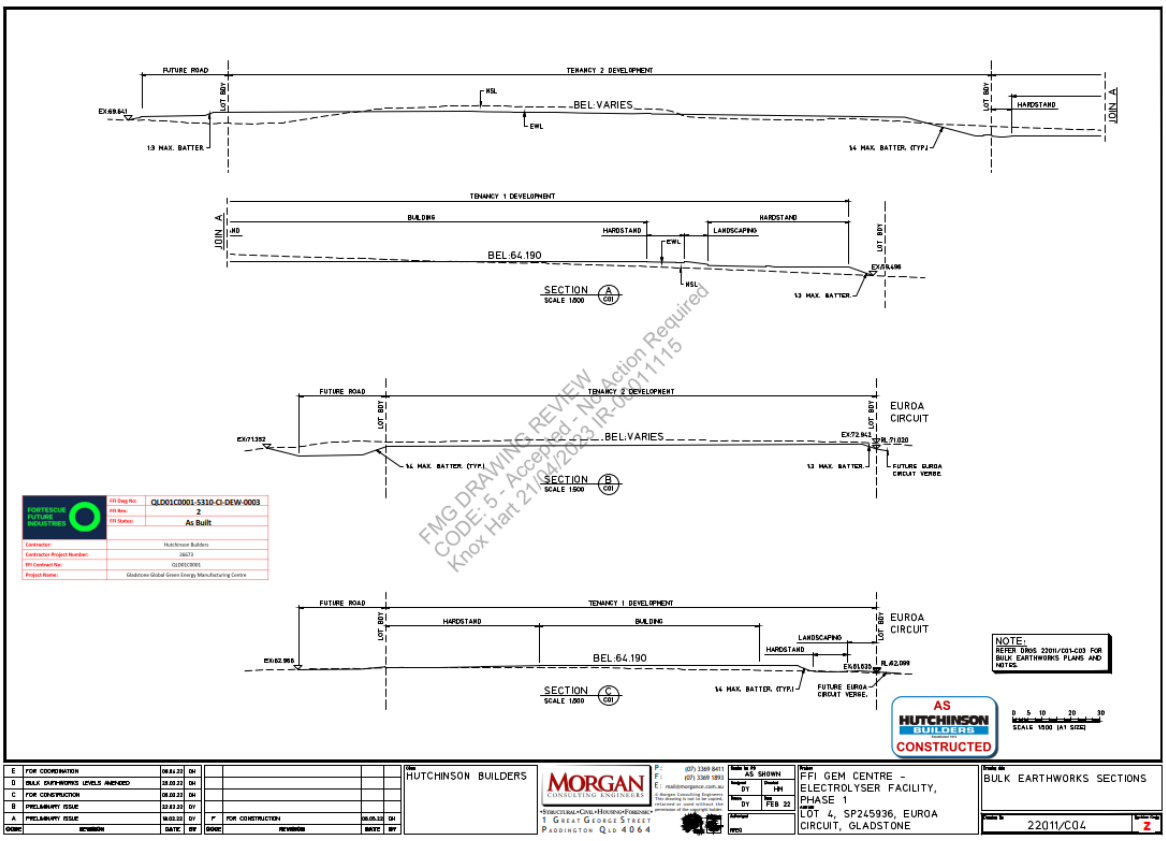



Figure 3-10 Bulk Earthworks Sections as constructed.

## 3.5.1 Site Layout

The manufacturing process of the electrolysers is considerate of environmental impacts. Specifically, the manufacturing process uses manufacturing machinery to cut thin materials that will be assembled in what is referred to as an electrolyser stack. There is also a proposed injection moulding operation that produces parts of the electrolyser. These processes will have negligible environmental impacts and all emissions, including noise and air, will be contained within the building.

The proposed Substantial Change Development involves the establishment of the GTF designed to support the production of electrolysers by allow the manufactured electrolysers to be tested prior them leaving site. It is proposed the GTF is designed to accommodate the functional Test Stations (FTS) and associated balance of Plant (BOP). Factory acceptance testing will be conducted in the GTF to ensure quality standards are maintained.

**2GW Electrolyser Assembly Facility - Constructed**

- The facility will contain a fully automated production line.
- Truck access and turning circles will need to accommodate heavy ridge and heavy articulated vehicles a separate ingress/ egress point will be provided to accommodate this access to site.
- Truck circulation will be provided with the proposed development area.
- The facility is to have a concrete delivery/despatch apron with awning roof above.

**Office - Constructed**

- The facility is to include a two-storey office, crib room, toilet amenity and shower area.

**Electrodes and Membranes Facility - Constructed**

- The Electrodes and Membranes (E&M) Facility is to receive raw materials and components, cut, shape or otherwise assemble and dispatch electrodes, membranes and other electrolyser components or feedstocks for the Hydrogen Electrolyser facility. The area of the facility required is estimated to be approximately 4,000 sqm.

- Truck access and turning circles will need to accommodate semi-trailer with a separate entry and exit point to the Site. Truck circulation will be required adjacent to the facility per the master site plan attached.
- The facility is to have a concrete delivery/despatch apron with awning roof above.
- The facility will need to have a clear height underneath any support beams <6 metres to allow for vertical storage systems.

**Main Facility Hardstand - Constructed**

- The Site is approximately 40,000 sqm including approximately 14,450 sqm of building, leaving 25,550 sqm of concrete hardstand. The hardstand area is to be utilised for:
    - Inbound trailer staging area;
    - Bulk Storage area;
    - Back freight area;
    - Trailer staging area outbound.

**Gladstone Testing Facility – Proposed Substantial Change**

- 4 x Functional Testing Stations, each outputting approximately 18kg/hr, peak flow is approximately 90kg/hr assuming all test stations are operating simultaneously.
- All waste process water will be directed to the RO and temporarily treated onsite to be redirected offsite to a suitable disposal centre.
- Hydrogen will be produced as a result of the testing, due to the quantities, the hydrogen will be released into the atmosphere. Modelling has confirmed no impact to the surrounding developments will occur.
- Associated Balance of Plant will be utilised to support the testing process which takes in the order of 40 hours per unit.

The use of all materials and substances will be in accordance with occupational health and safety and relevant standards, codes and Authority requirements.

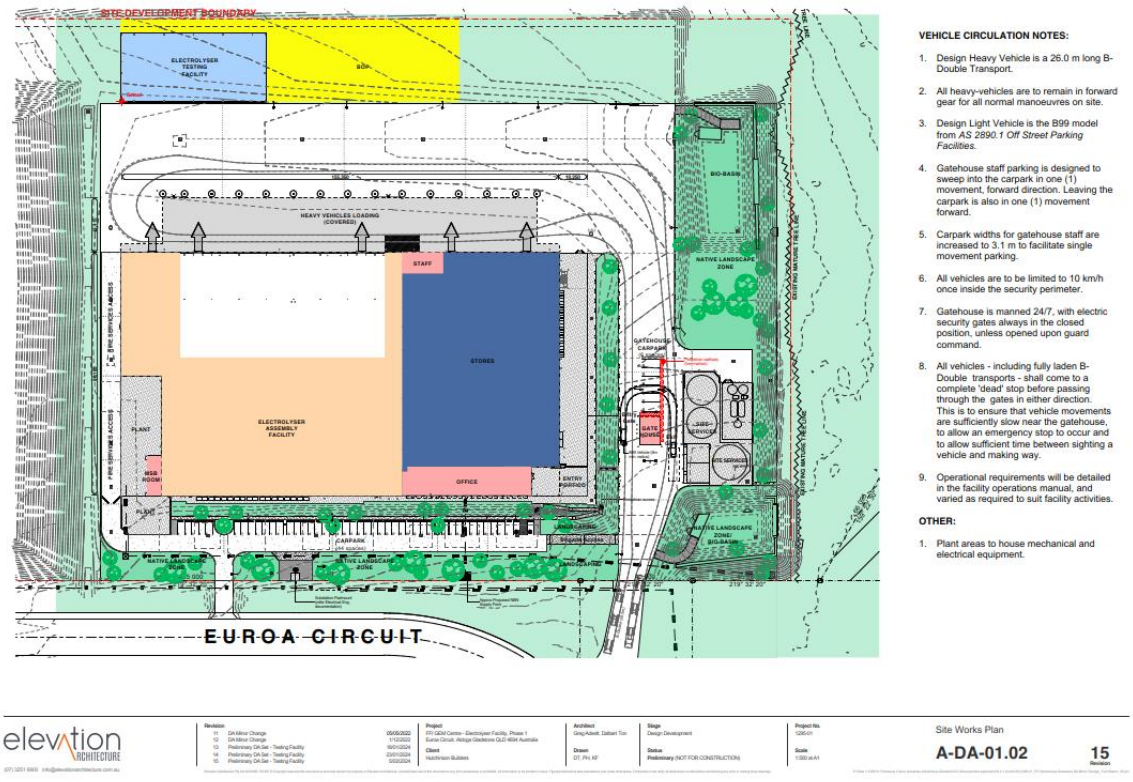



Figure 3-11 Building Layout excluding Gladstone Testing Factory

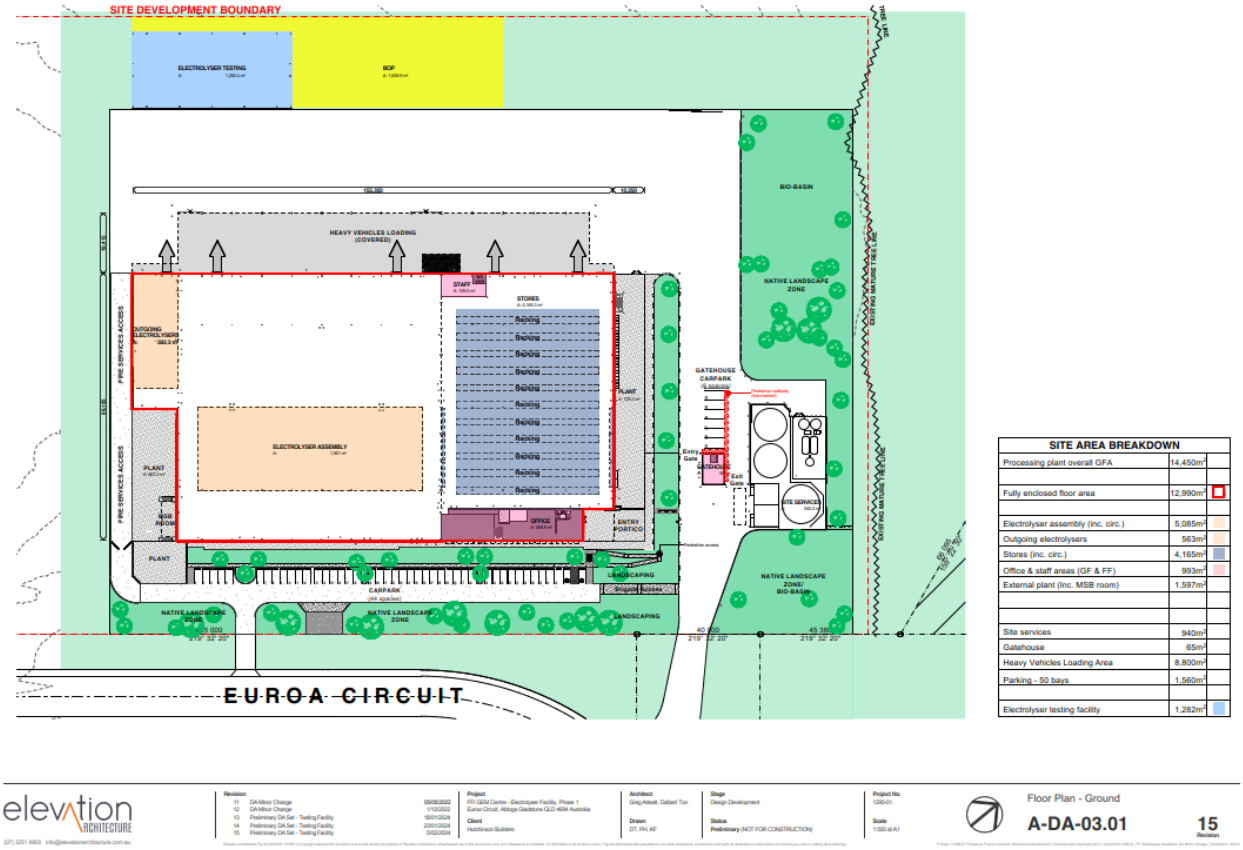



Figure 3-12 Ground Level Floor Plan

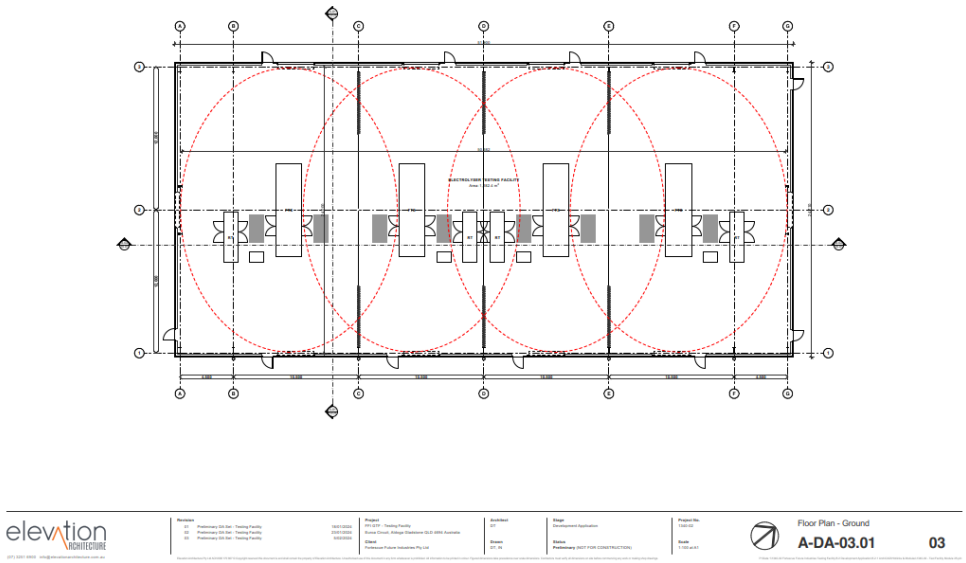



Figure 3-13 Proposed site Layout including Gladstone Testing Factory

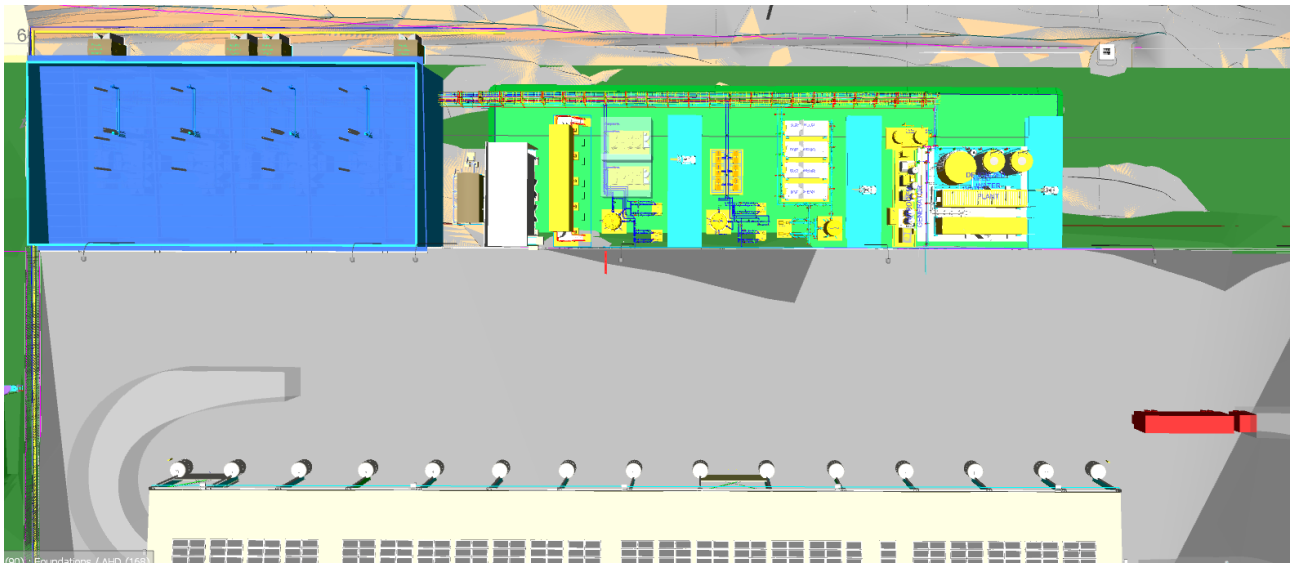


Figure 3-14 Indicative 3D model Layout including Gladstone Testing Factory and Balance of Plant (BOP)

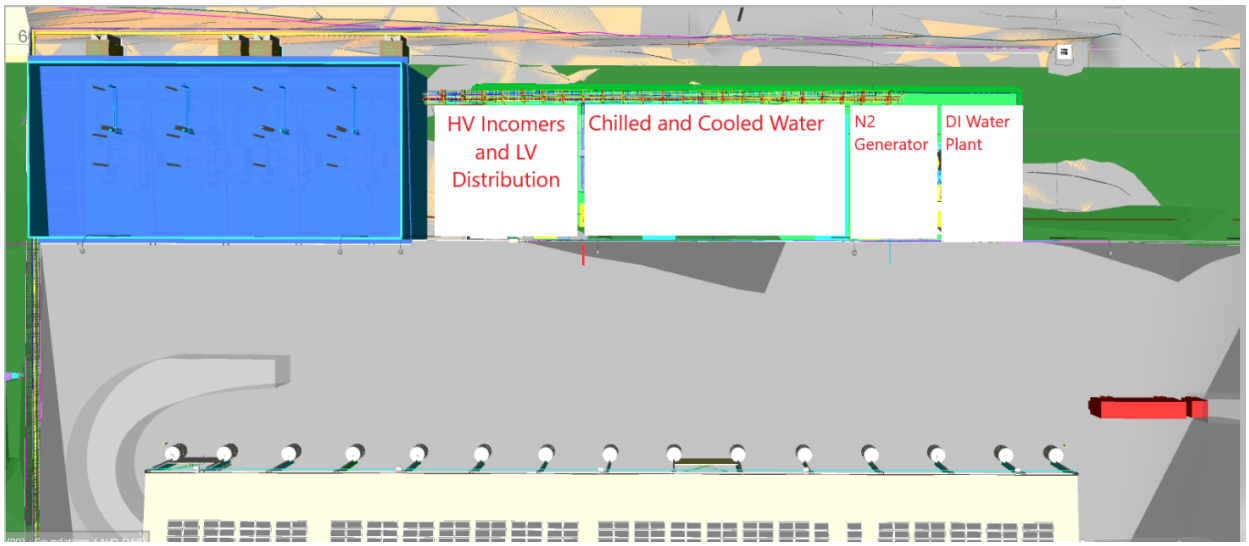



Figure 3-15 Indicative 3D model Layout including Gladstone Testing Factory and BOP labels

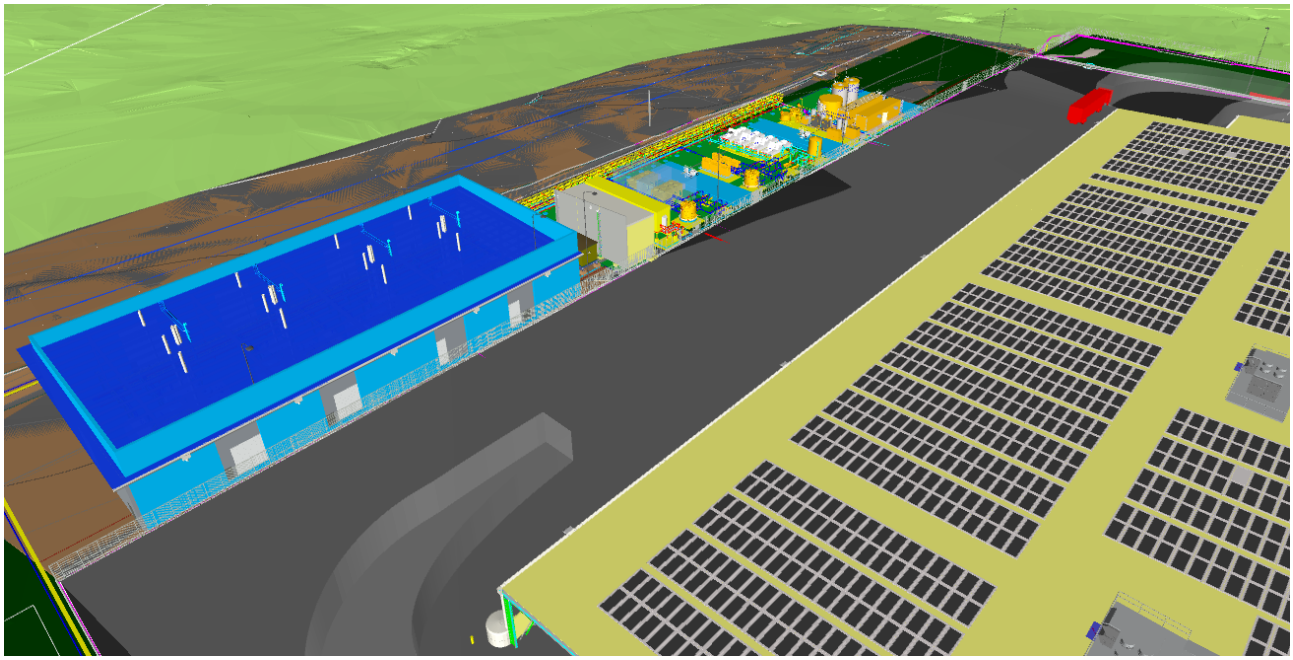


Figure 3-16 Indicative 3D model Layout including Gladstone Testing Factory and BOP alternative view

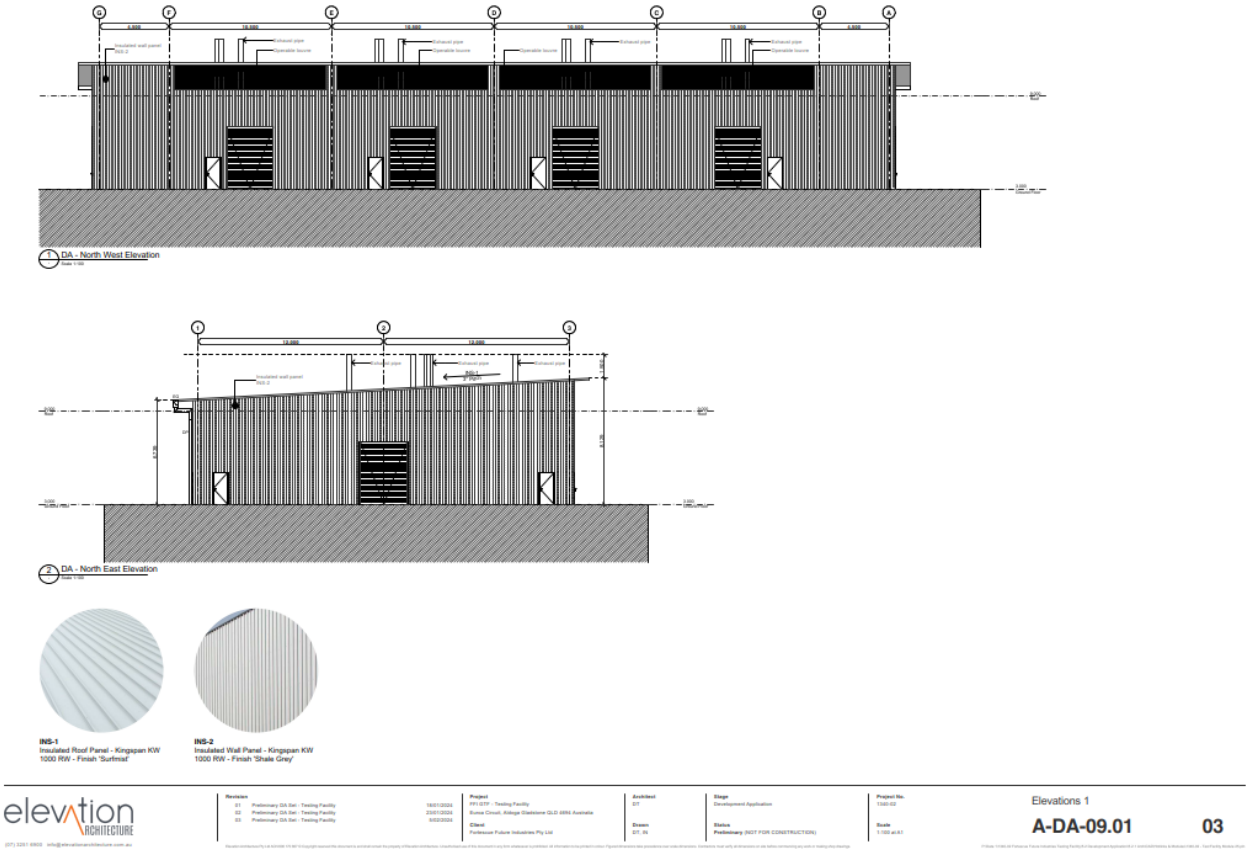



Figure 3-17 Building Elevations 1 (Source: With Architecture Studio)

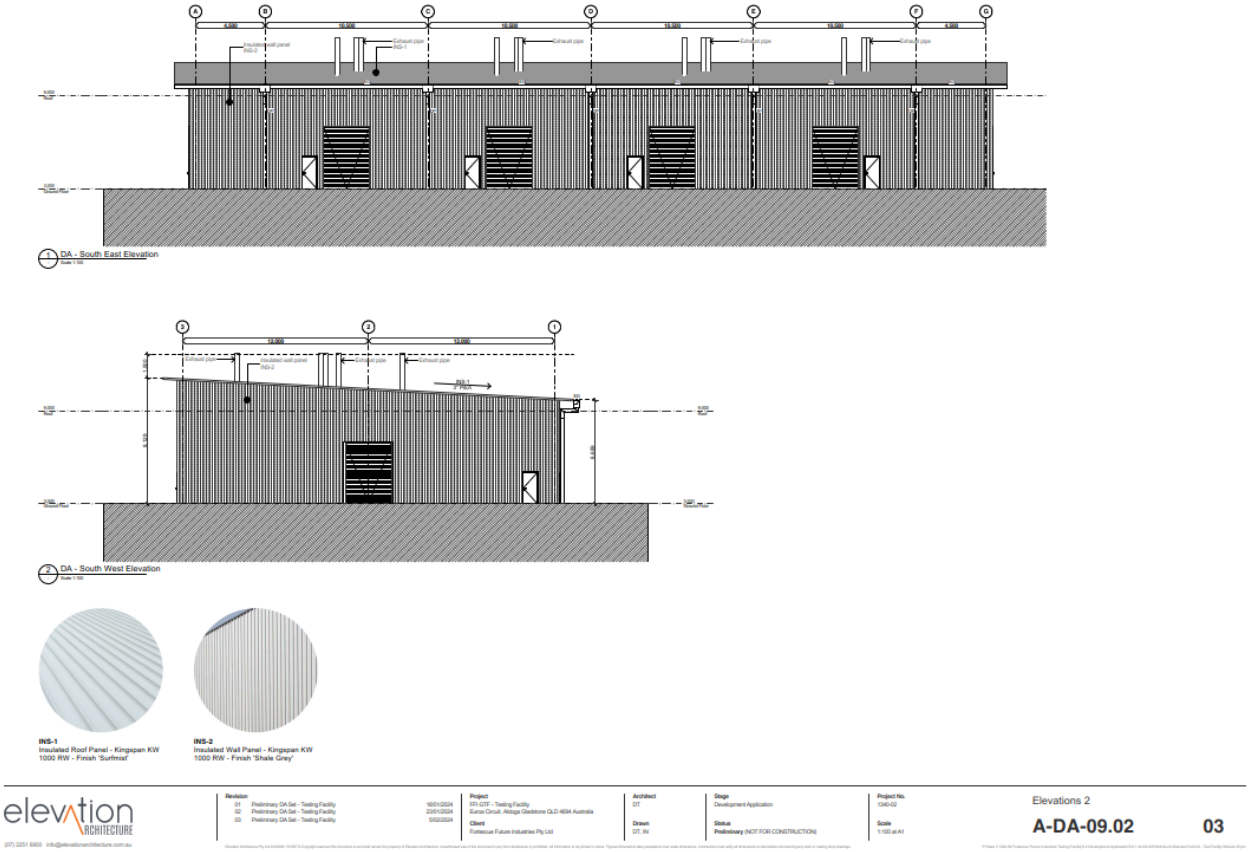



Figure 3-18 Building Elevations 2 (Source: With Architecture Studio)

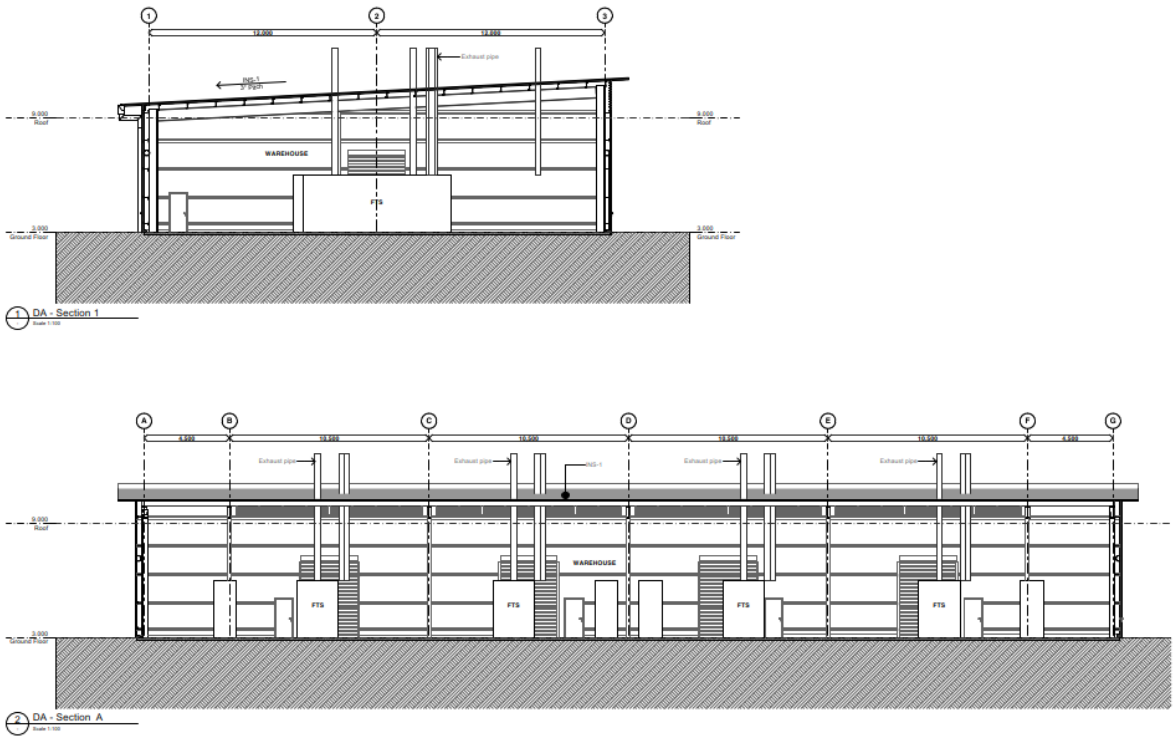


Figure 3-19 Sections Building Elevation (Source: With Architecture Studio)

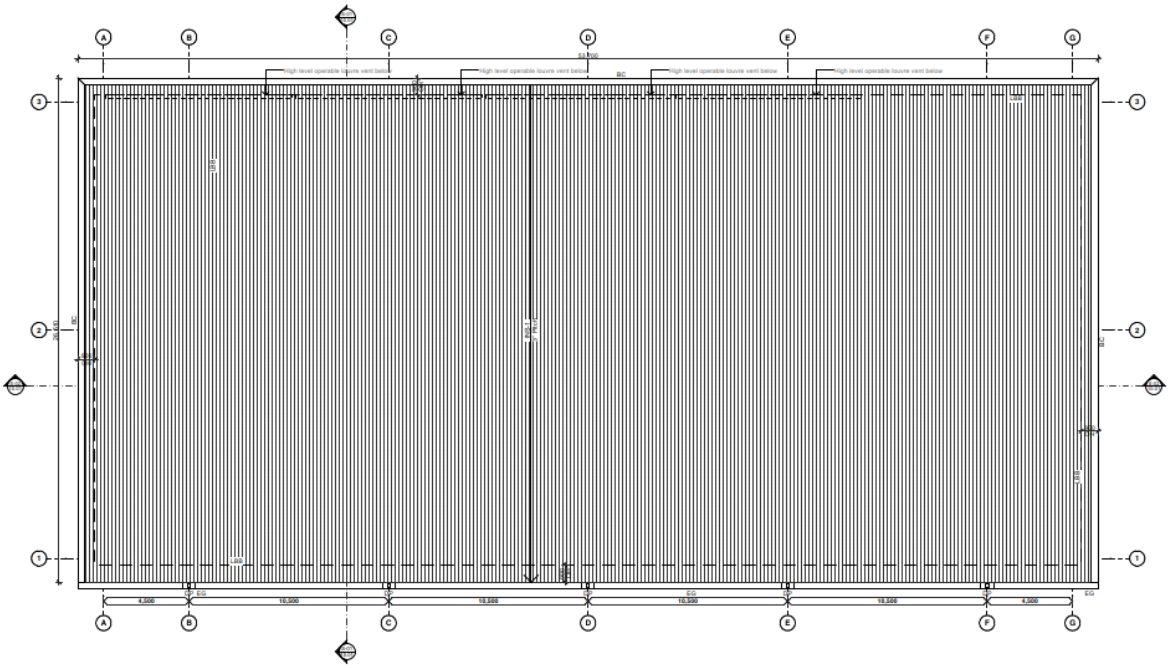


Figure 3-20 Roof Plan


Figure 3-21 Proposed Development and Existing Development Renders.

### 3.5.2 Site Boundary

The Site is securely fenced and gated. Electronic sliding gates have been installed on the entry and exit point to the Site. The entry also incorporates a security gatehouse. All security fencing on all perimeters of the Site (including gates) is to be chainmesh with three rows of barbwire to the rear and sides fencing at 2.1 metres.

### 3.5.3 Landscaping

The Site is screened by existing native vegetation when viewed from Gladstone – Mt Larcom Road.

A landscape treatment has been provided along the Euroa Circuit frontage of the Site to minimise visual impacts of bulky built form. Notwithstanding, the proposed buildings are in keeping with the desired intent for industrial areas.

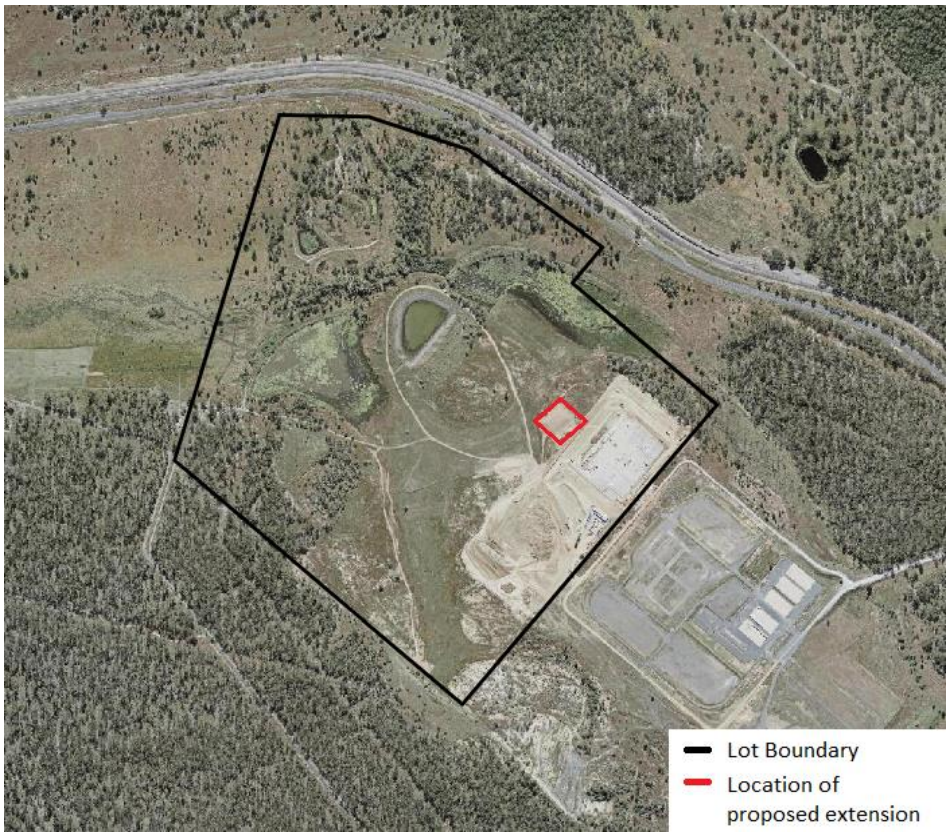



Figure 3-22 Existing vegetation screening the Site from Gladstone – Mt Larcom Road (Source: Queensland Globe)

### 3.5.4 Height

The maximum parapet height of the proposed GTF is 8.129 metres. Refer to Figure 3-234

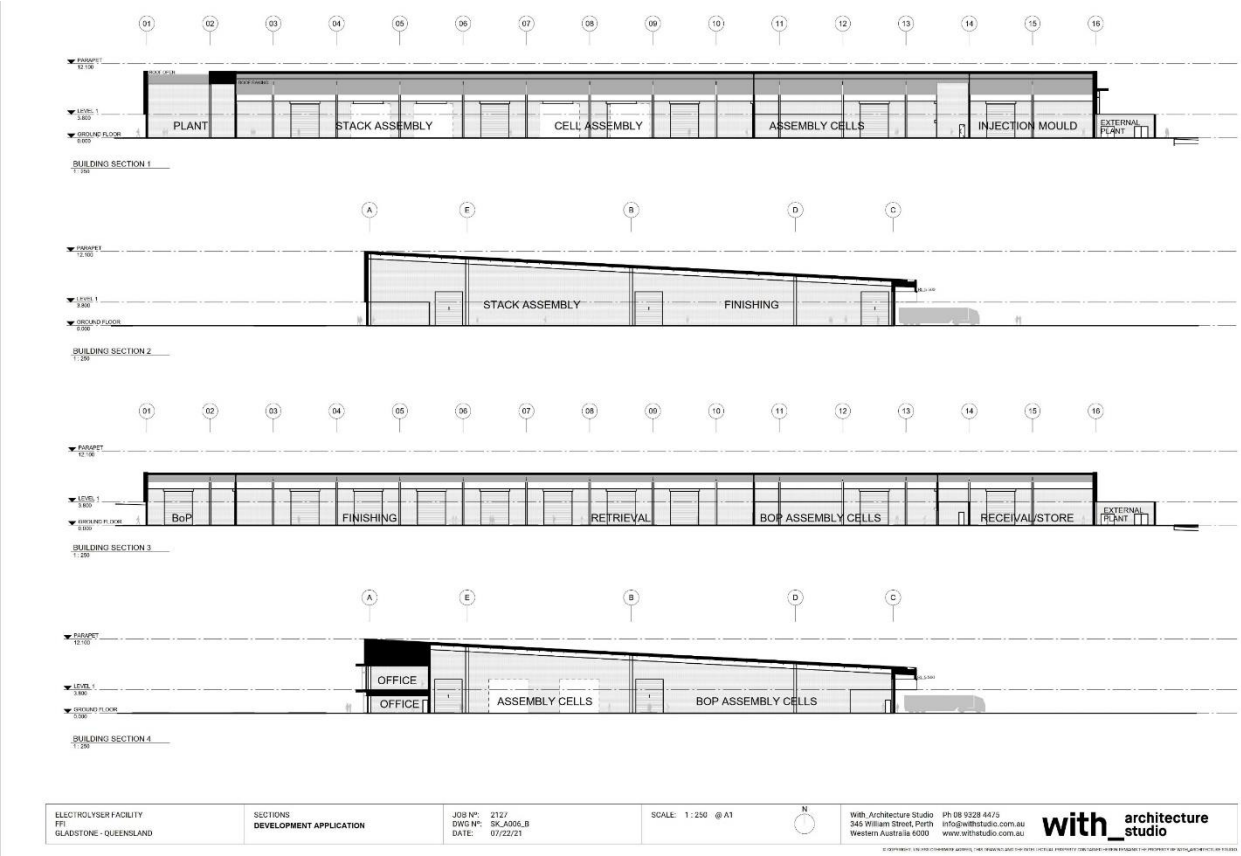



Figure 3-23 Building Section (Source: With Architecture Studio)

# 3.6 Access, Parking and Servicing

## 3.6.1 Vehicular Access

Vehicular access to the Site is via the upgraded Euroa Circuit as indicated in Figures 3-23 Built Gladstone Electrolyser Factory**.** The upgraded Euroa circuit is in accordance with Gladstone Regional Council policy no. P-2014/32 Road Hierarchy Table 7 Rural Area - Collector Road:  and has a design speed of 70Km/h and a posted speed of 60km/h, ensure safe access to the Site. The upgraded Euroa Circuit has been approved by Gladstone Regional Council which will be brought forward by Economic Development Queensland.

Truck access and turning circles will accommodate Single Semi Trailer vehicles with entry and exit points to the Site in the north-east off Euroa Circuit. Truck circulation is located around the total facility. A standard cross-over for frequent trips i.e., staff is located closer to the centre.

With the additional testing facility, the Site vehicular access will not be altered.

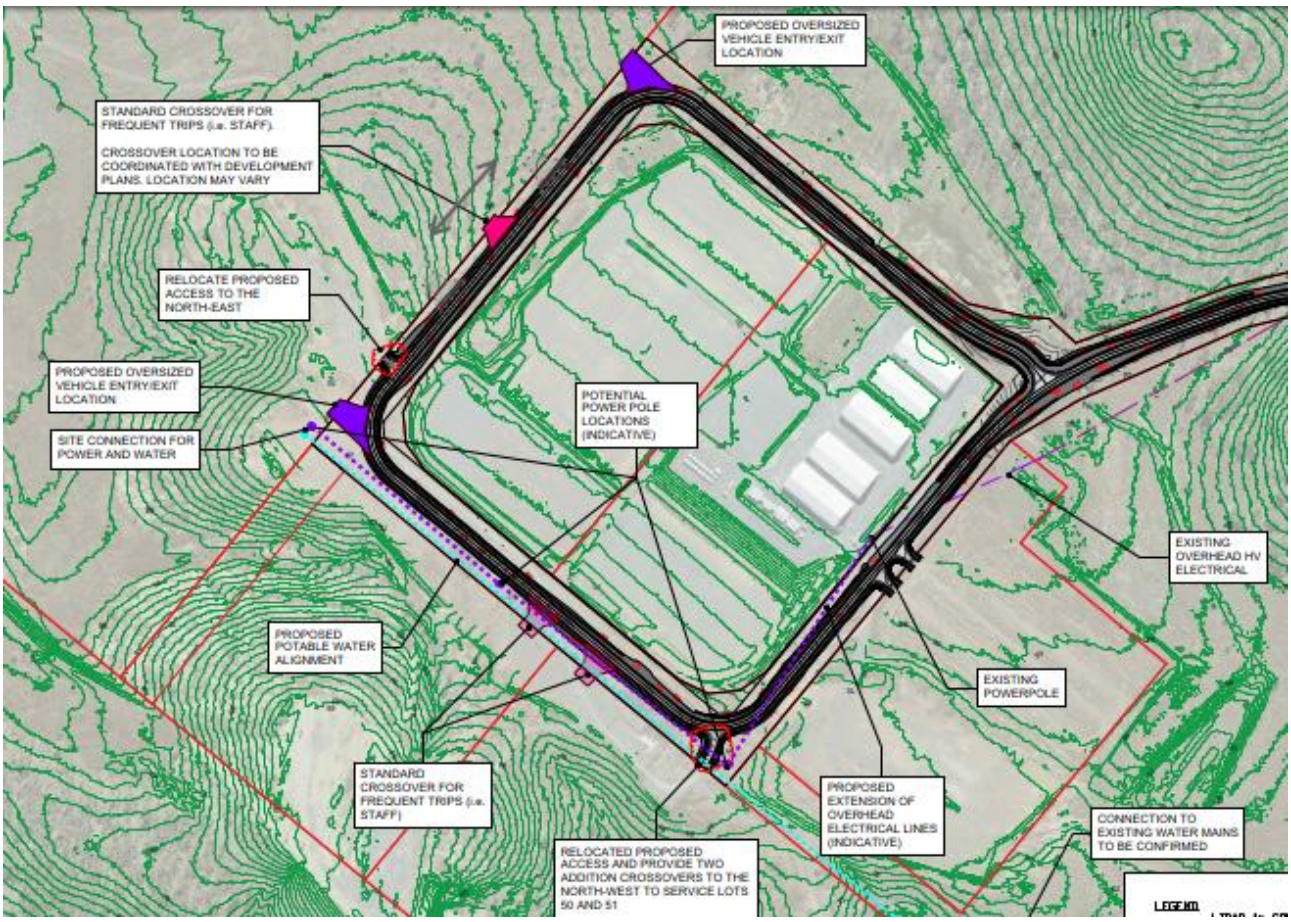



Figure 3-24 Euroa Circuit Upgrade (Preliminary Only) (*Source: Aecom)*

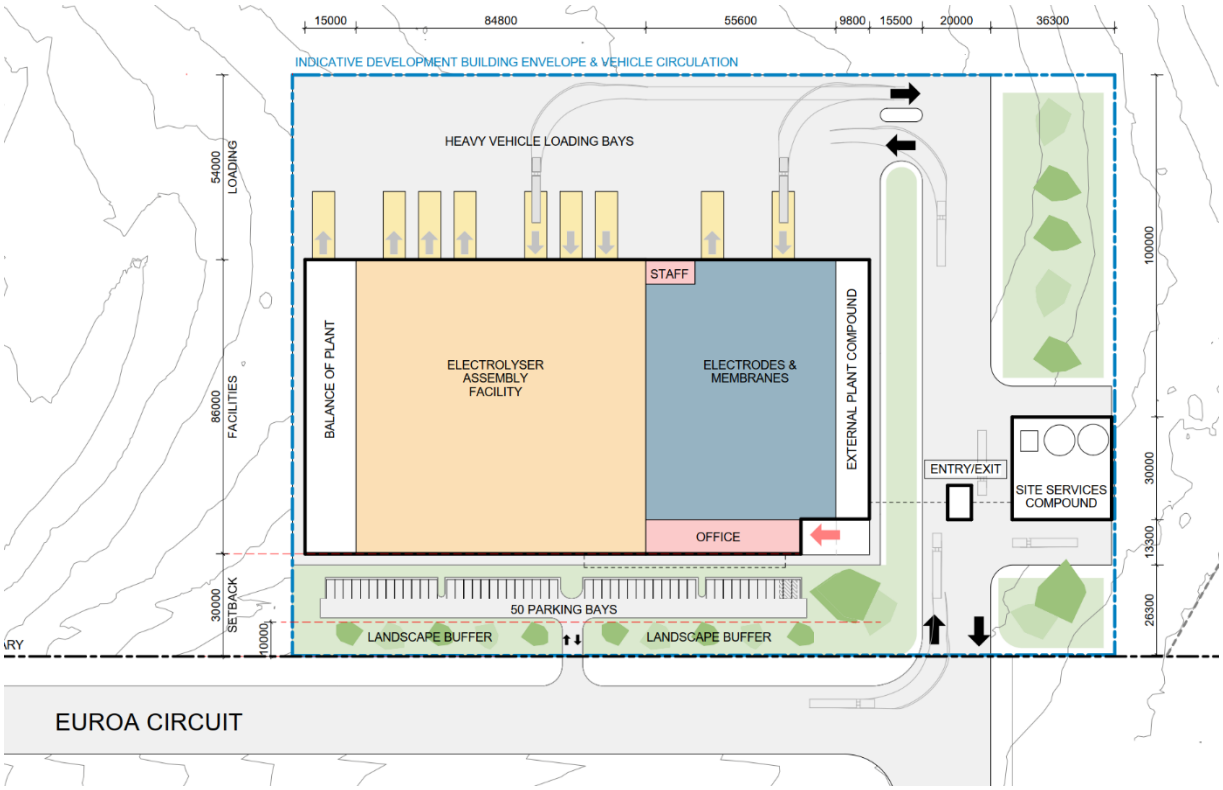



Figure 3-25 Concept Plan (Source: With Architecture Studio

### 3.6.2 Carparking

Carparking for 50 staff vehicles is be provided, including two (2) disabled bays, this is considered to be a reasonable allocation of carparking given the nature of the proposed bespoke nature of the activities on the Site. As there are not public transactions proposed to take place, and access to the Site will be via prearranged registered visitors. The carparking area has been constructed of sealed bitumen and marked in accordance with all appropriate Australian Standards and Building Codes. No additional parking is required for the proposed substantial change.

### 3.6.3 Servicing

Preliminary services upgrades to Euroa Circuit are indicated in the plan at Figure 3-25 Concept Plan above. The proposed development will be serviced by trunk water and electricity supplies provided to the south east corner of the Site via the Euroa Circuit road reserve.

### 3.6.4 End of trip facilities

End of Trip facilities for staff have been provided as outlined below, in accordance with the appropriate Australian Standards:

- Bicycle Racks
- Dedicated Lockers
- Change Rooms: Male and Female
- Showers
- Toilets: Change Rooms are to include toilet facilities
- Drying Rooms: A drying room including electric drying cupboards are to be provided in each of the Change Rooms.

### 3.6.5 Bicycle Parking

Bicycle racks have been provided on site for staff in a secure location.

## 3.7 Acoustic Environment

The surrounding area is largely vacant, however there is an industrial facility (residue storage facility) approximately 300m south-east of the Site. The proposed storage facility does not generate noise other than from traffic moving to, from and within the Site. With the inclusion of the GTF, traffic management and level of on-site vehicle servicing or manoeuvring will remain unchanged. The facility is proposed to be located within an industrial precinct. Higher noise levels are expected in this context than in most other areas, therefore the noise levels generated by traffic movements are considered to be appropriate within the Site's context.

## 3.8 Infrastructure Services

### 3.8.1 Sewer, water supply and utility services

**Mechanical Services**

The design of the mechanical services will cater for occupation densities of 1 person per ten (10) sqm. The air-conditioning system will be flexible and the system able to simultaneously accommodate heating and cooling in different zones (e.g., a VRV type system).

**Water Supply**

The total water demand expected for the GEF is 45ML/annum sourced from GAWB.

**Electrical Supply**

Electricity is to be distributed and connected via pulse type or smart meters in accordance with NABERS requirements. The design should allow for distribution boards in multiple locations.

**Lighting**

All lighting within the building and accommodation areas is to be LED or similar long-life, low-power device. Lighting levels in each area is to be in accordance with the relevant recommendation of the applicable Australian Standard.

**Building Management System**

A building management system is required to control the air-conditioning and provide alarm monitoring points to incoming power, lighting, access, intercom and security system. Additional monitoring points will be positively regarded.

**Fire Systems**

All fire systems are to be designed in accordance with the relevant Australian Standards. All emergency exit lighting is to be LED type.

### 3.8.2 Stormwater

To mitigate any adverse impacts, a detention basin has been designed and built to ensure peak flows from the Site are not increased as part of the works. The detention basin was sized based on the existing site conditions and taking in consideration the proposed works, consisted of the new industrial use building. The increase in hardstand is not expected to increase stormwater flows above what the existing stormwater controls are able to cater for onsite.

The existing stormwater controls will facilitate the discharge controls from the development, the entire affected areas were diverted to a single basin to the west of the development, discharging directly into the drainage reserve. This will reduce the flows into Eurora Circuit and ensure no worsening of the drainage and flooding conditions as part of the works. A circa 2,000m$^3$ (34m wide, 53m long, 1.5m deep) detention basin was calculated to be required to mitigate the discharge flows from the affected area to no worse than the existing scenario, refer to **Appendix E** for as constructed stormwater controls.

Stormwater treatment being both Quality and Quantity has been previously approved and built as part of this development.

During the construction phases, sediment and erosion and control measures were implemented to limit the discharge of any sediments into the drainage reserve. The footprint of the proposed Functional Test Stations (FTS) and associated Balance of Plant (BOP) is situated within the overarching development site which has established runoff controls. Accordingly, temporary erosion and sediment controls and all runoff from the final development will be directed to the established infrastructure which has the capacity to manage these changes.

The new development will not change the existing approved on-site stormwater management plan.

Refer to as constructed plans for Stormwater in **Appendix E**.

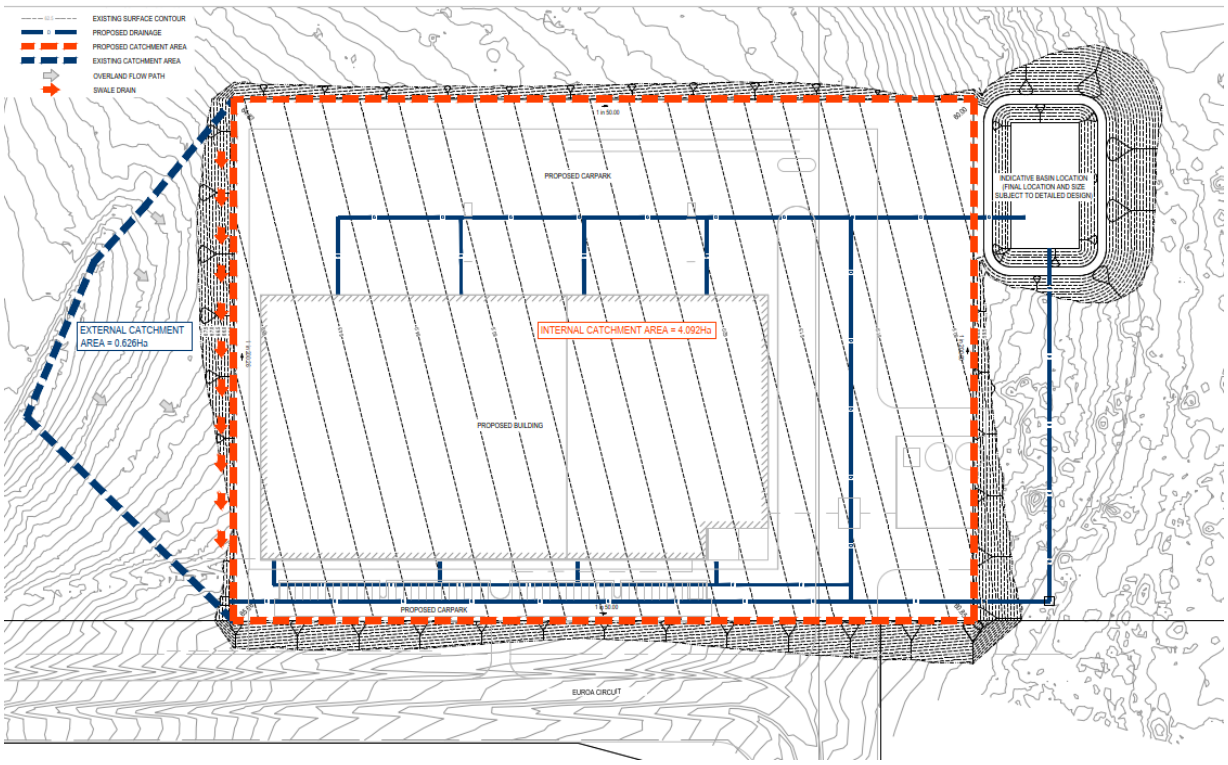



Figure 3-26 Storm Water Concept Plan (Source: SMEC, 2021)

## 3.9 Ecologically Sustainable Development

### Photovoltaic System

The GEF building design includes an energy storage photovoltaic system with panels installed on the roof to run the facility. The facility will include panels, inverters and battery storage.

## 3.10 Security

### Access Control System

All buildings and accommodation areas on the Site will include an electronic access control system. The system is to be a credit card size swipe system and be integrated into all external entry points (including car parking, fire doors and entry gates). The system will be able to be expanded to enable swipe card access to its various operational zones.

### Closed Circuit Television

A closed-circuit television (CCTV) is proposed. The system will use a minimum of 8MP IP based high resolution cameras and allow for a minimum of 30-day storage for recordings. The system will cover all external areas and common areas. The system will be able to be expanded to enable additional cameras to be installed (approximately 30 additional cameras).

# 4. Proposed Change (Condition 1)

The documented change necessitates an amendment to the SDA Approval Conditions, specifically Condition 1.

An adjustment to the previously approved drawings is required to accommodate the increase in gross floor area on the proposed development site due to the inclusion of the GTF. The incorporation of the GTF necessitates updated elevation plans, site plans, and GTF building plans to be reviewed in conjunction with this proposal. It's important to note that no changes are required for the existing approved buildings.

The layout of the proposed development will feature a ground floor only, designed to facilitate the onsite testing of electrolysers. The gross floor area for the proposed GTF is 1,282.4m².

| Condition 1 – approved plans and documents | | Timing |
|---|---|---|
| 1.1 | Carry out the approved development generally in accordance with the approved plans and documents as referenced in Table 1 (including any amendments marked in red), except insofar as modified by any of the conditions of this approval | *To be maintained at all times* |

Table 1 – Approved plans and documents

| Title | Prepared By | Document No | Date |
|---|---|---|---|
| Site Masterplan | With_Architecture Studio | SK_A001_D | 27/07/2021 |
| Concept Plan | With_Architecture Studio | SK_A002_D | 27/07/2021 |
| Ground Floor Plan | With_Architecture Studio | SK_A003_D | 27/07/2021 |
| Elevations | With_Architecture Studio | SK_A005_C | 27/07/2021 |
| Sections | With_Architecture Studio | SK_A006_C | 27/07/2021 |

The proposed development is seeking to gain compliance with the above condition through the inclusion of drawings and elevations regarding the proposed establishment of the GTF. Through the inclusion of the amended drawings and elevations, this will assist to satisfy the increase of gross floor area on the Site.

**It is noted the following will be unaffected:**

- Onsite Stormwater Management Plan: The current plan for managing onsite stormwater remains in effect.
- Traffic Management: No changes to the level of on-site vehicle servicing or manoeuvring.
- ERA 63 for Sewage Treatment: Continuation of the existing approval.
- Water Supply Demand from GWAB (45ML/annum): No alterations to the approved water supply demand.
- Emergency Response Evacuation Plans: The existing facility evacuation plans remain unchanged; however, a new response plan will be introduced for the GTF.

The proposed GTF is located within the existing approved 'Site Development Boundary'. The proposed layout and design relevant to the existing approval will not change.

As part of this application, an additional emergency response will be required to cater for all occupants within the new GTF. Additionally, the total water demand for the GEF is 45ML/ annum.

# 5. Statutory Planning Framework

## 5.1 State Development and Public Works Organisation Act 1971

This development application has been lodged under Section 84 of the *State Development and Public Works Organisation Act 1971* (SDPWO Act) and has provided all necessary supporting documentation, including landowners consent.

### 5.1.1 Assessment Manager

The Office of the Coordinator General, Queensland is the relevant Assessment Authority for development regulated by the Gladstone SDA Development Scheme.

## 5.2 Gladstone State Development Area Development Scheme

### 5.2.1 Land Use Definition

This application is seeking approval for Material Change of Use for Medium Impact Industry. Pursuant to Schedule 1, Section 2 of the Development Scheme ***Medium impact industry*** *means the use of premises for an industrial activity that:*

*(a) includes the manufacturing, producing, processing, repairing, altering, recycling, storing, distributing, transferring, or treating of products*

*(b) requires onsite controls for emissions, hazardous substances and dangerous goods risks*

*(c) has one or more of the following attributes:*

*(i) potential for noticeable impacts on sensitive land uses due to offsite emissions including aerosols, fumes, particles, smoke, odour, and noise*

*(ii) potential for noticeable offsite impacts in the event of fire, explosion, or toxic release*

*(iii) minimal traffic generation and heavy-vehicle usage*

*(iv) operations are primarily undertaken indoors, including any evening or night activities.*

**Level of Assessment**

Specific forms of development under the Development Scheme are 'regulated' pursuant to the *State Development and Public Works Organisation Act 1971* (SDPWO Act). The Development Scheme sets out SDA Self-Assessable Development and SDA Assessable Development. Within the High Impact Industry Precinct, Material Change of Use for Medium Impact Industry is identified as SDA Assessable Development.

It is noted that 'operational works' for bulk earthworks and 'buildings and works' associated with the proposed development are not regulated forms of development under the Development Scheme. These aspects of the proposal will therefore be subject to parallel application processes under the Development and Public Works Organisation Act 1971 and the relevant provisions of the Gladstone Planning Scheme.

### 5.2.2 Development Precinct

As detailed earlier in this report, the subject Site is located within the High Impact Industry Precinct and the Development Scheme forms the higher order statutory planning instrument for development within the SDA, with specific Precinct controls applicable to the Site. The Development Scheme was developed under the SDPWO Act and was declared by regulation in 1993. The May 2022 edition of the Development Scheme is the current version of this document.

The SDA covers a total land area of 26,934 hectares of land adjacent to the Port of Gladstone, with connections to major rail networks and Australia's national highway. Under the Development Scheme, the SDA is split into six (6) precincts as identified in Figure 5-1 Below. The subject site is located within the High Impact Industry Precinct.

The Gladstone SDA – High Impact Industry Precinct contains the specific land use and built form provisions that future development within the Precinct is required to satisfy.

This Town Planning Report will undertake a thorough assessment against the Development Scheme and demonstrate compliance with all relevant assessment provisions.

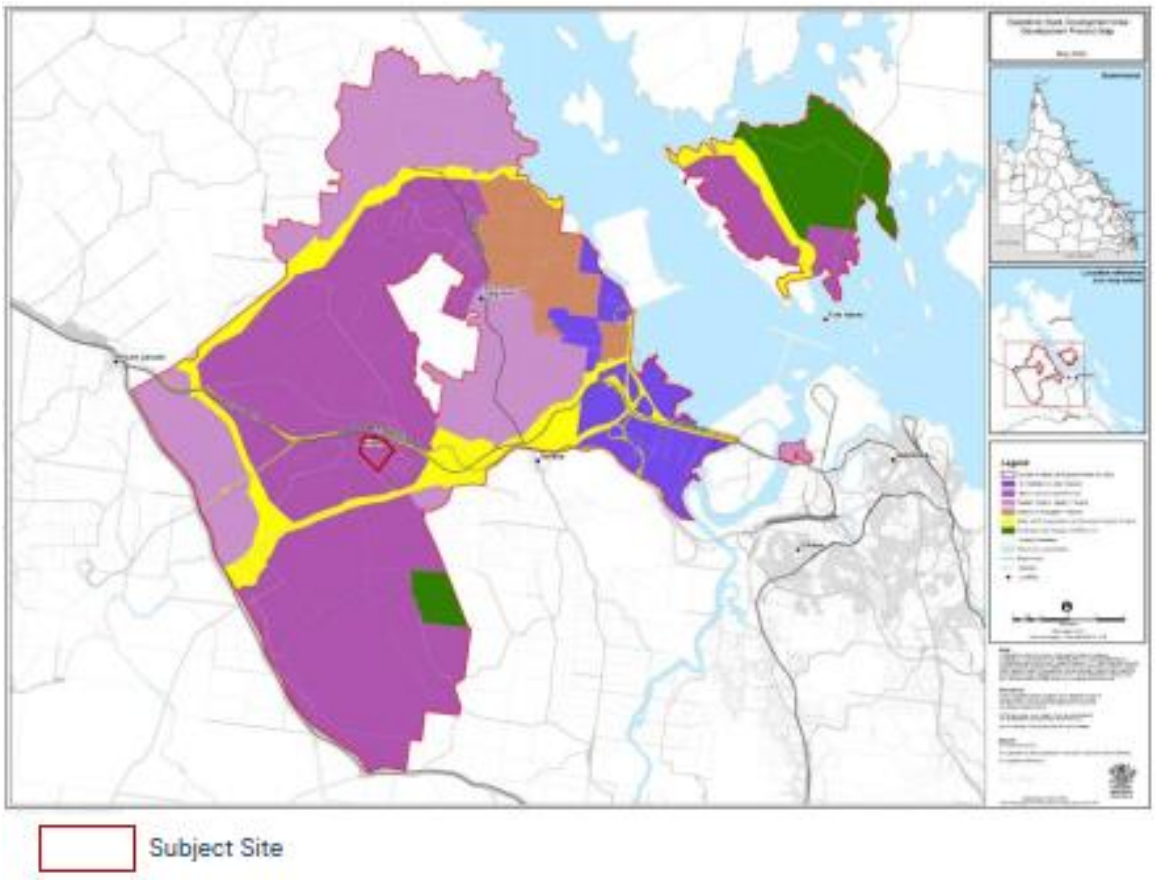



Figure 5-1 Precincts of the Gladstone SDA (Source: Gladstone State Development Area Development Scheme)

### 5.2.3 Development Assessment

Part 2.1.1(3) (Development Assessment Framework) of the Development Scheme identifies that the following elements of the Development Scheme are to be considered and addressed in preparation of a Development Application:

A. The strategic vision for the Gladstone SDA (see section 5.2.5 below)

B. The overall objectives for the development in the Gladstone SDA (see section 5.2.6 below)

C. The preferred development intent for each development precinct (see section 5.2.7 below); and

D. SDA wide assessment criteria (see section 5.2.8 below).

### 5.2.4 Strategic Vision

The strategic vision for the Gladstone SDA is defined as follows:

*(1) The vision for the Gladstone SDA is to:*

> *(a) be Central Queensland's economic powerhouse, with an efficient concentration of large-scale industry of national, State and regional significance that benefit from the SDA's strategic location near the Port of Gladstone and major road and rail networks*
>
> *(b) support development that aligns with the Queensland Government's strategic priorities for the region, particularly related to the hydrogen industry*
>
> *(c) maintain environmental, cultural heritage and community values where possible to support wider ecological processes and provide community benefits.*

*(2) The strategic vision is supported by the overall objectives for development and preferred development intents of development precincts within the Gladstone SDA.*

The proposed Medium Impact Industry (GEF and GTF) satisfies the above SDA vision, with the development being located within the High Impact Industry Precinct and delivering a medium impact industrial manufacturing facility that will ultimately act as a catalyst for an emerging industry of national and international significance.

The development will be integrated into the intended outcomes for the Precinct and utilises a planned traffic network and logical extension of utility services. Further, the design of the development provides a quality built form with active frontage where possible. The future building will integrate with existing and future development in surrounding lots and the natural features of the Subject Site.

Lastly, the Medium Impact Industry (GEF and GTF) will contribute to the short and long term economic benefits in the region and does not compromise the ability to deliver critical infrastructure/natural elements including waterways, rail corridors and road networks.

### 5.2.5 Overall Objectives

Section 2.3 of the Development Scheme identifies overall objectives for the Gladstone SDA. The following assessment confirms that the proposed development complies with all overall objectives sought:

> *(a) capitalise on Gladstone SDA's strategic location and support the role and function of the Port of Gladstone*
>
> *(b) identify and implement opportunities for synergies and co-location between other uses, services and infrastructure to minimise waste and inefficiencies*
>
> *(c) use land and infrastructure efficiently and be adequately serviced by infrastructure*
>
> *(d) ensure the integrity and functionality of the Gladstone SDA, including infrastructure corridors and future development opportunities, is maintained and protected from incompatible land uses*
>
> *(e) ensure new lots are appropriately sized to accommodate preferred development*
>
> *(f) be designed, constructed, and operated to a high quality consistent with best practice*
>
> *(g) avoid impacts on environmental, cultural heritage, and community values (including sensitive land uses), or minimise or mitigate impacts where they cannot be avoided and offset any residual impacts*
>
> *(h) not adversely impact on the outstanding universal values of the Great Barrier Reef World Heritage Area*
>
> *(i) manage the risks associated with the projected impacts of climate change and natural hazards to protect people and property*
>
> *(j) manage impacts of air quality on the capacity of the Gladstone airshed.*

As outlined in sections 5.2.5 and 5.2.7 of this report the proposed development is highly consistent with the preferred development intent for the High Impact Industry Precinct and will advance the strategic vision for the Gladstone SDA. In particular:

- The proposal gives consideration to the future land uses and is appropriately located to ensure the most efficient use of available industrial land.
- The Gladstone SDA has long held its strategic designation as a regionally significant industrial precinct and subsequently infrastructure planning has taken account of the intended future development outcomes. Existing and planned infrastructure to services will be drawn on to service the subject site, without resulting in adverse impacts to infrastructure or out-of-sequence development limitations.
- Private infrastructure to be delivered within the Site boundaries will be delivered by the Applicant in conjunction with Economic Development Queensland (EDQ) in accordance with the Memorandum of Understanding.
- The proposed Medium Impact Industry (Electrolyser Production Facility) is highly compatible land with the outcomes sought for the Gladstone SDA under the Development Scheme.
- The proposed development will not generate any unreasonable air quality impacts.

### 5.2.6 Precinct Preferred Development Intent and Outcomes

As identified previously, the subject site is located within the High Impact Industry Precinct. The preferred development intent of the High Impact Industry Precinct is to provide to:

1. *The preferred development intent for the high Impact Industry Precinct is described below.*
    a) *This precinct is to accommodate industrial development that:*
        I. *Is difficult to locate and require separation from sensitive land uses*
        II. *Requires access to key transport and supply chain networks*
    b) *Waste management related industries are supported south of Aldoga Road*
    c) *Development which adversely impacts existing or future LNG operations on Curtis Island will not be supported*
    d) *Development on Curtis Island must recognise the environmental values of the adjacent Environmental Management Precinct*
2. *Defined uses that support the preferred development intent are:*
    a) *High impact industry*
    b) *Special industry*
3. *Defined uses that may be considered where the use does not compromise the preferred development intent include:*
    a) *Freight terminal*
    b) *Linear infrastructure facility*
    c) *Medium impact industry*
    d) *Research and technology industry*
    e) *Utility installation*
    f) *Warehouse (Where ancillary to a use listed in 2.4.2(2)*
4. *Access from Gladstone-Mount Larcom Road to this precinct will be limited to three intersections at the following locations:*
    a) *A proposed intersection approximately 3.8 kilometres from the Bruce Highway*
    b) *A proposed intersection approximately 8.4 kilometres from the Bruce Highway (road/rail overpass)*
    c) *The intersection at Aldoga Road*

The proposed development satisfies the preferred development intent by contributing to the provision of industrial floor space in the Precinct. Whilst the proposed use is for Medium Impact Industry, it is compatible with the intended outcome for the High Impact Industrial Precinct, delivering a large-scale manufacturing facility within the Precinct.

The environmental impacts generated by the proposed development (noise, dust, odour, waste etc) will not be as significant some other potential High Impact Industrial land uses (making them difficult to locate). However, as the Precinct develops this will present a strategic opportunity by providing a 'clean' buffer between High Impact Industry and environmental values (downstream waterways, mapped flora and fauna etc) to the north of the Precinct without imposing any reverse amenity considerations on future land uses.

Access to the proposed development will be from the upgraded Euroa Circuit and via Aldoga Road as contemplated by the Precinct intent. Further, proposed development will not detract from cultural heritage values identified in the surrounding area.

### 5.2.7 SDA Wide Criteria

The SDA-wide development criteria apply to all assessable development within the SDA, and include the following 14 themes:

- Infrastructure and Services
- Transport
- Environmental Nuisance
- Contaminated Land
- Natural Hazards
- Climate Change
- Acid Sulfate Soils
- Water Quality
- Risk Management - Activities
- Cultural heritage and community
- Environment
- Engineering standards
- Other government matters
- Energy and Water efficiency
- Visual Impact
- Reconfiguring a Lot

A comprehensive assessment of the development against the SDA Vision, SDA Objectives, Precinct Intent and SDA-wide development criteria has been carried out and is provided in **Appendix F.**

# 6. Key Planning Matters

## 6.1 Environmental Matters

For the purpose of this application, an assessment has been undertaken by SMEC to identify the existing environment and to determine constraints to the development of the Subject Site. The assessments outlined in the following sections are based on a desktop assessment of available reports and data. As the design and impact of the proposed development is still conceptual, high level mitigation measures are proposed to establish design, construction management and operational management criteria to be met by the development ensuring that environmental matters are appropriately addressed. Mitigation measures consider the principles of best practice environmental management and when correctly applied, ensure that environmental impacts can be kept within the accepted State and National environmental parameters.

Environmental matters considered include:

- Soils and contamination
- Water resources
- Bushfire hazard
- Flora and fauna
- Emissions, noise and vibration, and chemical storage
- Cultural heritage (indigenous and non-indigenous)
- Traffic and transport
- Waste management
- Construction impacts
- Other matters

### 6.1.1 Soils and Contamination

#### 6.1.1.1 Contaminated land

A contaminated land search undertaken on 2 July 2021 concluded that the Site is not included on the Environmental Management Register (EMR) or the Contaminated Land Register (CLR). Refer to **Appendix H**.

#### 6.1.1.2 Acid Sulfate Soil

The Gladstone Regional Council Planning Scheme (GRCPS) does not identify Acid Sulfate Soils on site. The Australian Soil Resource Information System (ASRIS) shows the general vicinity to have Extremely Low and Low Probability of Acid Sulfate Soils (refer **Appendix I** - *Aldoga Precinct Stage 1 Environmental Assessment Report*, prepared by Aecom, dated 21 February 2011).

#### 6.1.1.3 Topography

The Steep Land Overlay plan from the GRCPS indicates that four small areas of steep land are identified around the Site but not within it. The proposed extension will be placed on a newly constructed REPQ designed pad away from areas of steep land on site.

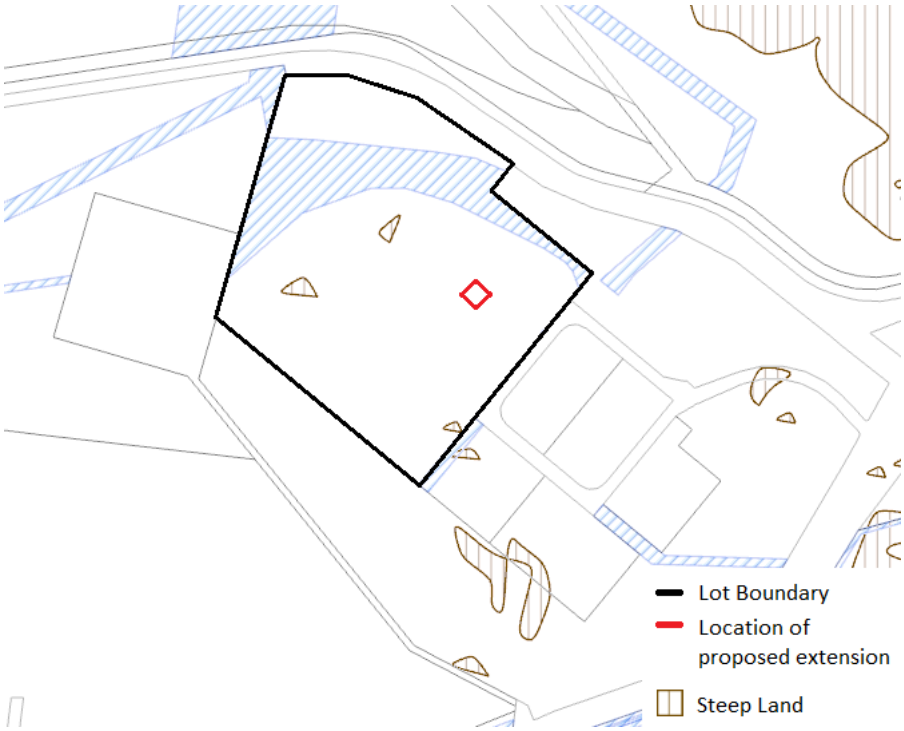



Figure 6-1 Steep land overlay (Source: GRCPS)

**Mitigation measures**

- Erosion and sediment during construction can be managed with the appropriate control measures to ensure that downstream water quality is not impacted if construction requires removal and placement of soil and topsoil for the additional area of works.
- The timing between clearing, grading and restoration should be limited to reduce the duration of soil exposure, while construction works should be minimised during high rainfall and flood events for the additional area of works.
- Sediment control devices may be installed to minimise erosion and sediment loading to waterways for the additional area of works.
- Progressive revegetation should be encouraged during construction and operations to reduce potential erosion risk for the additional area of works.

It is respectfully requested that the above considerations are addressed in a Construction Management Plan to be required by condition of the development permit.

### 6.1.2 Water Resources

The area of works is located alongside the boundary with Eurora Circuit. That part of the lot was previously cleared and subject to some earth movement. There is a gazetted drainage easement in favour of the State on the North and East of the area of works, forming man-made basins. Details of the performance of those basins are yet to be confirmed, however previous reports for the Site indicate they were constructed for the purpose of controlling sediment discharge from the Site. There are no other drainage features within the Site and the subject area of works is not affected by flooding.

The Site ultimately discharges into Larcom Creek to the north west. It is understood that a flood study for this creek was previously prepared by Aecom (2009), however details of the outcome of this study is subject to further investigation.

The small increase in impervious area is not expected to impact upon Larcom Creek as all stormwater will be discharged to existing stormwater systems.

### Flooding

Following review of the GRCPS, it has been determined that the Site is not located in a flood hazard area. Therefore, it is considered that a focused flood risk assessment and Flood Management Plan is not required.

### 6.1.2.1 Water quality

The Queensland Globe Map indicates that there are three Lacustrine wetlands with habitat type artificial/ highly modified wetlands approximately 100m to the north/north-west of the boundary of the Site. Given the location of the wetlands, Detailed Surface Water Assessment is unlikely to be required, however a Stormwater Management and Water Quality Plan (construction and operations) is likely to be required.

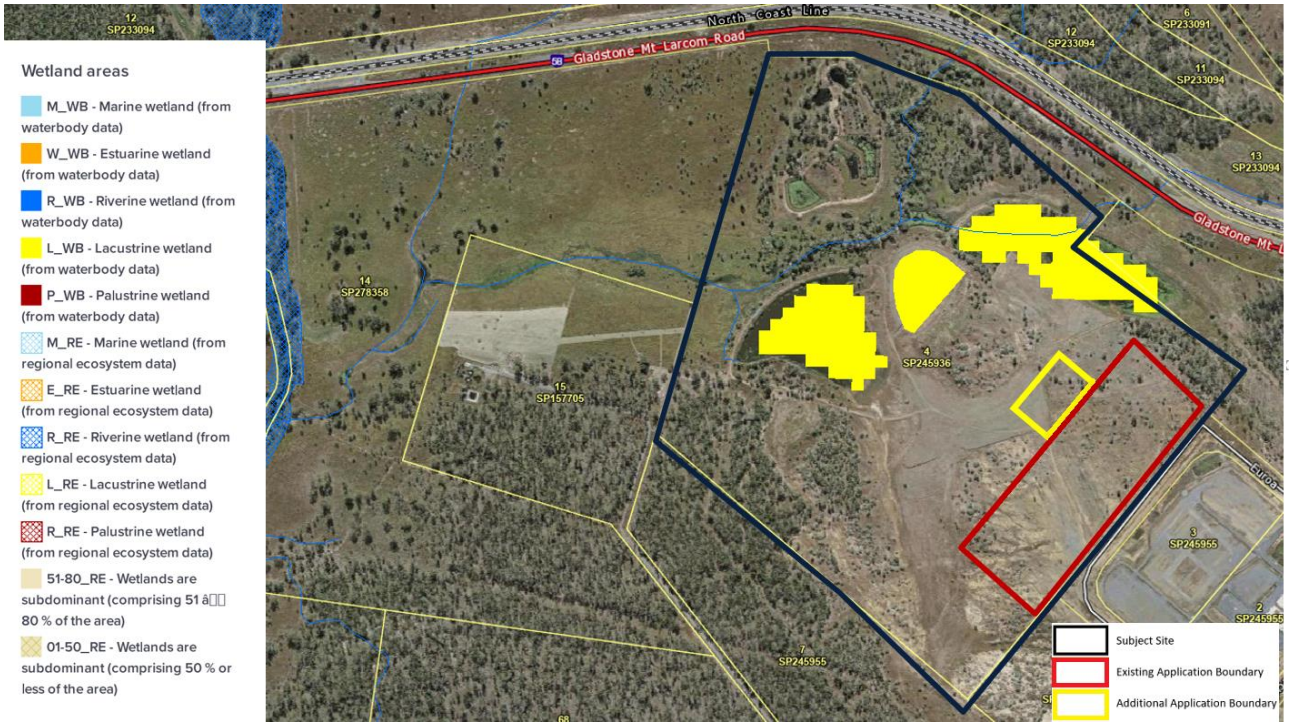



Figure 6-2 Wetlands area (Source: Queensland Globe Map)

### Mitigation measures

- Appropriate handling and storage of construction materials for the additional area of works.
- Detailed planning and design of the construction phase water management and mitigation systems should be undertaken to adequately manage water quality related issues (for example, erosion and sediment control plan) arising throughout construction. Environmental control design should take into account seasonal weather conditions for the additional area of works.
- Stage works to minimise erosion for the additional area of works.
- Provide management procedures related to spill prevention are implemented to mitigate associated impacts to groundwater and surface water resources for the additional area of works.
- Detailed planning and design of the operational phase water management devices and systems are required to adequately manage water quality related issues (for example, increased pollutant concentrations and loadings in stormwater).

## 6.1.3 Bushfire Hazard

The Site is within the Potential Impact Buffer, as indicated in the GRCPS. Proposed building works will not occur on any areas classified as having medium, high and very high potential bushfire intensity for the additional area of works. Refer excerpt from Bushfire Prone Areas map in Figure 6-3 Bushfire Prone Areas (Source: GRCPS).

### Mitigation measures

As part of the proposed development, the high and medium bushfire intensity risk was mitigated by the removal of the vegetation within the development boundary. The vegetation has been removed to accommodate the development This has ultimately reduce the potential impact buffer across a large portion of the Site including the area overlapping the future building footprint. Given the bushfire risk is no long present no further assessment is required for the additional area of works.

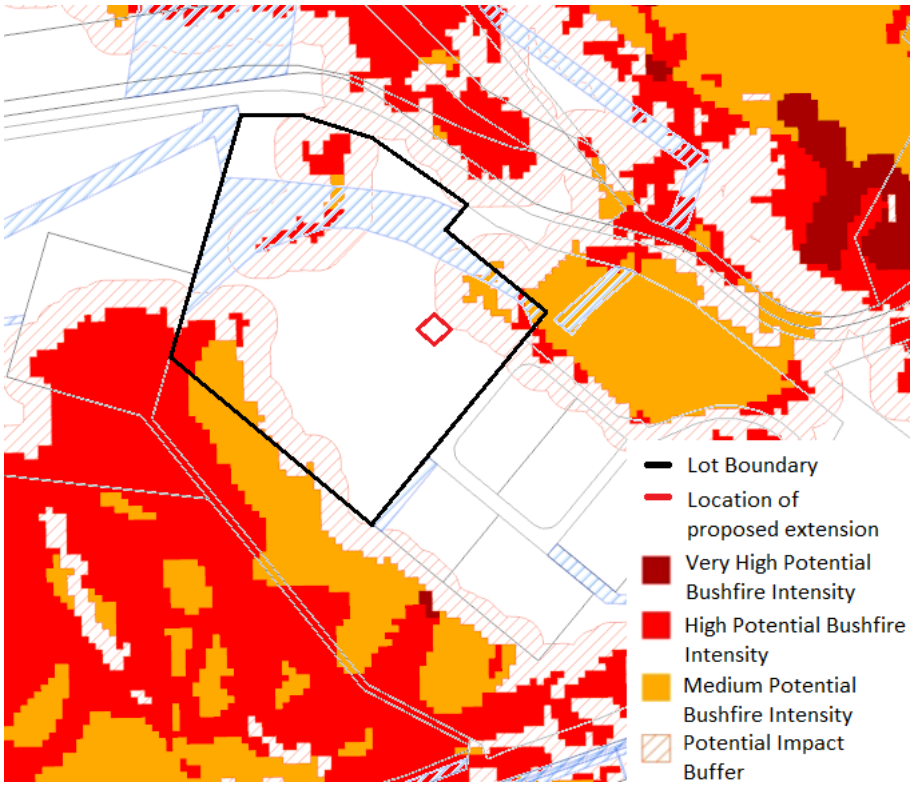



Figure 6-3 Bushfire Prone Areas (Source: GRCPS)

## 6.1.4 Flora and Fauna

As part of the proposed works a Desktop Environmental Assessment Report has been prepared. Please refer to Appendix L for information regarding the assessment.

## 6.1.5 Emissions, Noise and Vibration, and Chemical Storage

Operations planned and previously approved for the facility include prototype manufacturing activities and involve cutting and machining of various raw materials, assembly testing and receivals/dispatch of materials and products as well as testing the finished electrolysers.

The application seeks to include testing of the electrolysers to confirm that the electrolyser generates hydrogen at the specified output rate and pressure, within the rated temperature, and with no system warnings or alarms tested prior to shipment. As a result of the testing, the proposed GTF will generate hydrogen. Pap Solutions Pty Ltd prepared dispersion modelling to confirm the release of hydrogen will not impact the surrounding development. Please refer to the attached Technical Note Preliminary Vent Design Review for further details (Appendix K). Given the no hydrogen will be captured and stored on this part of the site the production is relatively benign with regard to environmental impacts. Specifically, large compressors are not required to condense the hydrogen for storage which generates the majority of noise in typical hydrogen production.

#### 6.1.5.1 Emissions

Hydrogen produced from the GTF will be released from the during the testing processes and dispersed. Dispersion modelling has confirmed that the release will not cause an impact to the surrounding developments. Pap Solutions Pty Ltd prepared dispersion modelling to confirm the release of hydrogen will not impact the surrounding development. Please refer to the attached Technical Note Preliminary Vent Design Review for further details (Appendix K).

Construction impacts are addressed at section 6.1.9 below.

#### 6.1.5.2 Noise and Vibration

The proposed industrial activity is located in the High Impact Industrial Precinct of the SDA. The Precinct is strategically located away from sensitive receptors. With the exception of vehicle access, operational activities will be carried out entirely within the proposed building which will reduce noise emissions externally from the Site.

A noise and vibration assessment for operations at the Site has not been undertaken. Operational activities will be limited to general office uses and robotic manufacturing which do not emit unreasonable noise. Operational activities will only be carried out during business hours, between 7am and 6pm, Monday to Friday. The testing of the electrolysers is largely free from Noise and Vibration as the testing will not involve compressors or other large industrial equipment.

A detailed Construction Management Plan will be prepared to address potential construction impacts including noise, dust, sediment runoff, traffic, waste and so on.

**Mitigation measures**

- Noise emission will comply with the Environmental Protection (Noise) Policy 2019 (legislation.qld.gov.au)
- Residents in close proximity to the Site shall be kept informed regarding construction activities and timing of noisy activities which will generally be scheduled between 7am and 6pm where practical.
- Landowners are to be advised of any planned activities that will cause loud and extensive periods of noise. Attenuation measures should be used where possible.
- Noise mitigation measures employed during construction shall be in accordance with AS2436, Guide to noise and vibration control on construction, demolition and maintenance sites.
- A construction noise and vibration management plan is to be prepared for development on the Site. The plan should include recommendations on plant and equipment, hours of operation, staging, construction noise limits, vibration and liaison with local residents and sensitive receptors.

### 6.1.6 Cultural Heritage (indigenous and non-indigenous)

A Cultural Heritage Management Plan (CHMP) has been prepared by Dillon Bowers Lawyers (refer **Appendix G**). The CHMP establishes the procedures to be carried out where activities are proposed that will disturb the surface of the land.

**Mitigation measures**

During construction, the recommendations of the CHMP are to be complied with. The first of the steps in the process are summarised as follows:

- The Proponent will ensure that its personnel are aware of their obligations in relation to project activity planning and the management of Aboriginal Cultural Heritage.
- Prior to undertaking any project activities, all personnel employed by the proponent to work onsite within the CHMP area will undergo an online Cultural Heritage Induction and Training Program.
- The Proponent must notify the Port Curtis Coral Coast (PCCC) Cultural Heritage Representative in writing a minimum of 20 business days prior to the commencement of any proposed Project Activities.
- On receipt of the Cultural Heritage Notice, the requirement for a Cultural Heritage Field Survey or inspection will be assessed by the PCCC Cultural Heritage Representative with reference to the procedures outlined in the CHMP and to the proposed level of surface disturbance within 2 business days.

## 6.1.7 Traffic and Transport

A Traffic Desk Top Assessment of traffic and transport impacts has been carried out by SMEC (refer **Appendix J**).

SMEC understand that construction commence in January 2022 with operation due to commence in mid 2024. A design horizon to the year 2033 has been adopted for transport planning purposes.

The following operational requirements were considered for the GEF development:

- 50 parking spaces (48 total, plus 2 disabled bays), including for visitors
- 22 parking bays for office workers (Arrive between 8-10 AM)
- 28 parking bays for factory works (Arrive between 7-8 AM)
- Peak hours are considered between 7-9am and 4-6pm
- Working pattern = 2 shifts / 5 days / 46 weeks
- An average 11 heavy vehicle movements per day

The testing of electrolysers will not lead to an increase in workers on site or lead to additional traffic movements.

### 6.1.7.1 Operation Stage Traffic

It should be noted that the testing of the electrolysers will not result in an additional workers that have already been identified in the TIA required to be onsite for their testing. Based on the Aecom Traffic Impact Assessment (2011), the morning and evening peak hours at the Gladstone Mount Larcom Road / Aldoga Rd intersection were identified as 08:45-09:45 and 16:45-17:45 respectively. It is assumed that the peak hour remains the same, this is because all factory workers would have arrived before 8am to commence work. The traffic generated from the office workers between 8am to 10am will not adversely affect traffic patterns and operations. For the evening peak period, it is assumed that all workers would leave the Site during this period.

According to the RMS guidelines and the traffic generation survey of existing developments similar to this proposed development in terms of scale, location, etc. it is suggested that an average of 5 daily trips are generated per 100 $m^2$. Therefore, 575 daily vehicle trips will be generated with this development. However, considering this specific automated assembly facility, the headcount provided (50 people) and the combined information from the Proponent and TMR, trips generated will be much less than 575.

SMEC has conducted an assessment for the resulting vehicle trip generation at peak hours for this development, which is presented in the following table. It should be noted that the proportion of trips arriving / departing during AM peak periods has been split to be 80/20 and vice versa at the PM peak hour, which is applied in our estimation.

Table 6-1: Vehicle Trip Generation

| Site Area | Morning peak Period (08:45-09:45) | | | | Evening Peak Period (16:45-17:45) | | | |
|---|---|---|---|---|---|---|---|---|
| | **Arrivals** | | **Departures** | | **Arrivals** | | **Departures** | |
| 1.6 hectare | Light | HGV | Light | HGV | Light | HGV | Light | HGV |
| | 27 | 2 | 6 | 1 | 9 | 1 | 43 | 2 |
| Total Trips | 29 | | 7 | | 10 | | 45 | |

### 6.1.7.2 Construction Stage Traffic

As previously stated, construction commence in January 2022 and has largely been finalised. The construction phase traffic for this development is estimated based on the development area and examples of similar industrial developments. It is expected the building of the testing area will not have a higher traffic volumes as was already identified during the main construction traffic stages.

The key traffic generation at construction stage will be from the movement of materials, plant / equipment and the transport of construction personnel to the Site. With regards to this site it is envisaged that the majority of the construction personnel would be located within the vicinity of the Site (most likely the City of Gladstone located some 18km east of the Site) and will commute via both light vehicle and by buses provided.

The construction traffic generated for the proposed development, will be in the order of 30 two-way trips are assumed at the peak period, which is less than the traffic generated at the operation stage, therefore the construction phase traffic is has not been considered as part of this assessment.

#### 6.1.7.3 Transport Assessment

Broadly, this assessment concludes that the proposed development will have a negligible impact on the existing road network.
A key consideration for the proposal is the impact of additional traffic on the intersection of Gladstone-Mt Larcom Road / Aldoga Road. SIDRA analysis of this intersection has been carried out for the following scenarios: 2023 Base, 2023 with Development, 2033 Base and 2033 with Development. The assessment concludes that:

- Gladstone-Mount Larcom Road / Aldoga Road intersection operates well within capacity in both AM and PM peak hour with minor queues and delays for all scenarios.
- Degree of Saturation (DoS), queues and average delays are increasing for this intersection, which is mainly caused by the natural traffic growth at the location.
- The proposed development will not have major impacts on traffic performance.
- The 2033 model shows that the intersection is adequate to support the 2033 traffic volume and no upgrade will be required for this intersection.

### 6.1.8 Waste Management

Waste will be created during construction and operation. There will be relatively small amounts of waste produced during the construction of the facility, produced from typical excavation, clearing and construction activities. The new testing facility is not expected to alter the amounts of waste produced during construction or operation. The only exception to this is the Brine produced from the GTF.

Brine produced from the GTF will be directed to the RO; the RO reject water will be relocated offsite to a suitable disposal facility.

A Waste Management Plan will be prepared prior to construction which will identify types of wastes/by-products that may be produced during construction, including chipped mulch from tree and vegetation clearing, excavated soils, scrap metal, offcuts of electrical cabling and conduit, some domestic wastes from construction/site offices, sewage and typical construction and demolition wastes and general wastes. There are waste and recycling facilities within the GSDA and Gladstone area (Refer to Appendix L for the Desktop Environmental Assessment Report)

When the facility is operational, the majority of waste produced from the Site will originate from the office component of the development. This waste will be stored in a storage facility on site and will be collected by a private collection service.

**Mitigation measures**

- Waste management is to be based on a hierarchy beginning with waste avoidance, minimisation and recycling before disposal. The majority of waste should be considered for re-use on site or recycled off site. Regulated waste, if produced, may be disposed of at licensed facilities, or treated in-situ on site.
- Care needs to be taken when handling, transporting, and temporarily storing any potential regulated waste produced from the project.
- Disposal and pre-treatment prior to disposal of regulated waste shall comply with all relevant regulations.
- Poor operation of the construction site and inefficient material management are likely to produce waste in this phase.
- A Waste Management Plan is to be developed prior to construction.

It is respectfully requested that the requirement for a Site Waste Management Plan forms a condition of the permit.

### 6.1.9 Construction Impacts

A detailed Construction Management Plan has been prepared prior to construction to address potential construction impacts including noise, dust, sediment runoff, traffic, waste and so on.

**Mitigation Measures**

Construction impacts will be addressed through the preparation of a Construction Management Plan to address the management of potential environmental impacts, with sub-plans including:

- Noise and Vibration Management Plan
- Quality Management Plan
- Erosion and Sediment Control Plan
- Traffic Management Plan
- Stormwater Management Plan
- Weed Management Plan
- Waste Management Plan

An Operations Management Plan is required to address ongoing operational environmental impacts including noise, traffic and waste management.

It is respectfully requested that the requirement for a Construction Management Plan and Operations Management Plan forms a condition of the permit.

### 6.1.10 Other Matters

The regional infrastructure overlay map (refer) from the GRCPS identifies the following:

- PQ substation to the north of the Site
- Powerlink within the Site
- Ergon 66kv outside the Site's north-east corner

The proposed works will not affect mapped regional infrastructure.

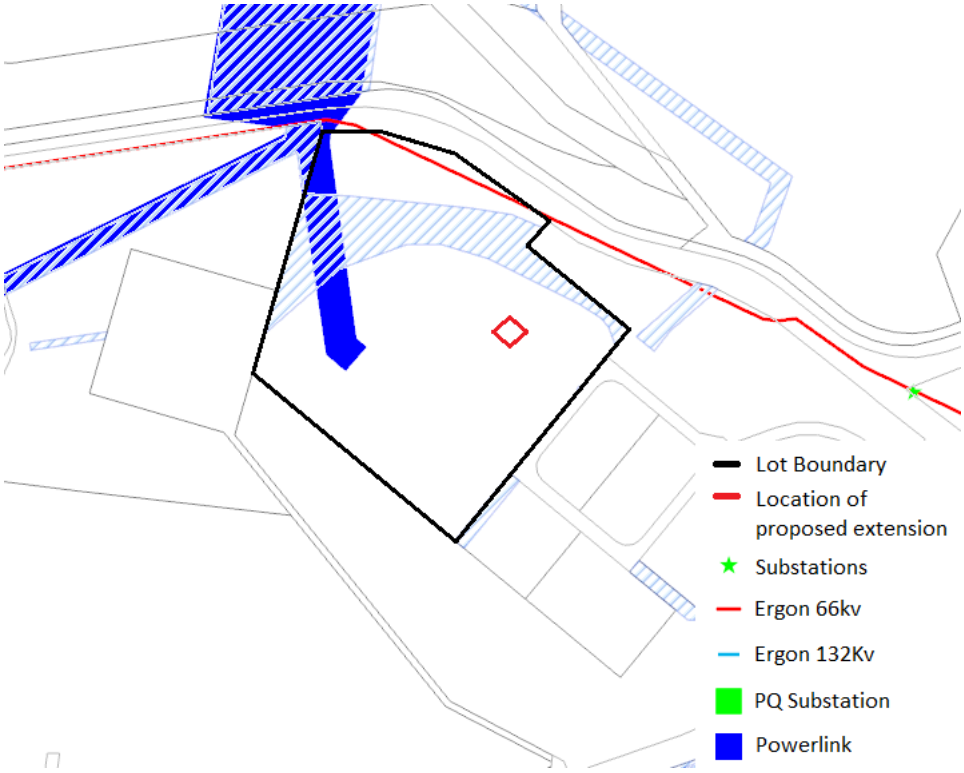



Figure 6-4 Regional infrastructure overlay (Source: GRCPS)

## 6.2 Social Impacts

Up to 50 employees may be on-site with up to approximately 22 based in the office and 28 in the manufacturing/warehouse area during operation of the facility. During construction, there will be employment benefits for the Gladstone area as around 400 people will be on-site at the peak of construction. There will be short

and long-term economic benefits for local businesses due to increased construction and operational employee activity in the area.

# 7. Conclusion and Recommendations

- This planning report demonstrates that the proposed Development Application for Medium Impact Industry (Electrolyser Production Facility) Lot 4 of Plan Number SP245936, within the Gladstone SDA, is warranted subject to reasonable and relevant conditions on the following basis:
- The proposed development seeks to utilise existing and planned road and service networks, as well as the newly constructed driveway crossover;
- The proposed land use is preferred development within the High Impact Industry Precinct and is considered consistent with the Development Scheme;
- The expected impacts of the proposed development are minor and/or able to be minimised through proposed mitigation measures.
- The development is consistent with the vision statement for the SDA and satisfies all development criteria (SDA and Precinct), or provides an acceptable alternative outcome that will result in a positive contribution to the High Impact Industry Precinct and will not result in any adverse amenity impacts to the precinct or adjoining allotments;
- All wastewater produced during electrolyser testing will be contained and then taken from site to a licensed treatment facility for disposal.
- This application complies with the outcomes sought by the Gladstone State Development Area; and,
- On the basis of the assessment contained within this report, it is requested that the OCG favourably consider the development proposal subject to reasonable and relevant conditions.

Appendix A

# Title Plan

# Current Title Search

**Queensland Titles Registry Pty Ltd**
**ABN 23 648 568 101**

| | | | |
|---|---|---|---|
| **Title Reference:** | **50861392** | **Search Date:** | 28/07/2021 12:01 |
| **Date Title Created:** | 21/10/2011 | **Request No:** | 38016819 |
| **Previous Title:** | 50501837 | | |

## ESTATE AND LAND

Estate in Fee Simple

LOT 4 SURVEY PLAN 245936
Local Government: GLADSTONE

## REGISTERED OWNER

Dealing No: 714121390 20/10/2011

MINISTER FOR ECONOMIC DEVELOPMENT QUEENSLAND

## EASEMENTS, ENCUMBRANCES AND INTERESTS

1. Rights and interests reserved to the Crown by
Deed of Grant No. 30176205 (POR 4)
Deed of Grant No. 30181145 (POR 26)
Deed of Grant No. 40012840 (Lot 1 on RP 619803)

2. EASEMENT No 714121392 20/10/2011 at 12:22
burdening the land to
LOT 6 ON SP245936 OVER EASEMENT A

## ADMINISTRATIVE ADVICES

NIL

## UNREGISTERED DEALINGS

NIL

Corrections have occurred - Refer to Historical Search

Caution - Charges do not necessarily appear in order of priority

** End of Current Title Search **


Requested by: D-ENQ PROPERTY & TITLE SEARCH

Appendix B

# Landowners Consent

Queensland Government

Department of
**State Development, Infrastructure, Local Government and Planning**

Our Ref: F21/3820
Contact officer: John Brun
Contact phone: 07 3452 7469

14 November 2023

Mr. Isaac Harslett.
Senior Planner – Urban Communities,
832 Southport – Nerang Road
Nerang, Queensland, 4211
Email: isaac.harslett@smec.com

Dear Isaac,

**RE: Request for Owners Consent to Lodge Application on Lot 4 on SP245936 owned by the Minister for Economic Development Queensland.**

I, Leisl Harris, Executive Director, Urban Development, Economic Development Queensland as delegate of the Minister for Economic Development Queensland (MEDQ), hereby consent to the lodgment of any applications or permits to the relevant administering authority by the following entity, Fortescue Future Industries (FFI) or its agent to the office of the Coordinator-General and the Gladstone Regional Council a major change application for the pervious approved Medium Impact Industry (Electrolyser Production Facility) on Lot 4 on SP245936 owned by the MEDQ within the Gladstone State Development Area .

Further, as Owner of Lot 6 on SP245936 that is benefitted by Easement A on SP245936 on lot 4 on SP245936 (Easement), the MEDQ grants consent for Storm Water to be Discharged in the easement from lot 4 on SP245936 as part of the proposed project.

This owner's consent is provided on the basis that:

- This consent is not an agreement by, or confirmation from, the Minister for Economic Development Queensland that the Applicant will be given rights to occupy or use any part of the land for the Project.
- It does not remove the statutory obligation of the Applicant to obtain all necessary cultural, environmental and development approvals from the administering authority prior to the commencement of any construction.
- It will not prejudice Economic Development Queensland from undertaking day to day operations or further detailed reviews of the proposed development and its impacts on land controlled by the Minister of Economic Development Queensland.
- It is only related to the applicant lodging an application with the relevant approving authority.

Economic Development Queensland
GPO Box 2202
Brisbane Queensland 4001 Australia
**Website** www.edq.qld.gov.au
ABN 76 590 288 697

- It does not allow the Applicant to act on behalf of the Minister of Economic Development Queensland. The Applicant is not the Minister for Economic Development Queensland's agent.
- It has an expiry date of twelve (12) months from the date of this letter.

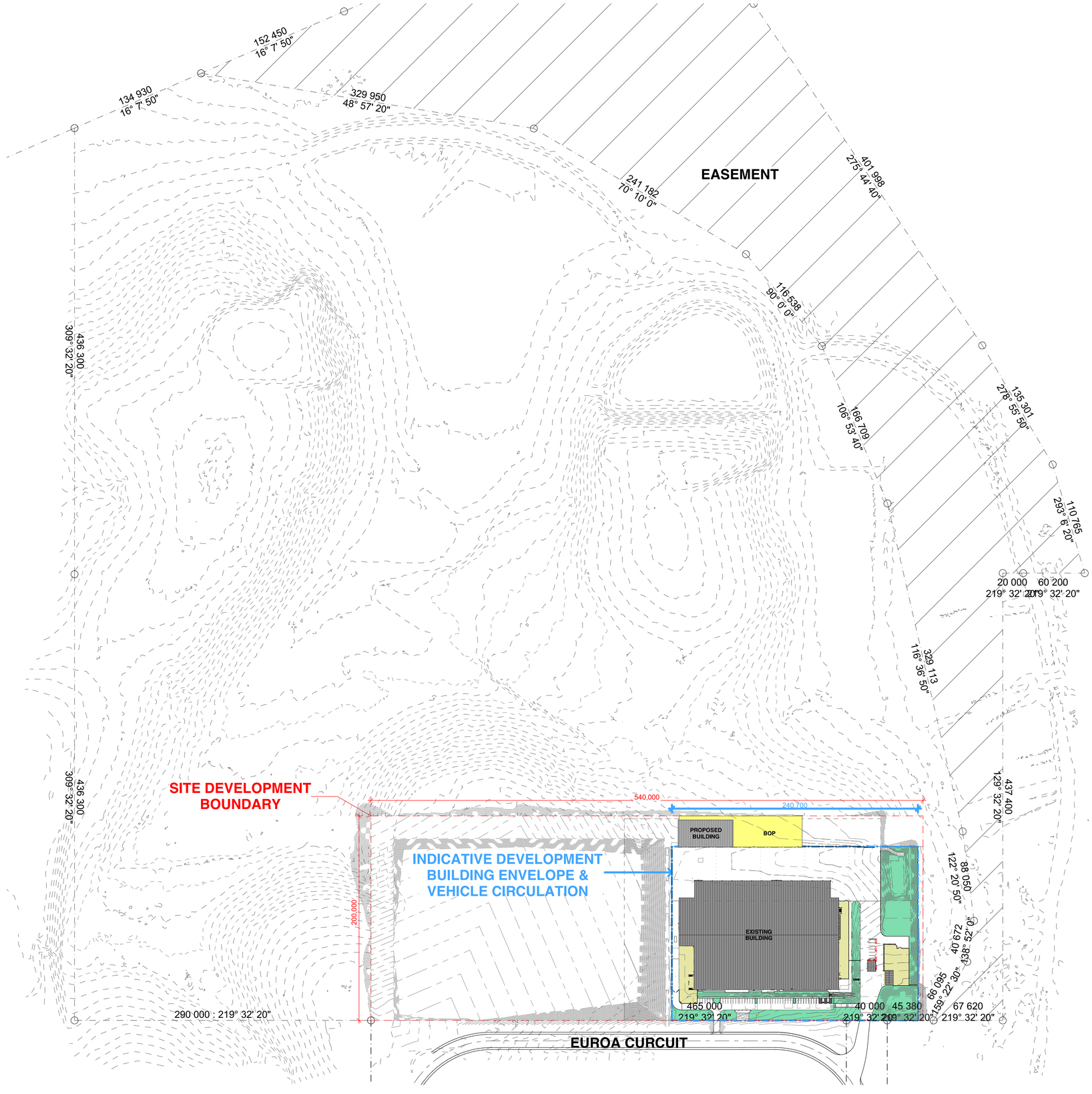
Should you have any questions regarding the above consent you are encouraged to contact John Brun on 3452 7469 or email john.brun@dsdilgp.qld.gov.au

Yours faithfully,

**Leisl Harris.**
**Executive Director**
**Urban Development**
**Economic Development Queensland**

Appendix C

# Architectural Drawings




elevation ARCHITECTURE

(07) 3251 6900 info@elevationarchitecture.com.au

**Revision**

| | | |
|---|---|---|
| 07 | DA Minor Change | 11/04/2022 |
| 08 | DA Minor Change | 19/04/2022 |
| 09 | Preliminary DA Set - Testing Facility | 18/01/2024 |
| 10 | Preliminary DA Set - Testing Facility | 23/01/2024 |
| 11 | Preliminary DA Set - Testing Facility | 5/02/2024 |

**Project**
FFI GEM Centre - Electrolyser Facility, Phase 1
Euroa Circuit, Aldoga Gladstone QLD 4694 Australia

**Client**
Hutchinson Builders

**Architect**
Greg Adsett, Dalbert Ton

**Drawn**
DT, PH, KF

**Stage**
Design Development

**Status**
**Preliminary** (NOT FOR CONSTRUCTION)

**Project No.**
1295-01

**Scale**
1:2000 at A1

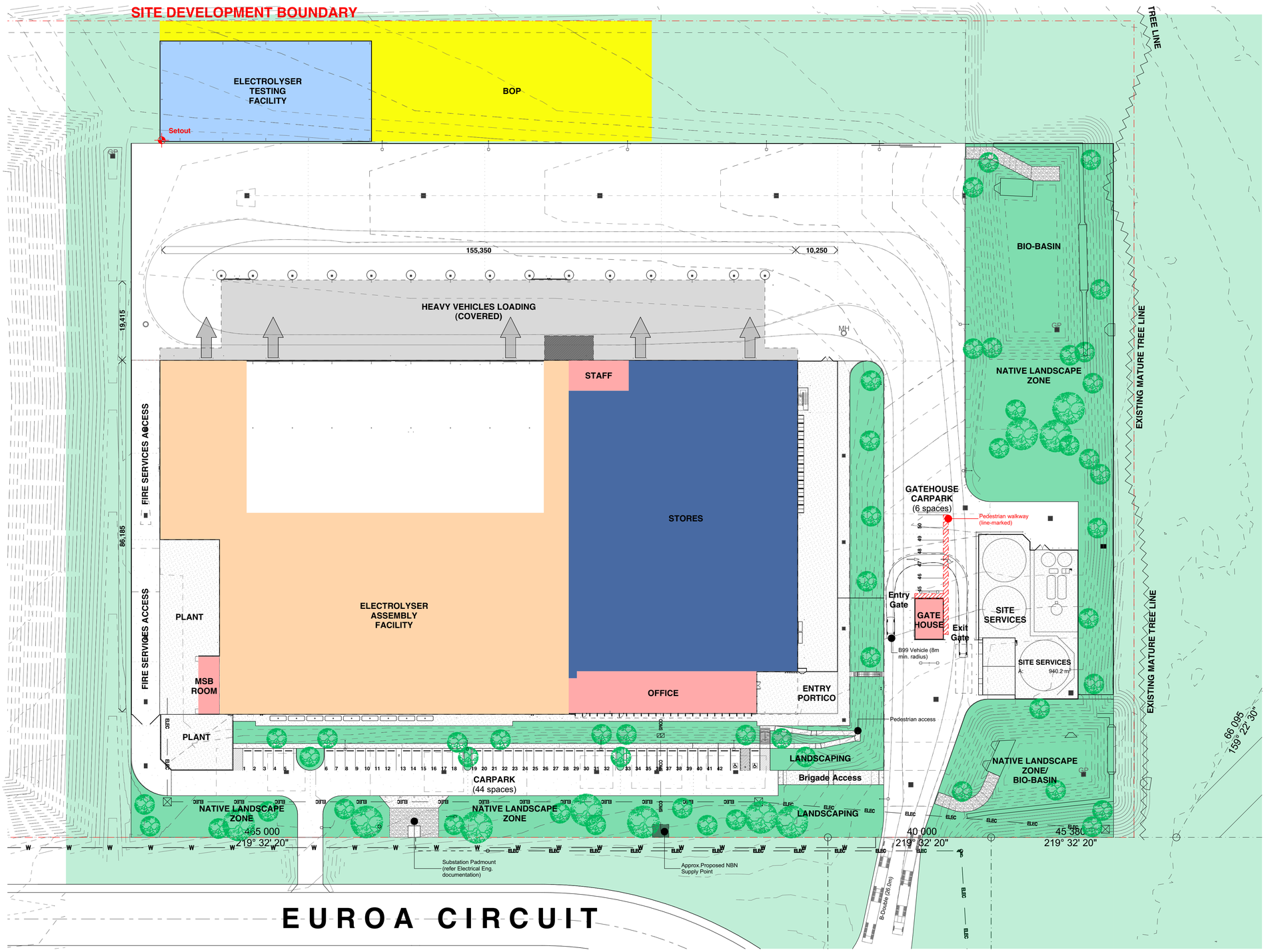
Site Plan

# A-DA-01.01

**11**
**Revision**



P:\Data 1\1295-01 Fortescue Future Industries Warehouse Gladstone\5.2 Development Application\5.2.1 ArchiCAD\1295-01_FFI Warehouse Gladstone DA Minor Change_Test Station 25.pln




## VEHICLE CIRCULATION NOTES:

1. Design Heavy Vehicle is a 26.0 m long B-Double Transport.
2. All heavy-vehicles are to remain in forward gear for all normal manoeuvres on site.
3. Design Light Vehicle is the B99 model from *AS 2890.1 Off Street Parking Facilities.*
4. Gatehouse staff parking is designed to sweep into the carpark in one (1) movement, forward direction. Leaving the carpark is also in one (1) movement forward.
5. Carpark widths for gatehouse staff are increased to 3.1 m to facilitate single movement parking.
6. All vehicles are to be limited to 10 km/h once inside the security perimeter.
7. Gatehouse is manned 24/7, with electric security gates always in the closed position, unless opened upon guard command.
8. All vehicles - including fully laden B-Double transports - shall come to a complete 'dead' stop before passing through the gates in either direction. This is to ensure that vehicle movements are sufficiently slow near the gatehouse, to allow an emergency stop to occur and to allow sufficient time between sighting a vehicle and making way.
9. Operational requirements will be detailed in the facility operations manual, and varied as required to suit facility activities.

## OTHER:

1. Plant areas to house mechanical and electrical equipment.

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| Revision | | |
|---|---|---|
| 11 | DA Minor Change | 05/05/2022 |
| 12 | DA Minor Change | 1/12/2022 |
| 13 | Preliminary DA Set - Testing Facility | 18/01/2024 |
| 14 | Preliminary DA Set - Testing Facility | 23/01/2024 |
| 15 | Preliminary DA Set - Testing Facility | 5/02/2024 |

**Project**
FFI GEM Centre - Electrolyser Facility, Phase 1
Euroa Circuit, Aldoga Gladstone QLD 4694 Australia

**Client**
Hutchinson Builders

**Architect**
Greg Adsett, Dalbert Ton

**Drawn**
DT, PH, KF

**Stage**
Design Development

**Status**
**Preliminary** (NOT FOR CONSTRUCTION)

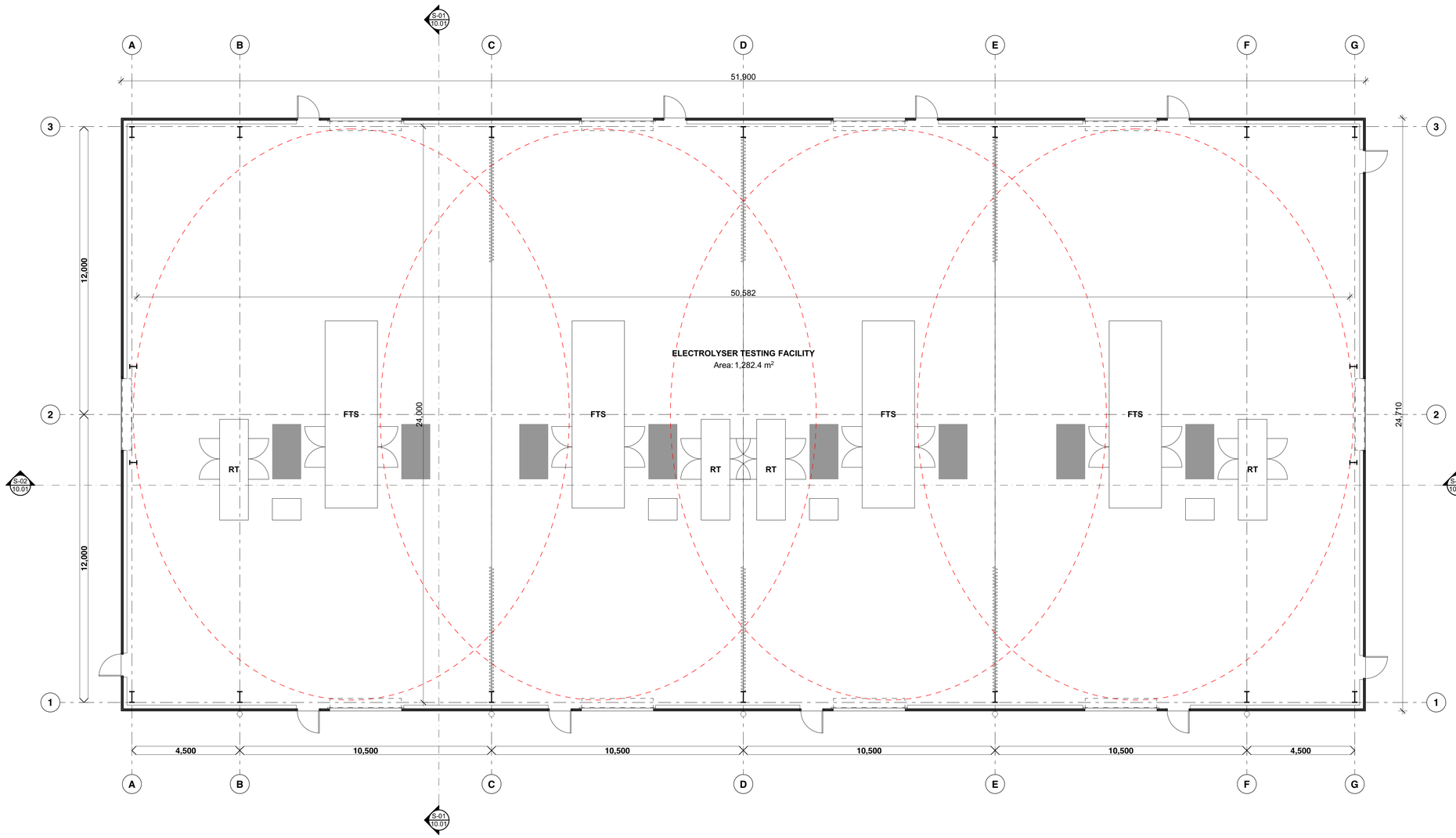
**Project No.**
1295-01

**Scale**
1:500 at A1

Site Works Plan

# A-DA-01.02

**15**
**Revision**

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**Revision**

| | | |
|---|---|---|
| 01 | Preliminary DA Set - Testing Facility | 18/01/2024 |
| 02 | Preliminary DA Set - Testing Facility | 23/01/2024 |
| 03 | Preliminary DA Set - Testing Facility | 5/02/2024 |

**Project**
FFI GTF - Testing Facility
Euroa Circuit, Aldoga Gladstone QLD 4694 Australia

**Client**
Fortescue Future Industries Pty Ltd

**Architect**
DT

**Drawn**
DT, IN

**Stage**
Development Application

**Status**
**Preliminary** (NOT FOR CONSTRUCTION)

**Project No.**
1340-02

**Scale**
1:100 at A1

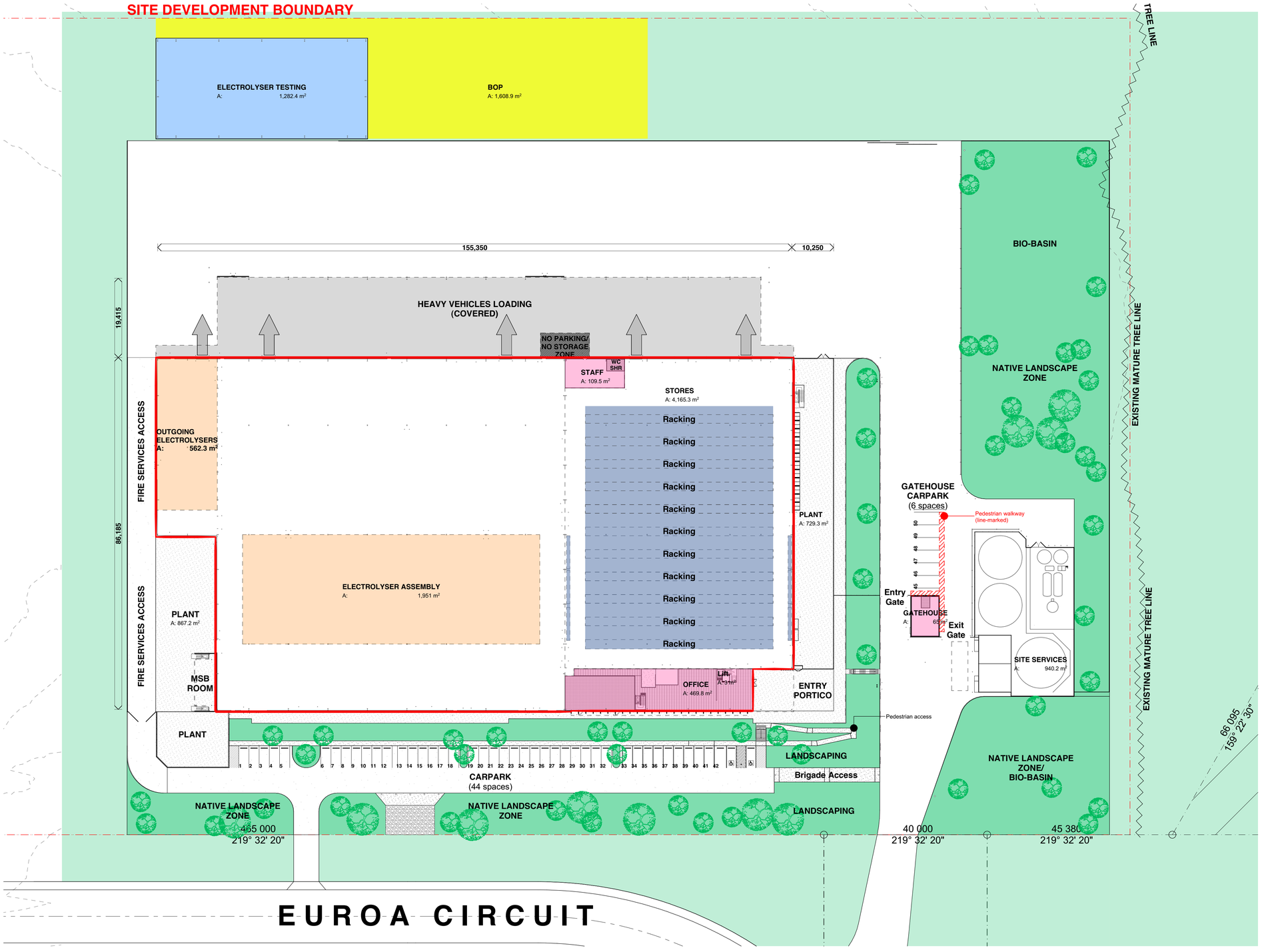
Floor Plan - Ground

# A-DA-03.01

03



P:\Data 1\1340-02 Fortescue Future Industries Testing Facility\5.2 Development Application\5.2.1 ArchiCAD\Hotlinks & Modules\1340-02 - Test Facility Module 25.pln




## SITE AREA BREAKDOWN

| | | |
|---|---|---|
| Processing plant overall GFA | 14,450m² | |
| | | |
| Fully enclosed floor area | 12,990m² | |
| | | |
| Electrolyser assembly (inc. circ.) | 5,085m² | |
| Outgoing electrolysers | 563m² | |
| Stores (inc. circ.) | 4,165m² | |
| Office & staff areas (GF & FF) | 993m² | |
| External plant (Inc. MSB room) | 1,597m² | |
| | | |
| | | |
| Site services | 940m² | |
| Gatehouse | 65m² | |
| Heavy Vehicles Loading Area | 8,800m² | |
| Parking - 50 bays | 1,560m² | |
| | | |
| Electrolyser testing facility | 1,282m² | |

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**Revision**

| | | |
|---|---|---|
| 11 | DA Minor Change | 05/05/2022 |
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Euroa Circuit, Aldoga Gladstone QLD 4694 Australia

**Client**
Hutchinson Builders

**Architect**
Greg Adsett, Dalbert Ton

**Drawn**
DT, PH, KF

**Stage**
Design Development

**Status**
**Preliminary** (NOT FOR CONSTRUCTION)

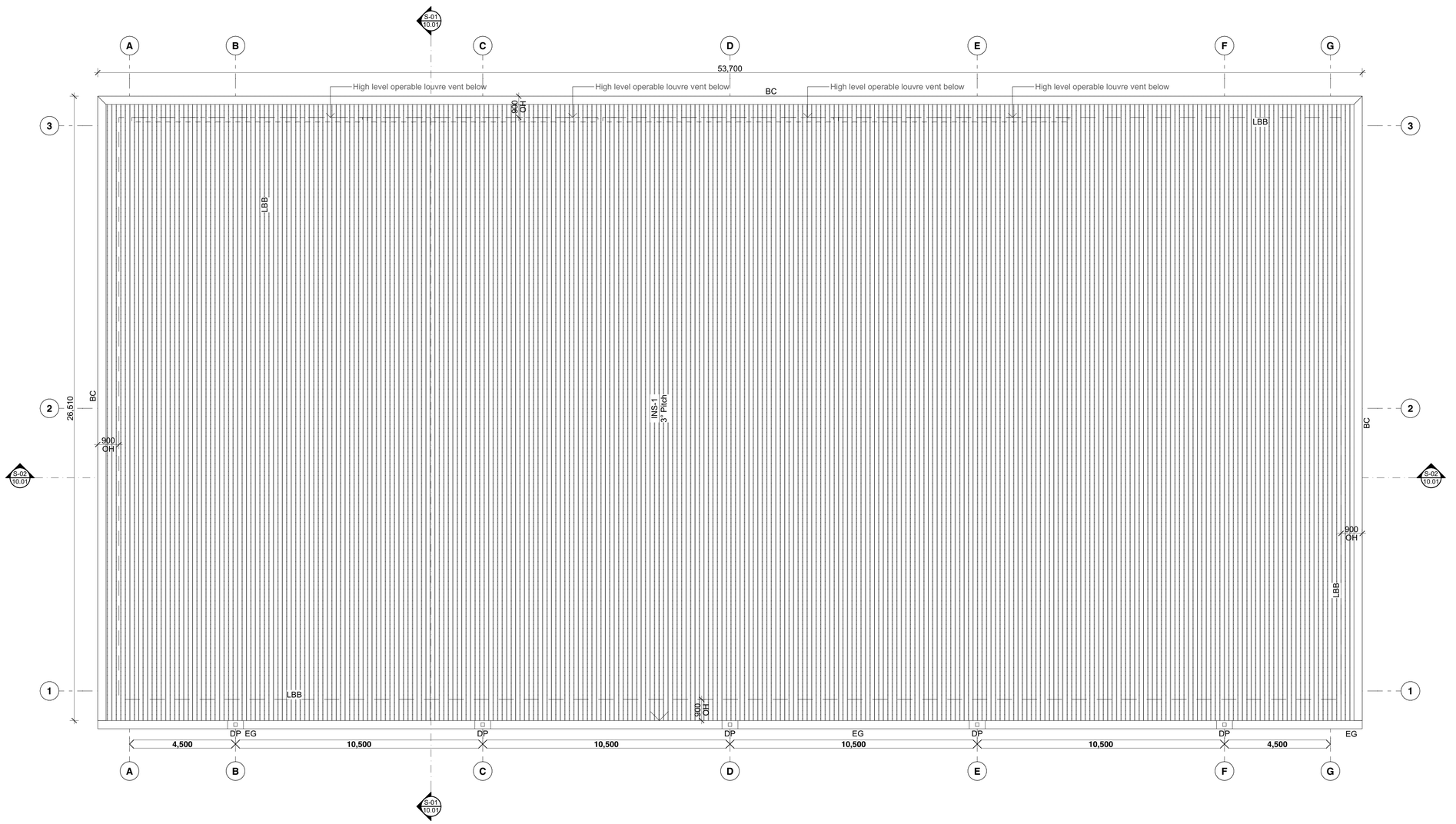
**Project No.**
1295-01

**Scale**
1:500 at A1

Floor Plan - Ground

# A-DA-03.01

**15**
**Revision**




elevation ARCHITECTURE

(07) 3251 6900 info@elevationarchitecture.com.au

**Revision**

| | | |
|---|---|---|
| 01 | Preliminary DA Set - Testing Facility | 18/01/2024 |
| 02 | Preliminary DA Set - Testing Facility | 23/01/2024 |
| 03 | Preliminary DA Set - Testing Facility | 5/02/2024 |

**Project**
FFI GTF - Testing Facility
Euroa Circuit, Aldoga Gladstone QLD 4694 Australia

**Client**
Fortescue Future Industries Pty Ltd

**Architect**
DT

**Drawn**
DT, IN

**Stage**
Development Application

**Status**
**Preliminary** (NOT FOR CONSTRUCTION)

**Project No.**
1340-02

**Scale**
1:100 at A1

Roof Plan

# A-DA-04.01

03



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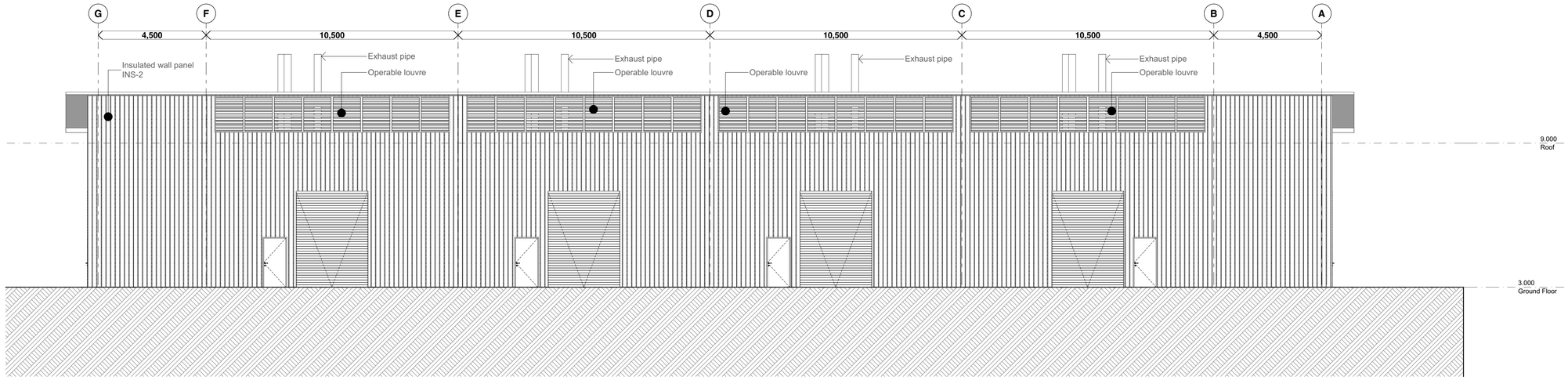
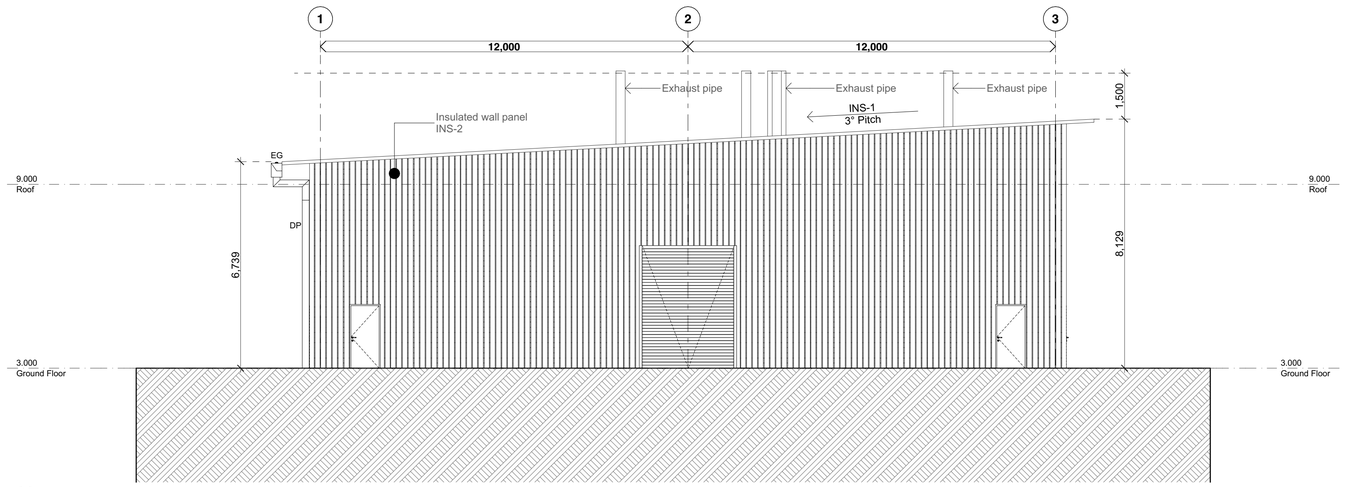



1 DA - North West Elevation
Scale 1:100




2 DA - North East Elevation
Scale 1:100

**INS-1**
Insulated Roof Panel - Kingspan KW 1000 RW - Finish 'Surfmist'

**INS-2**
Insulated Wall Panel - Kingspan KW 1000 RW - Finish 'Shale Grey'

elevation ARCHITECTURE
(07) 3251 6900 info@elevationarchitecture.com.au

**Revision**

| | | |
|---|---|---|
| 01 | Preliminary DA Set - Testing Facility | 18/01/2024 |
| 02 | Preliminary DA Set - Testing Facility | 23/01/2024 |
| 03 | Preliminary DA Set - Testing Facility | 5/02/2024 |

**Project**
FFI GTF - Testing Facility
Euroa Circuit, Aldoga Gladstone QLD 4694 Australia

**Client**
Fortescue Future Industries Pty Ltd

**Architect**
DT

**Drawn**
DT, IN

**Stage**
Development Application

**Status**
**Preliminary** (NOT FOR CONSTRUCTION)

**Project No.**
1340-02

**Scale**
1:100 at A1

Elevations 1

# A-DA-09.01

03



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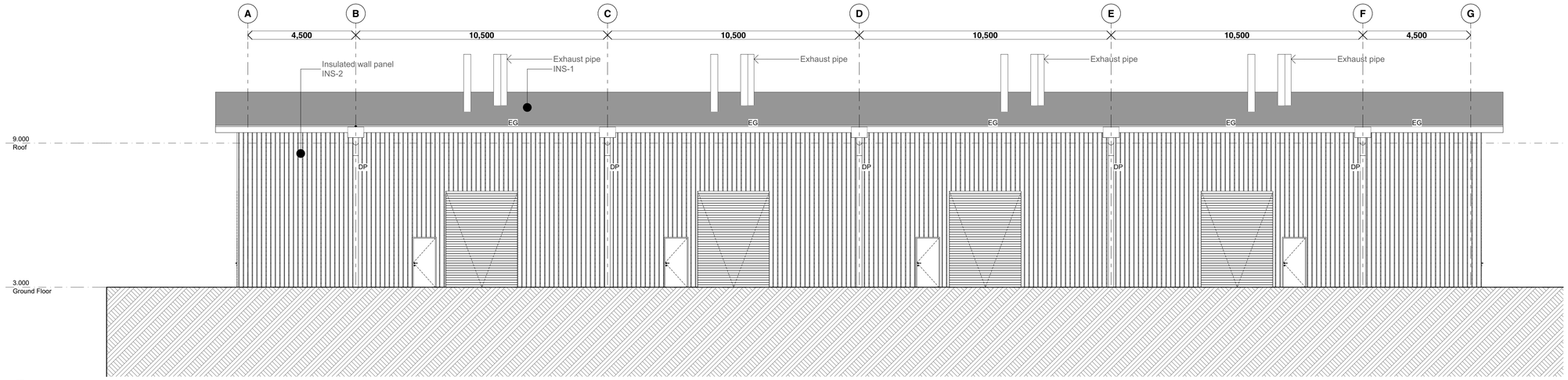


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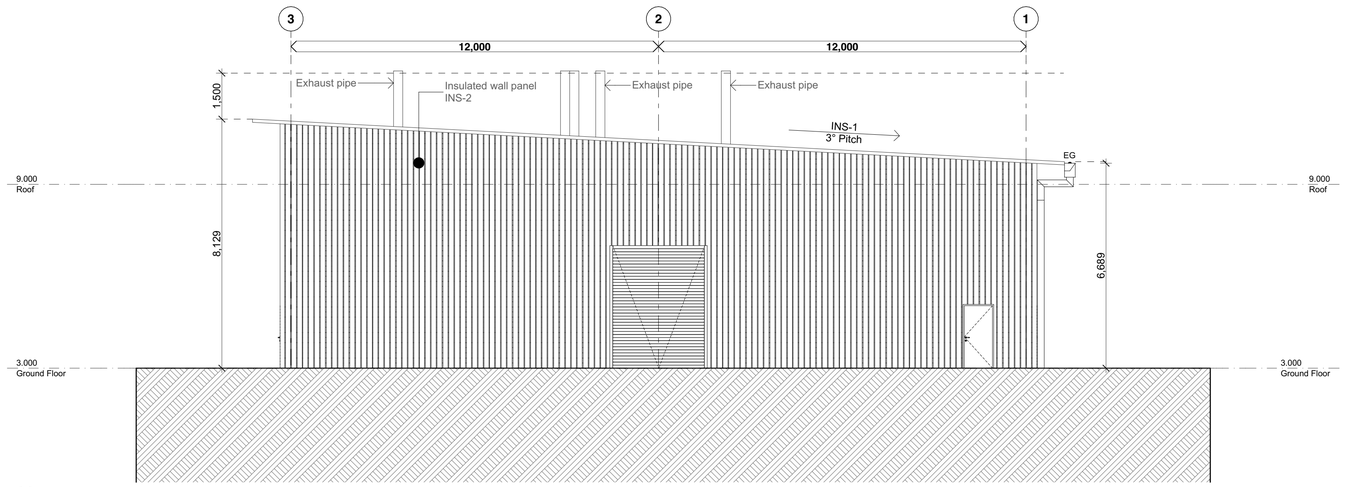
Scale 1:100




2 DA - South West Elevation
Scale 1:100

**INS-1**
Insulated Roof Panel - Kingspan KW 1000 RW - Finish 'Surfmist'

**INS-2**
Insulated Wall Panel - Kingspan KW 1000 RW - Finish 'Shale Grey'

elevation ARCHITECTURE
(07) 3251 6900 info@elevationarchitecture.com.au

**Revision**

| | | |
|---|---|---|
| 01 | Preliminary DA Set - Testing Facility | 18/01/2024 |
| 02 | Preliminary DA Set - Testing Facility | 23/01/2024 |
| 03 | Preliminary DA Set - Testing Facility | 5/02/2024 |

**Project**
FFI GTF - Testing Facility
Euroa Circuit, Aldoga Gladstone QLD 4694 Australia

**Client**
Fortescue Future Industries Pty Ltd

**Architect**
DT

**Drawn**
DT, IN

**Stage**
Development Application

**Status**
**Preliminary** (NOT FOR CONSTRUCTION)

**Project No.**
1340-02

**Scale**
1:100 at A1

Elevations 2

**A-DA-09.02** **03**



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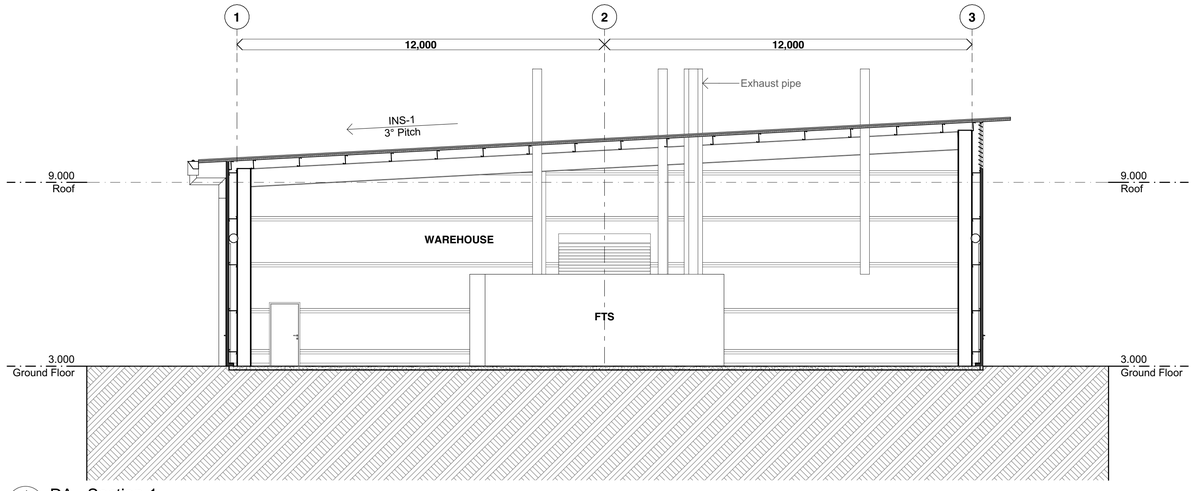


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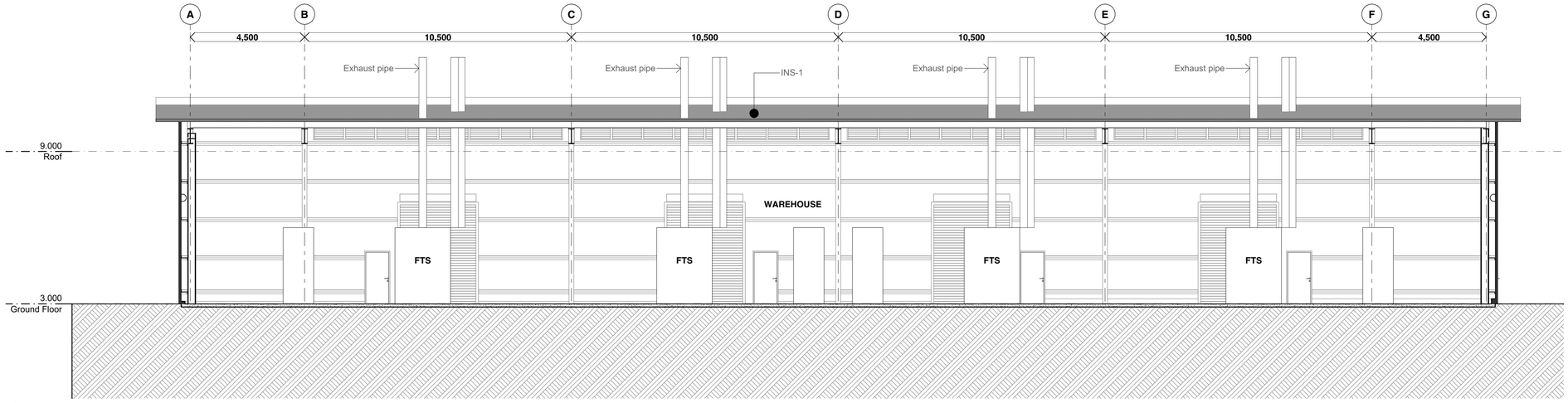
Scale 1:100




2 DA - Section A
Scale 1:100

elevation ARCHITECTURE
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**Revision**

| | | |
|---|---|---|
| 01 | Preliminary DA Set - Testing Facility | 18/01/2024 |
| 02 | Preliminary DA Set - Testing Facility | 23/01/2024 |
| 03 | Preliminary DA Set - Testing Facility | 5/02/2024 |

**Project**
FFI GTF - Testing Facility
Euroa Circuit, Aldoga Gladstone QLD 4694 Australia

**Client**
Fortescue Future Industries Pty Ltd

**Architect**
DT

**Drawn**
DT, IN

**Stage**
Development Application

**Status**
**Preliminary** (NOT FOR CONSTRUCTION)

**Project No.**
1340-02

**Scale**
1:100 at A1

Sections

# A-DA-10.01

03



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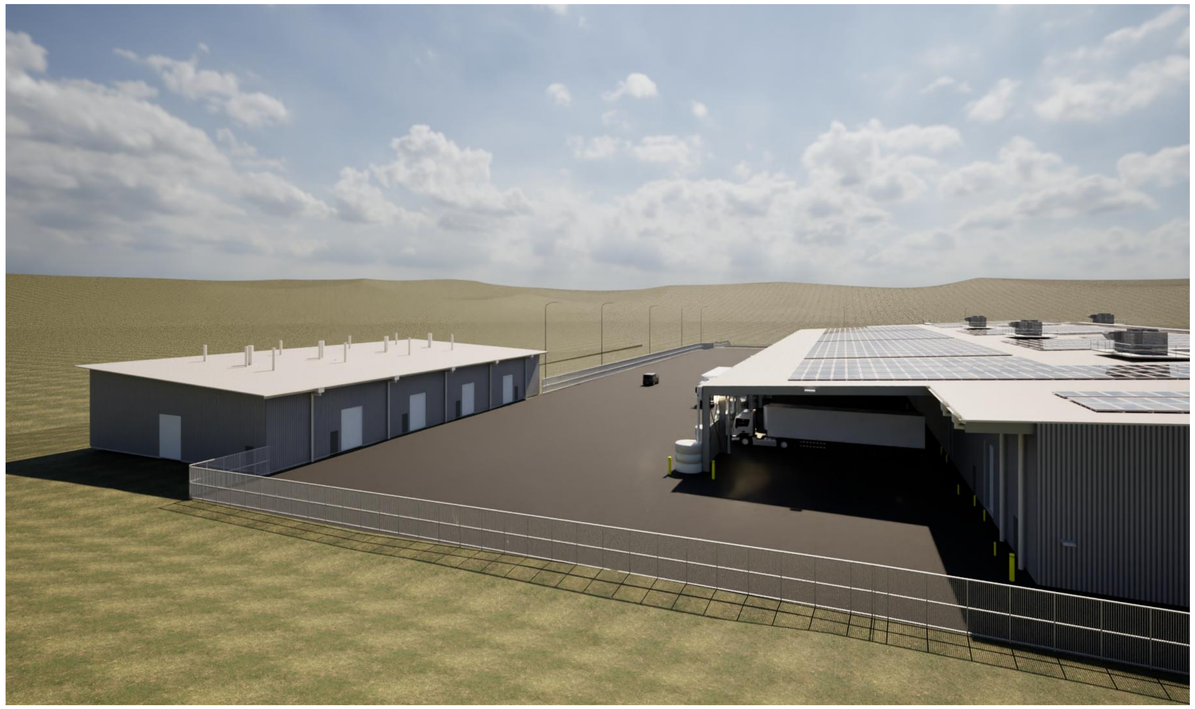


elevation ARCHITECTURE

(07) 3251 6900 info@elevationarchitecture.com.au

**Revision**

| | | |
|---|---|---|
| 01 | Preliminary DA Set - Testing Facility | 23/01/2024 |
| 02 | Preliminary DA Set - Updated Renders | 6/02/2024 |

**Project**
FFI GTF - Testing Facility
Euroa Circuit, Aldoga Gladstone QLD 4694 Australia

**Client**
Fortescue Future Industries Pty Ltd

**Architect**
DT

**Drawn**
DT, IN

**Stage**
Development Application

**Status**
**Preliminary** (NOT FOR CONSTRUCTION)

**Project No.**
1340-02

**Scale**
at A1

Renders

# A-DA-22.01 02



P:\Data 1\1340-02 Fortescue Future Industries Testing Facility\5.2 Development Application\5.2.1 ArchiCAD\Hotlinks & Modules\1340-02 - Test Facility Module 25.pln

Appendix D

# Stormwater Concept Plan

## LEGEND

- FINISHED SURFACE CONTOUR (62.5)
- EXISTING SURFACE CONTOUR (62.5)
- PROPOSED DRAINAGE (D)
- PROPOSED CATCHMENT AREA
- EXISTING CATCHMENT AREA
- OVERLAND FLOW PATH
- SWALE DRAIN

EXTERNAL CATCHMENT AREA = 0.626Ha

INTERNAL CATCHMENT AREA = 4.092Ha

PROPOSED CARPARK

PROPOSED BUILDING

PROPOSED CARPARK

EUROA CIRCUIT

INDICATIVE BASIN LOCATION (FINAL LOCATION AND SIZE SUBJECT TO DETAILED DESIGN)

64.82

60.00

65.60

60.85

1 in 50.00

1 in 200.26

1 in 200.00

1 in 50.00

| REV | DATE | AMENDMENT \ REVISION DESCRIPTION | DRAFT | DESIGN | WVR No. |
|---|---|---|---|---|---|
| 1 | 30.07.21 | ISSUE FOR MCU APPROVAL | KM | BD | |

STATUS: **FOR MCU APPROVAL**

APPROVED: -

RPEQ:

DATE

SMEC

Member of the Surbana Jurong Group



0 5 10 20

Scale 1:500

CLIENT

PROJECT NAME: PROPOSED DEVELOPMENT

EUROA CIRCUIT, GLADSTONE
GLADSTONE REGIONAL COUNCIL

DRAWING TITLE: STORMWATER LAYOUT PLAN

(CONCEPT ONLY)

| DATUM | SCALE | SIZE | PROJECT\DRAWING No | REVISION |
|---|---|---|---|---|
| AHD | AS SHOWN | A1 | 30033831E-001-SK-006 | 1 |

Appendix E

# Bulk Earthworks

## LEGEND

62.5 FINISHED SURFACE CONTOUR

62.5 EXISTING SURFACE CONTOUR

CUT

FILL

240.7m

169.8m

64.82

1 in 50.00

60.00

C 005

D 005

1 in 200.26

1 in 200.00

65.86

60.85

B 005

A 005

EUROA CIRCUIT

### EARTHWORKS VOLUMES

TOTAL CUT VOLUMES ($m^3$) = -29559.854

TOTAL FILL VOLUMES ($m^3$) = 24902.548

TOTAL BALANCE VOLUMES ($m^3$) = -4657.305 (EXPORT)

NOTE: VOLUMES SHOWN ARE SOLID FIGURES ONLY, NO ALLOWANCES HAVE BEEN MADE FOR COMPACTION, BULKING, UNSUITABLE MATERIAL, TRENCH SPOIL OR ROAD PAVEMENT DEPTHS.

| REV | DATE | AMENDMENT \ REVISION DESCRIPTION | DRAFT | DESIGN | WVR No. |
|---|---|---|---|---|---|
| 1 | 30.07.21 | ISSUE FOR MCU APPROVAL | KM | BD | |

STATUS: **FOR MCU APPROVAL**

APPROVED RPEQ:

DATE

SMEC

Member of the Surbana Jurong Group



0 5 10 20

Scale 1:500

CLIENT

PROJECT NAME: PROPOSED DEVELOPMENT

EUROA CIRCUIT, GLADSTONE
GLADSTONE REGIONAL COUNCIL

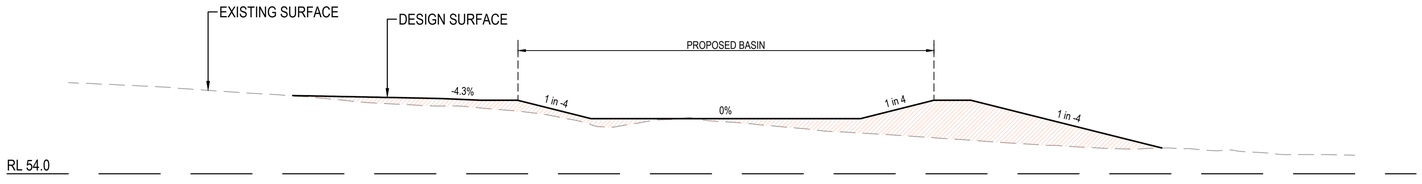
DRAWING TITLE: EARTHWORKS LAYOUT

(CONCEPT ONLY)

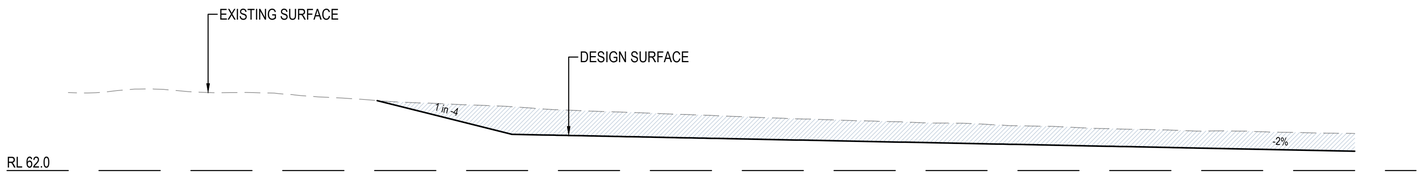
| DATUM | SCALE | SIZE | PROJECT\DRAWING No | REVISION |
|---|---|---|---|---|
| AHD | AS SHOWN | A1 | 30033831E-001-SK-004 | 1 |

## LEGEND

- CUT
- FILL
- EXISTING SURFACE
- FINISHED SURFACE




SECTION D / 004
SCALE 1:250




SECTION C / 004
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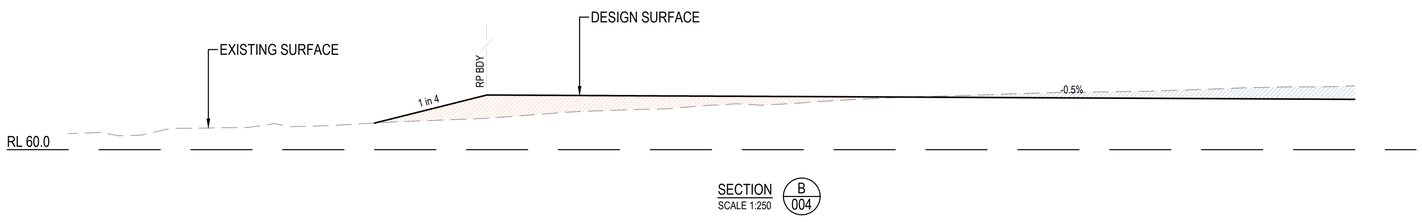
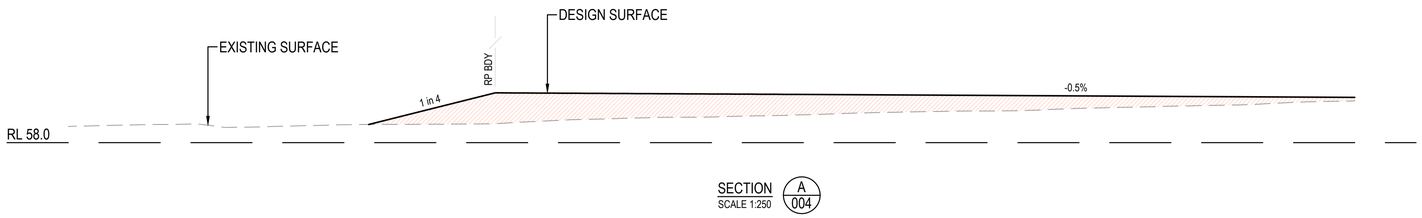



SECTION B / 004
SCALE 1:250




SECTION A / 004
SCALE 1:250

| REV | DATE | AMENDMENT \ REVISION DESCRIPTION | DRAFT | DESIGN | WVR No. |
|---|---|---|---|---|---|
| 1 | 30.07.21 | ISSUE FOR MCU APPROVAL | KM | BD | |

STATUS: **FOR MCU APPROVAL**

APPROVED RPEQ:

DATE -

SMEC
Member of the Surbana Jurong Group
© ABN 47 065 475 149

0 2.5 5 10
Scale 1:250

CLIENT

PROJECT NAME
PROPOSED DEVELOPMENT
EUROA CIRCUIT, GLADSTONE
GLADSTONE REGIONAL COUNCIL

DRAWING TITLE
EARTHWORKS SECTIONS
(CONCEPT ONLY)

| DATUM | SCALE | SIZE | PROJECT\DRAWING No | REVISION |
|---|---|---|---|---|
| AHD | AS SHOWN | A1 | 30033831E-001-SK-005 | 1 |

Appendix F

# CHMP

# Cultural Heritage Management Plan

Between

Port Curtis Coral Coast Registered Native Title Claimants

And the Proponent

The Minister for Economic Development Queensland care of Economic Development Queensland

Version: 4

62 Blackwood Street
Townsville QLD 4810
Tel > 07 4721 2477
Fax > 07 4724 5055
Email: general@dillonbowers.com
Our Ref: JMD:EJD:POR120206

dillonBOWERS LAWYERS

Table of contents

dillonBOWERS LAWYERS

# Cultural Heritage Management Plan

Dated

## Parties

**PCCC RNTC** **Kerry Blackman, Dean Sarra, Lurleen Blackman, Richard Johnson, Nat Minniecon, Matthew Cooke and Neville Johnson on their own behalf and on behalf of the Port Curtis Coral Coast People**

**Proponent** *The Minister for Economic Development Queensland (MEDQ)*

ABN : 76 590 288 697

## Background

A This CHMP has been prepared in consultation with the PCCC RNTC for the Minister for Economic Development Queensland

B The PCCC RNTC is the Aboriginal Party for the CHMP Area for the purposes of the ACHA. The CHMP is based on the ACHA Duty of Care Guidelines.

C The PCCC RNTC wish to identify record and protect Aboriginal Cultural Heritage within the CHMP Area.

D The parties intend this CHMP to be 'another agreement' for the purposes of section 23(3)(a)(iii) ACHA.

E The Parties have consulted about how best to manage Aboriginal Cultural Heritage in the CHMP Area and have agreed to enter into this CHMP for the purpose of managing the impact of Project Activities on Aboriginal Cultural Heritage that may be present in the CHMP Area, and to this end they are committed to working together in close cooperation in a relationship of respect, understanding, and trust, through open and constructive consultation.

F Specific management procedures have been prepared to ensure that all Project Activities will recognise, protect and manage Aboriginal Cultural Heritage in compliance with the requirements of the ACHA and the Port Curtis Coral Coast People.

G Aboriginal Cultural Heritage in Queensland is at least 60,000 years old. The purpose of the Act is to protect this heritage for past, present and future generations. Duty of Care applies to both Aboriginal and non-Indigenous participants.

H The parties first entered into a Cultural Heritage Management Plan in 2006 and this agreement replaces the earlier Cultural Heritage Management Plan

dillonBOWERS LAWYERS

# Agreed terms

## 1 Definitions

In this document:

| Term | Definition |
|---|---|
| **Aboriginal Cultural Heritage** | means anything that is:<br>(a) a Significant Aboriginal Area in Queensland; or<br>(b) a Significant Aboriginal Object; or<br>(c) evidence, of archaeological or historic significance, of Aboriginal occupation of an area of Queensland. |
| **Aboriginal Party** | has the meaning given in the ACHA. |
| **Aboriginal Tradition** | means the body of traditions, observances, customs and beliefs of Aboriginal people generally and, in particular, the beliefs of the families making up the PCCC RNTC community or of a particular community or group of Aboriginal people, and includes any such traditions, observances, customs and beliefs relating to particular persons, areas, objects or relationships. |
| **ACHA** | means the *Aboriginal Cultural Heritage Act 2003* (Qld). |
| **Additional Surface Disturbance** | means Surface Disturbance not inconsistent with previous Surface Disturbance. |
| **Proponent's Cultural Heritage Representative** | refers to the representative of the Proponent who is designated to liaise between the Proponent and its agents and representatives of the PCCC RNTC. |
| **Chief Executive Officer** | means the chief executive officer of the CHCU. |
| **CHMP Area** | means the area within the Gladstone State Development Area that are within the Port Coral Coast Claim area as set out in Schedule 1. |
| **CHCU** | means the cultural heritage coordination unit of the DNR&M. |
| **Clearing** | means in relation to grass, scrub or bush – the removal of vegetation by disturbing the root systems and exposing underlying soil and/or substantial pruning or removal of mature native vegetation, but does not include:<br>(a) the flattening or compaction of vegetation by vehicles if the vegetation remains living; or<br>(b) the slashing or mowing of vegetation by vehicles to facilitate access to existing tracks; or<br>(c) the clearing of noxious or introduced plant species; and |
| **Cultural Heritage Assessor (Technical Adviser)** | means one of those persons nominated in Schedule 2of this CHMP, or in the event that neither of these persons are available, a professional archaeologist or |

| Term | Definition |
|---|---|
| | anthropologist acceptable to both the PCCC RNTC and the Proponent, or another person who has particular knowledge or experience making the person suitable for engagement as a cultural heritage assessor. |
| **Cultural Heritage Committee** | means a maximum of two key representatives from the Port Curtis Coral Coast People (which may include a Cultural Heritage Assessor on behalf of the Port Curtis Coral Coast People) and an equal number of key representatives for the Proponent who at a minimum must meet annually from the commencement date or as agreed between the Parties to discuss issues relating to the Project under this CHMP or revisions to the CHMP. |
| **Cultural Heritage Coordinator** | means a member of the Port Curtis Coral Coast People appointed by the Project Coordinator as the field manager who is responsible for day to day coordination of inspections, and is employed to coordinate the field team and provide advice in-situ during surveys and inspections. The Cultural Heritage Coordinator should have sufficient knowledge and responsibility to make decisions regarding the proper identification and protection of Aboriginal Cultural Heritage. Other responsibilities include:<br>(d) liaising with the Cultural Heritage Assessor;<br>(e) coordinating the notification and prompt attendance of Cultural Heritage Field Officers and cultural inductors when they are required to be in attendance at the work site.<br>(f) Dealing with issues relating to time schedules and time sheets<br>(g) Ensure every member of the team is fit and able to carry out their duties |
| **Cultural Heritage Duty of Care** | has the meaning given in section 23 ACHA. |
| **Cultural Heritage Find** | means Aboriginal Cultural Heritage found in the course of undertaking a Project Activity. |
| **Cultural Heritage Field Officers** | means representatives of the Port Curtis Coral Coast People employed to conduct field surveys, inspections during Surface Disturbance activities and other Aboriginal Cultural Heritage management activities required under this CHMP in order to assess these areas for items of Aboriginal Cultural Heritage significance and to assist in managing any potential impacts on identified Aboriginal Cultural Heritage. The cultural heritage field officer should be recognised by their peers as a person with the knowledge and responsibility to make decisions regarding the proper identification and management of their Aboriginal Cultural Heritage. It will also be the responsibility of the Cultural Heritage Field Officer to:<br>(a) work in designated areas under the direction of the Cultural Heritage Coordinator; |

| Term | Definition |
|---|---|
| | (b) identify and record discoveries of Cultural Heritage Finds;<br>(c) work collaboratively with the Cultural Heritage Assessor and, where relevant, representatives of the Proponent; and<br>(d) conduct any salvage and relocation of nominated Cultural Heritage Finds. |
| **Cultural Heritage Survey** | means a comprehensive study of Aboriginal cultural heritage within a given portion of the CHMP Area. Such a study may be undertaken at any time by agreement between the PCCC RNTC and the Proponent. Such a study may also be conducted in accordance with Part 6 of the ACHA for the purpose of recording the findings of the study on the register, if agreed between the PCCC RNTC and the Proponent. |
| **Cultural Heritage Inspection Form** | means a form approved by both Parties that is used to record information relating to field inspection work conducted by the Port Curtis Coral Coast People. The form may be signed by representatives of each Party to confirm that the designated areas have been surveyed for the Proponent Project Activities and that work can proceed in instances where no further actions relating to the management of Project impacts on Aboriginal Cultural Heritage are required. These forms are generally utilised only for small scale activities where avoidance of identified Aboriginal Cultural Heritage is not practical or feasible such as Follow-up Inspections and Monitoring and where otherwise agreed between the Parties. Cultural Heritage Surveys and the production of Cultural Heritage Survey Reports are the preferred methodology for assessing Project impacts and to develop appropriate mitigation measures. |
| **Cultural Heritage Survey Report** | A report usually provided by either the Cultural Heritage Assessor or nominated PCCC Person that includes at a minimum the name, date and location of the survey, personnel involved (i.e. stakeholders and field representatives), context of finds and their location (inclusive of GPS coordinates), extent, content and significance, an evaluation of the potential for further Aboriginal Cultural Heritage including subsurface archaeological deposits to be present , levels of visibility, access and other relevant constraints to the outcomes of the survey, relevant contextual background research, proposed impacts, and practical recommendations for mitigation. |
| **Cultural Heritage Mitigation Report** | This report will provide the structure and process for the next stage incorporating the implementation of agreed management of identified Aboriginal Cultural Heritage and/or areas of Aboriginal Cultural Heritage potential. Annexure to this report will be produced in order to summarise the results of any Aboriginal Cultural Heritage management strategies and inspections undertaken |

| Term | Definition |
|---|---|
| | subsequent to the completion of the Aboriginal Cultural Heritage Survey. |
| **DNR&M** | means the Queensland Department of Natural Resources and Mines. |
| **Duty of Care Guidelines** | means the guidelines pursuant to section 23(1) ACHA. |
| **Follow-up Inspection** | means a further inspection of any areas or objects of Aboriginal Cultural Heritage and/or areas of potential Aboriginal Cultural heritage identified and demarcated such as through the use of Tiger Tape during the initial Cultural Heritage Survey or a subsequent inspection prior to carrying out any Project Activities. |
| **GPS** | means Global Positioning System. |
| **GST** | has the meaning given to that term in the GST Act. |
| **GST Act** | means *A New Tax System (Goods and Services Tax) Act 1999* (Cth). |
| **Input Tax Credit** | has the meaning given to that term in the GST Act. |
| **Isolated Find** | means a single object of Aboriginal Cultural Heritage that is not a Significant Aboriginal Object and that is separated by 5 or more metres from the nearest identified object of Aboriginal Cultural Heritage of a similar nature. |
| **Joint Venture Operator** | has the meaning given to that term in the GST Act. |
| **Low Density Artefact Scatters** | means a more than one object of Aboriginal Cultural Heritage that does not include a Significant Aboriginal Object/s, that generally number less than 30 objects and that are generally contained within an area of less than 50 metres$^2$, and where the maximum density of these objects is generally 2 or less per 2 metres$^2$. |
| **MDL** | means mineral development licence under the *Mineral Resources Act 1989* (Qld). |
| **Mitigation** | This is the process by which Project impacts on identified cultural heritage is managed through negotiation and agreed outcomes. Mitigation must prioritise avoiding harm to identified Aboriginal Cultural Heritage by retaining any such finds in situ and modifying Project Activities where practical and feasible to avoid impacting on said Aboriginal Cultural Heritage. Mitigation can also include a range of other strategies, such as archaeological investigation, re-location of identified Aboriginal Cultural Heritage and scientific analysis of collected material. |
| **Parties** | means the Proponent and the PCCC RNTC. |
| **PCCC Cultural Heritage Representative** | refers to the representative of the PCCC RNTC who is designated to liaise between the PCCC RNTC and |

| Term | Definition |
|---|---|
| | representatives of the Proponent and their nominated agents. |
| **PCCC RNTC** | means the registered native title claimants for the Port Coral Coast Claim, which at the date of this Agreement comprised Kerry Blackman, Dean Sarra, Lurleen Blackman, Richard Johnson, Nat Minniecon, Matthew Cooke and Neville Johnson. |
| **Port Curtis Coral Coast Claim** | means the Port Curtis Coral Coast native title claim (NNTT No. QC01/29, Federal Court No. QUD6026/01). |
| **Port Curtis Coral Coast People** | means the claim group for the Port Curtis Coral Coast Claim. |
| **Project** | Means works undertaken by the MEDQ within the Gladstone State Development Area in accordance with the Development Scheme applicable to that area under the State Development and Public Works Organisation Act 1971 |
| **Project Activities** | means any activities the Proponent is authorised to undertake within the Gladstone State Development Area within the CHMP Area, for the life of this agreement |
| **Project Coordinator** | means a member of the Port Curtis Coral Coast People who is responsible for overall management and co-ordination of inspections conducted for the Proponent. |
| **Proponent** | the Minister for Economic Development Queensland care of Economic Development Queensland |
| **Recipient** | has the meaning given to that term in the GST Act. |
| **Related Bodies Corporate** | has the same meaning as in the *Corporations Act 2001* (Cth). |
| **Representative Member** | has the meaning given to that term in the GST Act. |
| **Significant Aboriginal Area** | is an area of particular significance to Aboriginal people because of either or both of the following:<br>(a) Aboriginal tradition; and<br>(b) the history, including contemporary history, of any Aboriginal Party for the area.<br>(c) (Note: this can include both visible and invisible places) |
| **Significant Aboriginal Object** | is an object of particular significance to Aboriginal people because of either or both of the following:<br>(a) Aboriginal tradition; and<br>(b) the history, including contemporary history, of an Aboriginal Party for that area. |
| **Significant Ground Disturbance** | means:<br>(a) disturbance by machinery of the topsoil or surface rock layer of the ground, such as by ploughing, drilling or dredging; and |

| Term | Definition |
|---|---|
| | (b) the removal of native vegetation by disturbing root systems and exposing underlying soil. |
| **Sub-surface Cultural Heritage** | means Aboriginal Cultural Heritage located below the surface that is not visible as a result of earth or ground cover |
| **Supplier** | means the entity making the Supply. |
| **Supply** | has the meaning given to that term in the GST Act. |
| **Surface Disturbance** | means any disturbance of an area which causes a lasting impact to the land or waters during the activity or after the activity has ceased. |
| **Survey Team** | means the Project Coordinator and Cultural Heritage Coordinator and at least 2 Cultural Heritage Field Officers who form a team to carry out Aboriginal Cultural Heritage Surveys, inspections or Mitigation Activities, together with any Cultural Heritage Assessor required by the PCCC RNTC |
| **Tax Invoice** | has the meaning given to that term in the GST Act. |
| **Taxable Supply** | has the meaning given to that term in the GST Act. |
| **Gladstone State Development Area** | means Land within the regulated area of the Gladstone State Development Area (GSDA). |
| **Tiger Tape** | means yellow horizontally striped marking tape which is used by the Port Curtis Coral Coast People during Initial Inspections and which must be recorded in the Cultural Heritage Inspection Forms to identify Cultural Heritage Finds and that must not be disturbed by exploration activities unless otherwise agreed to by the Port Curtis Coral Coast People. |

## 2 Interpretation

In this document:

(a) a singular word includes the plural and vice versa;

(b) a word which suggests one gender includes the other gender;

(c) a reference to a clause, schedule, annexure or party is a reference to a clause of, and a schedule, annexure or party to, this document and references to this document include any schedules or annexures;

(d) a reference to a party to this document or any other document or agreement includes the party's successors, permitted substitutes and permitted assigns;

(e) if a word or phrase is defined, its other grammatical forms have a corresponding meaning;

(f) a reference to a document or agreement (including a reference to this document) is to that document or agreement as amended, supplemented, varied or replaced;

(g) a reference to this document includes the agreement recorded by this document;

(h) a reference to legislation or to a provision of legislation (including subordinate legislation) is to that legislation as amended, re-enacted or replaced, and includes any subordinate legislation issued under it;

(i) if any day on or by which a person must do something under this document is not a Business Day, then the person must do it on or by the next Business Day;

(j) a reference to a person includes a corporation, trust, partnership, unincorporated body, government and local authority or agency, or other entity whether or not it comprises a separate legal entity; and

(k) a reference to 'month' means calendar month.

# 3 Term

The term of this CHMP will be for the full term of 10 years. With a review undertaken in 5 years or earlier by agreement by both parties, The term commences on the date on which the last party signs this CHMP. .

# 4 Aims

## 4.1 Primary aims

It is agreed by all Parties that the objectives of this CHMP are to establish mechanisms to mitigate potential impacts on Aboriginal Cultural Heritage by:

(a) ensuring that the Proponent operates on the principle of minimum disturbance to Aboriginal Cultural Heritage, i.e. that the Proponent activities are, wherever practicable, moved to avoid Aboriginal Cultural Heritage if necessary;

(b) providing guidance to the Proponent, the operators of the Project and all site personnel in the identification, protection and management of Aboriginal Cultural Heritage during the construction and operational phases of the Project;

(c) providing the basis for site inductions provided to employees, contractors and sub-contractors;

(d) providing the necessary information and requirements for recognition of Aboriginal Cultural Heritage and the respect for Aboriginal knowledge, culture and traditions;

(e) outlining a clear and agreed process to the Proponent and the PCCC RNTC for the management of items of Aboriginal Cultural Heritage significance, including previously undiscovered materials;

(f) providing a basis for the inclusion of Aboriginal Cultural Heritage in management decisions and mine planning;

(g) outlining processes for ongoing effective communication between the Proponent and the Port Curtis Coral Coast People throughout the life of the Project;

(h) providing the Port Curtis Coral Coast People with an acceptable level of comfort that items of Aboriginal Cultural Heritage significance within the CHMP Area will be protected and managed according to their requirements; and

(i) recognising Aboriginal people as the primary guardians, keepers and knowledge holders of Aboriginal Cultural Heritage.

### 4.2 Secondary aims

While doing so the CHMP seeks to ensure that Project Activities proceed with minimum delay and impediment. The Parties affirm that they have developed this CHMP in a spirit of goodwill that will achieve suitable outcomes over the complete life of the Project.

## 5 Authorisation of the PCCC RNTC

**5.1** The PCCC RNTC:

(a) represents and warrants that, under the traditional laws and customs of the Port Curtis Coral Coast People, it is recognised and authorised as being entitled to speak on behalf of the Port Curtis Coral Coast People for the area of the GSDA overlapped by the Port Curtis Coral Coast Claim area;

(b) represents and warrants that, pursuant to that authority, it enters into this Agreement;

(c) acknowledges that in accordance with section 41(2) NTA, this Agreement will bind all the members of the Port Curtis Coral Coast People collectively and individually; and

(d) acknowledges that by entering into this Agreement and complying with its obligations, it does not waive, release or surrender any right and interest to the land within the area of the GSDA. In particular, nothing in this Agreement shall prejudice any current or future Native Title Rights and Interests under the common law and the NTA.

**5.2** The Parties acknowledge that the non-extinguishment principle applies, that is to say, nothing done pursuant to the GSDA shall be taken to extinguish native title.

## 6 Obligations of the PCCC RNTC

Subject to the Proponent operating lawfully and adhering to the conditions of this **CHMP**, the PCCC RNTC will:

(a) refrain from doing any act (other than an act permitted by this CHMP) which would impede or prevent the Proponent fromdeveloping within the Gladstone State Development Area. Nothing in this Agreement limits the rights of the Port Curtis Coral Coast People.

## 7 Applicable legislation

(a) Aboriginal Cultural Heritage in Queensland is governed by numerous State and Federal Acts. The applicable Queensland legislation is the ACHA.

(b) The ACHA defines Aboriginal Cultural Heritage as anything that is:

(i) a Significant Aboriginal Area; or

(ii) a Significant Aboriginal Object; or

(iii) evidence of archaeological or historic significance of Aboriginal occupation of an area of Queensland.

(c) A Significant Aboriginal Area or Significant Aboriginal Object can be significant to Aboriginal people because of Aboriginal tradition and/or the history, including contemporary history of any Aboriginal Party for the area. A Significant Aboriginal Area does not need to contain markings or any physical evidence to indicate Aboriginal occupation in order to be protected under the legislation.

(d) A significant principle of the ACHA is the recognition of Aboriginal people as the primary guardians, keepers and interpreters of Aboriginal Cultural Heritage.

# 8 Roles and responsibilities

All Parties to this CHMP agree to follow the procedures detailed in this document as a means of meeting the aims of this CHMP, while expediting the development of the Project where activities are conducted in accordance with this CHMP.

## 8.1 PCCC RNTC

Under this CHMP the PCCC RNTC will:

(a) conduct all activities in compliance with the relevant cultural heritage legislation;

(b) nominate the PCCC Cultural Heritage Representative to act on behalf of the PCCC RNTC and to be the contact point for communications with the Proponent and the PCCC People;

(c) complete cultural heritage inspections and salvages to progress construction, operational and exploration activities on the Project;

(d) use their best endeavours to ensure that all Cultural Heritage Field Officers are organised and managed to meet schedules and timetables;

(e) endeavour to meet all schedules and timetables and where doing so will not compromise the protection of Aboriginal Cultural Heritage;

(f) determine survey and inspections duties and other activities;

(g) provide all Parties relevant to this CHMP with the assistance and information necessary for the effective and timely implementation of the CHMP; and

(h) maintain public liability insurance in relation to all work or activities undertaken by them in connection with this CHMP in an amount of at least $20 million.

## 8.2 Cultural Heritage Coordinator

The Cultural Heritage Coordinator will be required to:

(a) adhere to all site health and safety requirements of the Proponent;

(b) provide management and coordination of inspections that are to be conducted for the Proponent where necessary;

(c) conduct all activities in compliance with the relevant Cultural Heritage legislation;

(d) adhere to work schedules and timeframes and conduct themselves in an appropriate manner;

(e) provide direction and advice to Cultural Heritage Field Officers;

(f) provide further direction to the Proponent regarding the location of Tiger Taped items during Follow-up Inspections, where necessary; and

(g) follow the procedures and the reporting requirements outlined within this CHMP, unless otherwise advised through agreement between the PCCC RNTC and the Proponent.

### 8.3 Cultural Heritage Field Officers

Cultural Heritage Field Officers will be required to:

(a) adhere to all site health and safety requirements of the Proponent;

(b) adhere to work schedules and timeframes and conduct themselves in an appropriate manner;

(c) operate within their designated work areas and under the direction of the Cultural Heritage Coordinator at all times; and

(d) follow the procedures and the reporting requirements outlined within this CHMP, unless agreed between the PCCC RNTC and the Proponent.

### 8.4 Cultural Heritage Assessors

If having regard to the scope and nature of any cultural heritage inspection or survey, the PCCC RNTC acting reasonably considers that a Cultural Heritage Assessor is required, the Proponent agrees to the appointment of the Cultural Heritage Assessor prior to the commencement of any assessment activities on the Gladstone State Development Area. The responsibilities of the Cultural Heritage Assessor will include:

(a) adhering to all site health and safety requirements of the Proponent;

(b) conducting all activities in compliance with the relevant cultural heritage legislation;

(c) being readily available to provide assistance and/or be able to visit the site if a potentially significant find occurs (e.g. skeletal remains which are thought to be of Aboriginal origin);

(d) collecting appropriate data, images and specimens (such as charcoal, bone or stone) that will facilitate production of any reporting required for the project

(e) preparing and distributing reports on inspections, collections/relocations as required;

(f) providing technical advice to the field officers while in the field about the nature and context of the cultural heritage

(g) conducting themselves in a manner which will expedite Project Activities where it does not compromise the protection and management of Aboriginal Cultural Heritage.

### 8.5 The Proponent

The Proponent is responsible for the protection and management of all Aboriginal Cultural Heritage in the area covered by the Project. The Proponent will be responsible for:

(a) scheduling activities which require the participation of the Port Curtis Coral Coast People;

(b) providing the relevant notification and information under this CHMP;

(c) ensuring that all site employees, contractors and sub-contractors undergo training in Aboriginal Cultural Heritage issues and the management of Aboriginal Cultural Heritage under this CHMP;

(d) following the procedures for the management and protection of Aboriginal Cultural Heritage under this CHMP; and

(e) nominating the Proponent's Cultural Heritage Representative.

(f) paying the reasonable costs of PCCC RNTC as per clause 9.6

## 9 Cultural heritage management procedures

The following management procedures are based on the ACHA and meetings between the key representatives of the PCCC RNTC and the Proponent.

### 9.1 Cultural Heritage Inductions and Training Programs

(a) The Proponent will ensure that its Personnel are aware of their obligations in relation to Project Activity planning and the management of Aboriginal Cultural Heritage.

(b) Prior to undertaking any Project Activities, all

(i) Personnel employed by the Proponent to work onsite within the CHMP Area will undergo an online Cultural Heritage Induction and Training Program provided by the Port Curtis Coral Coast People, with the

(A) reasonable cost of course participation to be borne by the Proponent, and

(B) the Port Curtis Coral Coast People to issue a certificate for successful completion of the online Program.

(ii) Senior Personnel employed by the Proponent to work on site within the CHMP Area will also attend in person Cultural Heritage Induction and Training provided by the PCCC People, unless an alternative location is agreed to by the parties.

(c) The Cultural Heritage Committee will nominate two Senior PCCC representatives to prepare and deliver the Inductions and Training Program.

(d) Senior PCCC representatives are to be engaged for a minimum of 3 hours per training session at the hourly rate of an Elder engaged as a Senior representative of the PCCC People (which time includes time taken to travel to and from home to the training venue), and in the event that the training session is longer than 3 hours, for such longer time as is taken to complete the training session.

(e) The Proponent agrees to pay those Senior PCCC representatives in accordance with the rates for Cultural Heritage Field officers set out in Clause 9.12(c)(ii) of this CHMP.

(f) Training presented by the PCCC representatives will include

(i) the significance of Aboriginal Cultural Heritage to the PCCC People

(ii) cultural awareness training, including how to identify

(A) Significant Aboriginal Objects

(B) Significant Aboriginal Areas

(iii) Personnel responsibilities under this CHMP and the Applicable legislation; and

(iv) the significance of Cultural Heritage Finds and appropriate protocols for the management of Cultural Heritage Finds.

(g) Prior to the convening of the Induction and Training Program, the Proponent and the PCCC People, working through the Cultural Heritage Committee:

(i) shall reach agreement on the location in which it is to be held, the length of time necessary to deliver it; and

(ii) will settle a budget and payment for delivery of the Induction and Training Program.

(h) The Proponent agrees to provide or otherwise organize meals and accommodation to enable the PCCC representatives to attend and conduct the Induction. Where the Nominated Body provides or organizes meals and accommodation, these costs are to be reimbursed by the Proponent to the Nominated Body in accordance with the approved Cultural Heritage Induction and Training Program budget.

(i) The Proponent will include in its operative procedures information about general Aboriginal Cultural Heritage to promote the awareness of its Personnel.

## 9.2 Cultural Heritage Committee Meetings

(a) Cultural Heritage Committee meetings will be held annually or as agreed between the Parties at a time and location convenient to all representatives.

(b) The reasonable costs of Port Curtis Coral Coast People representatives attending these meetings will be met by the Proponent.

(c) Port Curtis Coral Coast People representatives will be local people who are readily available to attend to site issues and Cultural Heritage Committee meetings.

(d) Cultural Heritage Committee meetings will require the attendance of a maximum two key representatives from the Port Curtis Coral Coast People (which may include a Cultural Heritage Assessor on behalf of the Port Curtis Coral Coast People) and an equal number of key representatives for the Proponent.

(e) Representatives of the Port Curtis Coral Coast People will be endorsed by the PCCC RNTC.

(f) The purpose of the Cultural Heritage Committee meetings is to:

(i) provide an overall update to the Parties on the progress of the Project under this CHMP;

(ii) discuss cultural heritage training programs for employees on the Project;

(iii) resolve any disputes in relation to Aboriginal Cultural Heritage as set out in clause 10 of this CHMP;

(iv) discuss the status of any assessments that are being carried out pursuant to this CHMP; and

(v) if there are any identified shortfalls in respect of this CHMP, provide an opportunity to update this CHMP where agreed by the Parties.

(g) Any issues that arise outside of the Cultural Heritage Committee meetings will be dealt with by the Cultural Heritage Representatives (**Informal Meetings**). Where reasonably requested by the PCCC Cultural Heritage Representative the Cultural Heritage Assessor may attend these meetings.

(h) Informal Meetings can cover a number of issues, including, but not limited to:

(i) administrative issues;

(ii) implementation of this CHMP;

(iii) any minor disputes;

(iv) day to day administration and implementation of this CHMP; and

(v) consultation with the Cultural Heritage Field Officers.

### 9.3 Cultural Heritage Field Surveys and Inspections - Planned areas of disturbance

(a) The Proponent must notify the PCCC Cultural Heritage Representative in writing a minimum of 20 business days prior to the commencement of any proposed Project Activities (Cultural Heritage Notice). The Cultural Heritage Notice will include:

(i) a topographical map (of appropriate scale) depicting the portion of the CHMP Area where Project Activities are to occur and related GIS data (in a format acceptable to the PCCC Cultural Heritage Representative); and

(ii) a detailed description of the activities proposed including the nature and timing of any Surface Disturbance activities and a description of the type of equipment, infrastructure and the approximate number of people that will be present during these activities.

To the extent applicable the Proponent shall also use reasonable endeavours to provide the Project Coordinator with an indicative schedule of planned project Activities on a six monthly basis.

(b) On receipt of the Cultural Heritage Notice the requirement for a Cultural Heritage Field Survey or inspection will be assessed the PCCC Cultural Heritage Representative with reference to the procedures outlined in this CHMP and to the proposed level of Surface Disturbance within 20 business days.

(c) Project Activities that involve no Surface Disturbance under category 1 of the Duty of Care Guidelines may proceed where activities involve:

(i) walking;

(ii) driving along existing roads and tracks (within the existing alignment) or other infrastructure footprint;

(iii) aerial surveys;

(iv) navigating through water;

(v) cadastral, engineering, environmental or geological surveys using methods which do not cause Surface Disturbance (such as GPS systems); or

(vi) photography.

(d) Project Activities that involve no Additional Surface Disturbance under category 2 of the Duty of Care Guidelines, may proceed where activities involve:

(i) cultivation of an area which is currently subject to cultivation;

(ii) grazing cattle on an area where cattle are currently grazed;

(iii) use and maintenance of existing roads, tracks and power lines within the existing infrastructure alignment, or other infrastructure footprint;

(iv) use, maintenance and protection of services and utilities (such as electricity infrastructure, water or sewerage disposal) on an area where such services and utilities are currently being provided;

(v) use, maintenance and protection of services and utilities (such as electricity infrastructure, water or sewerage disposal) on an area immediately adjacent to where such services and utilities are currently being provided providing the activity does not involve Additional Surface Disturbance; or

(vi) tourism and visitation activities on an area where such activities are already taking place.

(e) Project Activities that are conducted in Developed Areas under category 3 of the Duty of Care Guidelines may proceed where activities involve:

(i) use and maintenance of existing roads, tracks and power lines within the existing alignment, or other infrastructure footprint; or

(ii) use and maintenance of services and utilities (such as electricity infrastructure, water or sewerage disposal) on an area where such services and utilities are currently being provided.

(g) Unless otherwise agreed between the Parties all other Project Activities will require the undertaking of a Cultural Heritage Survey or inspection and the implementation of any subsequent agreed Mitigation.

**Cultural Heritage Survey Process**

On completion of a Cultural Heritage Field Survey, one of two agreed processes will be undertaken:

(a) An Cultural Heritage Inspection Form will be produced which designates areas that are considered on the basis of the field survey to allow works to proceed and/or areas that are to be avoided and any other relevant Aboriginal Cultural Heritage Mitigation measures required (to be used in minor ground disturbance projects). unless otherwise agreed between the Parties this report should be available within 5 business days from the completion of the Cultural Heritage Survey or inspection.

(b) A Cultural Heritage Survey Report will be produced that includes recommendations for Mitigation. These recommendations will inform the Proponent of their obligations and the PCCC of any issues relating to the management of Aboriginal Cultural Heritage. This report should be available within 20 business days from the completion of the Cultural Heritage Survey unless an extension is agreed to by the Parties.

**Mitigation Process**

**Cultural Heritage Surveys**

(a) Where a Cultural Heritage Survey has been conducted and it has been determined that a Cultural Heritage Survey Report will be required, Mitigation activities, inclusive of monitoring and archaeological investigation, will be developed by the Parties in accordance to the agreed recommendations contained within the Cultural Heritage Survey Report.

(b) Following agreement on the recommendations included in the Cultural Heritage Survey Report, appropriate Mitigation strategies will be developed and implemented. The primary objective of Mitigation is to avoid impacting on identified Aboriginal Cultural Heritage sites. Where this is not practical or feasible Aboriginal Cultural Heritage and areas of potential Aboriginal Cultural Heritage identified within the CHMP Area will be managed through the implementation of an agreed Mitigation program including, where relevant, scientific analysis inclusive of carbon dating. All Mitigation processes and results of any subsequent analysis should be adequately reported as an annexure to the Cultural Heritage Survey Report.

(c) Unless otherwise agreed between the Parties all items of Aboriginal Cultural Heritage that cannot be practically or feasibly left in situ, are not identified as a Significant Aboriginal Area or Object and that are located in portions of the CHMP Area designated for Significant Ground Disturbance will be managed in accordance with an agreed Mitigation strategy prior to any Surface Disturbance, such as Vegetation Clearance, occurring.

**Cultural Heritage Inspections**

(f) In the case of initial, low level investigations (for example feasibility investigations such as geotechnical investigation programs) all Aboriginal Cultural Heritage and areas of Aboriginal Cultural Heritage potential will be recorded on a Cultural Heritage Inspection Form with recommendations regarding any appropriate actions that need to be taken by the Field Officers and/or the Proponent to avoid harming Aboriginal Cultural Heritage (Initial Inspection).

(g) Subject to agreement by the Cultural Heritage Coordinator, the Proponent will be authorised to access and undertake Surface Disturbance in compliance with any Mitigation recommendations outlined on a Cultural Heritage Inspection Form within those portions of the CHMP Area that have subject to the Initial Inspection and have not been identified as incorporating a Cultural Heritage Find and/or are not flagged with Tiger Tape

and/or have not been identified as possessing a reasonable potential for unidentified Aboriginal Cultural Heritage inclusive of Sub-surface Cultural Heritage to be present.

(h) Items or areas to be avoided by the Proponent and/or that require further discussion before the Proponent can access or undertake Surface Disturbance in that area, will where practical be clearly flagged with Tiger Tape and both this Tiger Taping process and the GPS location of the item/area and an appropriate buffer zone will be recorded by the Cultural Heritage Field Officer and/or Cultural Heritage Assessor on the Cultural Heritage Inspection Form.

(i) One Cultural Heritage Coordinator and two Cultural Heritage Field Officers will be provided for the Initial Inspection, unless otherwise agreed by the Cultural Heritage Representatives that additional Cultural Heritage Field Officers are required to complete the Initial Inspection.

(j) Should any planned Surface Disturbance activities be delayed for more than six weeks following an Initial Inspection, then the Proponent's Cultural Heritage Representative must carry out a Follow-Up Inspection and check both the integrity of any Tiger Tape on the relevant tenement and the accuracy of the GPS location recorded for items/sites on the Inspection Form prior to undertaking those activities which may create Surface Disturbance. As part of the Follow-Up Inspection, the following steps must be adhered to by the Proponent:

(i) The inspector must record the acknowledgement of the Port Curtis Coral Coast People's recommendations and provide comments on sites that may require further discussions;

(ii) The Proponent's Cultural Heritage Representative must record the Tiger Taped sites as having been inspected and also sign and date the Cultural Heritage Inspection Form that records this Follow-up Inspection; and

(iii) The Cultural Heritage Inspection Form must be sent directly to the Proponent's Cultural Heritage Representative office to administer. A copy should also be sent to the PCCC Cultural Heritage Representative.

(k) If Tiger Tape is damaged or not visible and/or the GPS location and extent is inaccurately recorded on the Inspection Form when the Proponent's Cultural Heritage Representative conducts the Follow-up Inspection, the damaged Tiger Tape must be corrected or replaced and/or the GPS location must be corrected, as appropriate. The Cultural Heritage Coordinator must be contacted to provide further direction, if the exact position of the Tiger Tape is unclear.

(l) Salvaged artefacts are nominated for management by the PCCC Cultural Heritage Representative, according to their own preference for management strategies, including:

(i) being retained by the PCCC RNTC for the duration of Project Activities and then being returned to the original or nearest position once the relevant portion of CHMP Area has been rehabilitated; or

(ii) being relocated to a designated area that will not be disturbed by further activities within the Project boundaries for protection and preservation.

(iii) Or being retained for educational and/or scientific purposes

**9.4 Cultural Heritage Field Surveys and Inspections - Areas outside of direct impact**

(a) All areas within the CHMP Area but outside of the planned areas of Surface Disturbance will remain untouched by Project Activities.

(b) Where Project Activities need to extend beyond the planned area of Surface Disturbance, the Cultural Heritage Representatives will arrange to carry out further Aboriginal Cultural Heritage Surveys or Inspections in accordance with clause 9.3.

(c) The Proponent will ensure that its personnel are aware of their obligations in relation to Project Activity planning and the management of Aboriginal Cultural Heritage.

**9.5 Cultural Heritage Field Surveys and Inspections - Subsurface materials**

(a) Where it has been recognised that there is a potential for the presence of Sub-surface Cultural Heritage, there are generally two avenues:

(i) development and implementation of an archaeological investigation program; and/or

(ii) monitoring

(b) An archaeological investigation program generally involves the use of a predictive model combined with observations made during field assessments to determine areas that have a reasonable potentially to contain substantial and/or significant Sub-surface Cultural Heritage and to subsequently investigate these areas through the implementation of accepted archaeological practice utilising manual and/or mechanical means. Agreement for archaeological investigation to take place should be part of the agreed recommendations which should clearly state the location and methodology for an such investigation. Archaeological investigation provides a process to build higher certainty for the Parties in relation to the nature and significance of any Sub-surface Cultural Heritage that may be present and can often avoid delays that may otherwise occur should significant sub-Surface Cultural Heritage be located during Monitoring and can (and often does) replace monitoring.

(c) Monitoring will occur in areas designated by the Cultural Heritage Coordinator on advice from the survey report, Cultural Heritage Assessor and Field Officers where it is considered that there is a reasonable potential for further, unidentified Aboriginal Cultural Heritage to be present and may include both surface and Sub-Surface Cultural Heritage. Cultural Heritage Field Officers will be engaged to inspect the area during and/or after stripping of surface vegetation and surface materials has occurred. This inspection may occur in stages.

(d) Generally, surface materials will be regarded as the surface horizon or topsoil horizon immediately below any surface vegetation. The depth of the topsoil will vary across the site and will be determined through the use of the soils mapping data for the site and agreed with the PCCC RNTC.

(e) The Cultural Heritage Coordinator will decide on the level of field work to be undertaken for areas that have high, moderate and low potential for the existence of items and places of Aboriginal Cultural Heritage.

(f) All agreed monitoring activities will take into account the site safety management system and the requirements of the Proponent.

(g) Where Cultural Heritage Field Officers locate items of Aboriginal Cultural Heritage (Cultural Heritage Find), activities which may have the potential to impact on the Cultural Heritage Find will cease and an assessment will be conducted by the Cultural Heritage Field Officers.

(i) Where the Cultural Heritage Find is regarded as low significance (generally finds of fewer than five artefacts per site and that do not include a Significant Aboriginal Object or Area such as grindstones, axes and formal tools, or ovens that may require further investigation), and cannot feasibly or practically remain in situ the item(s) will be salvaged and managed under the appropriate management strategy preference of the PCCC RNTC.

(ii) Where a Cultural Heritage Find is regarded as significant, activities which will have a direct impact on the Cultural Heritage Find will cease immediately until management procedures have been implemented to protect the Cultural Heritage Find.

(iii) Field assessments and discussions with the Cultural Heritage Representatives and/or the Cultural Heritage Assessor will be held to determine the appropriate management strategy for any significant Cultural Heritage Finds which will have a major impact on Aboriginal Cultural Heritage and to determine if it is necessary to have a Cultural Heritage Assessor evaluate the Cultural Heritage Find in-situ.

### 9.6 Cultural Heritage Field Surveys and Inspections - Aboriginal Cultural Heritage Inspection Fees

| ITEM | AMOUNT | DESCRIPTION |
|---|---|---|
| **Cultural Heritage Officer Including:**<br>- **Monitor**<br>- **Field** | • $550.00 gross p/day<br>+ 12% superannuation & worker's comp<br>• $68.75 p/hr<br>+ 12% superannuation & worker's comp | • Being for works conducted up to Max 8hrs p/day<br>• Work conducted over 8hrs is to be paid in addition to Daily rate at hourly rate |
| **Senior Cultural Heritage Officer** | • $650.00 gross p/day + 12% superannuation & worker's comp<br>• $81.25 p/hr + 12% superannuation & worker's comp | • Being for works conducted up to Max 8hrs p/day<br>• Work conducted over 8hrs is to be paid in addition to Daily Rate at hourly rate |
| **Elders** | • $750.00 gross per day + 12% superannuation & worker's comp | • Being for any consultation/site visits – Set Daily Rate |

| ITEM | AMOUNT | DESCRIPTION |
|---|---|---|

| | | |
|---|---|---|
| **Project Co-ordinator** | $85.00 p/hr p/day | • 2 hrs prior to project<br>• 2hrs per day for each day of field works, monitoring or consultation<br>• 2 hrs post project<br>• Negotiate with proponent on off-site preparations (before & after works) |
| | $750.00 gross p/day + 12% superannuation & worker's comp | • Being for any On site visit<br>• Implementing CHMP/CHMA<br>• Negotiating Schedule of Fees<br>• Arranging Training |
| **Incidentals** | • $18.70 per day | • Daily Rate |
| **Meals** | • $102.55 per day | • Breakfast (if required to leave home before 6am) $25.35<br>• Lunch - $28.55<br>• Dinner - $48.65 (if away from place of residence at 6:30pm on day of event) |
| **Accommodation** | • $187.00 p/night | • OR reimbursement of abnormally high accommodation costs due to events out of our control (receipts will be provided) |
| **Travel** | • 75c p/klm capped @ 400klm each way | • This is for person/s travelling via vehicle<br>• Person/s travelling via plan, train or bus will be reimbursed upon production of receipts |

| ITEM | AMOUNT | DESCRIPTION |
|---|---|---|

| | | |
|---|---|---|
| **Inductions** | Full daily rate of Cultural Heritage Officer $550 + 12% superannuation & worker's comp | • All cultural heritage personnel are to be inducted;<br>• Including construction safety card training (if required, this will be @ project costs) |
| **Medicals** | • Half daily rate $275.00 + 12% superannuation & worker's comp | • All Cultural Heritage Personnel are to undertake medicals as required by the project @ project costs<br>• All Cultural Heritage Personnel will be paid rate for attendance |
| **Vehicle Hire** | • $300.00 p/day | • To supply (1) 4WD for Cultural Heritage Officers attendance on site @ project if required |
| **Venue Hire** | • $150.00 p/day | • Conference Room facility @ Gidarjil |
| **Catering** | • $35 p/person | • Morning Tea, Lunch, Afternoon Tea (Coffee, Tea provided) |
| **Administration Fee** | • 20% | • This fee is payable to GIDARJIL CULTURAL HERITAGE CORP calculated on the total amount of the invoices rendered by the Corporation |

### 9.7 New Cultural Heritage Finds

In the event that any site personnel locate potential items of Aboriginal Cultural Heritage that were not identified and salvaged or otherwise managed by the PCCC RNTC, all activities which have the potential to impact on the Cultural Heritage Find will cease and:

(a) the Cultural Heritage Find will be reported to the appropriate site personnel for notification to the Proponent's Cultural Heritage Representative and the PCCC Cultural Heritage Representative as soon as possible;

(b) the PCCC Cultural Heritage Representative will be contacted as soon as possible to inspect the Cultural Heritage Find and discuss its management;

(c) all such relocatable Cultural Heritage Finds will then be managed under the agreed salvage and relocation/storage procedures as outlined in clause 9.8 of this CHMP; and

(d) any Cultural Heritage Finds that the PCCC RNTC deem are not relocatable will need to be discussed between the Cultural Heritage Representatives. The PCCC Cultural Heritage Representative will need to contact the Proponent's Cultural Heritage Representative as soon as the PCCC RNTC are aware that the Cultural Heritage Find cannot be relocated so that the Cultural Heritage Representatives can discuss alternative ways of carrying out the activities to avoid harm to the Cultural Heritage Finds to the greatest extent possible. If an agreement cannot be reached regarding these non-relocatable Cultural Heritage Finds, the Parties will resolve this matter in accordance with clause 10 of this CHMP.

### 9.8 Salvage and storage of Cultural Heritage Items

(a) Any items of Aboriginal Cultural Heritage that are nominated for salvage by the PCCC RNTC will be collected, placed in bags and appropriately identified through the use of recording documentation as selected by the PCCC RNTC and the Cultural Heritage Assessor.

(b) A summary report (hardcopy and/or electronic) of all salvaged items will be produced for the Port Curtis Coral Coast People.

(c) While The PCCC RNTC will be responsible for the management and care of all salvaged materials the Proponent is required to meet any and all reasonable costs, inclusive of relevant scientific analysis, storage and curation, incurred by the PCCC RNTC in the execution of this responsibility.

(d) The storage of these materials will be at the PCCC RNTC's discretion and may involve relocation 'in country' in an undisturbed area or at a Port Curtis Coral Coast storage facility.

(e) Where the Aboriginal Cultural Heritage items are to be stored, the PCCC RNTC and the Proponent's Cultural Heritage Representative will discuss and agree on appropriate storage options and associated costs.

(f) Where the Aboriginal Cultural Heritage Finds are to be stored outside the boundaries of the Project, then the PCCC RNTC are responsible for all decision making and reporting is only required to document that the removal off-site has occurred.

(g) In the event that consideration is made of replacing Cultural Heritage Finds at the Project, or on some other part of the Proponent's land holdings, then this action will only be taken after agreement by the Party on whose land holdings replacement will occur.

### 9.9 Skeletal material

(a) If suspected human remains are located during any cultural heritage field inspections activities, all work within the area will cease immediately and the Cultural Heritage Find

will be reported to the appropriate site personnel for notification to the Proponent's Cultural Heritage Representative.

(b) The area around the Cultural Heritage Find will be clearly demarcated to ensure that no work is conducted in the area until the appropriate evaluations have been conducted and a management strategy has been implemented.

(c) Should there be a possibility that the remains are human, the local Queensland Police and the PCCC Cultural Heritage Representative will be contacted and discussions held as to the appropriate management of the find as per the ACHA 2003 Human Remains Guideline, outlined in Schedule 3 of this CHMP.

(d) The management of any human remains will be discussed with the CHCU, the PCCC RNTC, the Cultural Heritage Assessor, the Queensland Police, the Proponent and any other relevant regulatory agency.

(e) If the remains prove not to be human, work in the area will resume.

### 9.10 Corrective actions

(a) All site personnel will be informed of their obligations under this CHMP, including their duty of care under the ACHA, and made aware of the penalties involved for the damage or destruction of any items or areas of Aboriginal Cultural Heritage significance.

(b) If a site is damaged or destroyed, the nominated representatives for each Party will be contacted immediately.

(c) Any damage will be reported through the Proponent's environmental and incident reporting system.

(d) Remedial actions and management procedures will be discussed by both Parties' Cultural Heritage Representatives to determine the appropriate procedures to implement and the appropriate actions to ensure that the further damage or destruction of sites is prevented.

(e) If either Party deems it necessary and has exhausted all other options under this CHMP, specifically clause 10, the incident will then be referred to the CHCU.

## 10 Dispute resolution

(a) The Parties are obliged to, at all times, act in good faith with respect to the matters agreed in this CHMP.

(b) Where a dispute or difference arises out of or in connection with this CHMP, the Parties will adopt the following dispute resolution process:

(i) the Parties will attempt to resolve a dispute, without legal assistance, within 24 hours of being notified of the dispute;

(ii) if a dispute is not resolved in accordance with clause 10(b)(i), the Party alleging the dispute must provide a Notice of Dispute to the other Party. The recipient of a Notice of Dispute must call a Cultural Heritage Committee Meeting to be held within ten days of receipt of the Notice of Dispute;

(iii) if the Cultural Heritage Committee is unable to resolve the dispute within 30 days of the first meeting of the Cultural Heritage Committee regarding the Notice of

Dispute, and if the Parties agree to refer the dispute to mediation, the dispute must be referred to a mediator to be agreed by the Cultural Heritage Committee;

(iv) if the Parties cannot agree to refer the dispute to mediation under clause 10(b)(iii), the dispute will be referred directly to expert determination;

(v) if the Cultural Heritage Committee is unable to agree on the appointment of a mediator within ten business days of being required to refer the dispute to the mediator, the Cultural Heritage Committee will request the Institute of Arbitrators and Mediators Australia to nominate a mediator;

(vi) if the Parties fail to resolve the dispute by mediation within 30 days of referral to a mediator, either Party may refer the dispute to expert determination;

(vii) if the dispute is referred to expert determination under clause 10(b)(iv) or 10(b)(vi), the expert will be chosen by agreement;

(viii) if the parties cannot agree on an expert as contemplated in clause 10(b)(vii), the expert will be chosen by the President of the Queensland Law Society Inc;

(ix) an independent expert must determine the dispute within 30 days of the dispute being referred to expert determination.

(c) Where possible, the resolution of disputes will include the personnel directly involved in the dispute.

(d) The Parties involved in the dispute will adopt resolution methods that are fair and reasonable, economical and timely in an effort to resolve the dispute and avoid delays to exploration activities.

(e) Each Party will continue to implement the requirements of this CHMP despite the existence of a dispute unless the dispute is directly associated with the contents of this CHMP.

(f) The Proponent agrees to pay the reasonable costs of the mediator or expert, as applicable. Otherwise, the Parties agree to bear their own costs in relation to any dispute.

## 11 Intellectual property

### 11.1 Ownership of intellectual property

The ownership of intellectual property in information and reports pertaining to Aboriginal Cultural Heritage which is generated in the course of this CHMP and any agreement deriving therefrom which is not generally available on the public record, shall be vested in the PCCC RNTC.

### 11.2 Use of intellectual property

The PCCC RNTC allow the Proponent, free of cost, to use the intellectual property which relates to Aboriginal Cultural Heritage where reasonably required for the purposes of the development, operation and maintenance of the Project.

## 12 GST

### 12.1 GST exclusive

Except under this clause, the consideration for a Supply made under or in connection with this document does not include GST.

### 12.2 Taxable Supply

If a Supply made under or in connection with this document is a Taxable Supply, then at or before the time the consideration for the Supply is payable:

(a) the Recipient must pay the Supplier an amount equal to the GST for the Supply (in addition to the consideration otherwise payable under this document for that Supply); and

(b) the Supplier must give the Recipient a Tax Invoice for the Supply.

### 12.3 Reimbursement or indemnity

If either party has the right under this document to be reimbursed or indemnified by another party for a cost incurred in connection with this document, that reimbursement or indemnity excludes any GST component of that cost for which an Input Tax Credit may be claimed by the party being reimbursed or indemnified, or by its Representative Member, Joint Venture Operator or other similar person entitled to the Input Tax Credit (if any).

## 13 Variations to the CHMP

(a) Any variations to this CHMP will be discussed and be at the written agreement of both Parties.

(b) Should there be a change in legislation that affects cultural heritage management and/or CHMP s that would otherwise cause part or the whole of this CHMP to become void, unless otherwise agreed between the Parties this CHMP will be amended to comply with the law.

(c) Any other legislative changes that are relevant to this CHMP will be reviewed by the Parties and variations will be made as required.

## 14 Benefit of agreement

(a) Persons entitled to benefit of this CHMP include the Proponent, any future Related Bodies Corporate of the Proponent, and any persons with whom the Proponent (or their Related Bodies Corporate) associates with in joint venture arrangements within the Port Curtis Coral Coast People Claim area.

(b) If the Proponent proposes to assign, sell or transfer or grant an option over all or any part of its interest in one of the Gladstone State Development Area subject to this CHMP, it must notify the PCCC RNTC in writing.

## 15 Governing law and jurisdiction

(a) This CHMP is governed by the laws of Queensland.

(b) Each Party irrevocably submits to the exclusive jurisdiction of the Courts of Queensland.

## 16 Further assurances

Each Party must do all things and execute all further documents necessary to give full effect to this CHMP and refrain from doing anything that might hinder the performance of this CHMP.

## 17 Entire agreement

This CHMP constitutes the entire agreement of the Parties as to its subject matter and supersedes and cancels all prior arrangements, understandings and negotiations in connection with it. Any statement made in negotiations for this CHMP which is not set out in this CHMP does not form part of the agreement between the Parties.

## 18 No waiver

(a) The failure of a Party at any time to require full or partial performance of any provision of this CHMP does not affect in any way the full right of that Party to require that performance subsequently.

(b) The waiver by any Party of a breach of a provision of this CHMP is not deemed a waiver of all or part of that provision or of any other provision or of the right of that Party to avail itself of its rights subsequently.

(c) Any waiver of a breach of this CHMP must be in writing signed by the Party granting the waiver, and is effective only to the extent specifically set out in that waiver.

## 19 Costs

**19.1** The Proponent shall pay the reasonable legal and technical fees, and costs and expenses incurred by the Port Curtis Coral Coast People in connection with the negotiation and execution of this CHMP. The parties agree that the reasonable fees and costs in this matter are $4250.00 plus GST. Additional to these costs, the parties agree that the reasonable meeting costs to sign off on this matter will also be met. Such costs consist of professional fees at $3200 plus GST plus related outlays. These fees are to be paid on the execution of this CHMP. The explorer also agrees to pay execution fees agreed between the parties if applicable.

**19.2** On the date on which this CHMP is executed and on each anniversary of that date during the term of this **CHMP, the MEDQ shall pay to the Port Curtis Coral Coast People an Administration Charge of $850 (adjusted by CPI) to cover all administrative costs in relation to the Port Curtis Coral Coast People under this CHMP. The abovementioned costs shall be paid into the following bank account:**

Westpac Bank
Dillon Bowers Lawyers Trust Account
BSB: 034 222
Account: 388 018

## 20 CPI Adjustments

**20.1** The dollar amounts expressly mentioned in this Agreement shall be adjusted on each anniversary ("the relevant date") of the date of this Agreement by using the following formula:-

$$A = \frac{(B \times C)}{D}$$

Where:-

"A" means the adjusted dollar amount.

"B" means the dollar amount at the date of this Agreement.

"C" means the CPI number for the quarter immediately preceding the relevant date.

"D" means the CPI number for the quarter immediately prior to the date of this Agreement.

"CPI" means the all groups consumer price index for the City of Brisbane as determined by the Australian Bureau of Statistics.

## 21 Notice

(a) A notice, consent or communication under this document is only effective if it is:

(i) in writing, signed by or on behalf of the person giving it;

(ii) addressed to the person to whom it is to be given; and

(iii) given as follows:

(A) delivered by hand to that person's address;

(B) sent by prepaid mail (and by prepaid airmail if the person is overseas) to that person's address; or

(C) sent by fax to that person's fax number where the sender receives a transmission confirmation report from the despatching machine indicating the transmission has been made without error and showing the relevant number of pages and the correct destination fax number or name of recipient.

(b) A notice, consent or communication delivered under clause 21(a) is given and received:

(i) if it is hand delivered or sent by fax:

(A) by 5.00pm (local time in the place of receipt) on a Business Day–on that day; or

(B) after 5.00pm (local time in the place of receipt) on a Business Day, or at any time on a day that is not a Business Day–on the next Business Day; and

(ii) if it is sent by post:

(A) within Australia–three Business Days after posting; or

(B) to or from a place outside Australia–seven Business Days after posting.

(c) A person's address and fax number are those set out below, or as the person notifies the sender:

(i) Port Curtis Coral Coast:

Attention: Kerry Blackman
53 Walker Street
BUNDABERG QLD 4670
Tel: (07) 4130 7700
Fax: (07) 4130 7777

Email: Kerry.blackman@gmail.com

Proponent: The Minister for Economic Development Queensland

care of Economic Development Queensland.

Email: john.white@dilgp.qld.gov.au

# Schedule 1

**CHMP** Area

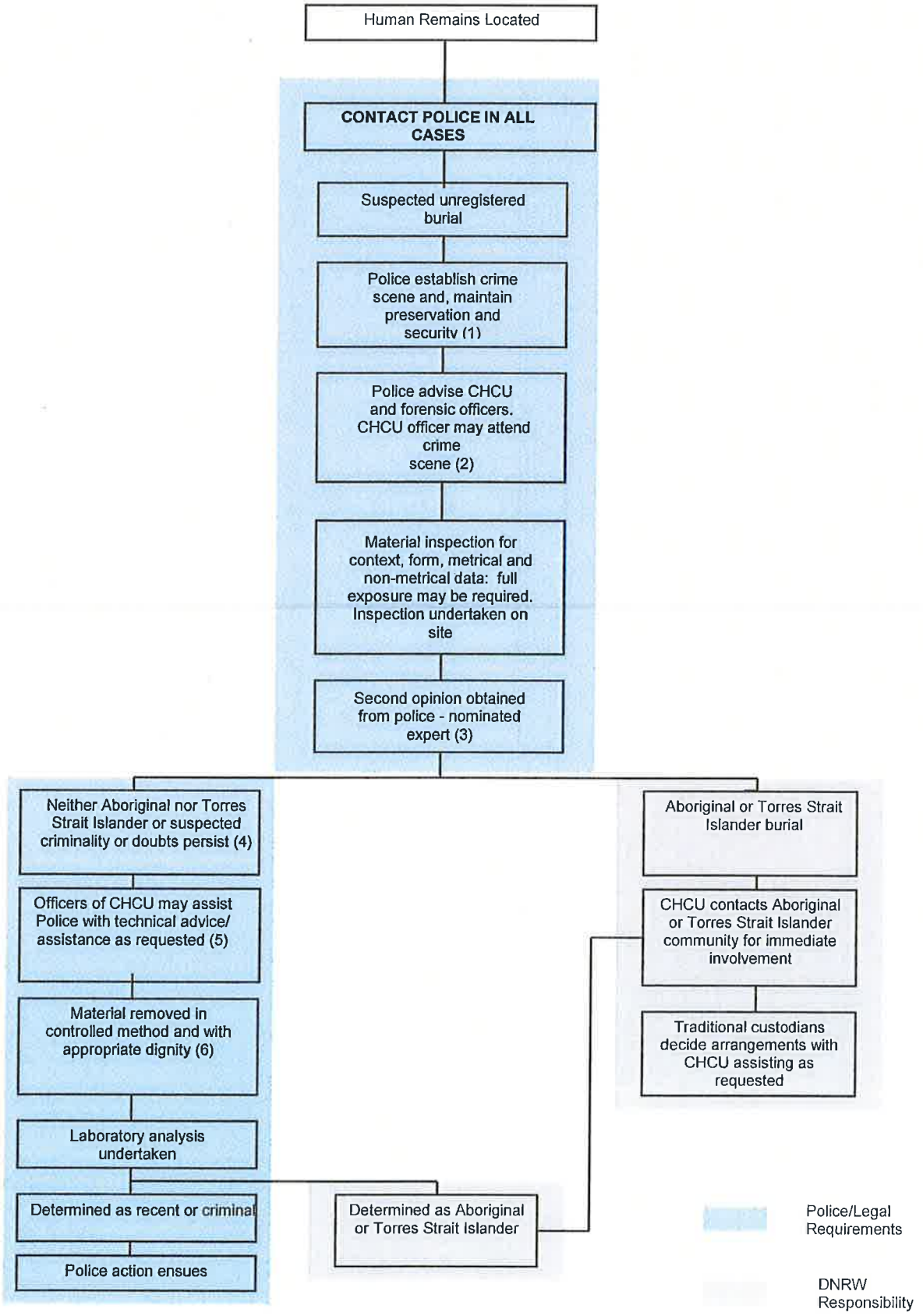
# Schedule 2

Nominated Cultural Heritage Assessors

Michael Strong or Simon Gall

# Schedule 3

Human Remains Guideline - ACHA 2003



## THE DISCOVERY, HANDLING AND MANAGEMENT OF HUMAN REMAINS UNDER THE PROVISIONS OF THE *ABORIGINAL CULTURAL HERITAGE ACT 2003* AND *TORRES STRAIT ISLANDER CULTURAL HERITAGE ACT 2003*

If you find bones and suspect that they are human it is **essential that you do not disturb the material**. **You must report the findings to the Queensland Police Service**. The Police will determine if the remains represent a crime scene. If it is established that the remains are not a crime scene and the Coroner is satisfied that the remains are Aboriginal or Torres Strait Islander, the Department of Natural Resources and Mines procedure on *The Discovery, Handling and Management of Human Remains under the Provisions of the Aboriginal Cultural Heritage Act 2003 and Torres Strait Cultural Heritage Act 2003* will apply.

### 1 General Guiding Principles

Death in all human societies is a significant event. It occurs on a regular but unpredictable basis, removing individuals from family, close relations and friends. Death is often associated with complex rituals. This was and is still the case with Aboriginal and Torres Strait Islander people. Disturbance to burials and human remains is therefore of major concern to them, as it is for all members of Australian society.

Aboriginal and Torres Strait Islander people have been in Australia for more than 40,000 years. In that time they have buried hundreds of thousands of their ancestors in a variety of ways. In some cases people were cremated; in others their bones were placed in hollowed-out logs or trees or wrapped in bark cylinders and placed in rock shelters. Many were also buried in the ground with grave goods. Burials commonly occurred in sand dunes and alluvial deposits, which were easy to dig. However, wind and water easily erode such locations and frequently these natural processes expose remains. Other common burial locations are rock shelters, rocky overhangs and hollow trees. All are vulnerable to human disturbance. The close proximity of scarred or carved trees and stone arrangements and the remains of fireplaces, stone artefacts and food refuse may be suggestive of an Aboriginal or Torres Strait Islander burial.

In view of possible natural or human disturbance to Aboriginal or Torres Strait Islander places the Queensland Government has in place a legislative framework that will ensure such burials are treated in a manner consistent with legal requirements and Aboriginal and Torres Strait Islander traditions.

There is also provision for Aboriginal or Torres Strait Islander people who have traditional or familial links with human remains to seek ownership of these remains regardless of who claimed previous ownership.

### 2 Desired Outcomes

This procedure has a number of general desired outcomes: -.

- While natural or human processes can inadvertently expose Aboriginal or Torres Strait Islander human remains, all attempts will be made to limit further disturbance.
- If further investigation and disturbance is required, procedures are in place for the proper handling of such remains.
- All such procedures are sensitive to the wishes of the Aboriginal or Torres Strait Islander owners of the remains.
- That Aboriginal or Torres Strait Islanders who have traditional or familial links with human

remains are able to claim ownership of those remains.

**Legislative Framework**

***Criminal Code Act 1899***

All persons **must** be aware that under the ***Criminal Code Act 1899*** (s236) it is an offence to improperly or indecently interfere with a human body or human remains, whether buried or not. An offence under this provision can result in imprisonment for up to two years.

***Coroners Act 2003***

Provisions of the ***Coroners Act 2003*** provide that when human remains are located it is the duty of the person finding the remains to report the findings to a police officer or Coroner (Part 2 s7 and 8). (**NB** Part 4, Division 4 Section 82 (1) defines every magistrate as a Coroner (a "local Coroner").

The Coroner starts having control of human remains when the Coroner starts investigating the deceased person's death (s26(1)). The Coroner must stop investigating a death if the Coroner's investigation shows that the body is Aboriginal or Torres Strait Islander traditional burial remains (Part 3 s12(2)(a)). Where this occurs, a Coroner will authorise for the remains to be released to the Minister responsible for administering the *Aboriginal Cultural Heritage Act 2003* and *Torres Strait Islander Heritage Act 2003*. (See s26(2) (a) and Form 12 version 1- Order for release of Traditional remains pub gaz 21 November 2003 p955-6).

To ensure best practice in the coronial system, the State Coroner must develop guidelines in respect to certain matters, including those dealing with investigations of deaths involving human remains found in a suspected traditional burial site, and in particular, must provide for the early notification and involvement of the Aboriginal or Torres Strait Islander community having a connection with the burial site ((Part 3 s14 (3) (b)).

***Aboriginal Cultural Heritage Act 2003 and Torres Strait Islander Cultural Heritage Act 2003***

The basic intent of the ***Aboriginal Cultural Heritage Act 2003*** and ***Torres Strait Islander Cultural Heritage Act 2003*** ('the Acts') is that Aboriginal and Torres Strait cultural heritage should be protected.

It is also the intent of the Acts that (as far as practicable) Aboriginal and Torres Strait cultural heritage should be owned and protected by Aboriginal and Torres Strait Islander people with traditional or familial links to the cultural heritage if it is comprised of any of the following-

(a) Aboriginal human remains;
(b) Secret or sacred objects; or
(c) Aboriginal heritage lawfully taken away from an area.

It is a further intent of the Acts that Aboriginal and Torres Strait Islander cultural heritage that is in the custody of the State, including the Queensland Museum, should continue to be protected by the State until it can be transferred into the protection of its Aboriginal or Torres Strait Islander owners (Part 2 Division 1 s14 (1-4)).

Under the Acts, Aboriginal or Torres Strait Islander people who have a traditional or familial link with Aboriginal human remains are the owners of those remains regardless of who may have owned the Aboriginal or Torres Strait Islander human remains before commencement of the Act (Part 2 Division 2 s15 (1-2)).

An Aboriginal or Torres Strait Islander person who owns human remains may at any time ask the State (or an entity that represents the State) which holds custody of the remains to continue to be the custodian of the human remains or return the human remains to them (Part 2 Division 2 s16 (1-4)).
If a person, other than the State, has in their possession Aboriginal or Torres Strait human remains to which they do not have traditional or familial links then the person must take all reasonable steps to ensure that the human remains are taken into the custody of the chief executive as soon as practicable. Penalties apply if a person fails to do this (Part 2 Division 2 s17 (1-2)).
If a person knows of the existence and location of Aboriginal human remains and is not the owner of those remains, or knows or ought reasonably to know the human remains are Aboriginal or Torres Strait Islander human remains or knows or suspects the chief executive does not know of the remains, the person must as soon as practicable (and after advising the Police or Coroner) advise the chief executive of the extent of the human remains and provide all the details about the nature and location of the human remains the chief executive reasonably requires. Penalties apply if a person fails to do this (Part 2 Division 2 s18).

**Procedures for dealing with Aboriginal and Torres Strait Islander human remains**

In all cases when human remains are located it is important to remember that:

- **The discovery of any human remains must as soon as possible be reported to the nearest police**.
- **It is an offence to interfere with human remains, whether buried or not**.

The Police or Coroner must be advised of the presence of any human remains. An appropriate officer or officers will then establish the area of discovery as a potential crime scene and are responsible for preserving and securing the area.

If a determination is made that satisfies the Coroner that the remains are not a crime scene and that the remains could constitute an Aboriginal or Torres Strait Islander burial site, Police will contact the Cultural Heritage Coordination Unit of the Department of Natural Resources and Mines. Officers of the Cultural Heritage Coordination Unit (or their representatives) may attend the scene and along with the Police scientific officers collect appropriate data on ethnicity, antiquity and evidence of criminal activity or otherwise for submission to the Coroner. Further advice might be sought from forensic osteologists/pathologists or physical anthropologists.

If the remains are thought to be neither Aboriginal nor Torres Strait Islander, related to criminal activity or are of doubtful determination, Officers of the Department of Natural Resources and Mines (or their representatives) may assist the Police in further determinations. This may require controlled removal and analysis by a suitable forensic expert as ordered by the Coroner. In all cases of possible criminal activity the requirements of the Police and Coroner for data collection and site security will have priority. If the remains are determined, to the satisfaction of the Police and Coroner, to be Aboriginal or Torres Strait Islander, Officers of the Department of Natural Resources and Mines will then take responsibility for liaison and reburial with the

appropriate Aboriginal or Torres Strait Islander community.

At all stages minimal disturbance to the remains will be a priority and they will be dealt with in a sensitive and caring manner. Advice and guidance from Aboriginal or Torres Strait Islander elders will be taken as soon as the possibility of criminal activity is dismissed.

Where an offence under provisions of the *Aboriginal Cultural Heritage Act 2003* or *Torres Strait Islander Heritage Act 2003* is suspected to have occurred then the Regional Compliance Team of the Department of Natural Resources and Mines must be advised. Where an offence is suspected the scene must be kept secure until handed over to Department of Natural Resources and Mines compliance officers.

**Explanation of procedures**

(1) Police Officers maintain authority and responsibility for a potential crime scene at all times.
(2) Cultural Heritage Coordination Unit Officers (or their representatives) may attend the scene and provide advice as required by Police or crime scene officers.
(3) Police will nominate a person to provide a second opinion if appropriate. Such opinion may be available on-site if a suitable forensic expert is available. However, if a suitable forensic expert is unavailable to travel to the site, digital images may be sent to them to provide an opinion. All data required for first and second opinions is to be collected on site.
(4) The final decision on this rests with Police, on advice from the Coroner.
(5) Officers of the Cultural Heritage Coordination Unit will, on request, assist Police in technical aspects of evidence retrieval.
(6) Advice on handling may be sought from appropriate sources where this does not compromise the integrity of the crime scene or the quality of evidence.

**Additional procedures and information**

Where the remains are determined to be Aboriginal or Torres Strait Islander the Coroner will authorise for the remains to be released and will complete *Form 12 Order for the Release of Traditional Remains*. This provides for the release of the remains to the Minister responsible for administering the *Aboriginal Cultural Heritage Act 2003* and the *Torres Strait Islander Heritage Act 2003*.

Should any Police Officer or Officer of the Department of Natural Resources and mines (or their representative) be in any doubt as to the requirements of the relevant Coroner for their region, then it is essential that the Coroner be directly consulted. Alternatively, as the State Coroner is responsible for all Coroners, any perceived difficulties in implementing the policy/procedure should be referred to him/her.

The excavation of human burial remains for whatever reason is not encouraged. However, this may occur if directed by the Coroner of if requested in writing by an Aboriginal or Torres Strait Islander Body.

If a researcher acting under an authority or agreement from the Cultural Heritage Coordination Unit and with the Aboriginal or Torres Strait Islander Body for an area discovers burial remains in the process of excavating a site, they shall immediately stop excavation, cover the remains and contact an Officer of the Cultural Heritage Coordination Unit, who will then follow the procedures set out in this document.

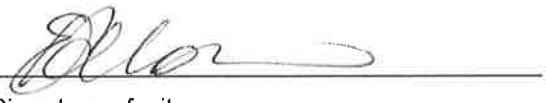
The Queensland Museum acquired human remains from the 1870's to 1972 including some legally recovered under the *Aboriginal Relics Preservation Act 1967*. However, by 1972 it was no longer considered appropriate to deposit human remains with the Queensland Museum except in exceptional circumstances and with the permission of the relevant Aboriginal or Torres Strait Islander community. The Museum has now developed a repatriation policy for human remains still in its collection (see – *Queensland Museum Policy on Ancestral Remains and Burial Goods* – May 2004, Queensland Museum Policy on Secret Sacred Objects – May 2004)). These policies commit the Queensland Museum to returning to Aboriginal and Torres Strait Islander communities, family groups, and individuals, ancestral remains and burial goods, and secret sacred objects held in Museum collections.

dillonBOWERS LAWYERS

# Execution

EXECUTED as an agreement

Signed by Kerry Blackman on his own behalf and on behalf of the Port Curtis Coral Coast People in the presence of:

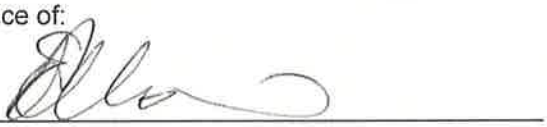


Signature of witness

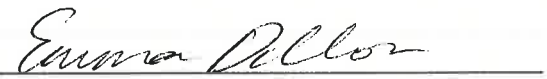
Name of witness (print)

Signature of Kerry Blackman

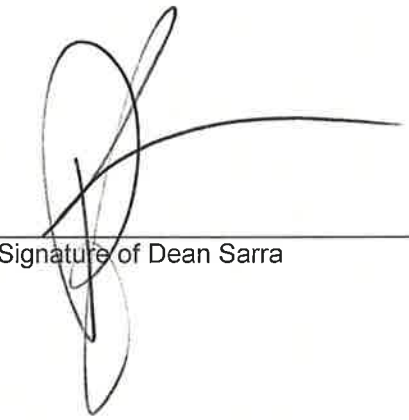
Signed by Dean Sarra on his own behalf and on behalf of the Port Curtis Coral Coast People in the presence of:



Signature of witness



Name of witness (print)



Signature of Dean Sarra

Signed by Lurleen Blackman on her own behalf and on behalf of the Port Curtis Coral Coast People in the presence of:

Signature of witness

Name of witness (print)

Signature of Lurleen Blackman

dillonBOWERS LAWYERS

Signed by Richard Johnson on his own behalf and on behalf of the Port Curtis Coral Coast People in the presence of:

Signature of witness

Name of witness (print)

Signature of Richard Johnson

Signed by Nat Minniecon on his own behalf and on behalf of the Port Curtis Coral Coast People in the presence of:

Signature of witness

Name of witness (print)

Signature of Nat Minniecon

Signed by Matthew Cooke on his own behalf and on behalf of the Port Curtis Coral Coast People in the presence of:

Signature of witness

Name of witness (print)

Signature of Matthew Cooke

Signed by Neville Johnson on his own behalf and on behalf of the Port Curtis Coral Coast People in the presence of:

Signature of witness

Name of witness (print)

Signature of Neville Johnson

Executed by Mr Stephen Johnston
Director General, Department of Infrastructure,
Local Government and Planning

Director General – Department of Infrastructure, Local Government and Planning.

Stephen Johnston

Charmian Brayton

Charmian Brayton

Appendix G

# Contamination Register

Department of Environment and Science (DES)
ABN 46 640 294 485
400 George St Brisbane, Queensland 4000
GPO Box 2454 Brisbane QLD 4001 AUSTRALIA
www.des.qld.gov.au

# SEARCH RESPONSE
ENVIRONMENTAL MANAGEMENT REGISTER (EMR)
CONTAMINATED LAND REGISTER (CLR)

Transaction ID: 50699197 EMR Site Id: 02 July 2021
This response relates to a search request received for the site:
Lot: 4 Plan: SP245936

## EMR RESULT

The above site is NOT included on the Environmental Management Register.

## CLR RESULT

The above site is NOT included on the Contaminated Land Register.

## ADDITIONAL ADVICE

All search responses include particulars of land listed in the EMR/CLR when the search was generated.
The EMR/CLR does NOT include:-

1. land which is contaminated land (or a complete list of contamination) if DES has not been notified
2. land on which a notifiable activity is being or has been undertaken (or a complete list of activities) if DES has not been notified

If you have any queries in relation to this search please phone 13QGOV (13 74 68)

**Administering Authority**

Appendix H

# Code Compliance

# Strategic vision of the Gladstone SDA

The amendment for a minor extension of approximately 1,282m$^2$ to the approved Medium Impact Industry of 12,990m$^2$ has responses in the below table that is consistent with the wider GEF Project. The extension for the facility is to facilitate a small volume of product material testing which is ancillary to the primary use of the approved development.

| Section | Vision | Comment | Complies |
|---|---|---|---|
| **1** | The vision for the Gladstone SDA is to: | | |
| **1(a)** | be Central Queensland's economic powerhouse, with an efficient concentration of large-scale industry of national, State and regional significance that benefit from the SDA's strategic location near the Port of Gladstone and major road and rail networks | The proposed Medium Impact Industry (GEF and GTF) satisfies the above SDA vision, with the development being located within the High Impact Industry Precinct and delivering a medium impact industrial manufacturing facility that will ultimately act as a catalyst for an emerging industry of national and international significance. It will establish Gladstone has the hydrogen manufacturing hub of Queensland. | ✓ |
| **1(b)** | support development that aligns with the Queensland Government's strategic priorities for the region, particularly related to the hydrogen industry | | ✓ |
| **1(c)** | maintain environmental, cultural heritage and community values where possible to support wider ecological processes and provide community benefits. | The development will be integrated into the intended outcomes for the Precinct and utilises a planned traffic network and logical extension of utility services. Furthermore, it will not compromise the ability to deliver critical infrastructure including rail corridors and road networks.<br><br>As demonstrated in this report, the proposed development will not have any adverse impacts on existing environmental values on and around the Site. The development will connect to the existing stormwater network, and therefore maintain the values of the Great Barrier Reef World Heritage Area.<br><br>The development will take significant investment on behalf of the Proponent and is intended to be a long-term commitment to the Precinct and, more broadly, the Gladstone region. It will introduce further jobs into the region over time and will act as a catalyst in the long term for supporting industries. | ✓ |
| **2** | The strategic vision is supported by the overall objectives for development and preferred development intents of development precincts within the Gladstone SDA. | The proposed development meets the overall objects and preferred intent for the High Impact Industry precinct. | ✓ |

## High Impact Industry Precinct Intent

| Section | Intent | Comment | Complies |
|---|---|---|---|
| **(1)** | This precinct is to accommodate industrial development that:<br>(i) is difficult to locate and requires separation from sensitive land uses<br>(ii) requires access to key transport and supply chain networks.<br>(b) Waste management related industries are supported south of Aldoga Road.<br>(c) Development which adversely impacts existing or future LNG operations on Curtis Island will not be supported.<br>(d) Development on Curtis Island must recognise the environmental values of the adjacent Environmental Management Precinct. | The proposed development satisfies the preferred development intent as it is difficult to locate and requires separation from sensitive land uses, and does not adversely impact existing or future LNG operations on Curtis Island. | ✓ |
| **(2)** | Defined uses that support the preferred development intent are:<br>(a) high impact industry<br>(b) special industry. | Whilst the proposed use is for Medium Impact Industry, it is compatible with the intended outcome for the High Impact Industrial Precinct, delivering a large scale manufacturing facility within the Precinct.<br>The environmental impacts generated by the proposed development (noise, dust, odour, waste, gas etc) will not be as significant as some other potential High Impact Industrial land uses. As the Precinct develops this will present a strategic opportunity by providing a 'clean' buffer between High Impact Industry and environmental values (downstream waterways, mapped flora and fauna etc) to the north of the Precinct without imposing any reverse amenity considerations. | ✓ |
| **(3)** | Defined uses that may be considered where the use does not compromise the preferred development intent include:<br>(a) freight terminal<br>(b) linear infrastructure facility<br>(c) medium impact industry<br>(d) research and technology industry<br>(e) utility installation<br>(f) warehouse (where ancillary to a use listed in 2.4.2(2). | The proposed development is for medium impact industry | ✓ |
| **(4)** | Access from Gladstone-Mount Larcom Road to this precinct will be limited to three intersections at the following | Access to the proposed development will be from the upgraded Euroa Circuit and via Aldoga Drive as contemplated by the Precinct intent. As demonstrated by the traffic assessment undertaken, the proposed | ✓ |

| Section | Intent | Comment | Complies |
|---|---|---|---|
| | locations: (a) a proposed intersection approximately 3.8 kilometres from the Bruce Highway<br>(b) a proposed intersection approximately 8.4 kilometres from the Bruce Highway (road/rail overpass)<br>(c) the intersection with Aldoga Road | development will have negligible impact on the intersection of Gladstone-Mt Larcom Road/Algoda Road. No further upgrades to this intersection are required to service the development. | |

## SDA Overall Objectives

| Section | Objectives | Comment | Complies |
|---|---|---|---|
| **(a)** | capitalise on Gladstone SDA's strategic location and support the role and function of the Port of Gladstone | The proposal gives consideration to the future land uses and is appropriately located to ensure the most efficient use of available industrial land. | ✓ |
| **(b)** | identify and implement opportunities for synergies and co-location between other uses, services and infrastructure to minimise waste and inefficiencies | The Gladstone SDA has long held its strategic designation as a regionally significant industrial precinct and subsequently infrastructure planning has taken account of the intended future development outcomes. Existing and planned infrastructure to services will be drawn on to service the subject Site, without resulting in adverse impacts to infrastructure or out-of-sequence development limitations. | ✓ |
| **(c)** | use land and infrastructure efficiently and be adequately serviced by infrastructure | | ✓ |
| **(d)** | ensure the integrity and functionality of the Gladstone SDA, including infrastructure corridors and future development opportunities, is maintained and protected from incompatible land uses | Private infrastructure to be delivered within the Site boundaries will be delivered by the Applicant in conjunction with Economic Development Queensland (EDQ) in accordance with the Memorandum of Understanding. | ✓ |
| **(e)** | ensure new lots are appropriately sized to accommodate preferred development | The proposed extension to the medium impact industry still fits within the site boundary. | ✓ |
| **(f)** | be designed, constructed, and operated to a high quality consistent with best practice | The proposed Medium Impact use will be compatible with surrounding land uses in the Precinct it develops over time. In the short term, there will be minimal impacts to surrounding vacant/grazing land. | ✓ |
| **(g)** | avoid impacts on environmental, cultural heritage, and community values (including sensitive land uses), or minimise or mitigate impacts where they cannot be avoided and offset any residual impacts | The proposed development will not have an impact on the environmental and cultural values on, or surrounding the Site. Specifically:<br>- There are no identified cultural heritage assets identified on the Site in accordance with the approved CHMP.<br>- The development is well setback from any mapped vegetation on Site and will not result in any removal, loss or damage to significant flora and fauna values.<br>- No wastewater discharged from the Site. Stormwater will be treated to ensure no adverse downstream impacts on water quality within the catchment area. | ✓ |

| Section | Objectives | Comment | Complies |
|---|---|---|---|
| **(h)** | not adversely impact on the outstanding universal values of the Great Barrier Reef World Heritage Area | The Site is not affected by flooding.<br>Stormwater generated by the development will be discharged into the existing stormwater network. | ✓ |
| **(i)** | manage the risks associated with the projected impacts of climate change and natural hazards to protect people and property | The orientation and design of the development seeks to meet best practice for energy and water efficient design where appropriate. | ✓ |
| **(j)** | manage impacts of air quality on the capacity of the Gladstone airshed | The proposed development will not generate any unreasonable air quality impacts. An Environmental Management Plan and Construction Management Plan will ensure that impacts are managed in accordance with the relevant planning policy and standards. | ✓ |

## SDA Wide Assessment Criteria

| Section | SDA Wide Criteria | Comment | Complies |
|---|---|---|---|
| **2.5.1 Infrastructure and Services** | (a) is designed to maximise efficiency and minimise the cost for infrastructure and services | The regional infrastructure overlay map from the GRCPS identifies the following:<br>• PQ substation to the north of the Site<br>• Powerlink within the Site<br>• Ergon 66kv outside the Site's north-east corner<br><br>The proposed works will not affect mapped regional infrastructure.<br><br>To mitigate any adverse impacts downstream, the existing detention basins will be used to ensure peak flows from the Site are not increased as part of the works. The detention basin was sized based on the existing Site conditions and taking in consideration the proposed works, consisted of a new industrial use building and associated hardstand areas and car parking.<br><br>Tertiary water treatment systems will be provided in the operational phase of the Site and will be incorporated as part of the development of the Site, in accordance with the State Planning Policy. During the construction phases, sediment and erosion and control measures will be implemented to limit the discharge of any sediments into the drainage reserve. | ✓ |
| | (b) plans for and manages its impacts on existing and planned infrastructure and services | | ✓ |
| | (c) is adequately serviced by the infrastructure and services necessary to meet the demand generated by the development | | ✓ |
| | (d) integrates with existing and planned infrastructure and services where possible. | | ✓ |
| **2.5.2 Transport** | (1) Increased traffic arising from development is able to be accommodated within existing road networks or works are undertaken to minimise adverse impacts. | Broadly, this assessment concludes that the proposed development will not increase existing traffic from the site and have a negligible impact on the existing road network. | ✓ |

| Section | SDA Wide Criteria | Comment | Complies |
|---|---|---|---|
| | (2) Local road networks within the SDA are to be designed to accommodate the proposed vehicle type and predicted traffic volumes associated with the development and the precinct/s. | The existing site traffic volumes will not be altered with the inclusion of the onsite testing of electrolysers. | ✓ |
| | (3) Development is designed to facilitate safe and efficient vehicular ingress and egress and does not unduly impact on the safe and efficient operation of the use of external roads, rail, transport infrastructure or services. | | ✓ |
| | (4) Adequate car parking for the number and nature of vehicles expected are provided on Site. | | ✓ |
| **2.5.3 Environmental Nuisance** | (1) Development is located, designed, and operated to avoid, minimise or manage<br>(a) adverse impacts from air, noise and other emissions that will affect the environment and/or health and safety, wellbeing, and amenity of communities and individuals<br>(b) conflicts with sensitive uses arising from (but not limited to) spray drift, odour, noise, light spill, dust, smoke, or ash emissions. | The proposed development will not generate air, noise and other emissions that will affect the environment and/or health and safety, wellbeing, and amenity of communities and individuals given the Sites location away from sensitive receptors and limited release air emissions.<br>A detailed Construction Management Plan will be prepared to address potential construction impacts including noise, dust, sediment runoff, traffic, waste and so on.<br><br>**Mitigation measures:**<br>• Noise emissions will comply with the *Environmental Protection (Noise) Policy 2019* (legislation.qld.gov.au).<br>• Residents in close proximity to the Site shall be kept informed regarding construction activities and timing of noisy activities which will generally be scheduled between 7am and 6pm where practical.<br>• Landowners are to be advised of any planned activities that will cause loud and extensive periods of noise. Attenuation measures should be used where possible.<br>• Noise mitigation measures employed during construction shall be in accordance with AS2436, Guide to noise and vibration control on construction, demolition and maintenance Sites.<br>• A construction noise and vibration management plan is to be prepared for development on the Site. The plan should include recommendations on plant and equipment, hours of operation, staging, construction noise limits, vibration and liaison with local residents and sensitive receptors. | ✓ |
| | (2) The location, design and operation of development achieves the relevant acoustic objectives of the Environmental Protection (Noise) Policy 2019 and achieves the relevant air quality objectives of the Environmental Protection (Air) Policy 2019. | | ✓ |
| | (3) Development:<br>(a) avoids adverse impacts on the cumulative air quality of the Gladstone airshed or<br>(b) where impacts cannot be avoided, conducts air shed modelling in accordance with current best practice to demonstrate compliance with air quality standards. | | ✓ |
| **2.5.4 Contaminated Land** | (1) Development on land likely to be contaminated or recorded on the Environmental Management Register or Contaminated Land Register does not adversely impact on human health or the environment by exposure, management, or movement of contaminants. | A contaminated land search undertaken on 2 July 2021 concluded that the Site is not included on the Environmental Management Register (EMR) or the Contaminated Land Register (CLR). Refer to **Appendix H**. | ✓ |

| Section | SDA Wide Criteria | Comment | Complies |
|---|---|---|---|
| | (2) Where required, develop a strategy to manage any existing contamination and the potential for additional contamination, so that human health and the environment are not adversely affected. | | ✓<br>✓ |
| **2.5.5 Natural hazards** | (1) Development, in accordance with current best practice:<br>(a) identifies relevant natural hazards that may impact upon the project<br>(b) appropriately manages risk associated with identified hazards (c) avoids increasing the severity of natural hazards<br>(d) avoids adverse impacts from natural hazards to protect people and property and enhances the community's resilience to natural hazards, or where adverse impacts cannot be avoided, impacts are minimised, mitigated, or offset<br>(e) avoids directly or indirectly increasing the severity of coastal erosion either on or off the Site. | With regard to bushfire hazard, the development Site is not within a Bushfire Prone Area, as indicated in the GRCPS. Proposed building works will not occur on any areas classified as having medium, high and very high potential bushfire intensity.<br><br>**Mitigation measures:**<br>As part of the proposed development, the high and medium bushfire intensity risk will be removed once the vegetation is removed within the development boundary. This will ultimately reduce the potential impact buffer across a large portion of the Site including the future building footprint. It is respectfully requested that the requirement for a Bushfire Management Plan be a condition of the development permit.<br><br>Following review of the GRCPS, it has been determined that the Site is not located in a flood hazard area. Therefore, it is considered that a focused flood risk assessment and Flood Management Plan is not required. | ✓ |
| | (2) Development, in accordance with current best practice, achieves an appropriate level of flood immunity and: (a) does not adversely affect existing flow rates, flood heights, or cause or contribute to other flooding impacts on upstream, downstream, and adjacent properties, or the state transport network (including potential impacts from changes to stormwater flows and local flooding). | | ✓ |
| **2.5.6 Climate Change** | (1) Development:<br>(a) avoids or, if avoidance cannot be achieved, minimises net increases in the emission of greenhouse gases<br>(b) can adapt to current and future impacts of a changing climate | The Proposed Development will use existing renewable energy network to fully offset the energy required. | ✓ |
| **2.5.7 Acid Sulfate soils** | (1) Development, in accordance with current best practice, is to:<br>(a) avoid the disturbance of acid sulfate soils (ASS) or<br>(b) ensure that the disturbance of ASS avoids or minimises the mobilisation and release of contaminants. | The Gladstone Regional Council Planning Scheme (GRCPS) does not identify Acid Sulfate Soils on Site. The Australian Soil Resource Information System (ASRIS) shows the general vicinity to have Extremely Low and Low Probability of Acid Sulfate Soils. | ✓ |
| **2.5.8 Water Quality** | (1) Consistent with the Environmental Protection (Water and Wetland Biodiversity) Policy 2019, development avoids or, if avoidance cannot be achieved, minimises, mitigates or offsets adverse impacts on the environmental values and water quality objectives of receiving waters and wetlands arising from:<br>(a) altered stormwater quality and/or flow<br>(b) wastewater (other than contaminated stormwater and sewage)<br>(c) the creation or expansion of regulated structures or non-tidal artificial waterways | The Queensland Globe Map indicates that there are three Lacustrine wetlands with habitat type artificial/ highly modified wetlands approximately 100m to the north/north-west of the boundary of the Site.<br><br>**Mitigation measures:**<br>• Appropriate handling and storage of construction materials.<br>• Detailed planning and design of the construction phase water management and mitigation systems should be undertaken to | ✓ |

| Section | SDA Wide Criteria | Comment | Complies |
|---|---|---|---|
| | (d) the release and mobilisation of nutrients and sediments. | adequately manage water quality related issues (for example, erosion and sediment control plan) arising throughout construction. Environmental control design should take into account seasonal weather conditions.<br>• Stage works to minimise erosion.<br>• Provide management procedures related to spill prevention are implemented to mitigate associated impacts to groundwater and surface water resources.<br>• Detailed planning and design of the operational phase water management devices and systems are required to adequately manage water quality related issues (for example, increased pollutant concentrations and loadings in stormwater).<br><br>It is respectfully requested that a condition of the development permit establish the requirement for a Stormwater Management and Water Quality Plan to be prepared to address the above mitigation measures during both the construction and operational phases of the project. | |
| | (2) Development encourages a precinct-wide stormwater management approach that achieves an improved water quality outcome. | | ✓ |
| | (3) Development protects the ecological and hydraulic function of waterway corridors in and adjacent to the Gladstone SDA, with particular regard to the Great Barrier Reef World Heritage Area, fish passage and marine plants. | | ✓ |
| **2.5.9 Risk Management - Activities** | (1) Development is located, designed, and operated to:<br>(a) minimise the health and safety risks to communities and individuals<br>(b) avoid any potential adverse impacts from emissions and hazardous activities, or where adverse impacts cannot be avoided, impacts are minimised or mitigated<br>(c) protect high pressure gas pipelines from encroachment that would compromise the ability of the pipelines to function safely and effectively | Any hazardous substances located on-Site will be secured away from general traffic areas, in spaces that will be safe during natural hazard events. | ✓ |
| | (2) Activities involving the use, storage, and disposal of hazardous materials and prescribed hazardous chemicals, dangerous goods, and flammable or combustible substances are located and managed to minimise the health and safety risks to communities and individuals | | ✓ |
| | (3) Development provides adequate protection from the harmful effects of noxious and hazardous materials and chemicals manufactured or stored in bulk during natural hazard events. | | ✓ |
| **2.5.10 Cultural heritage and community** | (1) Indigenous and non-Indigenous cultural heritage values, and community values of the premises on which the development is undertaken, and immediate surrounds, are identified and managed, consistent with current best practice. | A Cultural Heritage Management Plan (CHMP) has been prepared (refer **Appendix G**). The CHMP establishes the procedures to be carried out where activities are proposed that will disturb the surface of the land. | ✓ |

| Section | SDA Wide Criteria | Comment | Complies |
|---|---|---|---|
| | (2) Development is located, designed and operated to avoid adverse impacts on cultural heritage and community values, or where adverse impacts cannot be avoided, impacts are minimised, mitigated, or offset. | **Mitigation measures:**<br>During construction, the recommendations of the CHMP are to be complied with. | ✓ |
| | (3) Development recognises and protects the cultural heritage values associated with: (a) the Euroa Homestead on Lot 200 on SP239672 (b) the Mount Larcombe Station Original Homestead Site on Lot 73 on SP272417 and Lot 20 on SP272417 (c) the Targinnie Cemetery on Lot 95 on DS287. | | ✓ |
| | (4) Where development requires a buffer to mitigate the adverse amenity impacts of the development, including, but not limited to, visual and acoustic impacts, that buffer is accommodated within the development Site. | | |
| **2.5.11 Environment** | (1) Environmental values of the premises on which the development is undertaken, and immediate surrounds are identified and managed, consistent with current best practice. | **Environment:**<br>The Site has previously been cleared and there is very little vegetation remaining on Site. | ✓ |
| | (2) Development is located, designed, and operated to:<br>(a) avoid adverse impacts on environmental values including matters of local, state, and national environmental significance or where adverse impacts cannot be avoided, impacts are minimised, mitigated, or offset<br>(b) maintain ecological connectivity and processes<br>(c) maintain the outstanding universal value (OUV) of the Great Barrier Reef World Heritage Area including the local attributes of the OUV identified in the Master plan for the Priority Port of Gladstone and Port overlay<br>(d) retain, to the greatest extent possible, tidal fish habitat and marine plants. | Two Threatened Ecological Communities protected under the EPBC Act are listed as occurring within 2km of the Site. Previous field investigations have not identified either of these threatened ecological communities on the Site. Previous field investigations have also not located any threatened species under the EPBC Act and/or Nature Conservation Act 1992 (NC Act) on the Site.<br>Three Matters of State Environmental Significance (MSES) are in the vicinity of the Site but are not directly within it.<br>There are no recognised wetlands on the Site.<br>Nine species of fauna listed as threatened under the EPBC and /or NC Act were identified in searches of Commonwealth and State databases for an area within 2km of the broader precinct. | ✓ |
| | (3) Any residual significant adverse impacts are offset in accordance with the relevant Commonwealth or Queensland environmental offset framework | **Mitigation measures:**<br>• Develop and implement best-practice Site management measures within an Environmental Management Plan (EMP) Framework.<br>• Develop and implement a detailed Soil, Water and Waste Management Strategy.<br>• Undertake weed management before, during and after construction.<br>• Avoid the removal of large hollow-bearing trees (if any exist on Site). | ✓ |
| | (4) Lighting associated with the construction and operation of development is designed to limit the impacts on aquatic wildlife, including turtles and migratory species. | | ✓ |
| | (5) Where development requires a buffer to mitigate the impacts of the development, that buffer must be accommodated within the development Site.3 | | ✓ |
| | (6) Development avoids native vegetation clearing, or where avoidance is not reasonably possible, minimises clearing to: | | ✓ |

| Section | SDA Wide Criteria | Comment | Complies |
|---|---|---|---|
| | (a) conserve vegetation<br>(b) avoid land degradation<br>(c) avoid fragmentation and conserve connectivity. | It is respectfully requested that the requirement for an EMP and Construction Management Plan forms a condition of the permit which will incorporate the above mitigation measures. | |

| | | | | |
|---|---|---|---|---|
| **2.5.12 Engineer and Design Standards** | Acid Sulfate soils | • Queensland Acid Sulfate Soil Technical Manual – Soil Management Guideline v4.0<br>• National Acid Sulfate Soils Guidance – Guidance for the dewatering of Acid Sulfate soils in shallow groundwater environments – June 2018 | A Site Based Management Plan and Decommissioning Plan is required. It is respectfully requested that these are provided as a condition of the permit, prior to commencement of the use.<br><br>The proposal has adopted best practice building design, incorporating sustainability elements and technological efficiencies where appropriate. | ✓ |
| | Car parking | • Relevant local government standards | | |
| | Clearing native vegetation | • State code 16: Native vegetation clearing | | |
| | Environment | • Sea Turtle Sensitive Area Code<br>• Pathways to a climate resilient Queensland – Queensland Climate Adaptation Strategy 2017-2030 | | |
| | Filling | • AS3798 – Guidelines on Earthworks for Commercial and Residential Developments | | |
| | Footpaths and cycle paths | • Relevant local government standards<br>• AustRoads, Guide to Road Design - Part 6A: Pedestrian and Cyclist Paths | | |
| | Natural hazards - flooding | • Relevant local government standards | | |
| | Rail | • Department of Transport and Main Roads (DTMR) Guide to Development in a Transport Environment - Rail | | |
| | Risk management | • AS2885 – Pipelines – Gas and liquid petroleum<br>• AS/NZS ISO 31000:2009 – Risk management<br>• AS/NZS 2022-2003: Anhydrous ammonia – Storage and handling | | |

| | |
|---|---|
| | • State code 21: Hazardous chemical facilities |
| Roads (major) | • DTMR Road Planning and Design Manual<br>• DTMR Pavement Design Manual<br>• DTMR Pavement Design Supplement<br>• DTMR Bridge Design Manual<br>• Queensland Urban Drainage Manual<br>• DTMR Road drainage manual<br>• Manual of Uniform Traffic Control Devices<br>• DTMR Traffic and Road Use Management manual, Volume 3 – Signing and Pavement Making<br>• AS1158 - Lighting for roads and public spaces<br>• Institute of Public Works Engineering Australasia, Complete Streets: Guidelines for Urban Street Design - Section 17: Industrial Streets |
| Roads (minor) | • Relevant local government standards |
| Soil erosion | • International Erosion Control Association (IECA) – Best Practice Erosion and Sediment Control |
| Stormwater quality | • Water sensitive urban design: Design objectives for urban stormwater management<br>• Health Land and Water, Construction and Establishment Guidelines: Swales, Bioretention Systems and Wetlands: Version 1.1<br>• Concept Design Guidelines for Water Sensitive Urban Design |

| | |
|---|---|
| | • Standard Drawings for Water Sensitive Urban Design<br>• Curtis Island, Calliope River and Boyne River Basins - Environmental Values and Water Quality Objectives<br>• Great Barrier Reef River Basins—End-of-Basin Load Water Quality Objectives<br>• Water quality guidelines for the Great Barrier Reef Marine Park<br>• State code 9: Great Barrier Reef wetland protection areas<br>• State Planning Policy 2017 State Interest Water Quality Supplementary Implementation Guidelines February 2021 |
| Stormwater quantity | • Queensland Urban Drainage Manual<br>• Australian Rainfall and Runoff |
| Utilities (e.g. sewer, water, telecommunications, electricity supply) | • Relevant service provider standards (e.g. Gladstone Regional Council) |

| Section | SDA Wide Criteria | Comment | Complies |
|---|---|---|---|
| **2.5.13 Other government matters** | (1) Development is to demonstrate consistency with any other relevant legislative requirements that may be necessary for the development to proceed and to the extent practicable, be consistent with regional plans, the State Planning Policy, the Port Overlay for the priority Port of Gladstone, and the State Development Assessment Provisions, where the State interests articulated by these instruments are likely to be affected by the development. | The proposed land use is highly compatible with the vision for the Gladstone SDA and outcome sought by the Development Scheme. Furthermore, the strategic land use for this area has been contemplated since the early 1990's and therefore State and local government policy supports the intent of the SDA and use of the subject site for High or Medium Impact Industry (GEF and GTF). | ✓ |
| | (2) Development recognises and protects the long-term availability of the extractive resource and access related to the Targinnie Key Resource Area (Number 119). | | ✓ |
| | (3) Development does not compromise existing or future port facilities and operation on Strategic Port Land. | | ✓ |
| **2.5.14 Energy and water efficiency** | (1) Building, Site design, and layout maximises energy efficiency having regard to:<br>(a) building orientation and passive solar design<br>(b) maximising opportunities for cross ventilation<br>(c) appropriate shade treatments<br>(d) landscaping treatments to the western side of the building. | The proposed building design seeks to adopt best practice principles for energy and water efficiency where appropriate. | ✓ |
| | (2) Water efficiency is optimised with alternative water supply sources, including:<br>(a) rainwater harvesting systems<br>(b) recycled water source. | | ✓ |
| | (3) Where practicable, development should be consistent with the Queensland government's renewable energy policies. | | ✓ |
| **2.5.15 Visual Impacts** | (1) Visual impacts of buildings, retaining structures, or other development are minimised through building design, landscaping, and use of appropriate materials when viewed from a publicly accessible viewpoint such as major roads and the Mount Larcom landform. | (1) The proposed development will be only partially visible from Gladstone Mount Larcom Rd given existing vegetation between the Site and the Highway. This viewpoint will also be shielded from the existing GEM buildings from Gladstone Mount Larcom Rd. The design of the test area on the Site will also limit the visual impact from Gladstone Mount Larcom Rd. Landscaping has not been proposed given the cutting and possible impacts of vegetation being built in close proximity to the plant equipment.<br>(2) The proposed scale and form of the development is generally in keeping with the desired intent for the Precinct. It will introduce a high-quality built form to the area, with attractive street frontage to Euroa Circuit. | ✓ |
| | (2) Development maintains and enhances significant vegetation where possible and provides landscaping that: (a) minimises the visual impacts of the development (b) incorporates at least 50 per cent local species (c) is low maintenance. | | ✓ |

| Section | SDA Wide Criteria | Comment | Complies |
|---|---|---|---|
| | | The proposal has adopted best practice building design, incorporating sustainability elements and technological efficiencies where appropriate. | |
| **2.5.16 Reconfiguring a Lot** | (1) Development provides lawful, safe and practical access. | N/A - The Proposed Development is not reconfiguring any lots as part of the Proposed Works. | ✓ |
| | (2) Lot sizes are adequate to accommodate a development footprint consistent with the preferred development in each precinct. A range of lot sizes is preferred to accommodate development in each precinct. Minimum lot sizes for development precincts are generally consistent with the following:<br>(a) Port Related Industry Precinct – 2 hectares (ha)<br>(b) High Impact Industry Precinct – 10 ha<br>(c) Medium Impact Industry Precinct - 2 ha<br>(d) Industry Investigation Precinct – 2 ha | | ✓ |

The documented change necessitates an amendment to the SDA Approval Conditions, specifically Condition 1.

An adjustment to the previously approved drawings is required to accommodate the increase in gross floor area on the proposed development site due to the inclusion of the GTF. The incorporation of the GTF necessitates updated elevation plans, site plans, and GTF building plans to be reviewed in conjunction with this proposal. It's important to note that no changes are required for the existing approved buildings.

The layout of the proposed development will feature a ground floor only, designed to facilitate the onsite testing of electrolysers. The gross floor area for the proposed GTF is 1,282.4m².

| Condition 1 – approved plans and documents | | Timing |
|---|---|---|
| 1.1 | Carry out the approved development generally in accordance with the approved plans and documents as referenced in Table 1 (including any amendments marked in red), except insofar as modified by any of the conditions of this approval | *To be maintained at all times* |

Table 1 – Approved plans and documents

| Title | Prepared By | Document No | Date |
|---|---|---|---|
| Site Masterplan | With_Architecture Studio | SK_A001_D | 27/07/2021 |

| | | | |
|---|---|---|---|
| Concept Plan | With_Architecture Studio | SK_A002_D | 27/07/2021 |
| Ground Floor Plan | With_Architecture Studio | SK_A003_D | 27/07/2021 |
| Elevations | With_Architecture Studio | SK_A005_C | 27/07/2021 |
| Sections | With_Architecture Studio | SK_A006_C | 27/07/2021 |

The proposed development is seeking to gain compliance with the above condition through the inclusion of drawings and elevations regarding the proposed establishment of the GTF. Through the inclusion of the amended drawings and elevations, this will assist to satisfy the increase of gross floor area on the Site.

**It is noted the following will be unaffected:**

- Onsite Stormwater Management Plan: The current plan for managing onsite stormwater remains in effect.
- Traffic Management: No changes to the level of on-site vehicle servicing or manoeuvring.
- ERA 63 for Sewage Treatment: Continuation of the existing approval.
- Water Supply Demand from GWAB (45ML/annum): No alterations to the approved water supply demand.
- Emergency Response Evacuation Plans: The existing facility evacuation plans remain unchanged; however, a new response plan will be introduced for the GTF.

The proposed GTF is located within the existing approved 'Site Development Boundary'. The proposed layout and design relevant to the existing approval will not change.

As part of this application, an additional emergency response will be required to cater for all occupants within the new GTF. Additionally, the total water demand for the GEF is 45ML/ annum.

Appendix I

# Traffic Desk Top Assessment

Member of the Surbana Jurong Group

# Technical Memorandum

# Traffic Desk Top Assessment

| | | | |
|---|---|---|---|
| **Subject** | Reverse Brief TIA | **Date of Issue** | 29/07/2021 |
| **Project Name** | The Proponent - Stage 1 | **Discipline** | Traffic and Transport |
| **Author** | York Wang | **Revision** | 03 |
| **Reviewed by** | Henry Strachan RPEQ | | |
| **Prepared for** | | **Approved by** | Melissa Griffin |

# 1 Introduction

## 1.1 Background

The Stage 1 subject site is located within the Gladstone State Development Area in the Gladstone Local Government Authority. The subject site is identified as part of lot 4 on SP 245936. The site coverage of the proposed development is in the order of 2.0 hectares.

As a new manufacturing plant in Gladstone State Development Area, the SDA application needs to be accompanied by Impacts Assessment outcomes. This brief is aimed to summarise the traffic impact approach and potential application requirements of this Stage 1 development application.

## 1.2 Engineering References

- Department of Transport and Main Roads 2018, Guide to Traffic Impact Assessment (GTIA)
- Department of Transport and Main Roads 2017, Guide to Traffic Impact Assessment Case Studies
- Roads and Traffic Authority 2002, Guide to Traffic Generating Developments
- Queensland Government 2006–2017, Traffic Generation Open Data
- RMS 2013 Guide to Traffic Generating Developments
- Gladstone Regional Council Planning Scheme 2017

# 2 Stage 1 Development Impact

## 2.1 Key Principles

The underlying principles that will guide the assessment of this development are presented below:

1. The development must not compromise safety on the SCR network
2. The development should seek to achieve no worsening to safety or infrastructure condition and no net worsening to efficiency across the impact assessment area.
3. The development should seek to adopt a mitigation hierarchy of (in order of preference):
   (a) avoiding impacts
   (b) managing impacts and;
   (c) mitigating impacts.
4. The development access locations and permitted turning movements are consistent with the function and access limitation requirements of the road network being accessed.

## 2.2 Considerations

The following factors have been considered in this desktop assessment:

- development scale, layout and type, including land use components
- proximity to a State Controlled Road
- state transport planning, including projects in the area identified in the State Infrastructure Plan, QTRIP or any other planned upgrades to transport infrastructure for the area
- regional planning and land use context within which the site is located
- local government transport and infrastructure planning or strategies impacting the proposed development
- state land requirements
- information on existing or potential safety and traffic problems on the roads serving the proposed development
- information on the expected increase in traffic generated, changes to trip patterns and modal split, and the impact on current or projected operational characteristics of roads including safety, delays, queues, degree of saturation, turning movements, travel patterns and transport infrastructure
- impacts resulting from situations where traffic from other existing or proposed adjacent developments is likely to compound traffic impacts
- impacts from accesses, frontage modifications and development generated traffic on pedestrians, cyclists, public transport users, vision and physically impaired people and on service vehicle accessibility
- It should be noticed that Traffic impact assessments submitted to Transport and Main Roads for review must be certified and executed by a RPEQ in the same area of engineering expertise as that of the impact of infrastructure being assessed

# 3 Existing Conditions and Proposed Stage 1 Layout

The site is a part of Aldoga Precinct, described as Lot 4 of SP 245936. The total site area is approximately 2 hectares. It has direct access to Euroa Circuit which in turn connects Aldoga Rd and is in the close proximity to Gladstone Mount Larcom Rd, which is approximately 10km southeast of the Bruce Highway.

Four remote rural intersection will be impacted by the proposed development. The site and intersection location (Gladstone Mount Larcom Rd- Aldoga Rd, etc.) are illustrated in the Figure 3-1

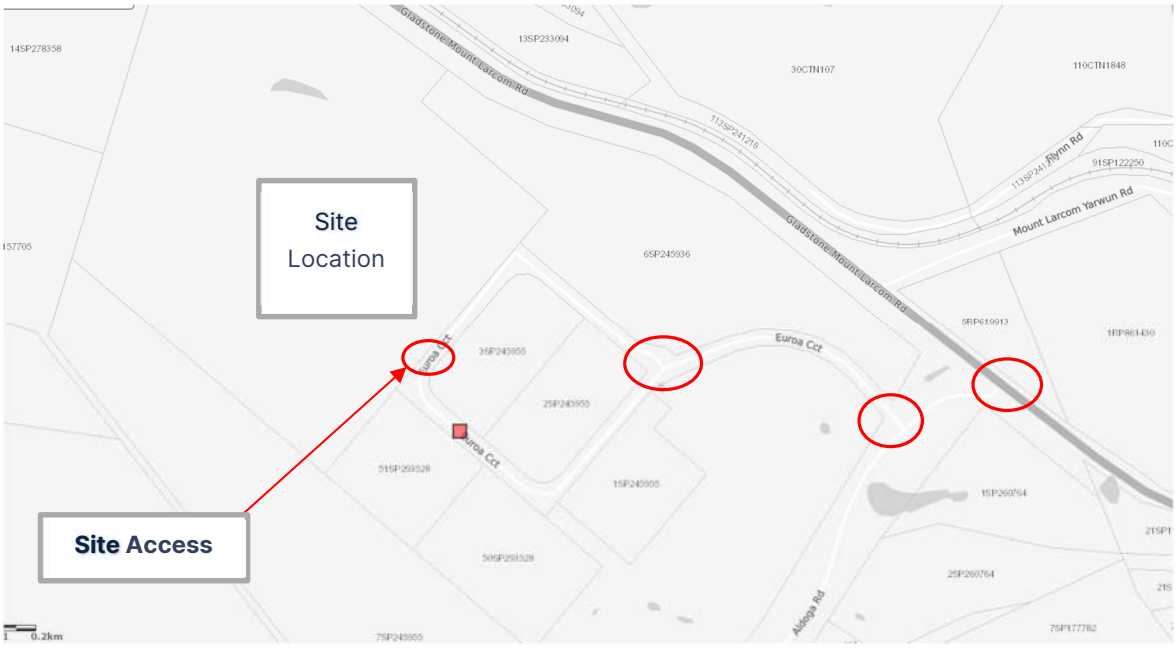



Figure 3-1: Site Location and Impacted Intersections

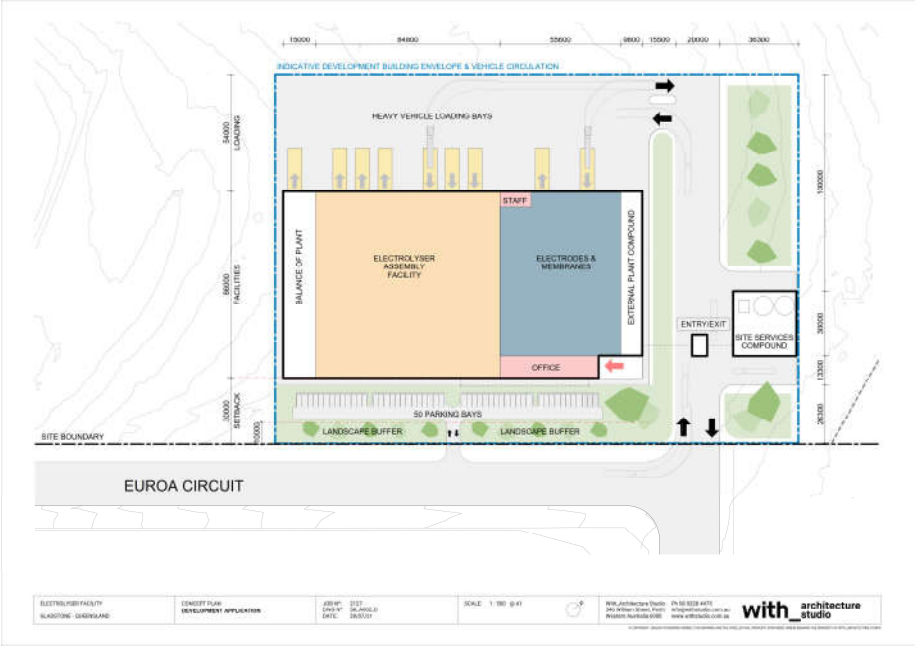



Figure 3-2: Development Concept Plan

There are some rural residential properties around the site with the City of Gladstone located approximately 18km east of the site. The townships of Yarwun and Mount Larcom are approximately 4.5km and 11km northwest of the site respectively.

The adjoining local highway network consists of the Bruce Highway and Gladstone Mount Larcom Road. Gladstone Mount Larcom Road has a posted 100kph speed limit and primarily consists of a single carriageway; which alters on approach to the A1 Bruce Highway with two lanes for eastbound traffic and a single lane for westbound traffic.

Aldoga Rd is accessed via a priority intersection at Gladstone Mount Larcom Road. The intersection layout is shown in Figure 3-3 below.


Figure 3-3: Intersection Layout at Gladstone Mount Larcom Road

The local road network in the vicinity of the proposed Stage 1 consist of Gladstone Mount Larcom Rd, Aldoga Rd and Euroa Ct. Table 3-1 presents the existing local road network features:

Table 3-1: Existing Conditions of Local Road Network

| Road | Lanes | Jurisdiction | Divided | Speed | Comment |
|---|---|---|---|---|---|
| Gladstone Mount Larcom Road | 2 | TMR | No | 100kph+ | State Route |
| Aldoga Road | 2 | Gladstone Council | No | Undeveloped | Undeveloped |
| Euroa Circuit | 2 | Gladstone Council | No | Undeveloped | Undeveloped |

According to the Guide to Traffic Impact Assessment (TMR,2018), the following components need to be assessed for existing traffic operations:

| TIA Item | ✔ | Assessment |
|---|---|---|
| Background | ✔ | Shown above |
| Scope and study area | ✔ | Illustrated in Figure 3-1 and Figure 3-2. |
| Pre-lodgement meeting notes | ✔ | TMR to decide if a full TIA analysis is required for the priority-controlled intersection at Gladstone Mount Larcom Rd / Aldoga Rd |
| Land use and zoning | ✔ | Major industry, remote rural area |
| Adjacent land uses / approvals | ✔ | Demonstrated above |
| Surrounding road network details | ✔ | Shown above |
| Traffic Volumes | **Further Investigation** | Latest traffic count is not available, assumptions and estimations are made, predominantly based on the previous TIA for Aldoga Precinct Stage 1, dated 2 August 2011 |
| Intersection and Network Performance | ✔ | A high level intersection performance is analysed in this report (see Section 6) based on the previous traffic impact assessment report and the estimated traffic volume at this location. |
| Road safety issues | **Further Investigation** | To be further assessed |
| Site access | **Further Investigation** | The site has direct access to Euroa Ct, further development needs consideration |
| Public transport | **NA** | Not required for this development |
| Active transport | **NA** | Not required for this development |
| Parking | ✔ | 50 parking spaces |
| Pavement | **Further Investigation** | Needs calculation of standard axle repetition on the existing links |
| Transport infrastructure | **Further Investigation** | List out existing bridges, culverts and other structures within the SCR network |

## 3.1 Existing Layout Desktop Analysis

### 3.1.1 Growth Rate and Traffic Volume Estimation

Recent traffic counts are not available. Assessments are based on the previous TIA study and local conditions for 2023 (base) and 2033 (design horizon) traffic volumes. Volumes were estimated from the 2011 TIA traffic counts. SMEC was provided with a study from PSA Consulting that was conducted for EDQ in June 2019 to assess background traffic and expected growth in the area. Background traffic volumes on the Bruce Highway have been taken from AADT segment reports in the vicinity of the subject site. In 2017, recorded AADT was 4,560 vehicles with 29.38% heavy vehicles. This data was collected on the Bruce Highway 100m south of the

Calliope River. Over a 10-year period, a historical growth rate of **1.87%** p.a. was observed and this has been applied to this study to grow the background traffic volumes forward to the 2033 year of the design horizon.

The following diagrams are extracts from the previous TIA and shows traffic surveys conducted in 2011.

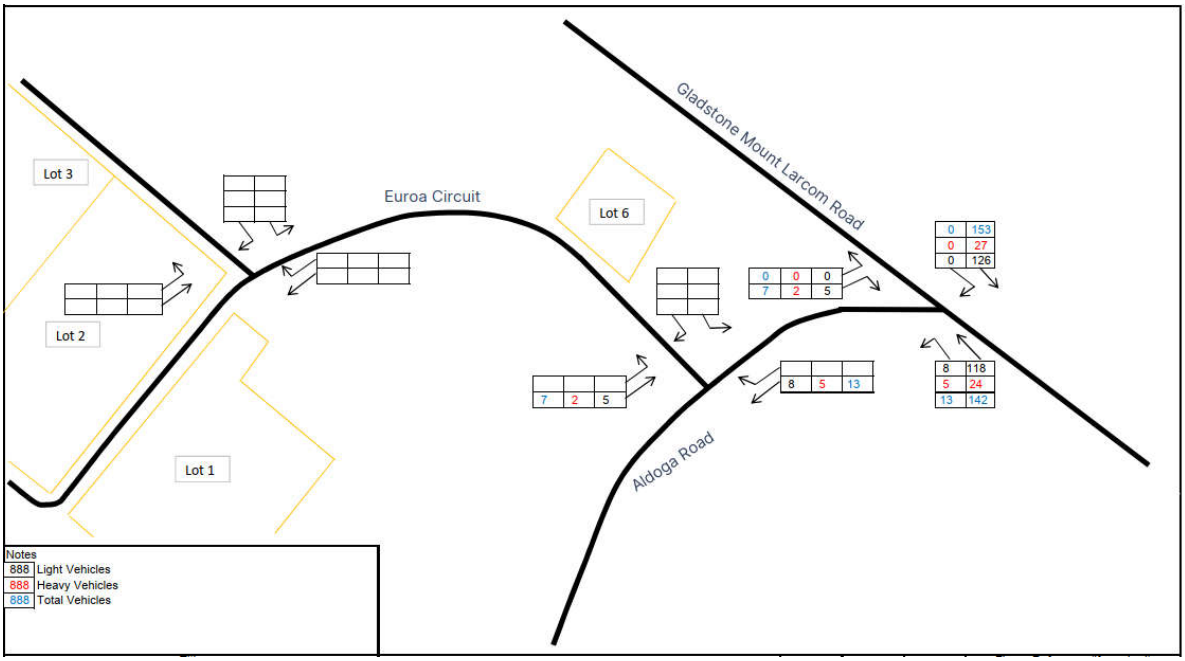



Figure 3-4: 2011 Traffic Survey at Gladstone Mount Larcom Road / Aldoga Road, AM Peak Period (08:45-09:45) (Extraction)

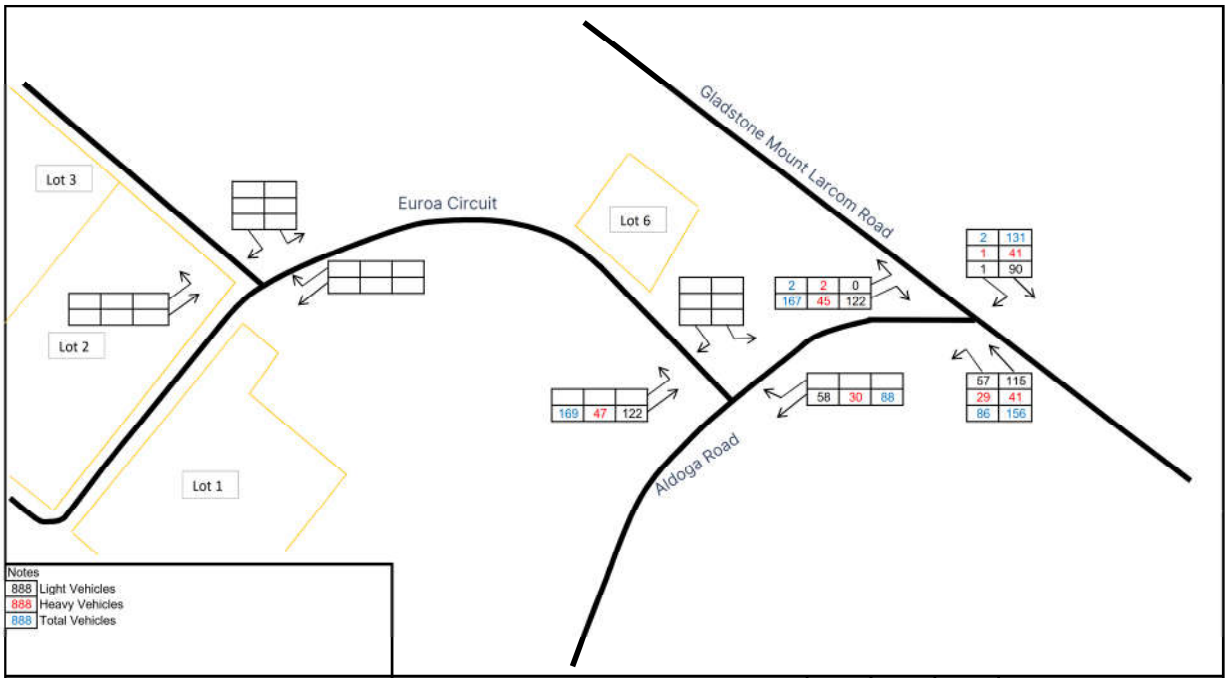
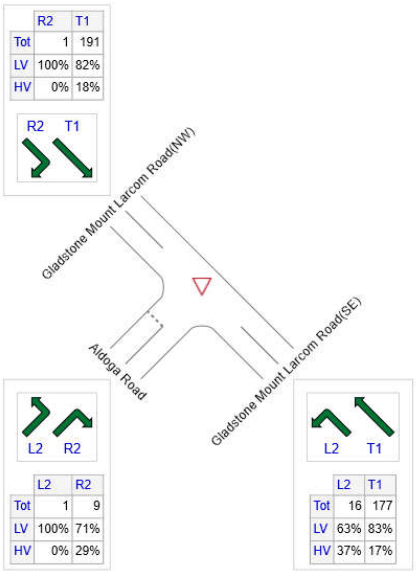
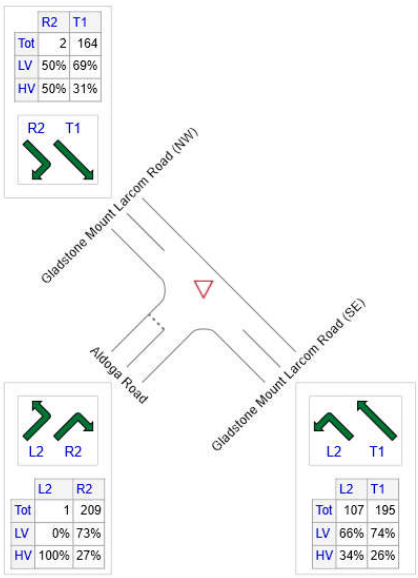



Figure 3-5: 2011 Traffic Survey at Gladstone Mount Larcom Road / Aldoga Road, PM Peak Period (16:45-17:45) (Extraction)

2023 estimated traffic at both AM and PM peak hours using a growth rate of 1.87% p.a. and applying compound growth are shown below:

Table 3-2: 2023 Peak Periods Traffic Estimation (Base) at Gladstone Mount Larcom Road / Aldoga Road

| 2023 Base AM Peak Traffic Flows (08:45-09:45) | 2023 Base PM Peak Traffic Flows (16:45-17:45) |
|---|---|
|  |  |



The intersection of Gladstone Mount Larcom Road / Aldoga Road is a three-legged priority controlled intersection (also refer to Appendix A for the intersection layout and detailed SIDRA outcomes). This intersection has been modelled in SIDRA Intersection v9.0 and the results are summarised in Table 3-3 below.

Table 3-3: Gladstone Mount Larcom Road / Aldoga Road Intersection – 2023 Base – peak period analysis

| Approach Lane | AM Peak Period (08:45-09:45) | | | PM Peak Period (16:45-17:45) | | |
|---|---|---|---|---|---|---|
| | Degree of Saturation (DoS, threshold of 0.80) | 95% Back of Queue (vehicles) | Average Delay (seconds) | Degree of Saturation (DoS, threshold of 0.80) | 95% Back of Queue (vehicles) | Average Delay (seconds) |
| South East: Gladstone Mount Larcom Road (SE) | 0.100 | 0.0 | 0.8 | 0.116 | 0.4 | 3.3 |
| North West: Gladstone Mount Larcom Road (NW) | 0.080 | 0.0 | 0.1 | 0.075 | 0.0 | 0.4 |
| South West: Aldoga Road | 0.014 | 0.1 | 8.7 | 0.446 | 2.0 | 12.0 |
| **Intersection** | **0.100** | **0.1** | **0.7** | **0.446** | **2.0** | **5.3** |

The above results show that all legs of this intersection operates well within the capacity in the peak period with little or no queues or delay. The only concern will be on the Aldoga Road approach. As an unsignalised intersection, there might be unexpected delays to the right turn movements on the Aldoga Road, especially when the westbound and eastbound traffic is under high-speed conditions. This desktop assessment will address possible impacts to the intersection introduced by the proposed development, hence only PM peaks will be examined for 2033 design horizon year as it represents critical traffic conditions (more vehicles on the Aldoga Road approach).

### 3.1.2 Miscellaneous Findings

The location of the site is on undeveloped rural land. Surrounding road network details are to be reviewed, including traffic volumes, intersection performance, road safety issues, site access locations etc.

A desktop analysis has been conducted for this development, the findings are summarised below.

- Public and active transport will not be considered in this assessment for this development as it is located in a remote rural area. This requirement should be confirmed with Council.
- Euroa Ct and Aldoga Rd have not been constructed, pavement assessment should also include these two roads
- Background AADT on Aldoga Road (entering from Gladstone Mount Larcom Rd) is reported as 221 (2020), and the heavy vehicle trips consist of 3.17% of total trips. This provides insights for the development of the traffic turning counts. AADT is expected to increase with this development application, trip generation and distribution will be analysed in Section 6.

| Site ID | Road Segment | | Base Data Year | Base Year AADT | | | | 10 Yr. GR % | Background AADT (2020) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Start (km) | End (km) | | Gaz | % HV | A-Gaz | % HV | | Gaz | | A-Gaz | |
| | | | | | | | | | Total | HV | Total | HV |
| Gladstone-Mount Larcom Road (181) | | | | | | | | | | | | |
| 60071 | 0.000 | 1.409 | 2019 | 3,563 | 18.52% | 3,085 | 15.24% | 2.00% | 3,634 | 673 | 3,147 | 480 |
| 60073 | 1.409 | 3.258 | 2018 | 3,025 | 16.07% | 3,150 | 16.16% | 2.00% | 3,147 | 506 | 3,277 | 530 |
| 61052 | 3.258 | 4.625 | | 4,706 | 11.52% | 4,542 | 14.11% | 2.00% | 4,896 | 564 | 4,725 | 667 |
| 60074 | 4.625 | 12.292 | | 3,206 | 13.54% | 3,189 | 15.96% | 2.00% | 3,336 | 452 | 3,318 | 530 |
| 60076 | 12.292 | 16.301 | | 1,480 | 21.89% | 1,482 | 30.23% | 2.00% | 1,540 | 337 | 1,542 | 466 |
| | 16.301 | 19.030 | | 1,480 | 21.89% | 1,482 | 30.23% | 2.00% | 1,540 | 337 | 1,542 | 466 |
| | 19.030 | 19.920 | | 1,480 | 21.89% | 1,482 | 30.23% | 2.00% | 1,540 | 337 | 1,542 | 466 |
| | 19.920 | 32.140 | | 1,480 | 21.89% | 1,482 | 30.23% | 2.00% | 1,540 | 337 | 1,542 | 466 |
| Bruce Highway (10D Gin Gin - Benaraby) | | | | | | | | | | | | |
| 60022 | 139.544 | 140.298 | 2018 | 3,392 | 18.87% | 3,512 | 19.25% | 3.23% | 3,615 | 682 | 3,743 | 720 |
| 60163 | 140.298 | 146.358 | | 3,911 | 27.77% | 4,322 | 19.90% | 2.74% | 4,128 | 1,146 | 4,562 | 908 |
| Bruce Highway (10E Benaraby - Rockhampton) | | | | | | | | | | | | |
| 60127 | 0.000 | 11.445 | 2018 | 2,681 | 24.24% | 2,776 | 27.88% | 2.00% | 2,789 | 676 | 2,888 | 805 |
| 60006 | 11.445 | 45.420 | | 2,483 | 26.38% | 2,373 | 24.74% | 2.20% | 2,593 | 684 | 2,479 | 613 |
| Aldoga Road | | | | | | | | | | | | |
| GRC | 0.000 | 0.275 | 2020 | 221 | 3.17% | 221 | 3.17% | 2.00% | 221 | 7 | 221 | 7 |

** Chainage and gazettal direction for Aldoga Road assumed to be south from Gladstone-Mount Larcom Road.
TMR Ch. 16.301km (181) – Gladstone-Mount Larcom Road / Calliope River Road intersection.
TMR Ch. 19.030km (181) – Gladstone-Mount Larcom Road / Quarry Road intersection.
TMR Ch. 19.920km (181) – Gladstone-Mount Larcom Road / Aldoga Road intersection.
TMR Ch. 139.544km (10D) – Bruce Highway / Silica Road intersection.
TMR Ch. 45.420km (10E) – Bruce Highway / Gladstone-Mount Larcom Road intersection.

- According to QLD Crash Data (2009-2019), only one crash is presented within 500m of the Gladstone Mount Larcom Rd – Aldoga Rd Intersection (Cause: Hit Animal), the other three intersections are still undeveloped, hence it is assumed that there are no current road safety issues at this intersection.
- Through desktop elevation analysis, steep grade (10.6%) was found at the frontage road (Euroa Circuit) to the south of the site, this should be appreciated and resolved when designing this road. Sight line requirements should also be assessed.
- AM and PM traffic peak hour needs to be determined from more recent traffic counts at the Gladstone Mount Larcom Road / Aldoga Rd intersection.
- To complete a comprehensive traffic impact assessment, current intersection performance should be assessed using the latest classified traffic survey data.

# 4 Proposed Development Details

According to Guide to Traffic Impact Assessment (TMR,2018), the following components regarding proposed development details need to be assessed:

| TIA Item | ✔ | Assessment |
|---|---|---|
| Development site plan | ✔ | Shown in Section 4 |
| Operational details | ✔ | |
| Proposed access and parking | ✔ | |

SMEC understand that construction on the preferred site is planned to commence in January 2022 with operation due to commence in January 2023, and the development will be within the close proximity of State-Controlled Road, hence the above items are to be assessed for the proposed development. The Design Horizon Year will also take this into account – hence the Design Horizon Year of 2033.

The following operational details are provided for the proposed development:

- 50 parking spaces
- 22 parking bays for office workers (arrive between 8-10 AM)
- 28 parking bays for factory works (arrive between 7-8 AM)
- Peak hours are considered between 7-9am and 4-6pm
- Floor area for the office and plant is around 11500 $m^2$
- full site size will be 145m × 110m, i.e. 15950 $m^2$
- Working pattern = 2 shifts / 5 days / 46 weeks
- An average 11 heavy vehicle movements per day

Further investigation is required for the access to this site, apart from Euroa Court, if any potential access to the site is proposed from Gladstone Mount Larcom Rd (State-Controlled Road). A more comprehensive assessment might be triggered here.

Although the Guide to Traffic Generating Developments, RTA suggests 1.3 parking spaces per 100$m^2$ GFA for factories, 208 parking spaces are required for this development. Additional elements are evaluated for this particular factory: the development is an electrolyser automates assembly facility with 50 employees working at the operational stage and less car parking spaces might be required. Hence it is reasonable that 50 parking bays are assigned for this development, in which 22 are assigned to office workers while 28 are assigned to factory workers.

Trip generation is assessed in the following section. An additional 100 trips are assumed at the Aldoga Rd intersection.

# 5 Stage 1 Development Traffic

| TIA Item | ✔ | Assessment |
|---|---|---|
| Traffic generation | ✔ | Section 5.1 |
| Trip distribution | ✔ | Section 5.2 |
| Development traffic volumes on the network | ✔ | Section 5.1 |

## 5.1 Traffic Generation

### 5.1.1 Operation Stage Traffic for Stage 1

Various factors will be reviewed at this stage for an accurate trip generation, for instance, the estimated productivity, estimated stuff number, hours of operation, haulage, etc, with the development of these factors, development traffic volumes, trip generation and trip distribution can be subsequently assessed.

Due to the lack of the planning guidelines for traffic and trip generation, the RMS Guide to Traffic Generating Developments Updated traffic surveys and Queensland Traffic Generation Data are referenced for the analysis of development traffic.

From the previous traffic impact assessment at this location (2011), the AM and PM peak hours at the Gladstone Mount Larcom Road / Aldoga Rd intersection were identified as 08:45-09:45 and 16:45-17:45 respectively. It is assumed that the peak hour remains the same as all factory workers would arrive before 8am to commence work. The traffic generated from the office workers between 8am to 10am will not adversely affect traffic patterns and operations. We assume that all workers would leave the site during the PM peak period.

According to the RMS guidelines and the traffic generation survey of existing developments similar to this proposed development in terms of scale, location, etc. it is suggested that an average of 5 daily trips are generated per 100 $m^2$, hence 575 daily vehicle trips will be generated with this development. However, considering this specific automated assembly facility, the provided headcount of 50 people and the combined information from the proponent and TMR, trips generated by the Stage 1 development will be much less than 575.

SMEC has conducted an assessment for the resulting vehicle trip generation at peak hours for this development, which is presented in the Table 5-1 below. It should also be noted that the proportion of trips arriving / departing during AM peak periods has been split into an 80/20 distribution and vice versa at the PM peak hour.

Table 5-1: Vehicle Trip Generation

| Site Area | AM peak Period (08:45-09:45) | | | | PM Peak Period (16:45-17:45) | | | |
|---|---|---|---|---|---|---|---|---|
| | Arrivals | | Departures | | Arrivals | | Departures | |
| 1.6 Hectare | Light | HGV | Light | HGV | Light | HGV | Light | HGV |
| | 27 | 2 | 6 | 1 | 9 | 1 | 43 | 2 |
| **Total Trips** | **29** | | **7** | | **10** | | **45** | |

### 5.1.2 Construction Stage Traffic

As previously stated, construction on the preferred site is planned to commence in January 2022 with operation due to commence in January 2023, the construction phase traffic for this development is estimated based on the development area and other major industry development example.

The key traffic generation at construction stage will be from the movement of materials, plant / equipment and the transport of construction personnel to the site. With regards to this site it is envisaged that the majority of the construction personnel would be located within the vicinity of the site (most likely the City of Gladstone located some 18km east of the site) and commute via both light vehicle and provided buses. It is also typical to use a concrete batching plant on these types of projects, it is assumed that the developer would most likely secure their own off-site and probably located towards Gladstone. (Extraction from previous TIA report).

Around 400 people and 110 daily two-way trips at the peak of the construction activities would be required for a 40.2 hectares major industry construction, hence for this 2.0 hectares factory, 30 two-way trips are assumed at the peak period, which is less than the traffic generated at the operation stage, therefore the construction phase traffic assessment is omitted for this assessment.

## 5.2 Vehicle Trip Distribution

Trip distribution will be based on local knowledge and assumptions, in determining an appropriate set of traffic distribution assumptions, following factors are taken into consideration:

- journey to site data (for both construction, operation stage)
- local knowledge of travel patterns (It is acknowledged that most of the traffic comes from/goes to Gladstone City, however, in the previous study, the vehicle trip distribution for the construction and operation stage of lot 6 assumes that vehicles will be travelling to / from Gladstone, i.e. those arriving will turn left into Aldoga Road from Gladstone Mount Larcom Road and those exiting will turn right from Aldoga Road. This assumption is retained for this assessment.
- proposed product delivery point, productivity and haulage
- traffic counts/traffic surveys – such as origin-destination surveys, classified turning volumes Aldoga Rd intersection counts and travel time surveys
- additional information from the proponent

The estimated traffic flow diagrams are as follows.

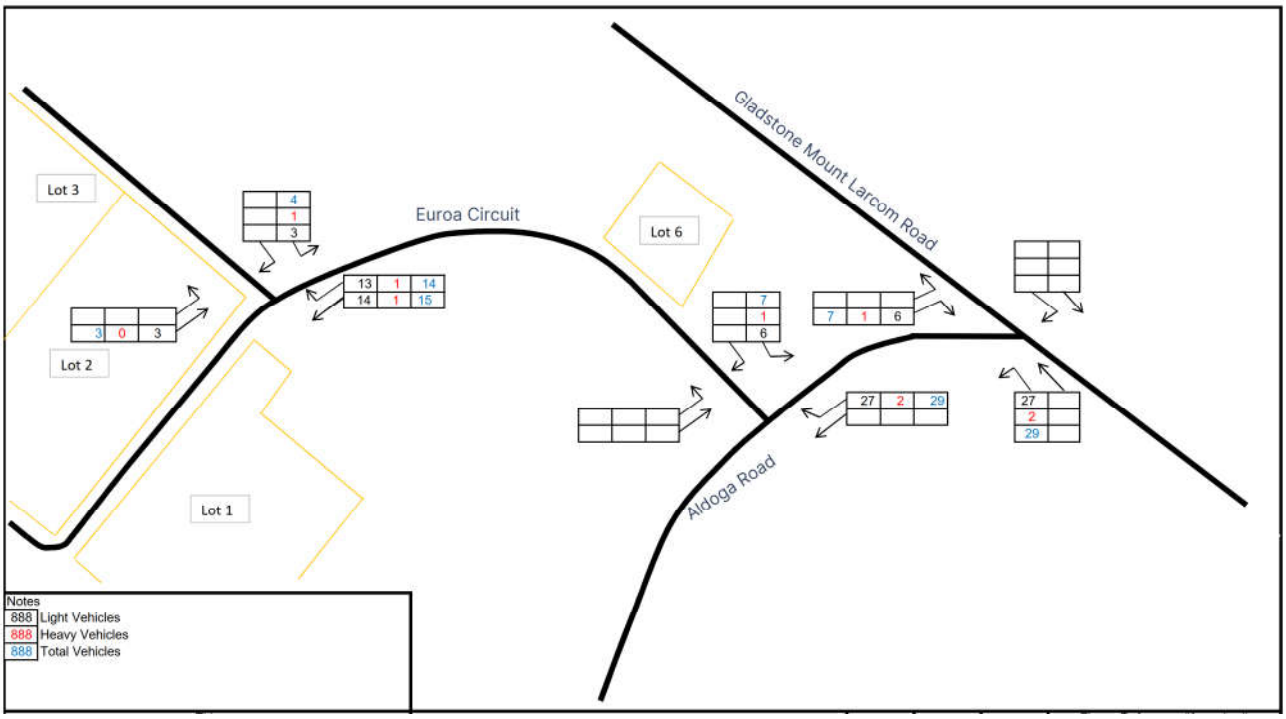



Figure 5-1: Development Traffic Flow Diagrams, AM Peak Period (08:45-09:45)

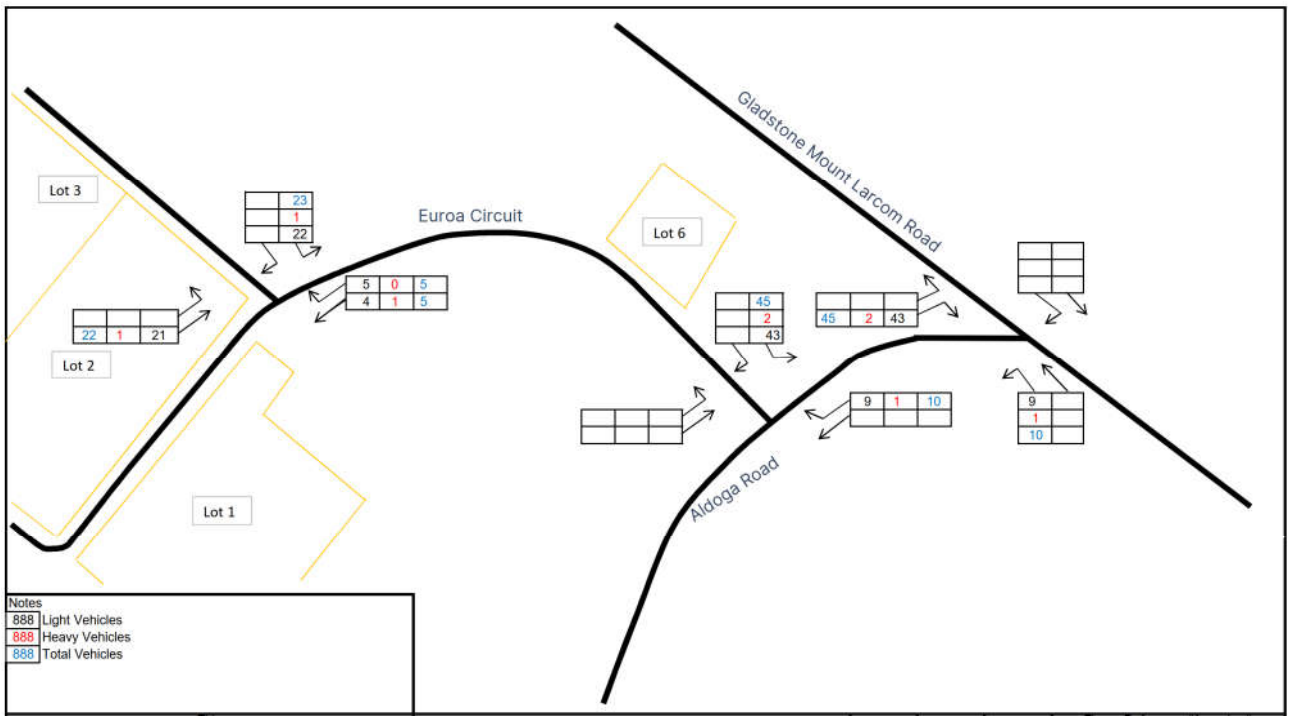



Figure 5-2: Development Traffic Flow Diagrams, PM Peak Period (16:45-17:45)

These traffic flow diagrams will be used to assess the 2023 opening year traffic performance at this intersection (see Section 6 of this report).

# 6 Impact Assessment and Mitigation

Key principles for the assessment of miscellaneous impacts of development are provided in Section 6 to Section 15 of Guide to Traffic Impact Assessment (TMR, 2018). TIA components for this development are assessed in line with the key principles outlined in the GTIA.

The required TIA aspects are summarised below.

| TIA Item | ✔ | Assessment |
|---|---|---|
| With and without development traffic volumes | ✔ | See Section 6.1 |
| Road safety impact assessment and mitigation | **Further Investigation** | A site road safety audit should be conducted, several existing safety risks at the intersection are listed in Section 6.2 |
| Access and frontage impact assessment and mitigation | **Further Investigation** | Potential access to the site on the Gladstone Mount Larcom Rd |
| Intersection delay impact assessment and mitigation | ✔ | See Section 6.4 |
| Road link capacity assessment and mitigation | ✔ | See Section 6.5 |
| Pavement impact assessment and mitigation | **Further Investigation** | Determine the standard axle repetitions (SAR) for traffic generated by this development on SCR, further investigation is required. |
| Transport infrastructure impact assessment and mitigation | **Further Investigation** | Assess all bridges or culverts within the study area |

## 6.1 With and without development traffic volumes

The traffic impact will be assessed through analysing the different With and Without development traffic volumes and scenarios (at opening year 2023 and a 10-year design horizon at 2033).

The development traffic estimated in Figure 5-1 versus 2023 background traffic at the Intersection is greater than 5%, meanwhile development traffic versus 2023 background AADT on all three road sections is greater than 5% impact, hence the intersection delay analysis threshold, road link and transport infrastructure threshold are triggered.

### 6.1.1 2023 Opening Year Intersection Operation Assessments – With Development Traffic

The traffic volumes with development traffic at peak hours (2023) are illustrated below:

Table 6-1: 2023 Opening Year with Development Traffic Flows

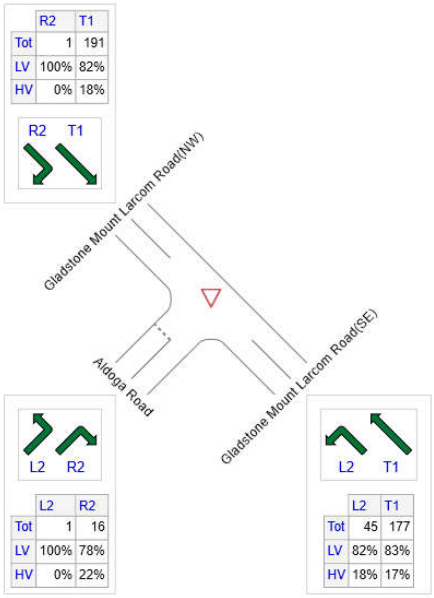
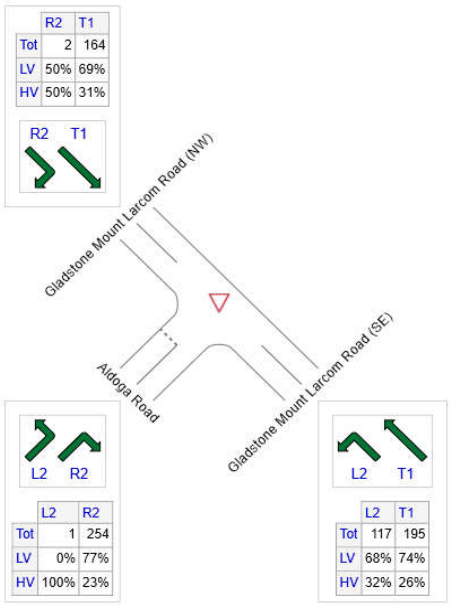
| 2023 AM Peak Traffic Flows With Development Traffic (08:45-09:45) | 2023 PM Peak Traffic Flows With Development Traffic (16:45-17:45) |
|---|---|
|  |  |



Table 6-2: Gladstone Mount Larcom Road / Aldoga Road Intersection – 2023 With Development – peak period analysis

| Approach Lane | AM Peak Period (08:45-09:45) | | | PM Peak Period (16:45-17:45) | | |
|---|---|---|---|---|---|---|
| | Degree of Saturation (DoS, threshold of 0.80) | 95% Back of Queue (vehicles) | Average Delay (seconds) | Degree of Saturation (DoS, threshold of 0.80) | 95% Back of Queue (vehicles) | Average Delay (seconds) |
| South East: Gladstone Mount Larcom Road (SE) | 0.100 | 0.1 | 1.8 | 0.116 | 0.4 | 3.4 |
| North West: Gladstone Mount Larcom Road (NW) | 0.080 | 0.0 | 0.1 | 0.075 | 0.0 | 0.4 |
| South West: Aldoga Road | 0.026 | 0.1 | 8.8 | 0.446 | 2.7 | 12.7 |
| **Intersection** | **0.100** | **0.1** | **1.3** | **0.446** | **2.7** | **5.9** |

The TMR GTIA recognises the intersection delay as a greater indicator of intersection performance in comparison to the previous TMR Guidelines for Assessment of Road Impacts of Development (GARID) significance on the degree of saturation (DOS). For priority-controlled intersections, where the average peak hour delays for any movement exceeds 42 seconds, as outlined in the GTIA, the intersection should be upgraded for safety reasons where it is practical to do so.

SIDRA analysis is conducted for this intersection at 2023 with development traffic. As Table 6-2 illustrated, the performance of the overall intersection is predicted to be acceptable in both AM and PM peak periods with the

development traffic. This result demonstrates that the proposed development-generated traffic has minor impacts on this intersection. Details for comparison between scenarios are shown in the following Sections.

### 6.1.2 2033 Design Horizon Year Intersection Operation Assessment - Base

2033 design horizon year traffic volume (without development traffic) is forecasted utilising the SIDRA design life analysis, a summary of SIDRA outputs is presented as follows:

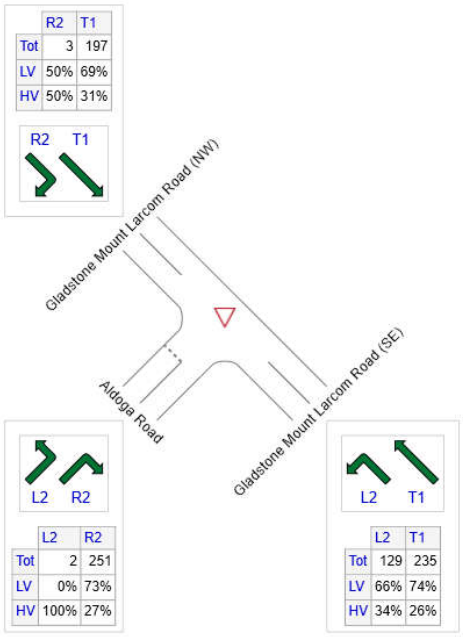



Figure 6-1: 2033 Design Horizon Year Traffic Flow without Development Traffic, PM Peak Period (16:45-17:45)

Table 6-3: Gladstone Mount Larcom Road / Aldoga Road Intersection – 2033 Without Development – peak period analysis

| Approach Lane | PM Peak Period (16:45-17:45) | | |
|---|---|---|---|
| | Degree of Saturation (DoS, threshold of 0.80) | 95% Back of Queue (vehicles) | Average Delay (seconds) |
| South East: Gladstone Mount Larcom Road (SE) | 0.139 | 0.4 | 3.3 |
| North West: Gladstone Mount Larcom Road (NW) | 0.091 | 0.0 | 0.4 |
| South West: Aldoga Road | 0.524 | 3.3 | 15.8 |
| **Intersection** | **0.524** | **3.3** | **6.5** |

The intersection layout is still acceptable to contain the increasing traffic volume at the 2033 base scenario, where the intersection shows an average delay of 6.5 seconds and DoS of 0.524.

The detailed SIDRA outputs for the 2033 Base case can be viewed in Appendix C.

### 6.1.3 2033 Design Horizon Year Intersection Operation Assessment – With Development Traffic

For comparison purposes the 2033 design horizon year with development traffic volume at PM peak period used for this assessment is as follows.

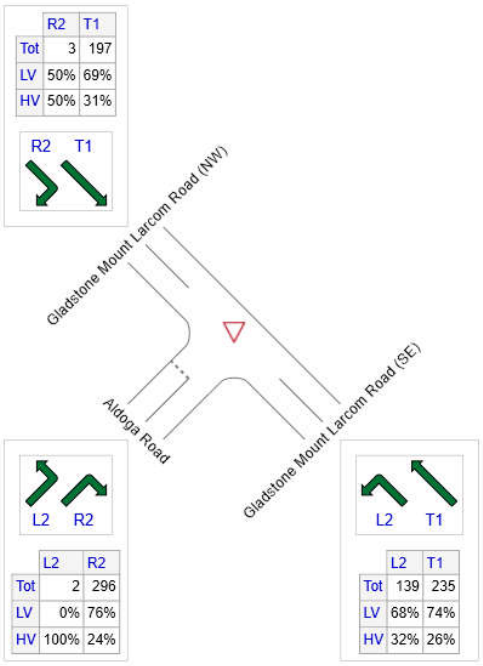



Figure 6-2: 2033 Design Horizon Year Traffic Flows with Development Traffic, PM Peak Period (1645-1745)

Table 6-4: Gladstone Mount Larcom Road / Aldoga Road Intersection 2033 Performance Comparison

| Approach Lane | 2033 Base Case | | | 2033 With Development Traffic | | |
|---|---|---|---|---|---|---|
| | Degree of Saturation (DoS, threshold of 0.80) | 95% Back of Queue (vehicles) | Average Delay (seconds) | Degree of Saturation (DoS, threshold of 0.80) | 95% Back of Queue (vehicles) | Average Delay (seconds) |
| South East: Gladstone Mount Larcom Road (SE) | 0.139 | 0.4 | 3.3 | 0.139 | 0.4 | 3.4 |
| North West: Gladstone Mount Larcom Road (NW) | 0.091 | 0.0 | 0.4 | 0.091 | 0.0 | 0.5 |
| South West: Aldoga Road | 0.524 | 3.3 | 15.8 | 0.607 | 4.4 | 17.2 |
| **Intersection** | **0.524** | **3.3** | **6.5** | **0.607** | **4.4** | **7.4** |

Comparison between 2033 base case and the 2033 with development traffic case are demonstrated in Table 6-4, which shows that this intersection is adequate to contain the traffic volume at 2033, the average delay at this intersection has only 0.9 second growth with the development traffic.

## 6.2 Road safety impact assessment and mitigation

Road safety assessment based on the road environment safety rating is demonstrated in Section 9.3.3 of Guide to Traffic Impact Assessment (TMR, 2018). It is stated that any changes to access configurations, nearby intersections, bus stop locations, cycling facilities, footpaths and so on, once designed, should be assessed to identify if they introduce any additional safety issues. This will be confirmed before a formalised TIA commences.

The road environment safety rating is Medium for Aldoga Rd (AADT<8000, speed between 60 and 70 km/h), and it is suggested that a road safety audit be undertaken to analyse any road side hazards and sight line requirements that might impact on the proposed development.

The following risks might present with the development:

- More left turning traffic on Aldoga Rd, rear end collision may occur with left turn under this high-speed condition.
- More right turn movements on Aldoga Rd into Gladstone Mount Larcom Road, at this high-speed traffic environment, this increases the likelihood and severity of T-bone crashes and rear-end crashes, with frequent use of heavy vehicles at this intersection.
- Right turn lane on Gladstone Mount Larcom Road may result in queuing out into 100kph traffic, which increases the likelihood of rear-end crashes.
- Overtaking at Gladstone Mount Larcom Road may increase the likelihood of crashes.
- Euroa Cct and Aldoga Rd are not developed yet, therefore no safety issues involved, a road safety audit is required for these two roads at the design and construction stage.

However, TMR should notice that these safety risks are in existence before the construction or operation of the adjacent proposed development, which are not direct results of this development.

## 6.3 Access and frontage impact assessment and mitigation

Further investigate the potential of an access to the SCR from the site location, sight lines need consideration.

## 6.4 Intersection delay impact assessment and mitigation

It should be noted that all development generates impacts on road intersections; however, TMR considers that it is unreasonable to require quantifying the impacts on intersection delays unless the development creates an increase in traffic over a particular threshold level. This threshold level applies to all intersections where the development traffic exceeds 5% of the base traffic for any movement in the design peak periods in the year of opening of each stage.

| Scenario | Intersection Delay AM | Intersection Delay PM |
|---|---|---|
| 2023 Without Development Traffic | 0.7 seconds | 5.3 seconds |
| 2023 With Development Traffic | 1.3 seconds | 5.9 seconds |
| % Difference | 85.7% | 11.3% |

Even though the percentage difference of development traffic is significantly higher than 5%, it should be noticed that the overall intersection operates well within capacity in both AM and PM peak periods with the development traffic, the delay only increases by 0.6 seconds for both AM and PM peak period for this intersection. Based on the detailed SIDRA outputs, SMEC suggests that no further upgrades are required for this intersection.

## 6.5 Road link capacity assessment and mitigation

| Section | 2023 Base Traffic | 2023 With Development |
|---|---|---|
| | LOS | LOS |
| Gladstone Mount Larcom Road (SE) | A | A |
| Gladstone Mount Larcom Road (NW) | A | A |

The LOS on both direction of SCR are precited as A at both AM and PM hours, for which mitigation is not required.

## 6.6 Pavement impact assessment and mitigation

- Determine the standard axle repetitions (SAR) for traffic generated by this development on SCR, which is a function of heavy trip generations, trip distribution and route usage.
- Assess all road links on SCR (Gladstone Mount Larcom Rd) where the SARs exceeds 5% of the base traffic in either direction on the link's SARs in the year of 2023.

## 6.7 Transport infrastructure impact assessment and mitigation

- Assess all bridges or culverts within the study area (No prevailing structural integrity issues of transport infrastructure are developed for this development), that might be impacted by the development site.
- No bridges or culverts are observed through a desktop assessment, further investigation might be required.

# 7 Conclusions

SMEC was commissioned to assist the Proponent with a development application for the creation of a new domestic manufacturing hub centred on green industries. Traffic impact approach and potential application requirements of this development are assessed in this report, both construction and operation phase traffic generation were analysed.

SIDRA analysis is conducted by SMEC for three scenarios: 2023 Base, 2023 with Development, 2033 Base and 2033 with Development Traffic, the results for representative PM peak hours are summarised below and detailed outputs can be found in Appendix A, B, C, D.

In conclusion, DoS, queues and average delays are increasing for this intersection, this is mainly caused by the natural traffic growth at the location. The proposed development will not have major impacts on the abutting traffic performance and the 2033 model shows that the Gladstone Mount Larcom Road / Aldoga Road intersection is adequate to support the 2033 traffic volumes, no upgrade will be required for this intersection.

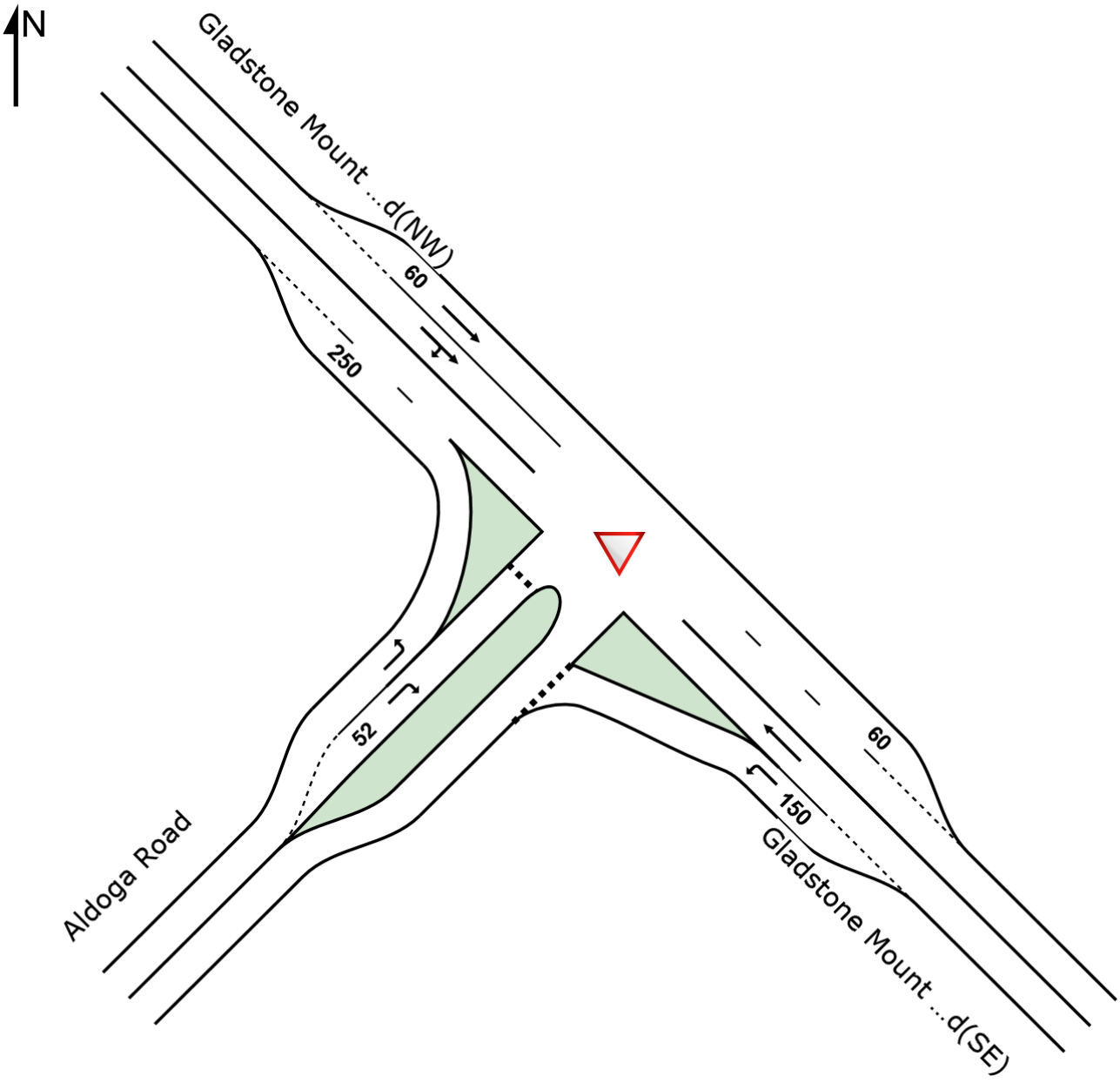
Table 7-1: Comparison of Gladstone Mount Larcom Road / Aldoga Road Intersection Performance

| Approach Lane | Degree of Saturation (DoS, threshold of 0.80) | | | | 95% Back of Queue (vehicles) | | | | Average Delay (seconds) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2023 Base | 2023 With Development | 2033 Base | 2033 With Development | 2023 Base | 2023 With Development | 2033 Base | 2033 With Development | 2023 Base | 2023 With Development | 2033 Base | 2033 With Development |
| South East: Gladstone Mount Larcom Road (SE) | 0.116 | 0.116 | 0.139 | 0.139 | 0.3 | 0.4 | 0.4 | 0.4 | 3.3 | 3.4 | 3.3 | 3.4 |
| North West: Gladstone Mount Larcom Road (NW) | 0.075 | 0.075 | 0.091 | 0.091 | 0.0 | 0.0 | 0.0 | 0.0 | 0.4 | 0.4 | 0.4 | 0.5 |
| South West: Aldoga Road | 0.375 | 0.446 | 0.524 | 0.607 | 2.0 | 2.7 | 3.3 | 4.4 | 12.0 | 12.7 | 15.8 | 17.2 |
| **Intersection** | **0.375** | **0.446** | **0.524** | **0.607** | **2.0** | **2.7** | **3.3** | **4.4** | **5.3** | **5.9** | **6.5** | **7.4** |

# Appendix A SIDRA Analysis – 2023 Base

# SITE LAYOUT

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



# MOVEMENT SUMMARY

## Site: [2011 AM - 12 Year Design Life (Site Folder: General)]

AM Peak
Site Category: Opening Year 2023
Give-Way (Two-Way)
Design Life Analysis (Final Year): Results for 12 years

**Vehicle Movement Performance**

| Mov ID | Turn | INPUT VOLUMES [ Total veh/h | HV ] % | DEMAND FLOWS [ Total veh/h | HV ] % | Deg. Satn v/c | Aver. Delay sec | Level of Service | 95% BACK OF QUEUE [ Veh. veh | Dist ] m | Prop. Que | Effective Stop Rate | Aver. No. Cycles | Aver. Speed km/h |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SouthEast: Gladstone Mount Larcom Road(SE) | | | | | | | | | | | | | | |
| 21 | L2 | 13 | 37.0 | 16 | 37.0 | 0.012 | 9.2 | LOS A | 0.0 | 0.4 | 0.01 | 0.63 | 0.01 | 61.5 |
| 22 | T1 | 142 | 17.0 | 177 | 17.0 | 0.100 | 0.0 | LOS A | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 | 100.0 |
| Approach | | 155 | 18.7 | 194 | 18.7 | 0.100 | 0.8 | LOS A | 0.0 | 0.4 | 0.00 | 0.05 | 0.00 | 95.9 |
| NorthWest: Gladstone Mount Larcom Road(NW) | | | | | | | | | | | | | | |
| 28 | T1 | 153 | 18.0 | 191 | 18.0 | 0.080 | 0.1 | LOS A | 0.0 | 0.1 | 0.00 | 0.00 | 0.00 | 99.8 |
| 29 | R2 | 1 | 0.0 | 1 | 0.0 | 0.080 | 8.5 | LOS A | 0.0 | 0.1 | 0.01 | 0.01 | 0.01 | 54.0 |
| Approach | | 154 | 17.9 | 192 | 17.9 | 0.080 | 0.1 | NA | 0.0 | 0.1 | 0.00 | 0.00 | 0.00 | 99.3 |
| SouthWest: Aldoga Road | | | | | | | | | | | | | | |
| 30 | L2 | 1 | 0.0 | 1 | 0.0 | 0.001 | 5.9 | LOS A | 0.0 | 0.0 | 0.00 | 0.53 | 0.00 | 53.7 |
| 32 | R2 | 7 | 29.0 | 9 | 29.0 | 0.014 | 9.1 | LOS A | 0.1 | 0.5 | 0.49 | 0.64 | 0.49 | 47.7 |
| Approach | | 8 | 25.4 | 10 | 25.4 | 0.014 | 8.7 | LOS A | 0.1 | 0.5 | 0.43 | 0.63 | 0.43 | 48.4 |
| All Vehicles | | 317 | 18.5 | 396 | 18.5 | 0.100 | 0.7 | NA | 0.1 | 0.5 | 0.01 | 0.04 | 0.01 | 95.6 |

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

# MOVEMENT SUMMARY

## Site: [2011 PM - 12 Years Design Life (Site Folder: General)]

PM Peak
Site Category: Opening Year 2023
Give-Way (Two-Way)
Design Life Analysis (Final Year): Results for 12 years

**Vehicle Movement Performance**

| Mov ID | Turn | INPUT VOLUMES [ Total veh/h | HV ] % | DEMAND FLOWS [ Total veh/h | HV ] % | Deg. Satn v/c | Aver. Delay sec | Level of Service | 95% BACK OF QUEUE [ Veh. veh | Dist ] m | Prop. Que | Effective Stop Rate | Aver. No. Cycles | Aver. Speed km/h |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SouthEast: Gladstone Mount Larcom Road (SE) | | | | | | | | | | | | | | |
| 21 | L2 | 86 | 34.0 | 107 | 34.0 | 0.077 | 9.2 | LOS A | 0.3 | 2.9 | 0.03 | 0.62 | 0.03 | 61.8 |
| 22 | T1 | 156 | 26.0 | 195 | 26.0 | 0.116 | 0.0 | LOS A | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 | 99.9 |
| Approach | | 242 | 28.8 | 302 | 28.8 | 0.116 | 3.3 | LOS A | 0.3 | 2.9 | 0.01 | 0.22 | 0.01 | 84.1 |
| NorthWest: Gladstone Mount Larcom Road (NW) | | | | | | | | | | | | | | |
| 28 | T1 | 131 | 31.0 | 164 | 31.0 | 0.075 | 0.2 | LOS A | 0.0 | 0.2 | 0.01 | 0.01 | 0.01 | 99.6 |
| 29 | R2 | 2 | 50.0 | 2 | 50.0 | 0.075 | 10.3 | LOS B | 0.0 | 0.2 | 0.02 | 0.01 | 0.02 | 48.8 |
| Approach | | 133 | 31.3 | 166 | 31.3 | 0.075 | 0.4 | NA | 0.0 | 0.2 | 0.01 | 0.01 | 0.01 | 98.3 |
| SouthWest: Aldoga Road | | | | | | | | | | | | | | |
| 30 | L2 | 1 | 100.0 | 1 | 100.0 | 0.001 | 7.0 | LOS A | 0.0 | 0.0 | 0.00 | 0.48 | 0.00 | 48.9 |
| 32 | R2 | 167 | 27.0 | 209 | 27.0 | 0.375 | 12.1 | LOS B | 2.0 | 17.1 | 0.63 | 0.91 | 0.80 | 45.5 |
| Approach | | 168 | 27.4 | 210 | 27.4 | 0.375 | 12.0 | LOS B | 2.0 | 17.1 | 0.62 | 0.91 | 0.79 | 45.6 |
| All Vehicles | | 543 | 29.0 | 678 | 29.0 | 0.375 | 5.3 | NA | 2.0 | 17.1 | 0.20 | 0.38 | 0.25 | 70.7 |

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

# Appendix B SIDRA Analysis – 2023 with Development Traffic

# MOVEMENT SUMMARY

## Site: [2023 AM With Development Traffic (Site Folder: General)]

AM Peak
Site Category: Opening Year 2023
Give-Way (Two-Way)

**Vehicle Movement Performance**

| Mov ID | Turn | INPUT VOLUMES [ Total veh/h | HV ] % | DEMAND FLOWS [ Total veh/h | HV ] % | Deg. Satn v/c | Aver. Delay sec | Level of Service | 95% BACK OF QUEUE [ Veh. veh | Dist ] m | Prop. Que | Effective Stop Rate | Aver. No. Cycles | Aver. Speed km/h |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SouthEast: Gladstone Mount Larcom Road(SE) | | | | | | | | | | | | | | |
| 21 | L2 | 45 | 17.6 | 45 | 17.6 | 0.030 | 8.8 | LOS A | 0.1 | 1.0 | 0.01 | 0.63 | 0.01 | 64.2 |
| 22 | T1 | 177 | 17.0 | 177 | 17.0 | 0.100 | 0.0 | LOS A | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 | 100.0 |
| Approach | | 222 | 17.1 | 222 | 17.1 | 0.100 | 1.8 | LOS A | 0.1 | 1.0 | 0.00 | 0.13 | 0.00 | 91.4 |
| NorthWest: Gladstone Mount Larcom Road(NW) | | | | | | | | | | | | | | |
| 28 | T1 | 191 | 18.0 | 191 | 18.0 | 0.080 | 0.1 | LOS A | 0.0 | 0.1 | 0.00 | 0.00 | 0.00 | 99.8 |
| 29 | R2 | 1 | 0.0 | 1 | 0.0 | 0.080 | 8.5 | LOS A | 0.0 | 0.1 | 0.01 | 0.00 | 0.01 | 54.0 |
| Approach | | 192 | 17.9 | 192 | 17.9 | 0.080 | 0.1 | NA | 0.0 | 0.1 | 0.00 | 0.00 | 0.00 | 99.5 |
| SouthWest: Aldoga Road | | | | | | | | | | | | | | |
| 30 | L2 | 1 | 0.0 | 1 | 0.0 | 0.001 | 5.9 | LOS A | 0.0 | 0.0 | 0.00 | 0.53 | 0.00 | 53.7 |
| 32 | R2 | 16 | 22.0 | 16 | 22.0 | 0.026 | 9.0 | LOS A | 0.1 | 0.8 | 0.49 | 0.66 | 0.49 | 48.0 |
| Approach | | 17 | 20.7 | 17 | 20.7 | 0.026 | 8.8 | LOS A | 0.1 | 0.8 | 0.46 | 0.66 | 0.46 | 48.3 |
| All Vehicles | | 431 | 17.6 | 431 | 17.6 | 0.100 | 1.3 | NA | 0.1 | 1.0 | 0.02 | 0.09 | 0.02 | 92.2 |

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

# MOVEMENT SUMMARY

## Site: [2023 PM With Development Traffic (Site Folder: General)]

PM Peak
Site Category: Opening Year 2023
Give-Way (Two-Way)

**Vehicle Movement Performance**

| Mov ID | Turn | INPUT VOLUMES [ Total veh/h | HV ] % | DEMAND FLOWS [ Total veh/h | HV ] % | Deg. Satn v/c | Aver. Delay sec | Level of Service | 95% BACK OF QUEUE [ Veh. veh | Dist ] m | Prop. Que | Effective Stop Rate | Aver. No. Cycles | Aver. Speed km/h |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SouthEast: Gladstone Mount Larcom Road (SE) | | | | | | | | | | | | | | |
| 21 | L2 | 117 | 32.0 | 117 | 32.0 | 0.083 | 9.1 | LOS A | 0.4 | 3.1 | 0.02 | 0.63 | 0.02 | 62.1 |
| 22 | T1 | 195 | 26.0 | 195 | 26.0 | 0.116 | 0.0 | LOS A | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 | 99.9 |
| Approach | | 312 | 28.3 | 312 | 28.3 | 0.116 | 3.4 | LOS A | 0.4 | 3.1 | 0.01 | 0.23 | 0.01 | 83.5 |
| NorthWest: Gladstone Mount Larcom Road (NW) | | | | | | | | | | | | | | |
| 28 | T1 | 164 | 31.0 | 164 | 31.0 | 0.075 | 0.2 | LOS A | 0.0 | 0.2 | 0.01 | 0.01 | 0.01 | 99.6 |
| 29 | R2 | 2 | 50.0 | 2 | 50.0 | 0.075 | 10.3 | LOS B | 0.0 | 0.2 | 0.02 | 0.01 | 0.02 | 48.8 |
| Approach | | 166 | 31.2 | 166 | 31.2 | 0.075 | 0.4 | NA | 0.0 | 0.2 | 0.01 | 0.01 | 0.01 | 98.7 |
| SouthWest: Aldoga Road | | | | | | | | | | | | | | |
| 30 | L2 | 1 | 100.0 | 1 | 100.0 | 0.001 | 7.0 | LOS A | 0.0 | 0.0 | 0.00 | 0.48 | 0.00 | 48.9 |
| 32 | R2 | 254 | 23.0 | 254 | 23.0 | 0.446 | 12.7 | LOS B | 2.7 | 22.4 | 0.65 | 0.95 | 0.92 | 45.2 |
| Approach | | 255 | 23.3 | 255 | 23.3 | 0.446 | 12.7 | LOS B | 2.7 | 22.4 | 0.65 | 0.95 | 0.91 | 45.2 |
| All Vehicles | | 733 | 27.2 | 733 | 27.2 | 0.446 | 5.9 | NA | 2.7 | 22.4 | 0.23 | 0.43 | 0.32 | 68.4 |

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

# Appendix C SIDRA Analysis – 2033 Base

# MOVEMENT SUMMARY

## Site: [2011 PM - 22 Years Deisgn Life (Site Folder: General)]

PM Peak
Site Category: Opening Year 2023
Give-Way (Two-Way)
Design Life Analysis (Final Year): Results for 22 years

**Vehicle Movement Performance**

| Mov ID | Turn | INPUT VOLUMES [ Total veh/h | HV ] % | DEMAND FLOWS [ Total veh/h | HV ] % | Deg. Satn v/c | Aver. Delay sec | Level of Service | 95% BACK OF QUEUE [ Veh. veh | Dist ] m | Prop. Que | Effective Stop Rate | Aver. No. Cycles | Aver. Speed km/h |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SouthEast: Gladstone Mount Larcom Road (SE) | | | | | | | | | | | | | | |
| 21 | L2 | 86 | 34.0 | 129 | 34.0 | 0.093 | 9.2 | LOS A | 0.4 | 3.6 | 0.03 | 0.62 | 0.03 | 61.8 |
| 22 | T1 | 156 | 26.0 | 235 | 26.0 | 0.139 | 0.0 | LOS A | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 | 99.9 |
| Approach | | 242 | 28.8 | 364 | 28.8 | 0.139 | 3.3 | LOS A | 0.4 | 3.6 | 0.01 | 0.22 | 0.01 | 84.1 |
| NorthWest: Gladstone Mount Larcom Road (NW) | | | | | | | | | | | | | | |
| 28 | T1 | 131 | 31.0 | 197 | 31.0 | 0.091 | 0.3 | LOS A | 0.0 | 0.3 | 0.02 | 0.01 | 0.02 | 99.5 |
| 29 | R2 | 2 | 50.0 | 3 | 50.0 | 0.091 | 10.7 | LOS B | 0.0 | 0.3 | 0.02 | 0.01 | 0.02 | 48.7 |
| Approach | | 133 | 31.3 | 200 | 31.3 | 0.091 | 0.4 | NA | 0.0 | 0.3 | 0.02 | 0.01 | 0.02 | 98.3 |
| SouthWest: Aldoga Road | | | | | | | | | | | | | | |
| 30 | L2 | 1 | 100.0 | 2 | 100.0 | 0.001 | 7.0 | LOS A | 0.0 | 0.0 | 0.00 | 0.48 | 0.00 | 48.9 |
| 32 | R2 | 167 | 27.0 | 251 | 27.0 | 0.524 | 15.9 | LOS C | 3.3 | 28.3 | 0.72 | 1.03 | 1.14 | 42.9 |
| Approach | | 168 | 27.4 | 253 | 27.4 | 0.524 | 15.8 | LOS C | 3.3 | 28.3 | 0.71 | 1.03 | 1.14 | 43.0 |
| All Vehicles | | 543 | 29.0 | 816 | 29.0 | 0.524 | 6.5 | NA | 3.3 | 28.3 | 0.23 | 0.42 | 0.36 | 69.0 |

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

# Appendix D SIDRA Analysis – 2033 with Development Traffic

# MOVEMENT SUMMARY

## Site: [2033 PM with Development (Site Folder: General)]

PM Peak
Site Category: Opening Year 2023
Give-Way (Two-Way)

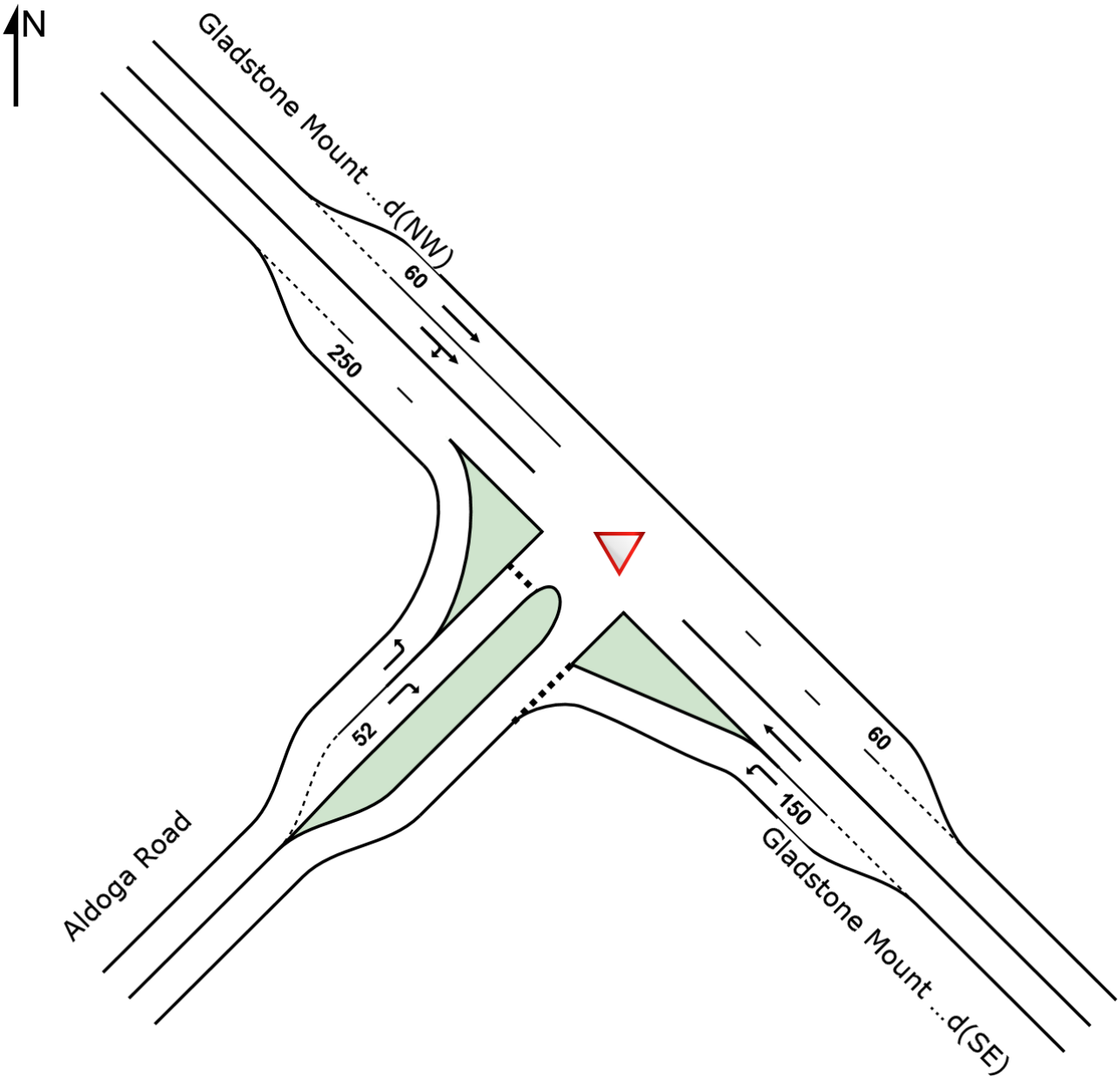
**Vehicle Movement Performance**

| Mov ID | Turn | INPUT VOLUMES [ Total veh/h | HV ] % | DEMAND FLOWS [ Total veh/h | HV ] % | Deg. Satn v/c | Aver. Delay sec | Level of Service | 95% BACK OF QUEUE [ Veh. veh | Dist ] m | Prop. Que | Effective Stop Rate | Aver. No. Cycles | Aver. Speed km/h |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SouthEast: Gladstone Mount Larcom Road (SE) | | | | | | | | | | | | | | |
| 21 | L2 | 139 | 32.0 | 139 | 32.0 | 0.099 | 9.1 | LOS A | 0.4 | 3.8 | 0.03 | 0.62 | 0.03 | 62.1 |
| 22 | T1 | 235 | 26.0 | 235 | 26.0 | 0.139 | 0.0 | LOS A | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 | 99.9 |
| Approach | | 374 | 28.2 | 374 | 28.2 | 0.139 | 3.4 | LOS A | 0.4 | 3.8 | 0.01 | 0.23 | 0.01 | 83.6 |
| NorthWest: Gladstone Mount Larcom Road (NW) | | | | | | | | | | | | | | |
| 28 | T1 | 197 | 31.0 | 197 | 31.0 | 0.091 | 0.3 | LOS A | 0.0 | 0.3 | 0.02 | 0.01 | 0.02 | 99.5 |
| 29 | R2 | 3 | 50.0 | 3 | 50.0 | 0.091 | 10.7 | LOS B | 0.0 | 0.3 | 0.02 | 0.01 | 0.02 | 48.7 |
| Approach | | 200 | 31.3 | 200 | 31.3 | 0.091 | 0.5 | NA | 0.0 | 0.3 | 0.02 | 0.01 | 0.02 | 98.3 |
| SouthWest: Aldoga Road | | | | | | | | | | | | | | |
| 30 | L2 | 2 | 100.0 | 2 | 100.0 | 0.002 | 7.0 | LOS A | 0.0 | 0.0 | 0.00 | 0.48 | 0.00 | 48.9 |
| 32 | R2 | 296 | 24.0 | 296 | 24.0 | 0.607 | 17.2 | LOS C | 4.4 | 36.9 | 0.75 | 1.11 | 1.36 | 42.2 |
| Approach | | 298 | 24.5 | 298 | 24.5 | 0.607 | 17.2 | LOS C | 4.4 | 36.9 | 0.75 | 1.10 | 1.35 | 42.2 |
| All Vehicles | | 872 | 27.7 | 872 | 27.7 | 0.607 | 7.4 | NA | 4.4 | 36.9 | 0.26 | 0.48 | 0.47 | 66.6 |

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

# SITE LAYOUT

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



# MOVEMENT SUMMARY

## Site: [2011 AM - 12 Year Design Life (Site Folder: General)]

AM Peak
Site Category: Opening Year 2023
Give-Way (Two-Way)
Design Life Analysis (Final Year): Results for 12 years

**Vehicle Movement Performance**

| Mov ID | Turn | INPUT VOLUMES [ Total veh/h | HV ] % | DEMAND FLOWS [ Total veh/h | HV ] % | Deg. Satn v/c | Aver. Delay sec | Level of Service | 95% BACK OF QUEUE [ Veh. veh | Dist ] m | Prop. Que | Effective Stop Rate | Aver. No. Cycles | Aver. Speed km/h |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SouthEast: Gladstone Mount Larcom Road(SE) | | | | | | | | | | | | | | |
| 21 | L2 | 13 | 37.0 | 16 | 37.0 | 0.012 | 9.2 | LOS A | 0.0 | 0.4 | 0.01 | 0.63 | 0.01 | 61.5 |
| 22 | T1 | 142 | 17.0 | 177 | 17.0 | 0.100 | 0.0 | LOS A | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 | 100.0 |
| Approach | | 155 | 18.7 | 194 | 18.7 | 0.100 | 0.8 | LOS A | 0.0 | 0.4 | 0.00 | 0.05 | 0.00 | 95.9 |
| NorthWest: Gladstone Mount Larcom Road(NW) | | | | | | | | | | | | | | |
| 28 | T1 | 153 | 18.0 | 191 | 18.0 | 0.080 | 0.1 | LOS A | 0.0 | 0.1 | 0.00 | 0.00 | 0.00 | 99.8 |
| 29 | R2 | 1 | 0.0 | 1 | 0.0 | 0.080 | 8.5 | LOS A | 0.0 | 0.1 | 0.01 | 0.01 | 0.01 | 54.0 |
| Approach | | 154 | 17.9 | 192 | 17.9 | 0.080 | 0.1 | NA | 0.0 | 0.1 | 0.00 | 0.00 | 0.00 | 99.3 |
| SouthWest: Aldoga Road | | | | | | | | | | | | | | |
| 30 | L2 | 1 | 0.0 | 1 | 0.0 | 0.001 | 5.9 | LOS A | 0.0 | 0.0 | 0.00 | 0.53 | 0.00 | 53.7 |
| 32 | R2 | 7 | 29.0 | 9 | 29.0 | 0.014 | 9.1 | LOS A | 0.1 | 0.5 | 0.49 | 0.64 | 0.49 | 47.7 |
| Approach | | 8 | 25.4 | 10 | 25.4 | 0.014 | 8.7 | LOS A | 0.1 | 0.5 | 0.43 | 0.63 | 0.43 | 48.4 |
| All Vehicles | | 317 | 18.5 | 396 | 18.5 | 0.100 | 0.7 | NA | 0.1 | 0.5 | 0.01 | 0.04 | 0.01 | 95.6 |

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

# MOVEMENT SUMMARY

## Site: [2011 PM - 12 Years Design Life (Site Folder: General)]

PM Peak
Site Category: Opening Year 2023
Give-Way (Two-Way)
Design Life Analysis (Final Year): Results for 12 years

**Vehicle Movement Performance**

| Mov ID | Turn | INPUT VOLUMES [ Total veh/h | HV ] % | DEMAND FLOWS [ Total veh/h | HV ] % | Deg. Satn v/c | Aver. Delay sec | Level of Service | 95% BACK OF QUEUE [ Veh. veh | Dist ] m | Prop. Que | Effective Stop Rate | Aver. No. Cycles | Aver. Speed km/h |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SouthEast: Gladstone Mount Larcom Road (SE) | | | | | | | | | | | | | | |
| 21 | L2 | 86 | 34.0 | 107 | 34.0 | 0.077 | 9.2 | LOS A | 0.3 | 2.9 | 0.03 | 0.62 | 0.03 | 61.8 |
| 22 | T1 | 156 | 26.0 | 195 | 26.0 | 0.116 | 0.0 | LOS A | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 | 99.9 |
| Approach | | 242 | 28.8 | 302 | 28.8 | 0.116 | 3.3 | LOS A | 0.3 | 2.9 | 0.01 | 0.22 | 0.01 | 84.1 |
| NorthWest: Gladstone Mount Larcom Road (NW) | | | | | | | | | | | | | | |
| 28 | T1 | 131 | 31.0 | 164 | 31.0 | 0.075 | 0.2 | LOS A | 0.0 | 0.2 | 0.01 | 0.01 | 0.01 | 99.6 |
| 29 | R2 | 2 | 50.0 | 2 | 50.0 | 0.075 | 10.3 | LOS B | 0.0 | 0.2 | 0.02 | 0.01 | 0.02 | 48.8 |
| Approach | | 133 | 31.3 | 166 | 31.3 | 0.075 | 0.4 | NA | 0.0 | 0.2 | 0.01 | 0.01 | 0.01 | 98.3 |
| SouthWest: Aldoga Road | | | | | | | | | | | | | | |
| 30 | L2 | 1 | 100.0 | 1 | 100.0 | 0.001 | 7.0 | LOS A | 0.0 | 0.0 | 0.00 | 0.48 | 0.00 | 48.9 |
| 32 | R2 | 167 | 27.0 | 209 | 27.0 | 0.375 | 12.1 | LOS B | 2.0 | 17.1 | 0.63 | 0.91 | 0.80 | 45.5 |
| Approach | | 168 | 27.4 | 210 | 27.4 | 0.375 | 12.0 | LOS B | 2.0 | 17.1 | 0.62 | 0.91 | 0.79 | 45.6 |
| All Vehicles | | 543 | 29.0 | 678 | 29.0 | 0.375 | 5.3 | NA | 2.0 | 17.1 | 0.20 | 0.38 | 0.25 | 70.7 |

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

# MOVEMENT SUMMARY

## Site: [2023 AM With Development Traffic (Site Folder: General)]

AM Peak
Site Category: Opening Year 2023
Give-Way (Two-Way)

**Vehicle Movement Performance**

| Mov ID | Turn | INPUT VOLUMES [ Total veh/h | HV ] % | DEMAND FLOWS [ Total veh/h | HV ] % | Deg. Satn v/c | Aver. Delay sec | Level of Service | 95% BACK OF QUEUE [ Veh. veh | Dist ] m | Prop. Que | Effective Stop Rate | Aver. No. Cycles | Aver. Speed km/h |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SouthEast: Gladstone Mount Larcom Road(SE) | | | | | | | | | | | | | | |
| 21 | L2 | 45 | 17.6 | 45 | 17.6 | 0.030 | 8.8 | LOS A | 0.1 | 1.0 | 0.01 | 0.63 | 0.01 | 64.2 |
| 22 | T1 | 177 | 17.0 | 177 | 17.0 | 0.100 | 0.0 | LOS A | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 | 100.0 |
| Approach | | 222 | 17.1 | 222 | 17.1 | 0.100 | 1.8 | LOS A | 0.1 | 1.0 | 0.00 | 0.13 | 0.00 | 91.4 |
| NorthWest: Gladstone Mount Larcom Road(NW) | | | | | | | | | | | | | | |
| 28 | T1 | 191 | 18.0 | 191 | 18.0 | 0.080 | 0.1 | LOS A | 0.0 | 0.1 | 0.00 | 0.00 | 0.00 | 99.8 |
| 29 | R2 | 1 | 0.0 | 1 | 0.0 | 0.080 | 8.5 | LOS A | 0.0 | 0.1 | 0.01 | 0.00 | 0.01 | 54.0 |
| Approach | | 192 | 17.9 | 192 | 17.9 | 0.080 | 0.1 | NA | 0.0 | 0.1 | 0.00 | 0.00 | 0.00 | 99.5 |
| SouthWest: Aldoga Road | | | | | | | | | | | | | | |
| 30 | L2 | 1 | 0.0 | 1 | 0.0 | 0.001 | 5.9 | LOS A | 0.0 | 0.0 | 0.00 | 0.53 | 0.00 | 53.7 |
| 32 | R2 | 16 | 22.0 | 16 | 22.0 | 0.026 | 9.0 | LOS A | 0.1 | 0.8 | 0.49 | 0.66 | 0.49 | 48.0 |
| Approach | | 17 | 20.7 | 17 | 20.7 | 0.026 | 8.8 | LOS A | 0.1 | 0.8 | 0.46 | 0.66 | 0.46 | 48.3 |
| All Vehicles | | 431 | 17.6 | 431 | 17.6 | 0.100 | 1.3 | NA | 0.1 | 1.0 | 0.02 | 0.09 | 0.02 | 92.2 |

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

# MOVEMENT SUMMARY

## Site: [2023 PM With Development Traffic (Site Folder: General)]

PM Peak
Site Category: Opening Year 2023
Give-Way (Two-Way)

**Vehicle Movement Performance**

| Mov ID | Turn | INPUT VOLUMES [ Total veh/h | HV ] % | DEMAND FLOWS [ Total veh/h | HV ] % | Deg. Satn v/c | Aver. Delay sec | Level of Service | 95% BACK OF QUEUE [ Veh. veh | Dist ] m | Prop. Que | Effective Stop Rate | Aver. No. Cycles | Aver. Speed km/h |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SouthEast: Gladstone Mount Larcom Road (SE) | | | | | | | | | | | | | | |
| 21 | L2 | 117 | 32.0 | 117 | 32.0 | 0.083 | 9.1 | LOS A | 0.4 | 3.1 | 0.02 | 0.63 | 0.02 | 62.1 |
| 22 | T1 | 195 | 26.0 | 195 | 26.0 | 0.116 | 0.0 | LOS A | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 | 99.9 |
| Approach | | 312 | 28.3 | 312 | 28.3 | 0.116 | 3.4 | LOS A | 0.4 | 3.1 | 0.01 | 0.23 | 0.01 | 83.5 |
| NorthWest: Gladstone Mount Larcom Road (NW) | | | | | | | | | | | | | | |
| 28 | T1 | 164 | 31.0 | 164 | 31.0 | 0.075 | 0.2 | LOS A | 0.0 | 0.2 | 0.01 | 0.01 | 0.01 | 99.6 |
| 29 | R2 | 2 | 50.0 | 2 | 50.0 | 0.075 | 10.3 | LOS B | 0.0 | 0.2 | 0.02 | 0.01 | 0.02 | 48.8 |
| Approach | | 166 | 31.2 | 166 | 31.2 | 0.075 | 0.4 | NA | 0.0 | 0.2 | 0.01 | 0.01 | 0.01 | 98.7 |
| SouthWest: Aldoga Road | | | | | | | | | | | | | | |
| 30 | L2 | 1 | 100.0 | 1 | 100.0 | 0.001 | 7.0 | LOS A | 0.0 | 0.0 | 0.00 | 0.48 | 0.00 | 48.9 |
| 32 | R2 | 254 | 23.0 | 254 | 23.0 | 0.446 | 12.7 | LOS B | 2.7 | 22.4 | 0.65 | 0.95 | 0.92 | 45.2 |
| Approach | | 255 | 23.3 | 255 | 23.3 | 0.446 | 12.7 | LOS B | 2.7 | 22.4 | 0.65 | 0.95 | 0.91 | 45.2 |
| All Vehicles | | 733 | 27.2 | 733 | 27.2 | 0.446 | 5.9 | NA | 2.7 | 22.4 | 0.23 | 0.43 | 0.32 | 68.4 |

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

# MOVEMENT SUMMARY

## Site: [2011 PM - 22 Years Deisgn Life (Site Folder: General)]

PM Peak
Site Category: Opening Year 2023
Give-Way (Two-Way)
Design Life Analysis (Final Year): Results for 22 years

**Vehicle Movement Performance**

| Mov ID | Turn | INPUT VOLUMES [ Total veh/h | HV ] % | DEMAND FLOWS [ Total veh/h | HV ] % | Deg. Satn v/c | Aver. Delay sec | Level of Service | 95% BACK OF QUEUE [ Veh. veh | Dist ] m | Prop. Que | Effective Stop Rate | Aver. No. Cycles | Aver. Speed km/h |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SouthEast: Gladstone Mount Larcom Road (SE) | | | | | | | | | | | | | | |
| 21 | L2 | 86 | 34.0 | 129 | 34.0 | 0.093 | 9.2 | LOS A | 0.4 | 3.6 | 0.03 | 0.62 | 0.03 | 61.8 |
| 22 | T1 | 156 | 26.0 | 235 | 26.0 | 0.139 | 0.0 | LOS A | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 | 99.9 |
| Approach | | 242 | 28.8 | 364 | 28.8 | 0.139 | 3.3 | LOS A | 0.4 | 3.6 | 0.01 | 0.22 | 0.01 | 84.1 |
| NorthWest: Gladstone Mount Larcom Road (NW) | | | | | | | | | | | | | | |
| 28 | T1 | 131 | 31.0 | 197 | 31.0 | 0.091 | 0.3 | LOS A | 0.0 | 0.3 | 0.02 | 0.01 | 0.02 | 99.5 |
| 29 | R2 | 2 | 50.0 | 3 | 50.0 | 0.091 | 10.7 | LOS B | 0.0 | 0.3 | 0.02 | 0.01 | 0.02 | 48.7 |
| Approach | | 133 | 31.3 | 200 | 31.3 | 0.091 | 0.4 | NA | 0.0 | 0.3 | 0.02 | 0.01 | 0.02 | 98.3 |
| SouthWest: Aldoga Road | | | | | | | | | | | | | | |
| 30 | L2 | 1 | 100.0 | 2 | 100.0 | 0.001 | 7.0 | LOS A | 0.0 | 0.0 | 0.00 | 0.48 | 0.00 | 48.9 |
| 32 | R2 | 167 | 27.0 | 251 | 27.0 | 0.524 | 15.9 | LOS C | 3.3 | 28.3 | 0.72 | 1.03 | 1.14 | 42.9 |
| Approach | | 168 | 27.4 | 253 | 27.4 | 0.524 | 15.8 | LOS C | 3.3 | 28.3 | 0.71 | 1.03 | 1.14 | 43.0 |
| All Vehicles | | 543 | 29.0 | 816 | 29.0 | 0.524 | 6.5 | NA | 3.3 | 28.3 | 0.23 | 0.42 | 0.36 | 69.0 |

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

# MOVEMENT SUMMARY

## Site: [2033 PM with Development (Site Folder: General)]

PM Peak
Site Category: Opening Year 2023
Give-Way (Two-Way)

**Vehicle Movement Performance**

| Mov ID | Turn | INPUT VOLUMES [ Total veh/h | HV ] % | DEMAND FLOWS [ Total veh/h | HV ] % | Deg. Satn v/c | Aver. Delay sec | Level of Service | 95% BACK OF QUEUE [ Veh. veh | Dist ] m | Prop. Que | Effective Stop Rate | Aver. No. Cycles | Aver. Speed km/h |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SouthEast: Gladstone Mount Larcom Road (SE) | | | | | | | | | | | | | | |
| 21 | L2 | 139 | 32.0 | 139 | 32.0 | 0.099 | 9.1 | LOS A | 0.4 | 3.8 | 0.03 | 0.62 | 0.03 | 62.1 |
| 22 | T1 | 235 | 26.0 | 235 | 26.0 | 0.139 | 0.0 | LOS A | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 | 99.9 |
| Approach | | 374 | 28.2 | 374 | 28.2 | 0.139 | 3.4 | LOS A | 0.4 | 3.8 | 0.01 | 0.23 | 0.01 | 83.6 |
| NorthWest: Gladstone Mount Larcom Road (NW) | | | | | | | | | | | | | | |
| 28 | T1 | 197 | 31.0 | 197 | 31.0 | 0.091 | 0.3 | LOS A | 0.0 | 0.3 | 0.02 | 0.01 | 0.02 | 99.5 |
| 29 | R2 | 3 | 50.0 | 3 | 50.0 | 0.091 | 10.7 | LOS B | 0.0 | 0.3 | 0.02 | 0.01 | 0.02 | 48.7 |
| Approach | | 200 | 31.3 | 200 | 31.3 | 0.091 | 0.5 | NA | 0.0 | 0.3 | 0.02 | 0.01 | 0.02 | 98.3 |
| SouthWest: Aldoga Road | | | | | | | | | | | | | | |
| 30 | L2 | 2 | 100.0 | 2 | 100.0 | 0.002 | 7.0 | LOS A | 0.0 | 0.0 | 0.00 | 0.48 | 0.00 | 48.9 |
| 32 | R2 | 296 | 24.0 | 296 | 24.0 | 0.607 | 17.2 | LOS C | 4.4 | 36.9 | 0.75 | 1.11 | 1.36 | 42.2 |
| Approach | | 298 | 24.5 | 298 | 24.5 | 0.607 | 17.2 | LOS C | 4.4 | 36.9 | 0.75 | 1.10 | 1.35 | 42.2 |
| All Vehicles | | 872 | 27.7 | 872 | 27.7 | 0.607 | 7.4 | NA | 4.4 | 36.9 | 0.26 | 0.48 | 0.47 | 66.6 |

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

Appendix J

# Technical Note Preliminary Vent Design Review

PAP SOLUTIONS PTY LTD

# TECHNICAL NOTE

# PRELIMINARY VENT DESIGN REVIEW

PREPARED FOR:

FORTESCUE FUTURE INDUSTRIES

BG&E RESOURCES

| Document Number: | Rev |
|---|---|
| **FFI2301-PRO-TN-001** | **A** |

Issue Date: 19th December 2023

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# TECHNICAL NOTE – PRELIMINARY VENT DESIGN REVIEW

## Disclaimer & Confidentiality



| | | | | | | |
|---|---|---|---|---|---|---|
| | | | | | | |
| | | | | | | |
| | | | | | | |
| A | 19-12-23 | Issue for Review | AT | MB | MP | |
| REV | DATE | DESCRIPTION | ORIGINATOR | REVIEWER | APPROVAL | BG&E |

## REVISION HISTORY

| REV | SECTION | DESCRIPTION |
|---|---|---|
| A | - | Initial issue |

## HOLDS TO BE RESOLVED

| Hold | Location and Explanation |
|---|---|
| | |

# TABLE OF CONTENTS

# ABBREVIATIONS

**Table 0.1 – Abbreviations**

| Term | Meaning |
|---|---|
| **BOP** | Balance of Plant |
| **DI** | Deionised |
| **DN** | Nominal Diameter |
| **FFI** | Fortesque Future Industries |
| **FTS** | Functional Test Station |
| **GEM** | Green Energy Manufacturing |
| **L/D** | Length to Diameter |
| **LEL** | Lower Explosive Limit |
| **PEM** | Proton Exchange Membrane |
| **SME** | Subject Matter Expert |
| **SRV** | Safety Relief Valve |

# 1 INTRODUCTION

## 1.1 BACKGROUND

Fortescue Future Industries (FFI) is building an automated manufacturing facility for 1 MW Proton Exchange Membrane (PEM) electrolysers at Aldoga near Gladstone. This is known as the Green Energy Manufacturing (GEM) Facility. The manufacturing facility shall receive electrolyser components and assemble them using automated robotics to produce a completed electrolyser. Adjacent to the automated manufacturing facility for the PEM electrolysers, FFI plans to expedite the local fabrication of a single automated assembly gantry module prototype.

As a first stage of this project, one assembly line with capacity to manufacture 2000, 1 MW PEM electrolysers, per year shall be installed. After assembly, each electrolyser needs to be tested functionally to confirm the electrolyser generates hydrogen at the specified output rate, and pressure, within the rated temperature, and with no system warnings or alarms tested prior to shipment.

For the first stage of this project four 1 MW PEM electrolyser Function Test Stations (FTS) shall be supplied by Greenlight Innovation with capacity to test 2000 1 MW PEM electrolysers per year. These FTSs vent the produced hydrogen and oxygen gases from electrolysis to atmosphere.

## 1.2 SCOPE

BG&E Resources has been contracted by FFI to design the Balance of Plant (BOP). This involves the supply of cooling water and deionised (DI) water, as well as the venting of produced oxygen and hydrogen. The vent lines discharge outdoors above the FTSs.

The vent lines will connect to the FTS and provide outlets for the produced hydrogen and oxygen from the electrolyser. Hydrogen is produced from the cathode and oxygen is produced from the anode. The vents are designed for gas from normal operation and for relief scenarios.

Pap Solutions has been approached by BG&E to provide Subject Matter Expert (SME) knowledge on the preliminary vent design. The technical note will review the proposed vent sizes given by BG&E to ensure the pressure drop is appropriate. Consequence modelling will be conducted to determine the 4.73 $kW/m^2$ thermal radiation contours, and the 50% Lower Explosive Limit (LEL) contours It will also assess compliance against the relevant standards to ensure safety.

## 1.3 REFERENCE DOCUMENTS

The following have been used as references and should be read in conjunction with this document.

**Table 1.1 – Reference Documents**

| Ref | Document Number | Title/Description |
|---|---|---|
| 1. | AS 22734:2020 | Hydrogen generators using water electrolysis - Industrial, commercial, and residential applications |
| 2. | SA TR 15916:2015 | Basic considerations for the safety of hydrogen systems |
| 3. | EIGA Doc 211/17 | EIGA Hydrogen Vent Systems for Customer Applications |
| 4. | CGA G-5.5-2021 | Standard for Hydrogen Vent Systems |
| 5. | NFPA 2-2020 | Hydrogen Technologies Code |
| 6. | API 521-2020 | Pressure-relieving and Depressuring Systems |
| 7. | - | “22036.03 Vent Piping Details” |
| 8. | - | “G22-5120_Greenlight Operating and Design Parameters 230724” |
| 9. | DOI:10.1016/j.ijhydene.2020.07.033 | Experimental study of the lower flammability limits of H2/O2/CO2 mixture |

# 2 VENT LINE SIZING

All vent lines and stacks in the BOP will be sized in this report in accordance with AS 22734. In addition to this, CGA G-5.5, EIGA Doc 211/17 and API 521-2020 will be used for guidance.

## 2.1 VENT OPERATING AND DESIGN PARAMETERS

The operating and design parameters for each of the vents were provided by BG&E and have been summarised in Table 2.1 and Table 2.2. These will be used as inputs for the line sizing calculations. The flowrates provided are peak flowrates during relief and are not representative of typical operations.

**Table 2.1 - Vent hydraulic parameters [Ref 7]**

| Interface Point | Pipe Description | Pipe Size (DN) | Schedule | Length (m) | Elevation change (m) | Fittings |
|---|---|---|---|---|---|---|
| A | $H_2$ Vent Tank | 25 | 40S | 22.9 | 14 | • x2 90° elbows<br>• x2 45° elbows |
| 4 | Product $O_2$ vent | 50 | 10S | 23.3 | 14 | • x1 expander<br>• x4 90° elbows |
| 5 | Anode $O_2$ vent | 50 | 10S | 22.5 | 14 | • x3 90° elbows<br>• x2 45° elbows |
| 6 | Cathode $H_2$ high pressure SRV vent | 50 | 10S | 19.4 | 14 | • x3 90° elbows<br>• x2 45° elbows |
| 7 | Product $H_2$ Vent | 50 | 10S | 18.6 | 14 | • x1 expander<br>• x3 90° elbows |
| 8 | Cathode $H_2$ low pressure SRV vent | 50 | 10S | 15.7 | 14 | • x1 expander<br>• x1 90° elbow |
| 9 | Cathode $H_2$ vent | 50 | 10S | 11.0 | 14 | • x3 90° elbows<br>• x2 45° elbows |
| 10 | Anode $O_2$ relief vent | 100 | 10S | 23.2 | 14 | • x1 expander<br>• x4 90° elbows |

**Table 2.2 - Vent operating parameters [Ref 8]**

| Interface Point | Pipe Description | Gas Flowrate (kg/h) | Water Flowrate (kg/h) | Temperature (°C) | Max Back pressure (kPag) |
|---|---|---|---|---|---|
| A | $H_2$ Vent Tank | 0.00283 [1] | 0.000420 [2] | 15 | 20 |
| 4 | Product $O_2$ vent | 207 | - | 15 | 20 |
| 5 | Anode $O_2$ vent | 286 | 180 [3] | 15 | 20 |
| 6 | Cathode $H_2$ high pressure SRV vent | 22.1 | 1200 | 80 | 20 |
| 7 | Product $H_2$ Vent | 23.4 | - | 15 | 20 |
| 8 | Cathode $H_2$ low pressure SRV vent | 39.4 | 253 [2] | 80 | 20 |
| 9 | Cathode $H_2$ vent | 22.5 | 180 [3] | 15 | 20 |
| 10 | Anode $O_2$ relief vent | 281 [4] | 1205 [4] | 150 | 20 |

[1]The hydrogen flowrate from the H2 vent (break) tank is almost negligible. Hydrogen through this vent line comes entirely from hydrogen saturated in the water entering the break tank. The break tank operates at atmospheric pressure and has a peak water flowrate of 30 L/min [Ref 8]. If all the saturated hydrogen comes out of solution and flows into the vent line, this totals 2.02 $Nm^3/h$.

[2]The water flowrate was calculated assuming saturated hydrogen [Ref 8].

[3]The water flowrate was estimated at 3 LPM [Ref 8].

[4]Design rates of 751 kg/h water and 175 kg/h oxygen were given. These were scaled up to the maximum relieving rate of 1485 kg/h.

CGA G-5.5 states that the vent stacks should be able to handle the flow of vents from all sources without over pressurisation of any part of the vent stack. For vent lines that are connected to a common stack, the maximum flowrate should be calculated as the sum of the individual flowrates from each of the interconnecting vent lines. However, per the preliminary concept designs provided, the vents do not connect to a common stack.

## 2.2 VENT LINE MODELLING

Each of the individual vents and the flare stack were modelled on UniSim Design R492 using the data in Table 2.1 and Table 2.2. The outlet pressure was set to atmospheric, and the pressure drop across the vent was calculated using pipe segments.

### 2.2.1 PRESSURE DROP, VELOCITY AND BACKPRESSURE

Table 2.3 below shows the velocity, backpressure (pressure drop) and relief device set pressure for the BOP vent lines.

**Table 2.3 - Piping Pressure Drop and Velocities**

| Interface Point | Pipe Description | Velocity (m/s) | Pressure Drop (kPa) | Relief Device Set Pressure (kPag) |
|---|---|---|---|---|
| A | $H_2$ Vent Tank | 0.0168 | 0.0134 | - |
| 4 | Product $O_2$ vent | 17.5 | 2.79 | - |
| 5 | Anode $O_2$ vent | 22.2 | 13.8 | - |
| 6 | Cathode $H_2$ high pressure SRV vent | 36.0 | 51.9 | 4500 |
| 7 | Product $H_2$ Vent | 32.8 | 0.528 | - |
| 8 | Cathode $H_2$ low pressure SRV vent | 102.3 | 12.27 | 414 |
| 9 | Cathode $H_2$ vent | 37.34 | 0.369 | - |
| 10 | Anode $O_2$ relief vent | 72.1 | 9.71 | 414 |

The flowrates used in these velocity calculations are well in excess of the operating flowrates, with most flowrates being for relief cases.

The pressure drop is reasonable for all vent lines, with the exception of cathode $H_2$ high pressure SRV vent. Here, the pressure drop exceeds the maximum backpressure, thus flow will be impossible given the stated conditions. However, this vent line will only be used in the pressure relief case. In this scenario, the pressure upstream will have increased significantly thus the maximum backpressure is not appropriate.

As outlined in CGA G-5.5-2021 Clause 6.2.1, the backpressure of the vent system piping should not exceed 10% of the relief device set pressure. This is the case for all vent lines.

# 3 VENT DISCHARGE CONSEQUENCE MODELLING

The dispersion and radiation contours were modelled for the hydrogen vents. Oxygen was not modelled as there are no significant consequences.

## 3.1 MODEL PARAMETERS

The consequence models were developed in Phase v8.9. The default values provided in Phast will be used in this assessment unless otherwise specified.

The discharge was assumed to be horizontal for conservatism. Per guidance from CGA G-5.5-2021, vents shall not divert gas downwards towards grade. The discharge point was selected at 14 m above grade per a preliminary concept drawing from BG&E. Water was not included in the discharge material as omitting it gave more conservative results.

## 3.2 CONSEQUENCE LEVELS

For this assessment, a thermal radiation limit of 4.73 kW/m$^2$ for personnel has been used. API 521:2020 describes this limit as the “maximum radiant heat intensity in areas where emergency action lasting 2 min to 3 min can be required by personnel without shielding but with appropriate clothing”. The dispersion concentration will be taken to 50% of LEL.

## 3.3 METEOROLOGICAL CONDITIONS

The environmental and meteorological conditions used for the model are shown in Table 3.1 below.

**Table 3.1 – Environmental and Meteorological Data**

| Condition | Values |
|---|---|
| Ambient temperature (°C) | 15 |
| Wind speed (m/s) and Pasquil stability | 1.5F, 1.5D and 5D |

Weather conditions 1.5F, 1.5D and 5D were selected as default in Phast. The selection was not based on review of local conditions. 1.5F/D is considered representative of low wind speeds, and 5D for high wind speeds. Phast is unable to accurately model wind speeds below 1.5 m/s and so the 1.5F weather condition is the closest to a ‘no wind’ scenario.

## 3.4 CONSEQUENCE RESULTS

The dispersion and radiation results are given below, and the graphs can be seen in Appendix A.

The vents were modelled as standalone jet fires for the radiation modelling. The mass discharge rate was set at the flowrate in Table 2.3, and the jet velocity was set at the velocity in Table 2.3.

**Table 3.2 – Thermal Radiation Contour Results**

| Interface Point | Vent Description | Release Rate (kg/hr) | Horizontal extent of 4.73 kW/m$^2$ from vent (m) | Vertical extent of 4.73 kW/m$^2$ contour below vent (m) |
|---|---|---|---|---|
| A | $H_2$ vent tank[1] | 0.00283 | - | - |
| 6 | Cathode $H_2$ high pressure SRV vent | 22.1 | 4.35 | 1.51 |
| 7 | Product $H_2$ vent | 23.4 | 4.45 | 1.54 |
| 8 | Cathode $H_2$ low pressure SRV vent | 39.4 | 5.11 | 1.98 |
| 9 | Cathode $H_2$ vent | 22.5 | 4.35 | 1.52 |

[1]Phast was unable to calculate the dispersion and radiation contours at this low flowrate as it is below the margin of error. It is safe to assume that no contour is created at these low flowrates.

The vents were modelled as leaks from pressure vessels for the dispersion modelling. The pressure was varied until the flowrate calculated by Phast matched the flowrate in Table 2.3.

**Table 3.3 – Dispersion Contour Results**

| Interface Point | Vent Description | Release Rate (kg/hr) | Horizontal extent of 50% LEL from vent (m) | Vertical extent of 50% LEL below vent (m) |
|---|---|---|---|---|
| A | $H_2$ vent tank[1] | 0.00283 | - | - |
| 6 | Cathode $H_2$ high pressure SRV vent | 22.1 | 7.02 | 0.16 |
| 7 | Product $H_2$ vent | 23.4 | 7.14 | 0.16 |
| 8 | Cathode $H_2$ low pressure SRV vent | 39.4 | 8.48 | 0.22 |
| 9 | Cathode $H_2$ vent | 22.5 | 7.06 | 0.16 |

[1]Phast was unable to calculate the dispersion and radiation contours at this low flowrate as it is below the margin of error. It is safe to assume that no contour is created at these low flowrates.

As shown in the table above, the maximum vertical extent of the 4.73 kW/m$^2$ is 2 m below the outlet of the vent. The vent locations are not finalised, however are expected to be approximately 7 m from grade, per client correspondence. This will allow operators to work safely outside of the 4.73 kW/m$^2$ contours.

The maximum horizontal extent of the 50% LEL extends 8.5 m downwind of the vent outlet. The maximum vertical extent of the 50% LEL below the vent outlet is 0.22 m.

The effects of hydrogen in an oxygen-enriched atmosphere are not considered to be significant. The LEL of hydrogen does not change in a pure oxygen atmosphere [Ref 9] and there is adequate space on-site to separate the hydrogen and oxygen vents.

# 4 SAFE VENTING PRACTICES

## 4.1 RELEVANT STANDARDS

### 4.1.1 OXYGEN VENTING

Additional risk mitigation measures are not required for venting of the oxygen lines. The oxygen is to be vented outdoors above the FTS, directed away from the hydrogen vents. As the oxygen is not vented indoors or to an enclosure, it will not create a hazardous condition per Clause 4.1.5 of AS 22734:2020.

### 4.1.2 HYDROGEN VENTING

Hydrogen is highly flammable, therefore additional considerations must be made to ensure safety during hydrogen venting. AS 22734:2020 and standards referenced by it have been examined and reproduced below with regards to hydrogen venting.

***AS 22734:2020***

AS 22734:2020 gives no guidance on continuous purging of piping, however it references SA TR 15916:2021, EIGA Doc 211/17, and CGA G-5.5.

***SA TR 15916:2021***

SA TR 15916:2021 gives minimal advice into preventing ignition in hydrogen vent lines. It advises that the backflow of air into the vent system should be prevented, and inert gas can be added to the vent when hydrogen is not flowing to limit the ingress of air.

Minimisation of the risk of air ingress, deflagration, and detonation shall be considered in the detailed design. This should include an operating and a startup/shutdown procedure. It may involve continuous or slug inert gas purging.

***EIGA Doc 211/17***

Clause 5.5 of EIGA Doc 211/17 states, *"The vent stack shall be able to withstand the maximum peak pressure created by a detonation except if inert gas is used for continuous purging and so avoiding presence of oxygen within the vent stack."* EIGA Doc 211/17 is not prescriptive in the design of vent piping, however it recommends that the design pressure of vent piping be at least 40 bar, with a minimum wall thickness of 1.25 mm.

Clause 7.4 states, *"Vent lines shall not be fitted with flame arrestors, or any other restrictions that prevent the free release of hydrogen to the atmosphere."*

EIGA Doc 211/17 is not concerned about ignition at the vent outlet. Clause 13.4 states, *"Occasional ignition at vent outlet is expectable and should not be considered abnormal. Firemen shall be instructed not to attempt to extinguish the flame or spray water at the vent stack in the case of such an ignition."*

***CGA G-5.5-2021***

CGA G-5.5-2021 agrees with EIGA Doc 211/17, stating in Section 5.4 that a vent stack fire should be considered a design event and not an emergency. The vent should be designed so burning the hydrogen proceeds safely IAW API 521.

Section 5.5 states that flammable hydrogen-air mixtures will often exist in vent systems, typically during startup, and that detonation or deflagration shall be considered in vent design pressure.

*"The principal measure for the potential of deflagration or detonation inside the vent stack and piping is the ratio of length to internal diameter (L/D) of the components. Generally, the greater the L/D ratio, the greater the probability of these occurrences. Every effort shall be made to reduce this ratio to the lowest level practical."* Table 4.1 reproduces the contents of Sections 6.2.10 and 6.2.11, which outline the flame front propagation as a function of the L/D ratio.

**Table 4.1 – Possibility of deflagration and detonation based on L/D ratio**

| **L/D Ratio** | Less than 60:1 | Between 60:1 to 100:1 | Greater than 100:1 |
|---|---|---|---|
| **Combustion method** | Normal combustion | Deflagration | Detonation |

Section 6.2.12 provides additional guidance on the possibility of detonation.

*"Hydrogen vent systems within the scope of this publication (gaseous and liquid hydrogen systems at user sites) are unlikely to sustain deflagrations or detonations, regardless of L/D ratios. The relatively simple geometry of the system (few turns, few tie-ins) and operating scenarios are not conducive to forming detonable hydrogen-air concentrations within the system and limit potential ignition sources external to the stack discharge. In the unlikely instance that a deflagration or detonation occurs, experience has shown that a system designed for 150 psi (1030 kPa) will sustain the event without bursting. When rupture disks are installed in a vent system, their design and construction should consider these conditions."*

***NFPA 2-2020***

NFPA 2-2020 was consulted, however it references out to CGA G-5.5 with regards to hydrogen venting.

## 4.2 PROPOSED COMBUSTION CONTROL METHODOLOGY

Initially, continuous nitrogen purging was considered as a possible method for avoiding deflagration or detonation within the hydrogen vents. However, on reviewing the relevant standards, nitrogen purging is not required.

The easiest method for avoiding deflagration or detonation is to keep the L/D ratio of the vent piping to 60:1 or less. The vent piping should have a design pressure of 40 bar per EIGA Doc 211/17, or detailed calculations provided if the design pressure is less.

**Table 4.2 – Vent operating and design parameters [Ref 7]**

| Interface Point | Pipe Description | Design Pressure (barg) | Length (m) | Pipe Size (DN) | Inside Diameter (mm) | L/D Ratio |
|---|---|---|---|---|---|---|
| A | $H_2$ Vent Tank | 10 | 22.9 | 25 | 26.60 | 860 |
| 6 | Cathode $H_2$ high pressure SRV vent | 10 | 19.4 | 50 | 54.76 | 354 |
| 7 | Product $H_2$ Vent | 10 | 18.6 | 50 | 54.76 | 340 |
| 8 | Cathode $H_2$ low pressure SRV vent | 10 | 15.7 | 50 | 54.76 | 287 |
| 9 | Cathode $H_2$ vent | 10 | 11.0 | 50 | 54.76 | 201 |

As shown in Table 4.2, the current preliminary design has a design pressure of 10 barg for all vent piping, which should be increased to 40 barg. This should not require a change to the pipe schedule. The L/D ratio of the proposed piping is far too high and could easily result in detonation. The L/D ratio should be decreased significantly. This can be done by reducing the piping length and increasing the pipe size.

## 4.3 PROPOSED VENT OUTLET LOCATIONS

It is proposed to set the vent discharge location as close to the FTSs as allowable. This will reduce the pressure drop across the vent system and reduce the L/D ratio, reducing detonation risk. The requirements on the location of the vent outlet are summarised in Table 4.3.

**Table 4.3 – Vent outlet height requirements**

| Vent Outlet Requirement | Reference |
|---|---|
| >3 m above grade | CGA G-5.5-2021 Section 6.2.4. |
| >0.61 m above equipment | CGA G-5.5-2021 Section 6.2.4. |
| >3.98 m above grade | Based on thermal radiation calculations. |
| <3.29 m from outlet | To achieve L/D of 60 per CGA G-5.5-2021 Section 6.2.10. |

The minimum vent outlet height is 4 m above grade which will expose operators to a maximum of 4.73 kW/m$^2$ thermal radiation. If the vents go vertically upwards with no deviations, this will result in a vent length of 1.2 m, with a L/D ratio of 22 for DN50 vents and 45 for the DN25 vent. Note that the piping inside the FTS is not included within this L/D calculation and must be accounted for.

# 5 CONCLUSIONS

## 5.1 VELOCITIES AND PRESSURE DROP

The velocities through the vent lines are high, but appropriate considering that these are maximum flowrates and are not representative of typical operations. The pressure drops are also high, but appropriate with the same caveat. All pressure drops are below 10% of the SRV set pressure as required by CGA G-5.5-2021.

## 5.2 CONSEQUENCE MODELLING

The hydrogen low pressure SRV vent creates the largest thermal radiation and dispersion contour, as it has the largest flowrate of all vents (39.4 kg/h). The maximum horizontal extent of the 4.73 kW/m$^2$ thermal radiation contour is 5.11 m and the maximum vertical extent below the outlet is 1.98 m. To ensure an operator 2 m tall is not exposed to the radiation contour, the minimum vent outlet height is 3.98 m.

Compared to the thermal radiation contours, the 50% LEL contours are much wider but do not extend very far beneath the vent outlet. The hydrogen low pressure SRV vent creates the largest 50% LEL contour, with the maximum horizontal extent being 8.48 m and the maximum vertical extent below the outlet being 0.22 m.

## 5.3 SAFE VENTING PRACTICES

Nitrogen purging has been considered, but the recommended method to avoid detonation from flashback into the vents is to limit the L/D ratio to a maximum of 100. Limiting the L/D ratio to a maximum of 60 will prevent detonation. Flame arrestors are not to be used as they act to block the outlet in the case of ignition.

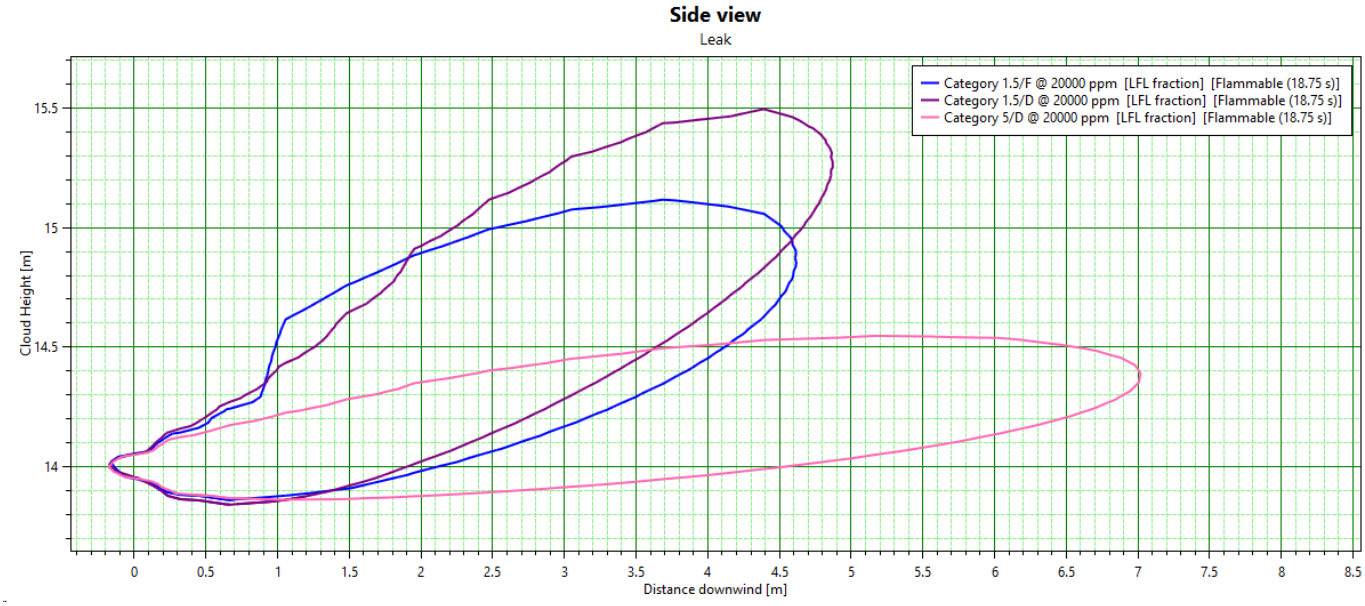
It is recommended that the vents discharge vertically upwards, directly above the FTS. If the vent outlets are set at a height of 4 m above grade, the L/D ratio of vent piping will be 22 for all DN50 vents, and 45 for the DN25 hydrogen vent tank vent. Note that this does not account for piping internal to the FTS.

The design pressure of the vent piping should be set at 40 barg to comply with EIGA Doc 211/17 guidelines.

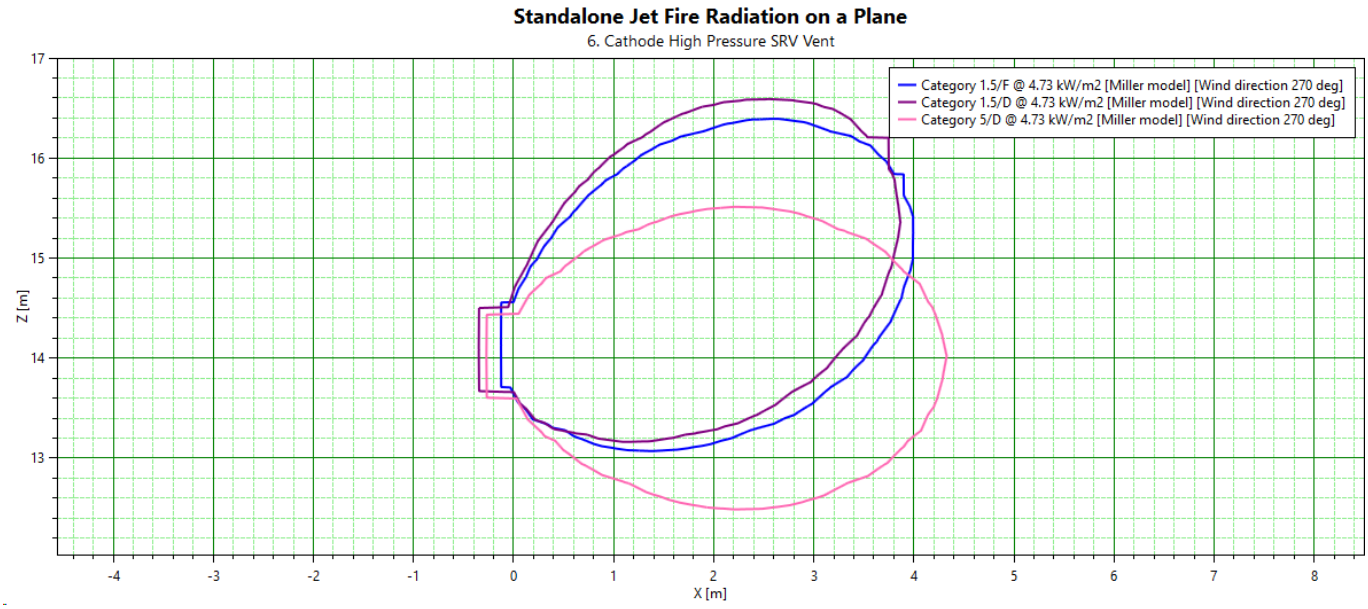
When shutdowns occur, air may enter the vent lines and create an explosive atmosphere. To mitigate this, safe operating procedures must be created to ensure the risks are minimised to the operators and the facility. This may involve continuous or slug purging with nitrogen or another inert gas.

# APPENDIX A. CONSEQUENCE MODELLING RESULTS

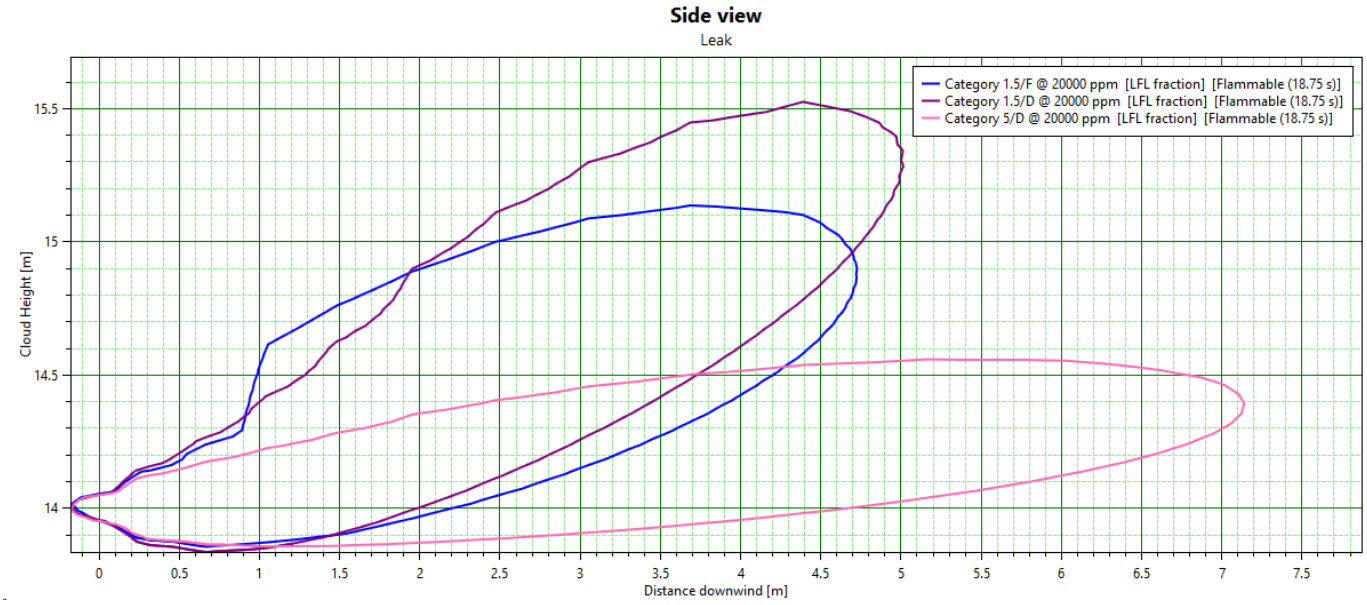
### 6. Cathode High Pressure SRV Vent Dispersion Contour



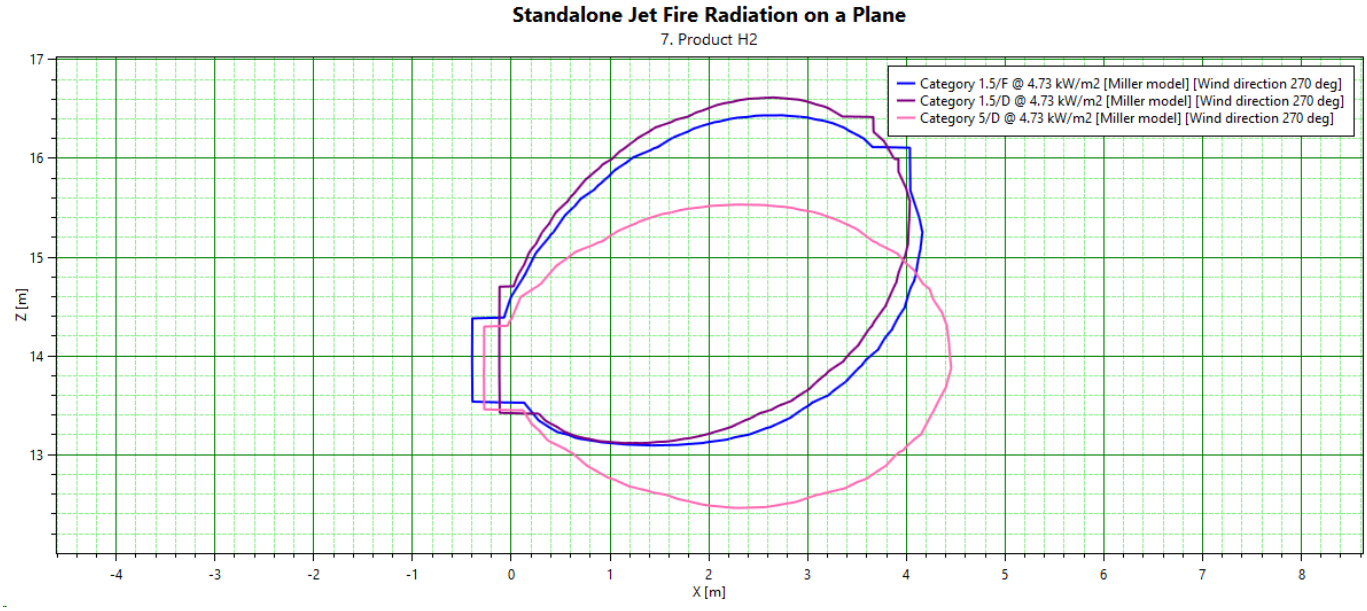

### 6. Cathode High Pressure SRV Vent Radiation Contour



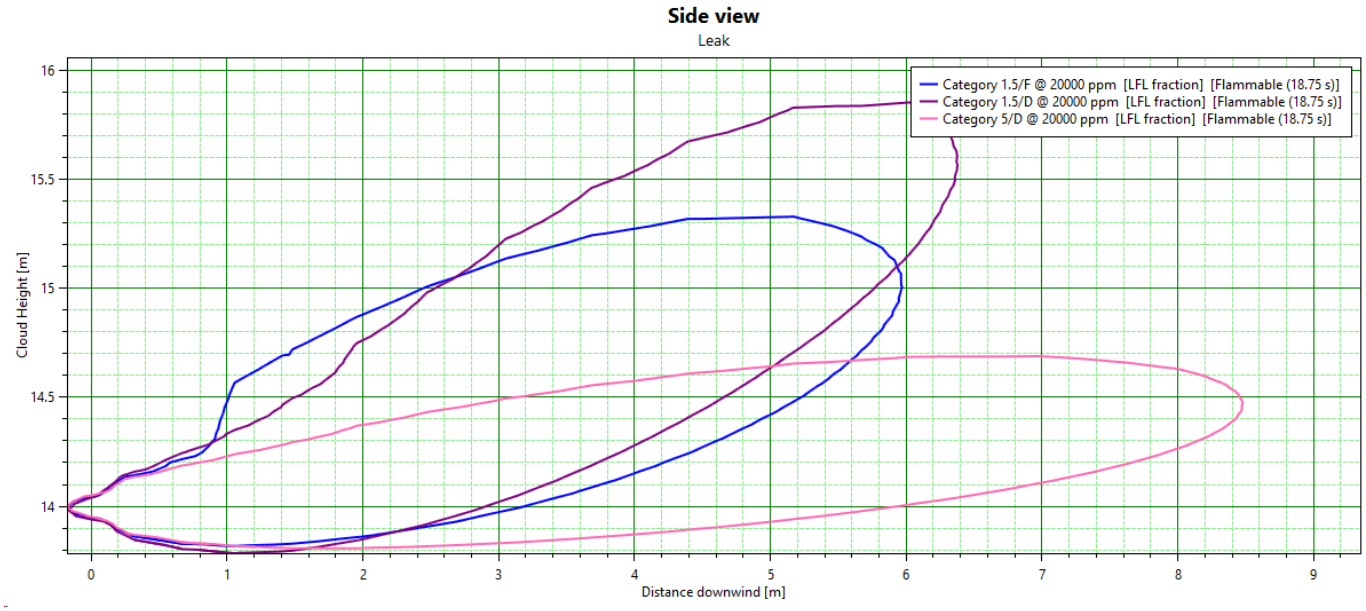
### 7. Product H2 Vent Dispersion Contour



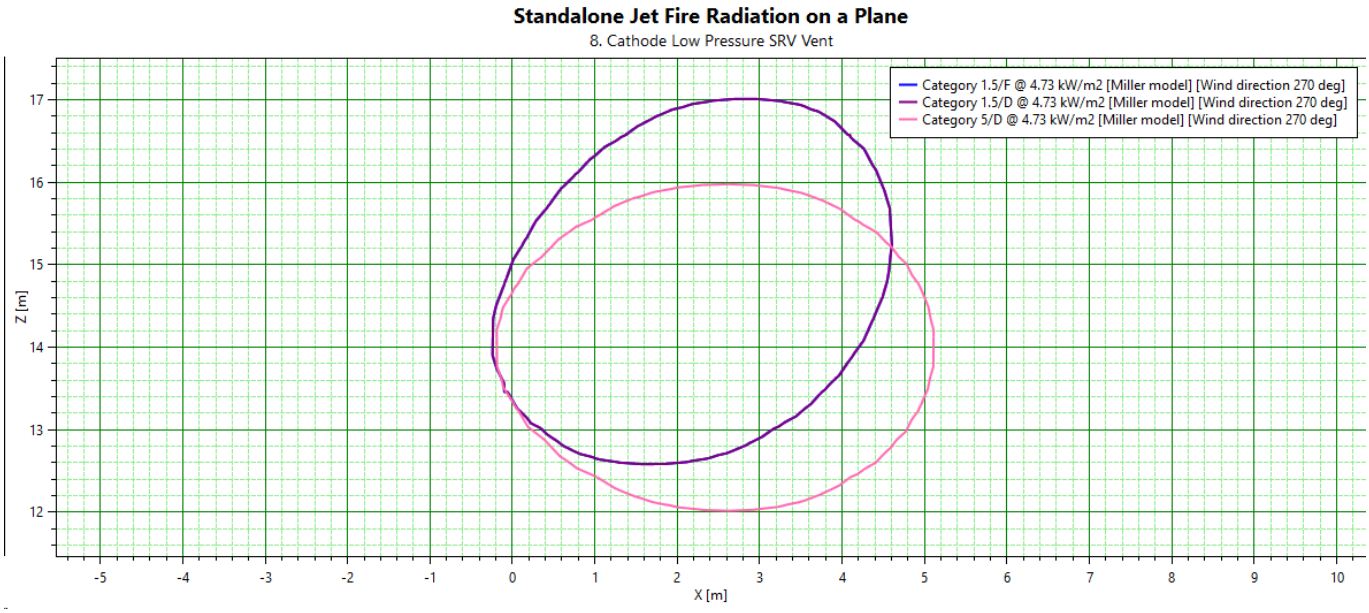

### 7. Product H2 Vent Radiation Contour



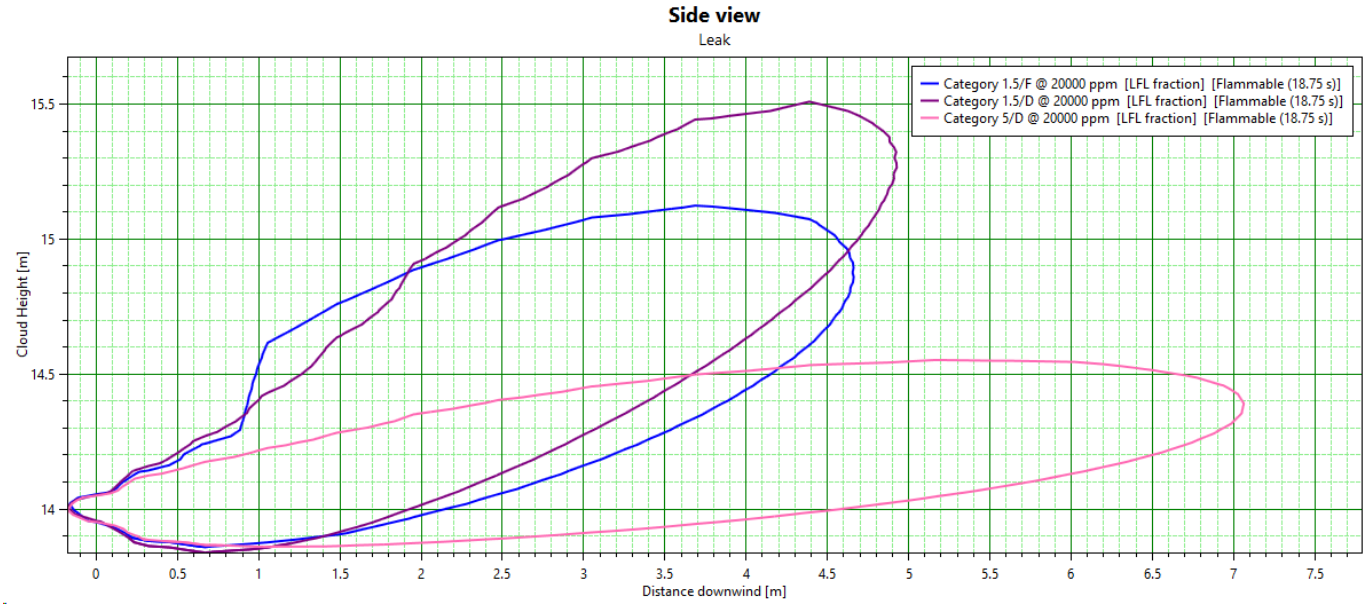
### 8. Cathode Low Pressure SRV Vent Dispersion Contour



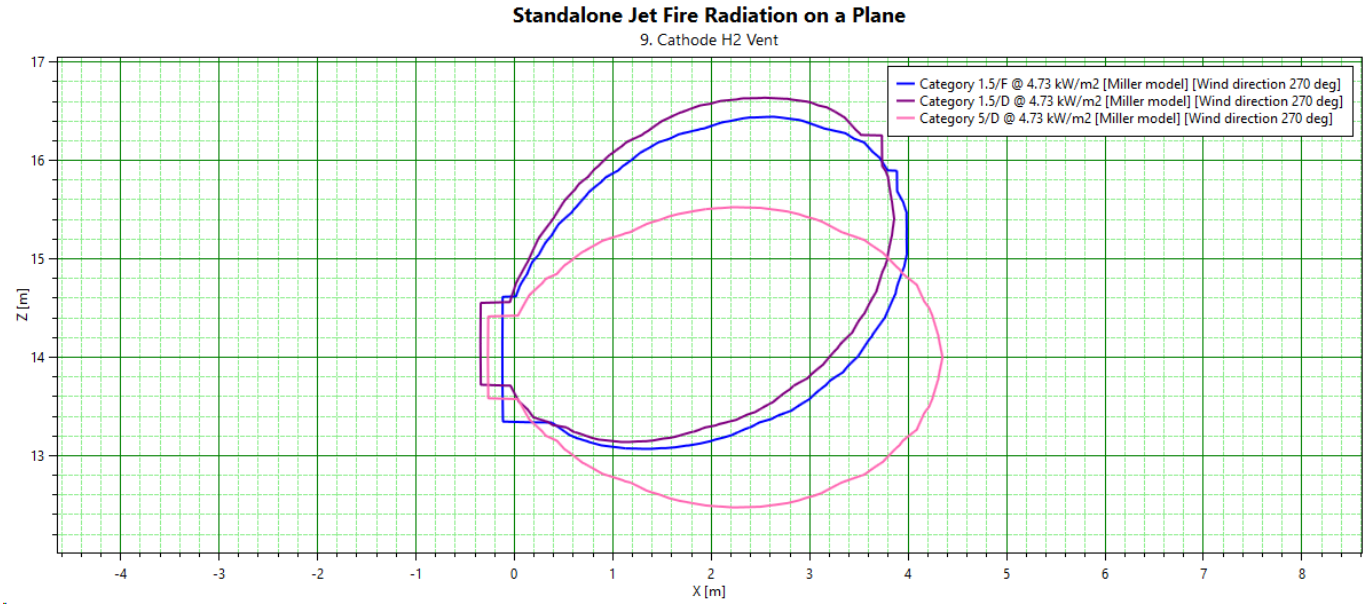

### 8. Cathode Low Pressure SRV Vent Radiation Contour

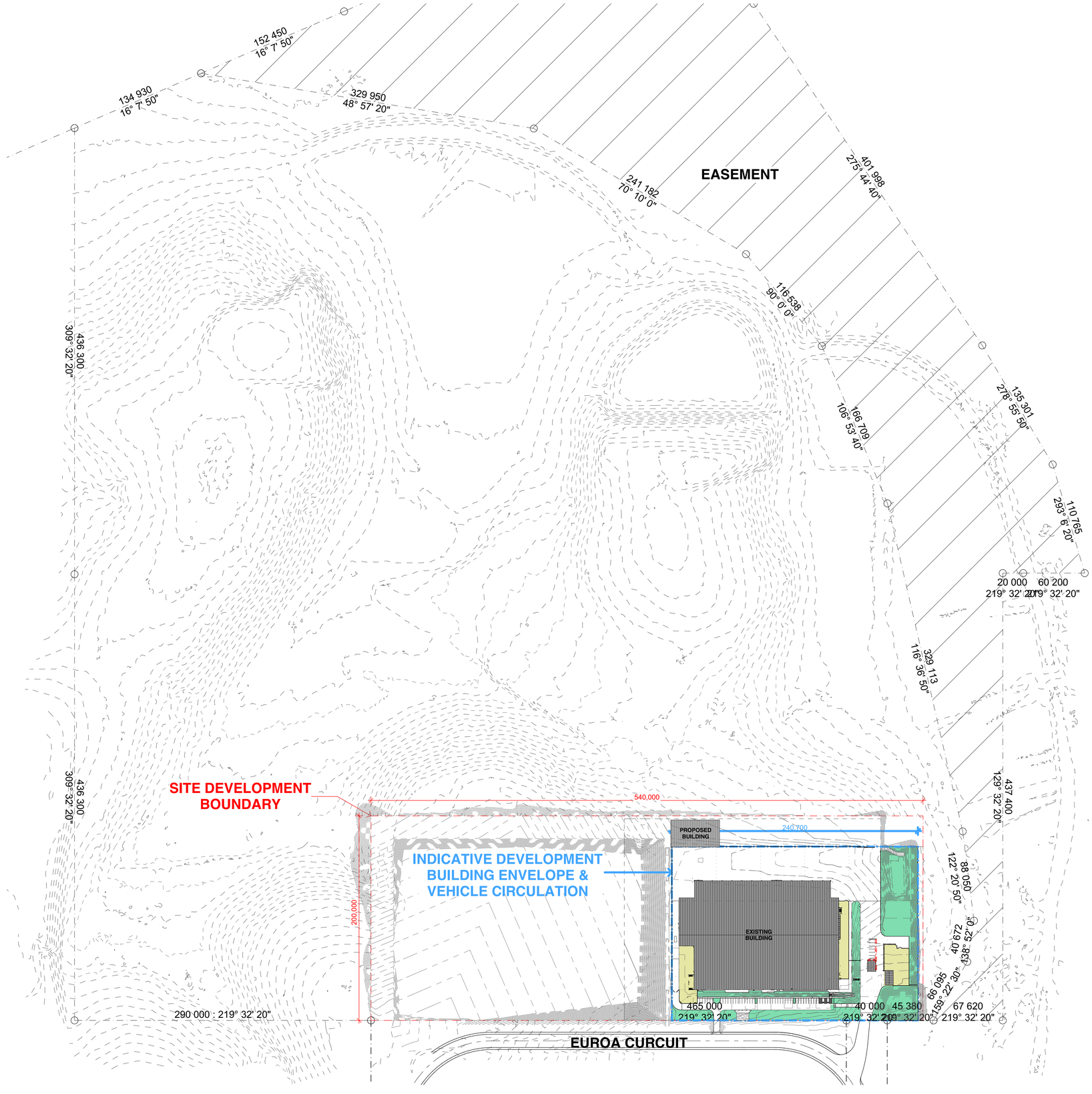


### 9. Cathode H2 Vent Dispersion Contour




### 9. Cathode H2 Vent Radiation Contour



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**Revision**

| | | |
|---|---|---|
| 05 | DA Revisions | 11/04/2022 |
| 06 | DA Minor Change | 19/04/2022 |
| 07 | DA Minor Change | 26/10/2022 |
| 08 | DA Minor Change | 1/12/2022 |
| 09 | Preliminary DA Set - Testing Facility | 18/01/2024 |

**Project**
FFI GEM Centre - Electrolyser Facility, Phase 1
Euroa Circuit, Aldoga Gladstone QLD 4694 Australia

**Client**
Hutchinson Builders

**Architect**
Greg Adsett, Dalbert Ton

**Drawn**
DT, PH, KF

**Stage**
Design Development

**Status**
**Preliminary** (NOT FOR CONSTRUCTION)

**Project No.**
1295-01

**Scale**
1:2000 at A1

Site Plan

# A-DA-01.01

**09**
**Revision**



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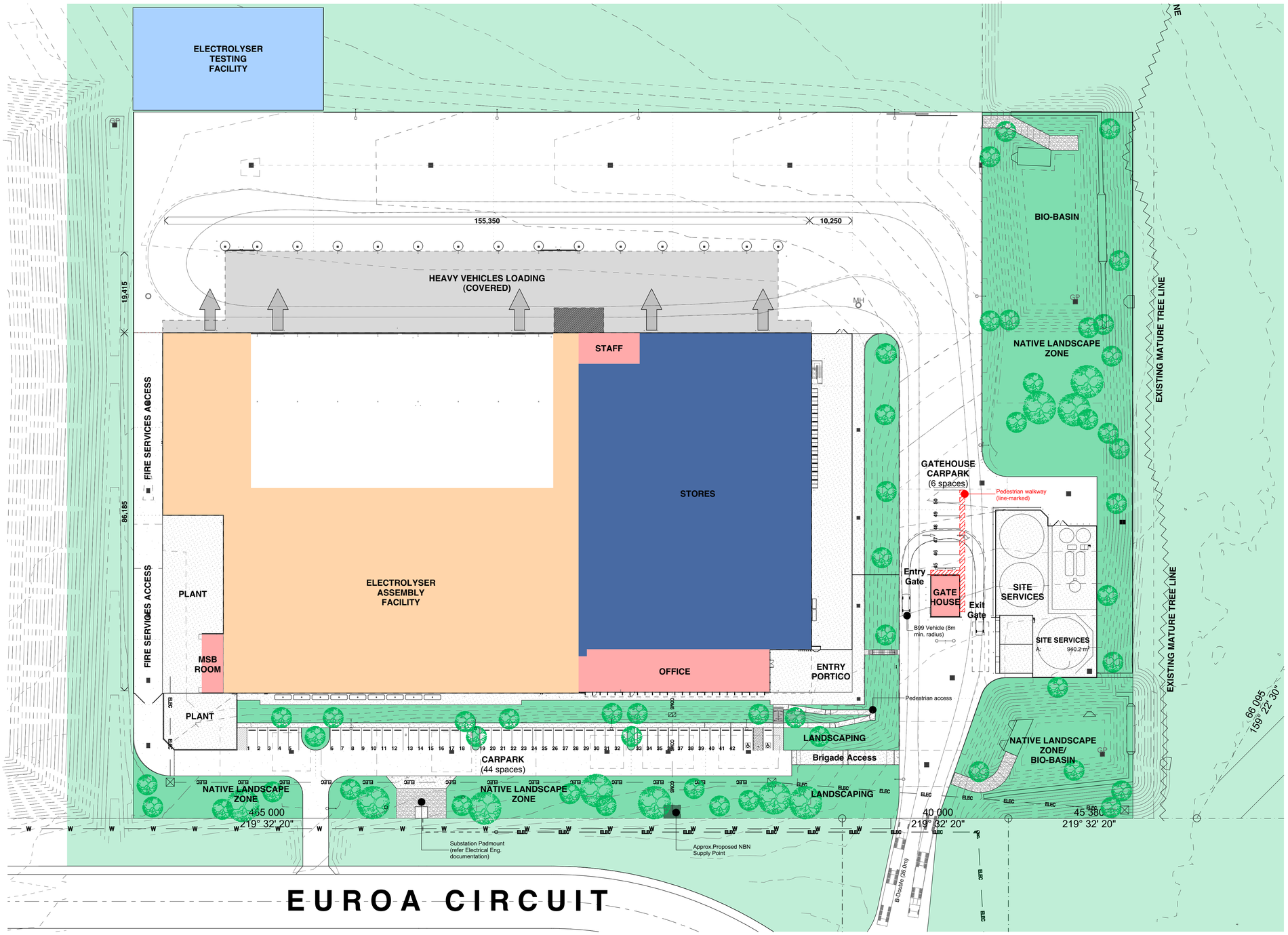


## VEHICLE CIRCULATION NOTES:

1. Design Heavy Vehicle is a 26.0 m long B-Double Transport.
2. All heavy-vehicles are to remain in forward gear for all normal manoeuvres on site.
3. Design Light Vehicle is the B99 model from *AS 2890.1 Off Street Parking Facilities.*
4. Gatehouse staff parking is designed to sweep into the carpark in one (1) movement, forward direction. Leaving the carpark is also in one (1) movement forward.
5. Carpark widths for gatehouse staff are increased to 3.1 m to facilitate single movement parking.
6. All vehicles are to be limited to 10 km/h once inside the security perimeter.
7. Gatehouse is manned 24/7, with electric security gates always in the closed position, unless opened upon guard command.
8. All vehicles - including fully laden B-Double transports - shall come to a complete 'dead' stop before passing through the gates in either direction. This is to ensure that vehicle movements are sufficiently slow near the gatehouse, to allow an emergency stop to occur and to allow sufficient time between sighting a vehicle and making way.
9. Operational requirements will be detailed in the facility operations manual, and varied as required to suit facility activities.

## OTHER:

1. Plant areas to house mechanical and electrical equipment.

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| Revision | | |
|---|---|---|
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| 11 | DA Minor Change | 11/11/2022 |
| 12 | DA Minor Change | 1/12/2022 |
| 13 | Preliminary DA Set - Testing Facility | 18/01/2024 |

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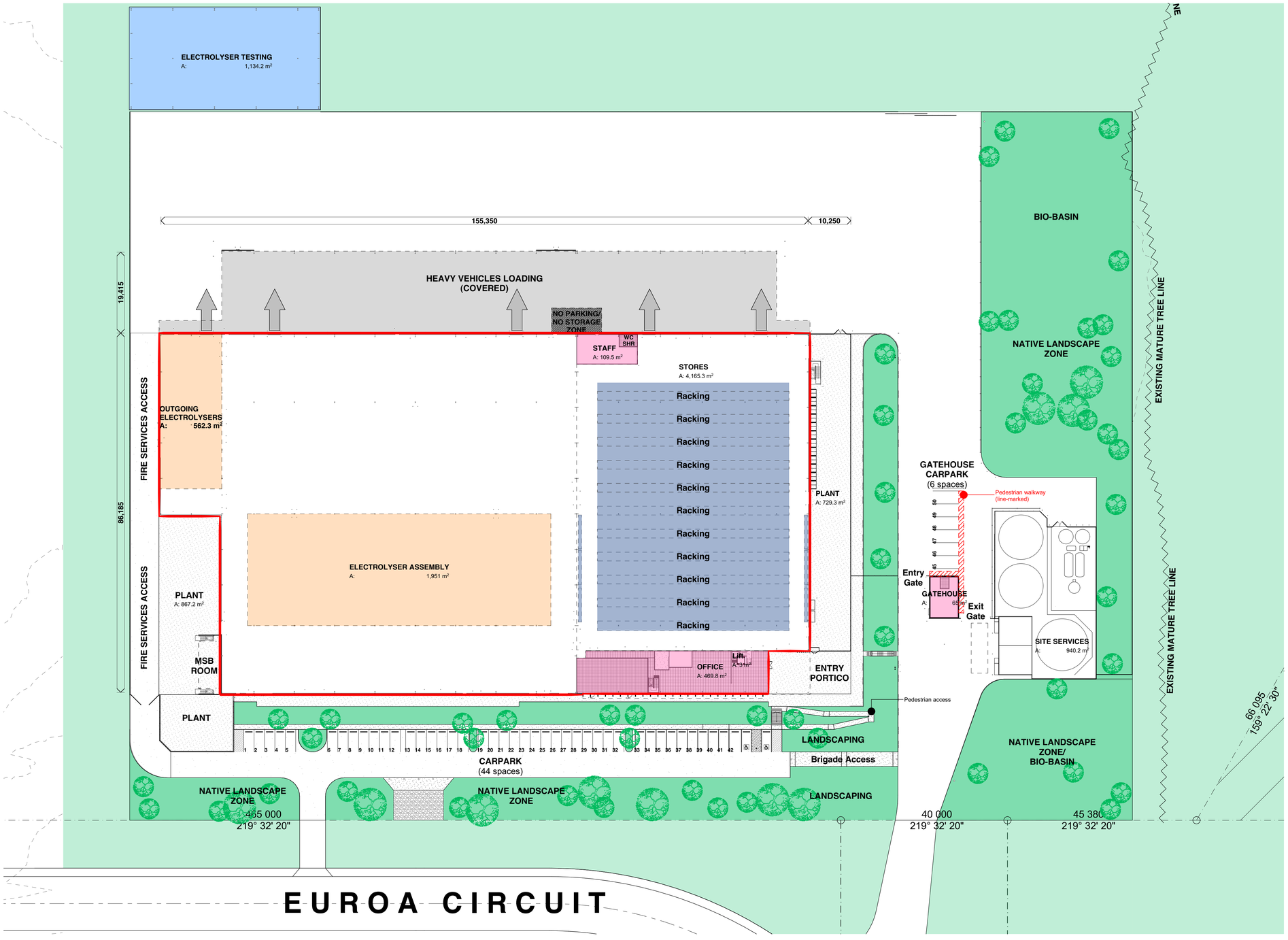
Site Works Plan

# A-DA-01.02

**13**
**Revision**




| SITE AREA BREAKDOWN | | |
|---|---|---|
| Processing plant overall GFA | 14,450m² | |
| | | |
| Fully enclosed floor area | 12,990m² | |
| | | |
| Electrolyser assembly (inc. circ.) | 5,085m² | |
| Outgoing electrolysers | 563m² | |
| Stores (inc. circ.) | 4,165m² | |
| Office & staff areas (GF & FF) | 993m² | |
| External plant (Inc. MSB room) | 1,597m² | |
| | | |
| | | |
| Site services | 940m² | |
| Gatehouse | 65m² | |
| Heavy Vehicles Loading Area | 8,800m² | |
| Parking - 50 bays | 1,560m² | |
| | | |
| Electrolyser testing facility | 1,134m² | |

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| Revision | | |
|---|---|---|
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| 11 | DA Minor Change | 11/11/2022 |
| 12 | DA Minor Change | 1/12/2022 |
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**Client**
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**Architect**
Greg Adsett, Dalbert Ton

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DT, PH, KF

**Stage**
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**Status**
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**Project No.**
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**Scale**
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Floor Plan - Ground

# A-DA-03.01

**13**
**Revision**



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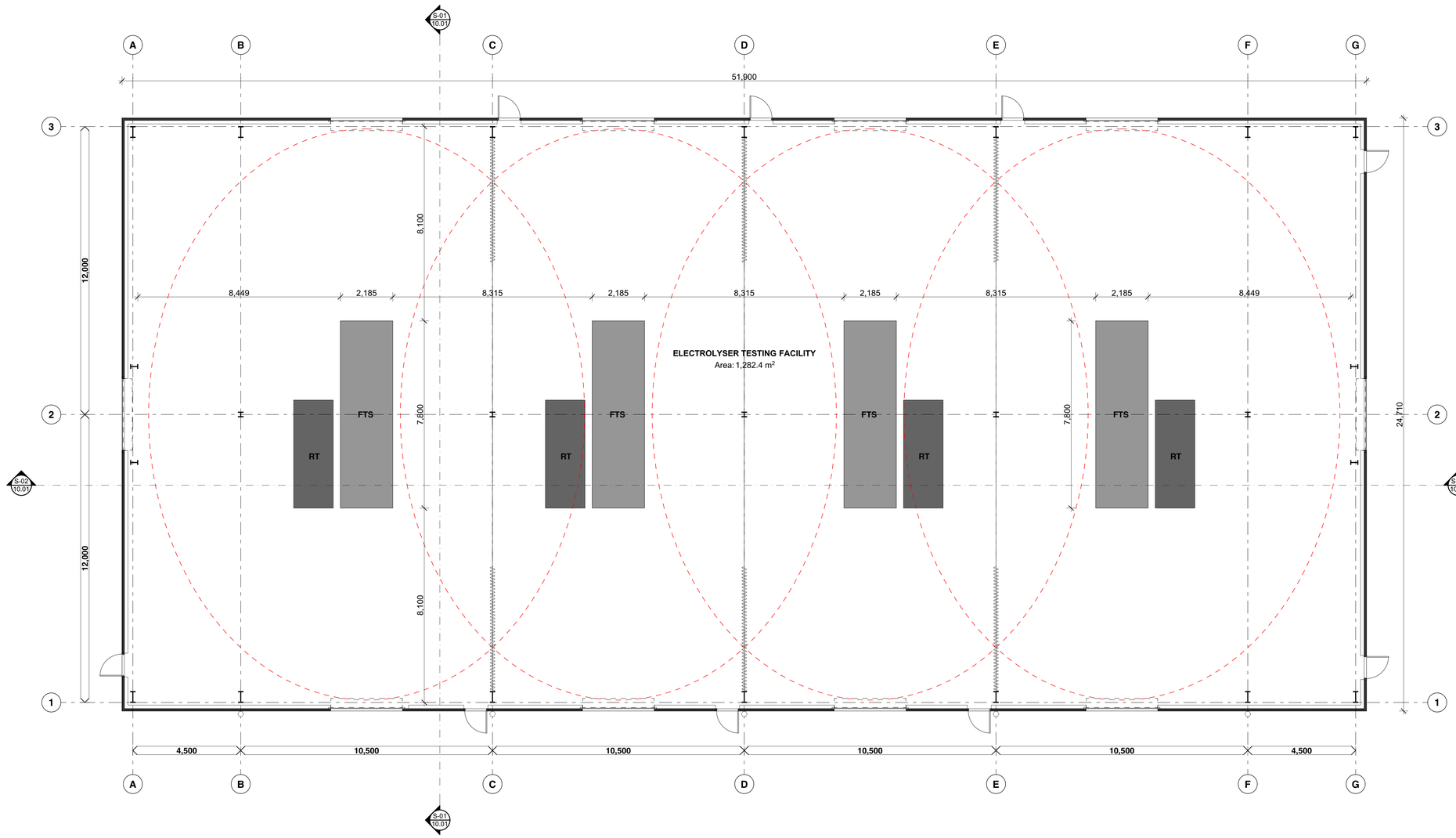


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| Revision | | |
|---|---|---|
| 01 | Preliminary DA Set - Testing Facility | 18/01/2024 |

**Project**
FFI GTF - Testing Facility
Euroa Circuit, Aldoga Gladstone QLD 4694 Australia

**Client**
Fortescue Future Industries Pty Ltd

**Architect**
DT

**Drawn**
DT, IN

**Stage**
Development Application

**Status**
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**Project No.**
1340-02

**Scale**
1:100 at A1

Floor Plan - Ground

# A-DA-03.01

01



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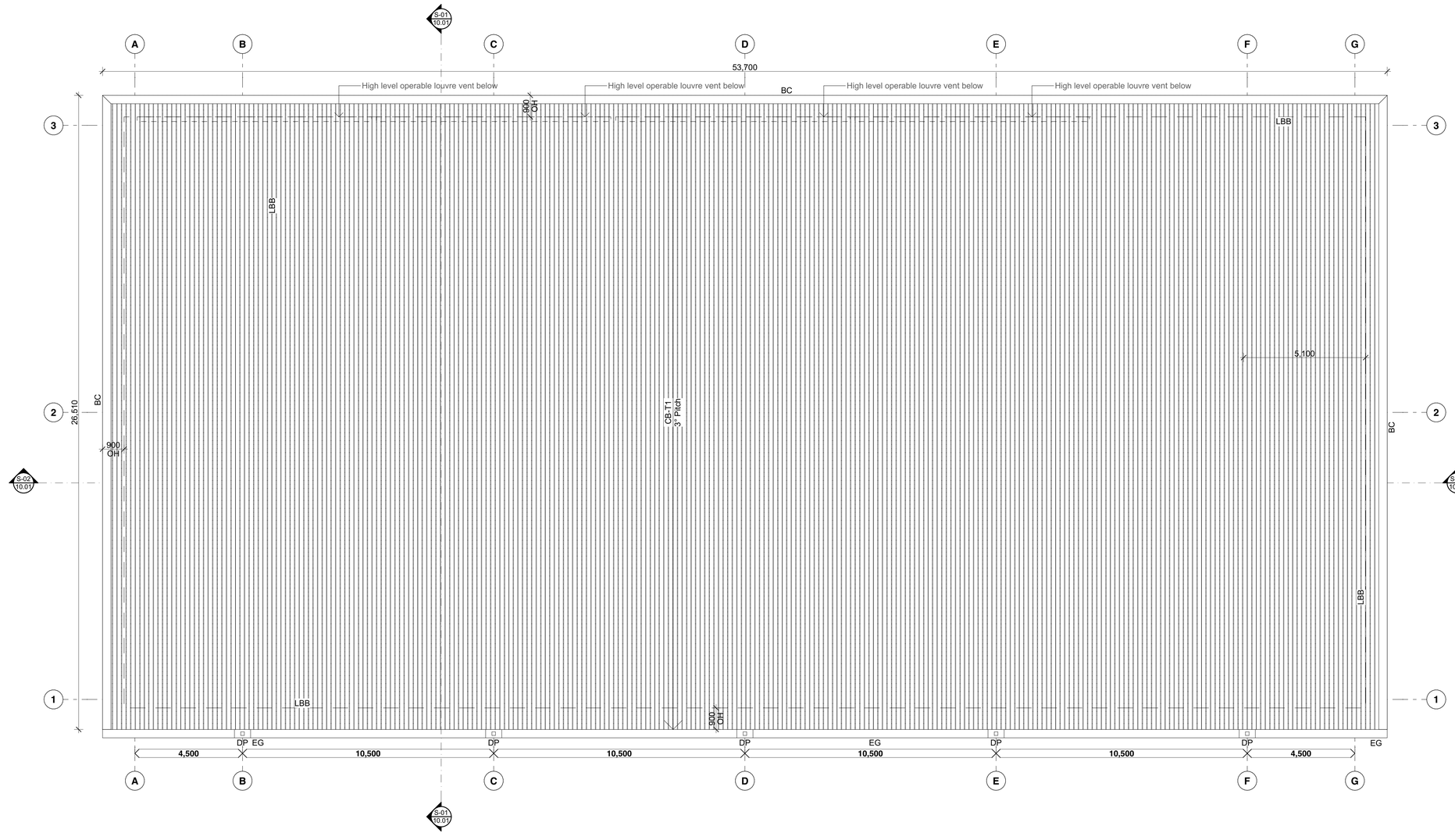


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| | | |
|---|---|---|
| **Revision** | | |
| 01 | Preliminary DA Set - Testing Facility | 18/01/2024 |

**Project**
FFI GTF - Testing Facility
Euroa Circuit, Aldoga Gladstone QLD 4694 Australia

**Client**
Fortescue Future Industries Pty Ltd

**Architect**
DT

**Drawn**
DT, IN

**Stage**
Development Application

**Status**
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**Project No.**
1340-02

**Scale**
1:100 at A1

Roof Plan

# A-DA-04.01

01



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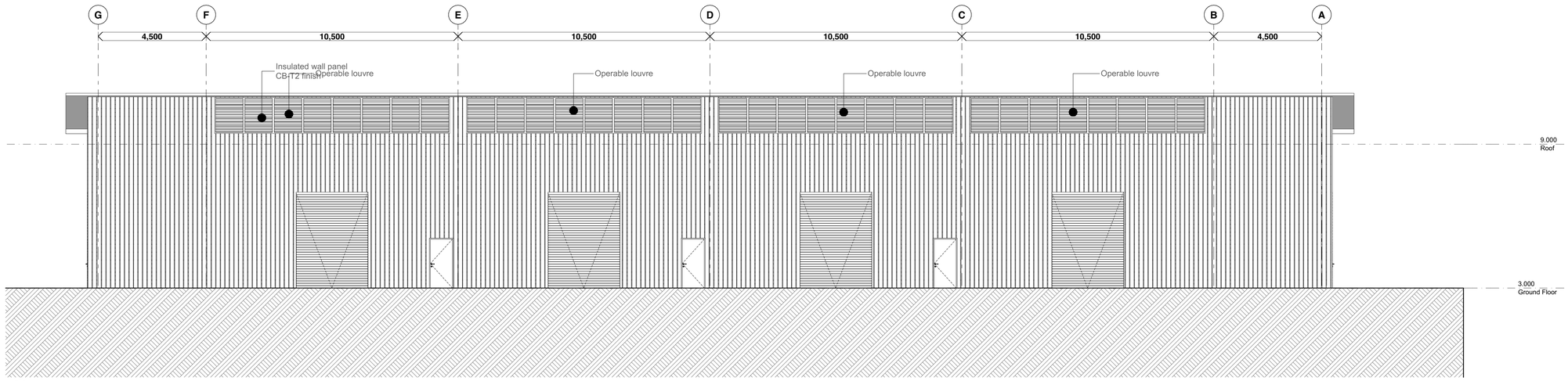


1 DA - North West Elevation
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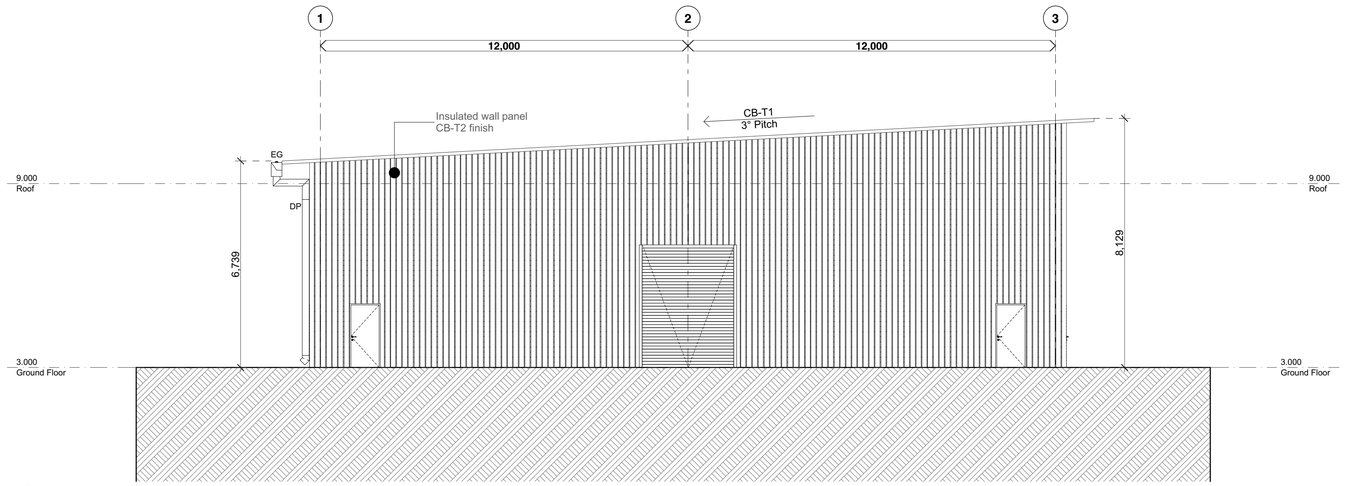


2 DA - North East Elevation
Scale 1:100

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**Revision**
01 Preliminary DA Set - Testing Facility 18/01/2024

**Project**
FFI GTF - Testing Facility
Euroa Circuit, Aldoga Gladstone QLD 4694 Australia

**Client**
Fortescue Future Industries Pty Ltd

**Architect**
DT

**Drawn**
DT, IN

**Stage**
Development Application

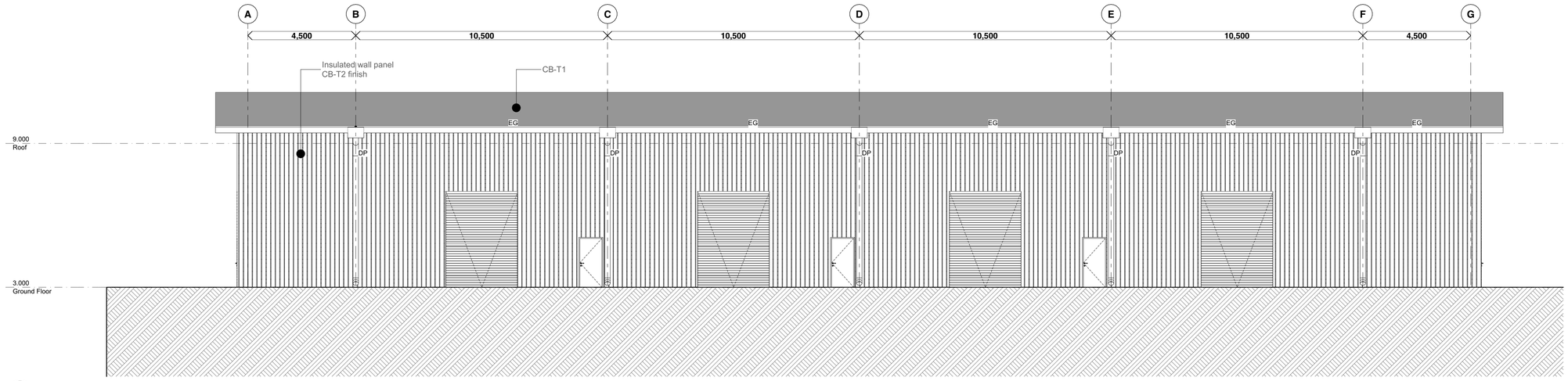
**Status**
**Preliminary** (NOT FOR CONSTRUCTION)

**Project No.**
1340-02

**Scale**
1:100 at A1

Elevations 1

# A-DA-09.01 01

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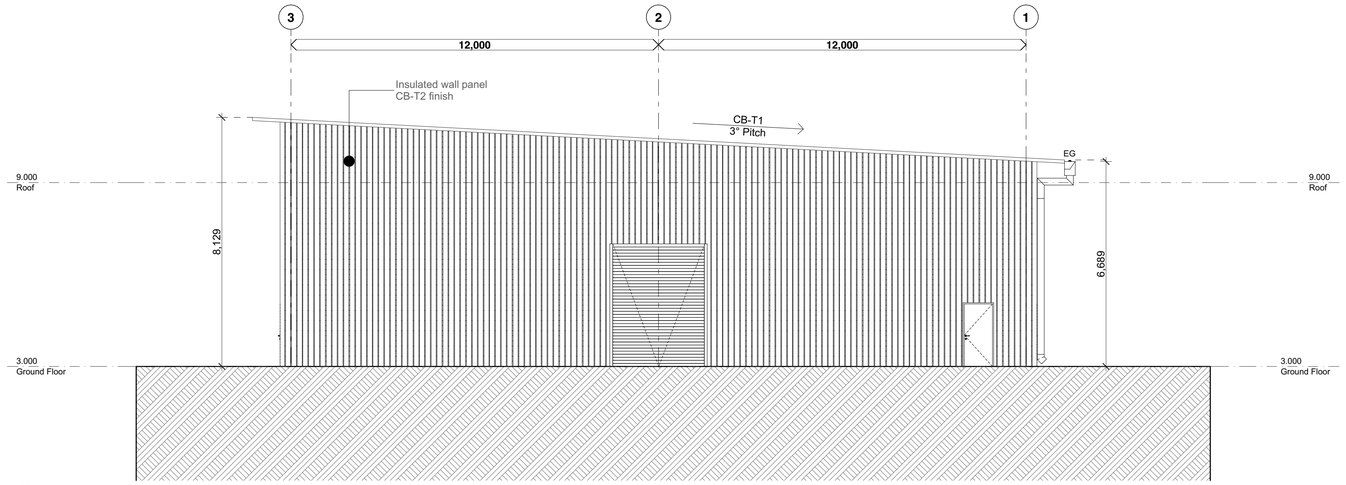


2 DA - South West Elevation
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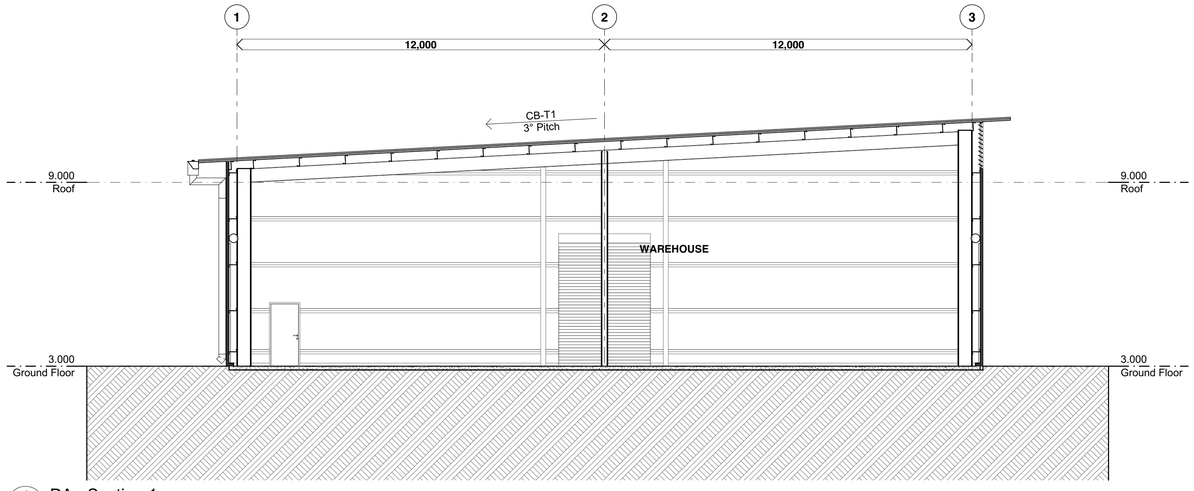
Elevations 2

# A-DA-09.02

01

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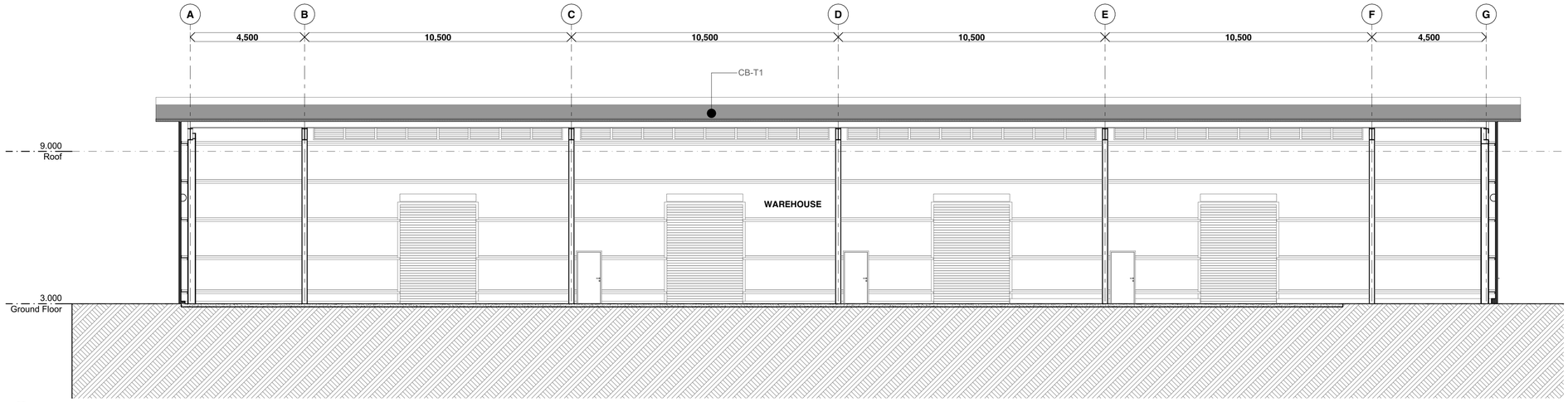


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**Project No.**
1340-02

**Scale**
1:100 at A1

Sections

# A-DA-10.01 01

Appendix K

# Desktop Environmental Assessment Report

# 1. Desktop Environmental Assessment

This environmental assessment has been prepared in support of a Substantial Change to Development Application for a Material Change of Use Medium Impact Industry to include an operational commissioning pad for the testing of Hydrogen electrolysers (hereafter referred to as the 'Proposed Development Area') on Lot 4 on SP245936 (hereafter the 'Site').

The electrolyser assembly building (enclosed area approx. 12,990m$^2$) and associated infrastructure and hardstand has been constructed and is currently undergoing some operational readiness and commissioning activities prior to commencement of use. Accordingly, this substantial change involves the development of an electrolyser Function Test Stations (FTS) and Balance of Plant (BOP) in a separate building (1,282m$^2$) to the rear of the main electrolyser assembly building. The building has been situated within the general development footprint of the previously approved project. Notwithstanding the following review does include content consistent with the assessment previously provided development applications over Lot 4 on SP245936 (where there is no change to environmental values resulting from the substantial change).

The aim of the assessment is to identify the existing environmental values, constraints and potential impacts associated with the Project. This addresses the following:

- a description of the **Land** environmental values, both onsite and offsite, likely to be affected by the proposed activity
- a description of the **Biodiversity** environmental values, both onsite and offsite, likely to be affected by the proposed activity
- a description of the **Air** environmental values, both onsite and offsite, likely to be affected by the proposed activity
- a description of the **Noise** environmental values, both onsite and offsite, likely to be affected by the proposed activity
- a description of the **Water** environmental values, both onsite and offsite, likely to be affected by the proposed activity
- a description of the **Waste** associated values associated with the proposed activity
- expected sources if impact, relevant to the environmental values above
- description of the risk and likely magnitude of impacts, relevant to the environmental values above
- management practices, relevant to the environmental values above.

## 1.1 Study Area and assessment method

The information in this report is based on a high-level desktop assessment of the Study area which encompasses a 2.5 km buffer around the facility. The assessment comprises a review of:

- Queensland Globe mapping portal
- WildNet database (DEIS)
- *Environment Protection and Biodiversity Conservation Act 1999* (EPBC) Protected Matters Search Tool (Department of Climate Change, Energy, Environment and Water (DCCEEW))
- Development Assessment Mapping System (DAMS) (Department of State Development, Infrastructure, Local Government and Planning (DSDILGP))
- State Planning Policy (SPP) Interactive Mapping System (DSDILGP)
- Regulated Vegetation Management Map (Department of Resources (DoR)
- Aerial imagery available through QLD Globe and NearMap
- Cultural Heritage Database and Register (Department of Seniors, Disability Services and Aboriginal and Torres Strait Island Partnerships (DSDATSIP))
- Environmental Management and Contaminated Land Registers (EMR/CLR)) (DESI)Gladstone Regional Council (GRC) online mapping system

- Commonwealth, State and local government statutory instruments, including legislation, policies and guidelines.

## 1.2 Land

### 1.2.1 Site location and description

The Site property address is Euroa Circuit, Aldoga, Queensland located on Lot 4 on SP245936 approximately 20 kilometres (km) west of the centre of Gladstone.

### 1.2.2 Existing land use

The Proposed Development Area is located adjacent to the Gladstone Electrolyser Facility (GEF) Facility (currently under development) within a  located within the High Impact Industry Precinct and the Development Scheme forms the higher order statutory planning instrument for development within the SDA, with specific Precinct controls applicable to the Site. The Development Scheme was developed under the SDPWO Act and was declared by regulation in 1993. The May 2022 edition of the Development Scheme is the current version of this document.

The SDA covers a total land area of 26,934 hectares of land adjacent to the Port of Gladstone, with connections to major rail networks and Australia's national highway. Under the Development Scheme, the SDA is split into six (6) precincts (refer to Figure 1 below). The subject Site is located within the High Impact Industry Precinct.

The Gladstone SDA – High Impact Industry Precinct contains the specific land use and built form provisions that future development within the Precinct is required to satisfy.

This Town Planning Report will undertake a thorough assessment against the Development Scheme and demonstrate compliance with all relevant assessment provisions.

The GRC online mapping tool shows that the surrounding area is a combination of industrial, agricultural, commercial and residential, with only industrial (commercial) and agricultural located within a 2.5 km radius of the proposed site location.

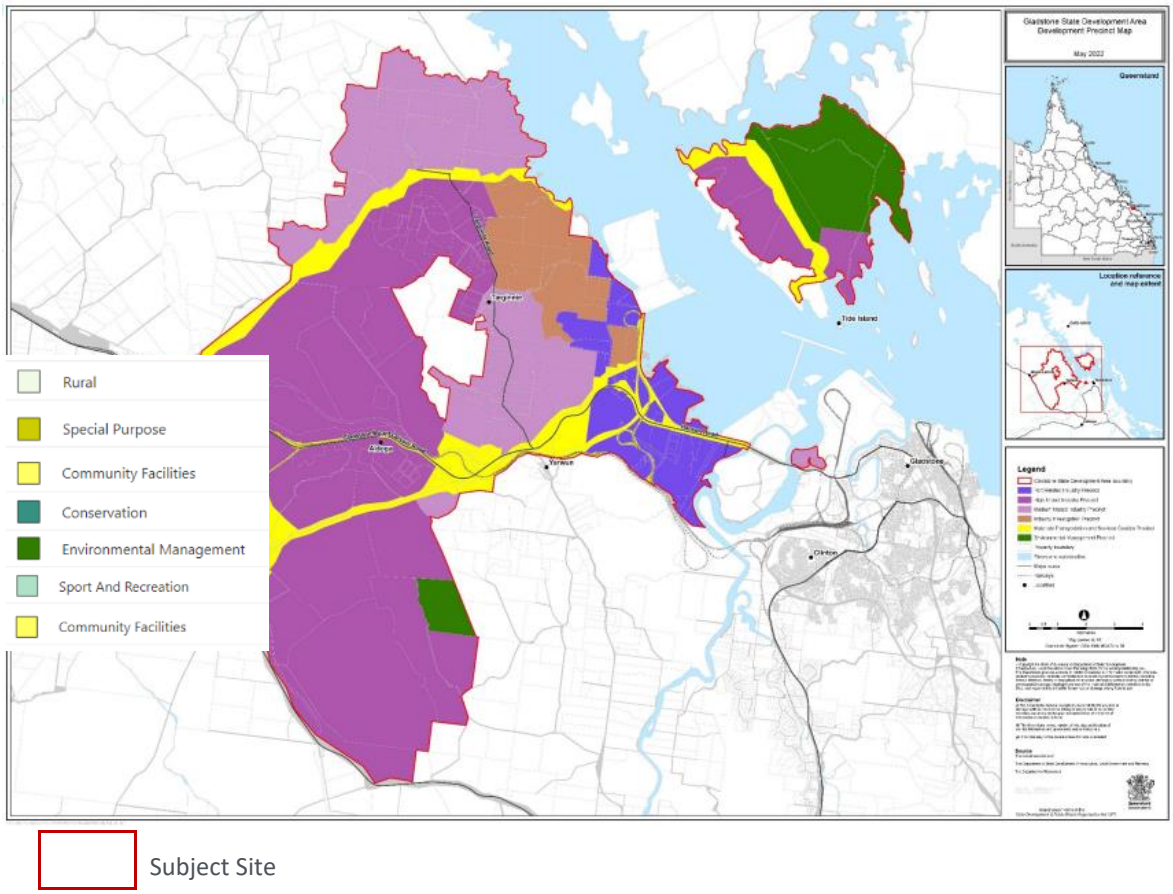



*Figure 1 Precincts of the Gladstone SDA Source: GSDAP*

### 1.2.3 Site topography

The Site elevation is approximately 60 metres (m). Bulk earth works have been carried out across the central portion of the Site under OPW/54/21, resulting in majority of the Site being relatively flat, with steeper areas in the north-east and southern corners. While most of the land within the Proposed Development Area will be flat, there will be a retaining wall installed towards the northern and north-eastern portions of the boundary. The immediate surrounding land is relatively flat, however steep elevations of up to 300 m are located within 3 km to the northeast, east and southeast of the Site (refer Figure 1–1), including four small areas within the lot boundary identified as steep land on the Steep Land Overlay Plan from Gladstone Regional Council Planning Scheme (GRCPS) (refer Figure 1–2). The Development Area is considered flat and will not require further earthworks.


*Figure 1–1: Site topography including contour mapping Lot 4 SP245936 + 2.5 km.*

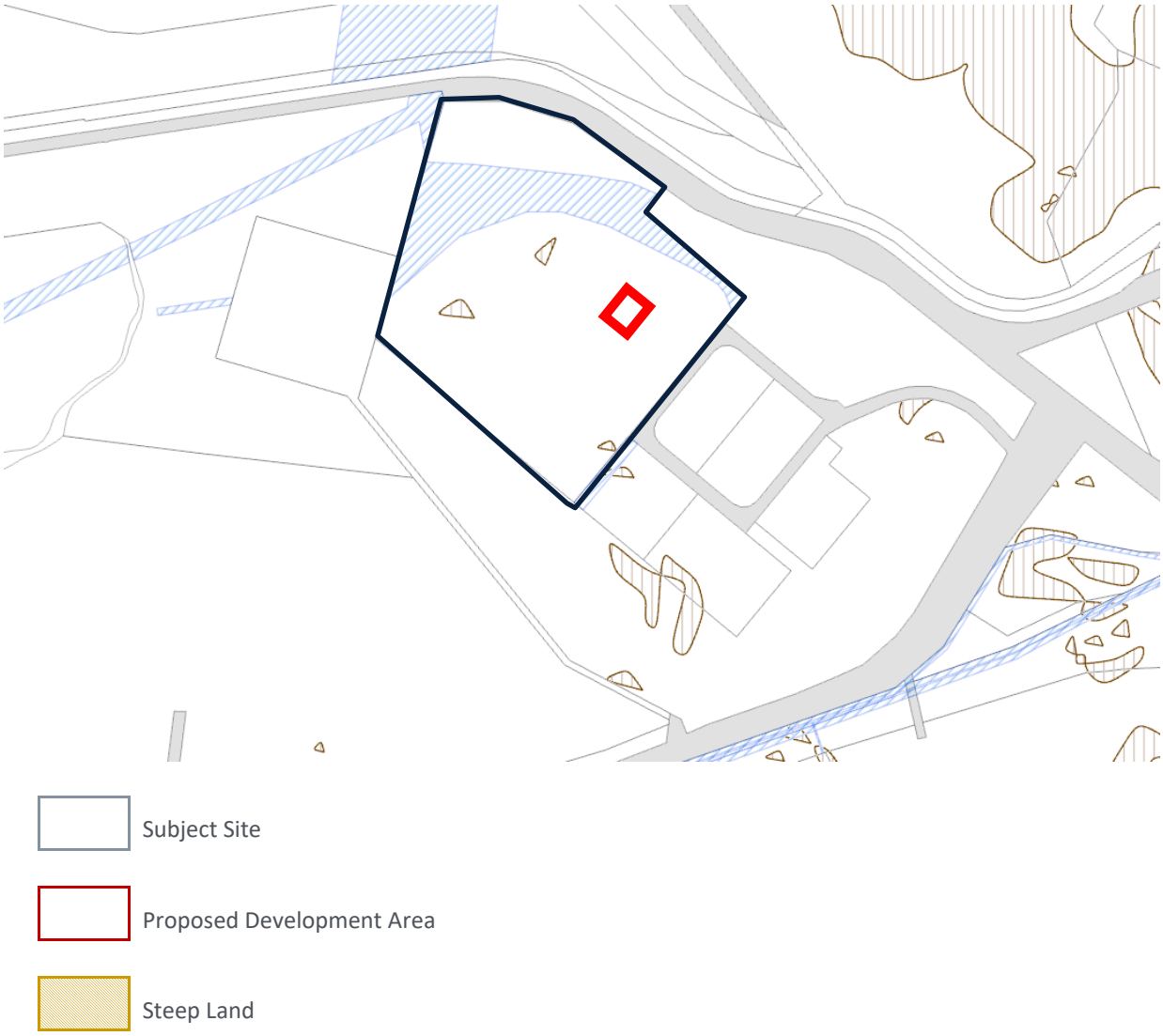



*Figure 1–2: Steep land overlay Source: GRCPS*

### 1.2.4 Unexploded ordnance

No areas with substantial potential for unexploded ordnance (UXO) have been identified within the Study area.

### 1.2.5 Contaminated land

A contaminated land search undertaken on 2 July 2021 concluded that the site is not included on the Environmental Management Register (EMR) or the Contaminated Land Register (CLR).

### 1.2.6 Acid sulfate soils

The Australian Soil Resource Information System (ASRIS) shows the Site to have 'Extremely Low' and 'Low Probability' of acid sulfate soils (ASS). ASS is unlikely to occur at the Site as ASS generally occurs below 20m Australian height datum (AHD).

### 1.2.7 Bushfire hazard

The Proposed Development Area is within a Bushfire Prone Area, as indicated in the GRCPS. Proposed building works will occur on some areas classified as having a Potential Impact Buffer, however there is no vegetation present in the Proposed Development Area (Figure 1–3).

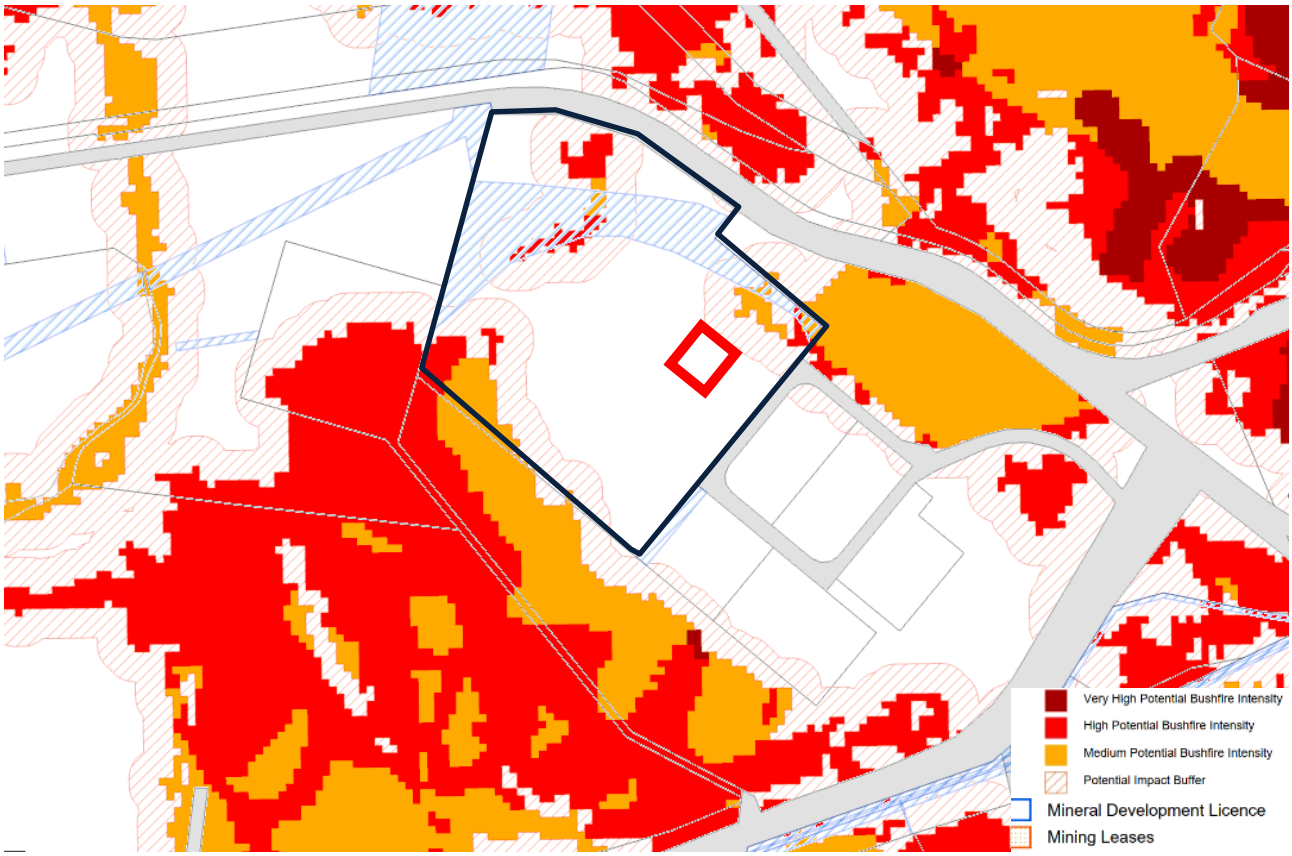



*Figure 1–3 – Bushfire Prone Areas Source: GRCPS*

### 1.2.8 Cultural heritage

The Site is located within the Bailai, Gurang, Gooreng Gooreng, Taribelang Bunda People Cultural Heritage party boundary and the first Nations Bailai, Gurang, Gooreng Gooreng, Taribelang Bunda People Aboriginal Corporation RNTBC Cultural Heritage body boundary.

An approved Cultural Heritage Management Plan (CHMP) (Aldoga South Road Extension Project) between the Port Curtis Coral Coast (PCCC) Registered Native Title Claimants and the Minister for Economic Development Queensland covers the Site.

No Cultural Heritage sites included on the Cultural Heritage Database and Register are mapped within the Site boundary, however two sites are mapped approximately 1 km south of the Site and south-east of the Site.

### 1.2.9 Land risk assessment

**Risk: Low**

A moderate risk of impacts to the abovementioned environmental values exists, due to the site being already heavily modified and the proposed design not requiring encroaching on the surrounding existing vegetation.

### 1.2.10 Land mitigation measures

#### 1.2.10.1 Cultural heritage

Impacts to Cultural Heritage are unlikely as the Site has previously been cleared of vegetation and the proposed works will not occur in or nearby mapped vegetation.

A “Stop Works” procedure in the event of an unexpected Cultural Heritage finding must be developed prior to any ground disturbing or clearing works commencing.

## 1.3 Biodiversity

### 1.3.1 Flora

#### 1.3.1.1 Threatened Ecological Communities

An EPBC Act Protected Matters Report identified four threatened ecological communities (TECs)that may occur within 2 km of the site. These include:

- Coastal Swamp Oak Forest of New South Wales and Southeast Queensland
- Coolibah – Black Box Woodlands of the Darling Riverine Plains and the Brigalow Belt South Bioregions
- Poplar Box Grassy Woodland on Alluvial Plains
- Weeping Myall Woodlands.

It is unlikely for a TEC to occur at the Site as the Proposed Development Area has previously been cleared of vegetation.

#### 1.3.1.2 Regulated Vegetation

The following Regulated Vegetation occurs within the Site but does not intersect the Proposed Development Area (Figure 1–4 and Figure 1–5):

- Regulated vegetation (intersecting a watercourse) – 1.3 km
- Regulated vegetation (category B) – 1.3 ha
- Regulated vegetation (category C) – 4.19 ha
- Regulated vegetation (category R) – 8.53 ha
- Regulated vegetation (essential habitat) – 8.53 ha

No Regulated Vegetation will be impacted by the development proposed by the application.

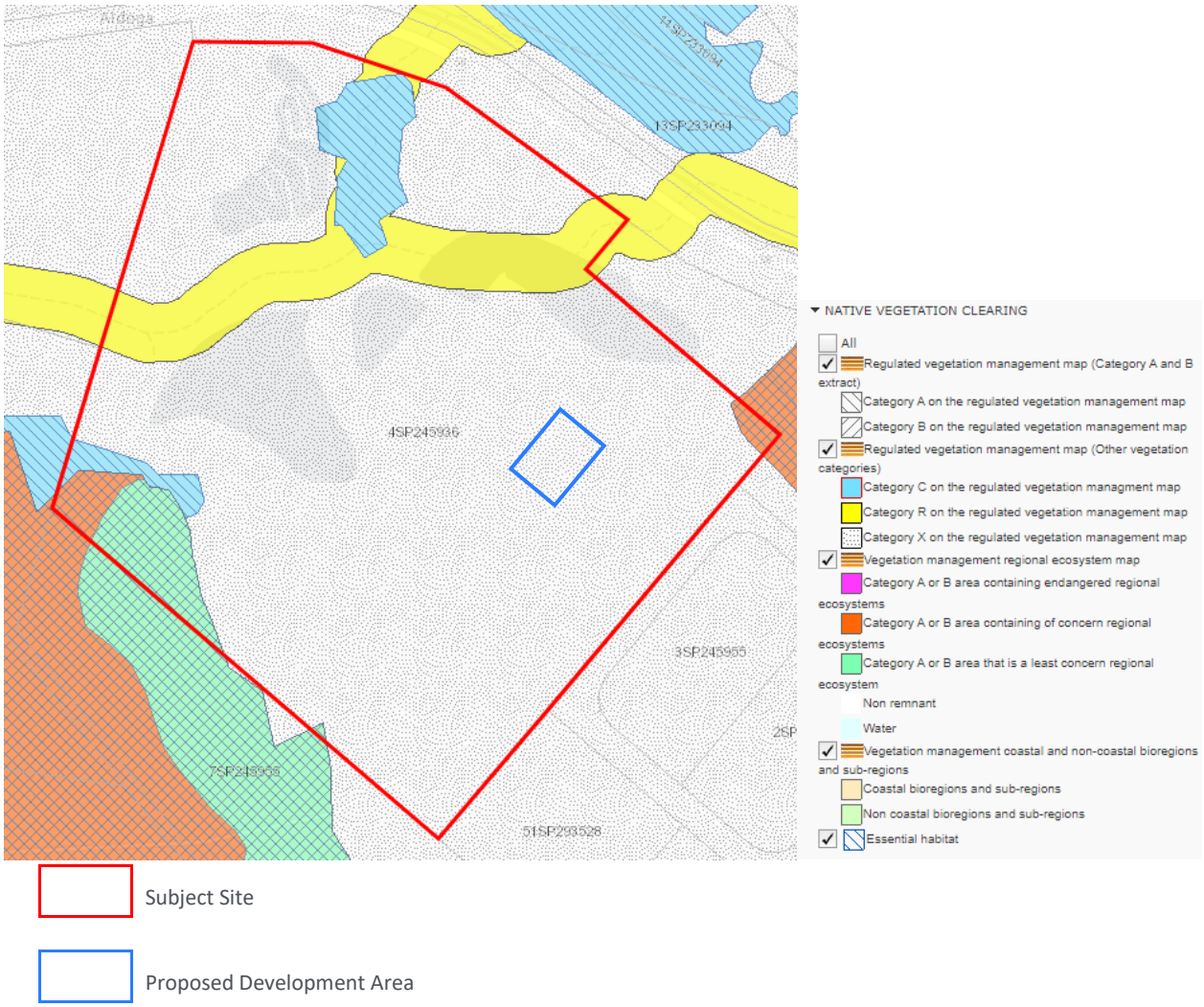



*Figure 1–4: MSES Mapping Source: Queensland Globe*

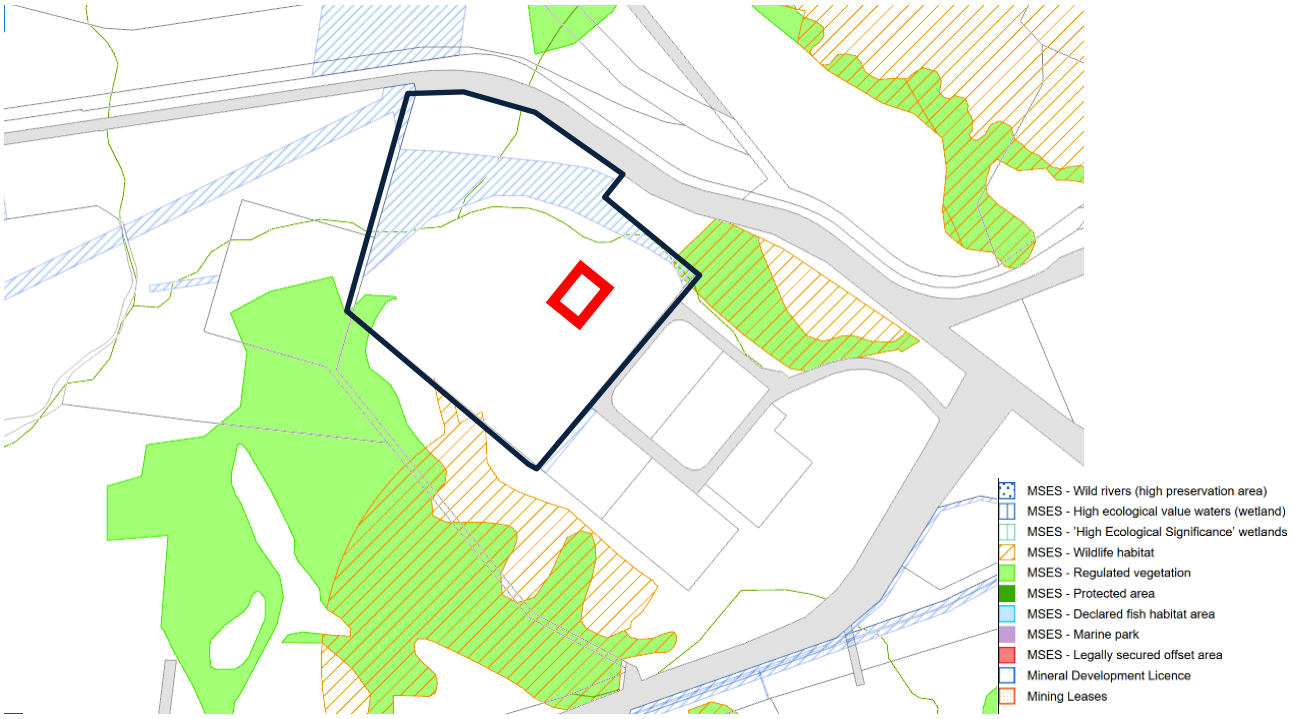



*Figure 1–5: Biodiversity overlay Source: GRCPS*

#### 1.3.1.3 Conservation Significant Flora

The Protected Matters Search Tool (PMST) report returned ten EPBC-listed threatened flora species as having the potential to occur within 2 km of the Site. While the Site contains areas of remnant vegetation that may provide suitable habitat for conservation significant flora species, it is unlikely for any to occur within the Proposed Development Area as vegetation is absent.

### 1.3.2 Fauna

#### 1.3.2.1 Wildlife habitat (vulnerable and endangered)

Wildlife habitat (vulnerable and endangered) is mapped within the Site for the following species:

- Squatter pigeon (southern subspecies) (*Geophaps scripta* subsp. *scripta*)
- Central greater glider (*Petauroides armillatus*)
- Powerful owl (*Ninox strenua*)
- Yellow-bellied glider (southern subspecies) (*Petaurus australis* subsp. *australis*).

#### 1.3.2.2 Conservation Significant Fauna

The PMST report returned 23 EPBC-listed threatened fauna species as having potential to occur within 2 km of the Site. Additionally, 16 migratory species (inclusive of threatened species that are listed as migratory) were returned as having potential to occur within 2 km of the Site. While the Site contains areas of remnant vegetation that may provide suitable habitat for conservation significant fauna species, it is unlikely for any to occur within the Proposed Development Area as vegetation is absent.

### 1.3.3 Biodiversity risk assessment

**Risk: Low**

A low risk of impact to the abovementioned environmental values is expected as the Site is already heavily modified and the works do not require significant changes to landforms outside of the current lot and plan.

### 1.3.4 Biodiversity value mitigation measures

- develop and implement best-practice Site management measures within an EMP Framework
- develop and implement a detailed Water and Waste Management Strategy
- avoid the removal of large hollow-bearing trees (if any exist on Site).

## 1.4 Air

### 1.4.1 Wind direction

The prevailing winds (Figure 1–6) at this location are:

- >40% of the time between 20 and 30 km/h from the E
- >15% of the time between 20 and 30 km/h from the NE
- >15% of the time between
- <10% of the time between 20 and 30 km/h from the SE.

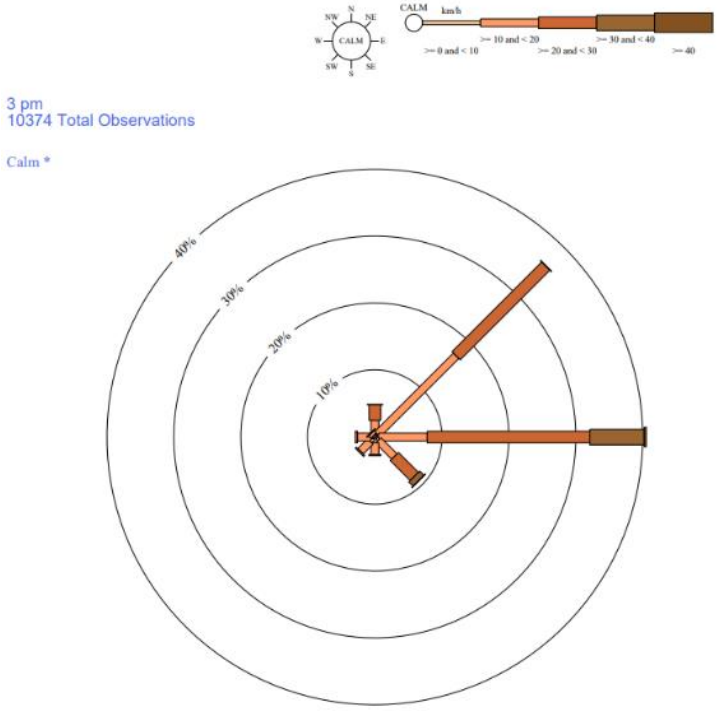



*Figure 1–6: Prevailing wind direction*

### 1.4.2 Description of ambient air quality

The Department of Environment, Science and Innovation operate the Boat Creek live air quality monitoring station, located in the grounds of the Gladstone Area Water Board's Boat Creek pumping station on the Gladstone Mt Larcom Road, north of Gladstone – approximately 5 km from the proposed site location.

The station records the following parameters:

- Nitrogen dioxide
- Particle PM10
- Particle PM2.5
- Sulphur dioxide
- Visibility
- Humidity
- Temperature
- Wind direction
- Wind speed.

The station is located in the opposite direction to the predominant prevailing winds, which provides a sound ambient air quality baseline location.

Figure 1–7 presents air quality trends from the Gladstone air quality monitoring locations, with results indicating the prevailing condition of “fair”. A description of air quality categories is included in Table 1-1.

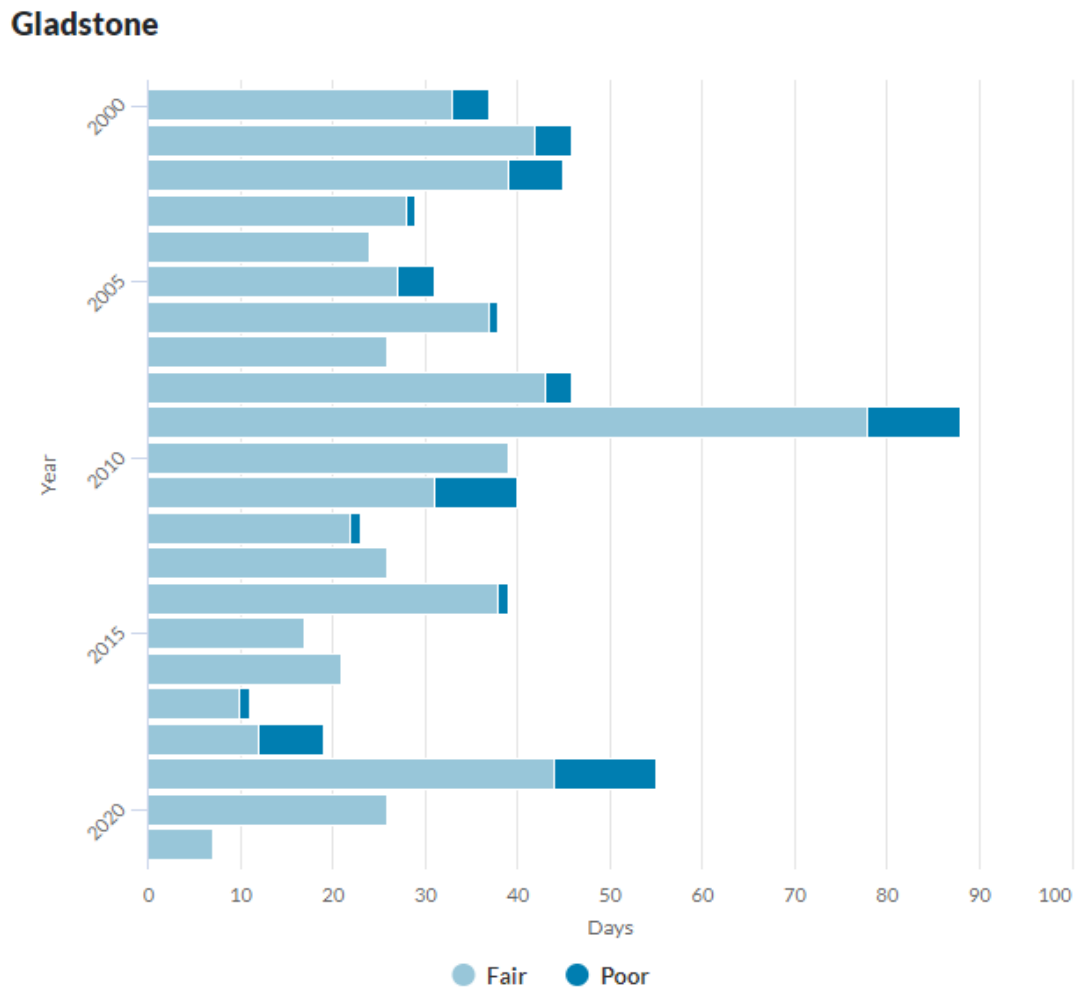



*Figure 1–7: Air quality trend (human health) 2000-2021*

*Table 1-1: Air quality category definitions*

| Category | Condition threshold |
|---|---|
| Poor | At least one Air NEPM monitoring station did not meet the air quality objective for one or more pollutants, reflecting high pollution levels. |
| Fair | All Air NEPM monitoring stations met the air quality objective(s), but at least one station reached half the objective for one or more pollutants. |
| Good | All Air NEPM monitoring stations were below half the air quality objective(s) for all pollutants, reflecting good air quality. |
| Objectives | 0.065 ppm (parts per million) ozone (8-hour average)<br>0.08 ppm nitrogen dioxide (1-hour average)<br>0.10 ppm sulphur dioxide (1-hour average)<br>9.0 ppm carbon monoxide (8-hour average)<br>50 µg/$m^3$ (micrograms per cubic metre) $PM_{10}$ (particles less than 10 micrometres in size)<br>25 µg/$m^3$ $PM_{2.5}$ (particles less than 2.5 micrometres in size)<br>20 km visual distance (1-hour average) |

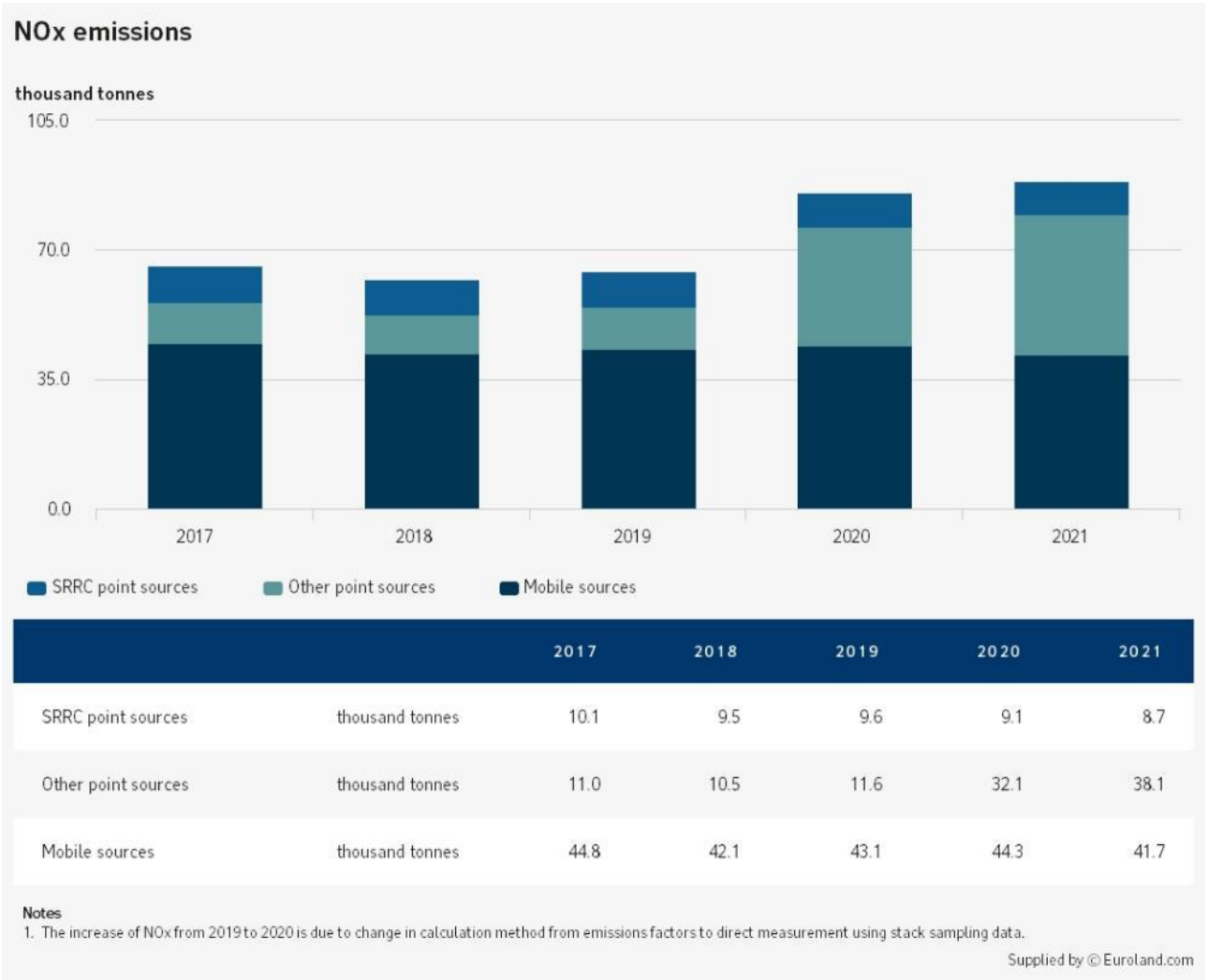
**Table note:**

Source: Queensland Government Regional Air Quality Trends - https://www.qld.gov.au/environment/management/monitoring/air/air-trends/regional-trends#container-304623

The operation of the Yarwun Alumina Refinery directly to the south of the proposed site location is likely to be the largest influencer of air quality in the immediate surrounding environment. The major air emissions from the refinery operations are:

- greenhouse gases, predominantly from the generation of electricity, combustion of fuel, and the production of aluminium
- sulphur oxides (SOx), mainly at the aluminium and copper smelters and coal and fuel oil fired power stations
- nitrogen oxides (NOx) from burning fossil fuels
- gaseous fluoride emissions from aluminium smelters
- respirable particulate emissions – very fine particles from mining and processing operations and from burning fossil fuels.

Figure 1–8 and Figure 1–9 present 5 years of Nitrogen Oxides and PM10 particulate monitoring from the refinery, with slightly increasing trends appearing.




| | | 2017 | 2018 | 2019 | 2020 | 2021 |
|---|---|---|---|---|---|---|
| SRRC point sources | thousand tonnes | 10.1 | 9.5 | 9.6 | 9.1 | 8.7 |
| Other point sources | thousand tonnes | 11.0 | 10.5 | 11.6 | 32.1 | 38.1 |
| Mobile sources | thousand tonnes | 44.8 | 42.1 | 43.1 | 44.3 | 41.7 |

Notes
1. The increase of NOx from 2019 to 2020 is due to change in calculation method from emissions factors to direct measurement using stack sampling data.

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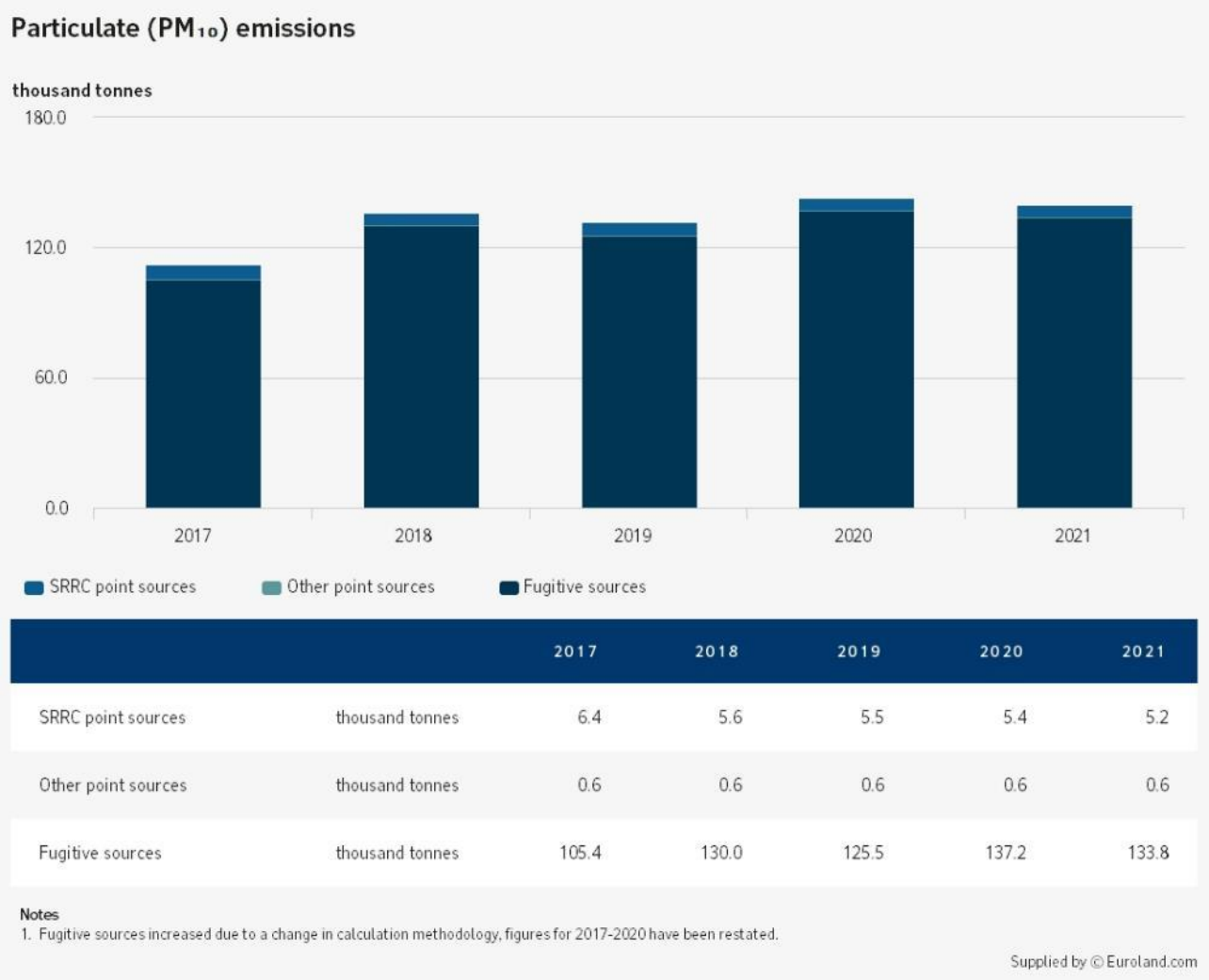
*Figure 1–8: NOx emissions from the Yarwun Alumina Refinery 2017-2021*




| | | 2017 | 2018 | 2019 | 2020 | 2021 |
|---|---|---|---|---|---|---|
| SRRC point sources | thousand tonnes | 6.4 | 5.6 | 5.5 | 5.4 | 5.2 |
| Other point sources | thousand tonnes | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 |
| Fugitive sources | thousand tonnes | 105.4 | 130.0 | 125.5 | 137.2 | 133.8 |

Notes
1. Fugitive sources increased due to a change in calculation methodology, figures for 2017-2020 have been restated.

Supplied by © Euroland.com

*Figure 1–9: Particulate emissions from the Yarwun Alumina Refinery 2017-2021*

### 1.4.3 Emissions

Emissions produced from the commission of electrolysers will be restricted to production of gaseous hydrogen from the cathode and oxygen from the anode and this will be vented into the atmosphere, instead of capture. In the event of a shutdown and air entering the vent lines, nitrogen or another inert gas may be used to purge vent lines before commissioning recommences.

The maximum vent release of hydrogen is modelled at 39.4 kg/hr from the safety relief valve but it expected to typically release at 23.4 kg/hr (Preliminary Technical note – Preliminary vent Design Review, PAP Solutions 2023).

There will be no discharge to air of contaminants that may cause an adverse effect on any of the environmental values that are to be enhanced or protected under the Environmental Protection (Air) Policy 2019 from the operation of the activity and the Environmental objectives under the Environmental Protection Regulation 2019 for air can be met, therefore no assessment has been undertaken. Evaluating impacts of emissions

**Risk: Low**

Given the relatively low risk of vapour / gas release during operations and the low toxicity of the gases used the major risk to air quality during operations is through explosion of the storage tanks. Storage and operation of these tanks in accordance with manufacturers recommendations and safety protocols is therefore imperative. Emergency management plans should be developed prior to operation.

#### 1.4.3.1 Discharges and releases (including unplanned and uncontrolled)

Storage and handling areas for prescribed hazardous chemicals are designed to prevent contact between the prescribed hazardous material and have any discharges or releases

The system is designed to continuously monitor for hydrogen leaks at the electrolysers. However, as the application is for the commissioning of electrolysers, hydrogen will not be monitored or collected.

### 1.4.4 Odour

No odours are expected to be produced through the operational phases of the plant.

### 1.4.5 Dust

No significant dust emissions are expected to be produced through the operational phases of the plant.

### 1.4.6 Air dispersion modelling

Due to the low risk of impact to air during operations, air dispersion modelling has not been undertaken.

### 1.4.7 Air impact assessment

**Risk: Low**

The Site is currently operating as per the current EA in regard to proposed air quality impacts. No addition in quantum of air quality impacts are expected, relative to the previous licencing conditions.

### 1.4.8 Air mitigation measures

The following measures will be utilised to reduce ongoing impacts to air values. These include:

- the Project is designed so that it meets the requirements outlined in the EP Act and the *Environmental Protection (Air) Policy 2019*
- an Air Management Plan should be developed as part of the EMP(C), to effectively manage risks to sensitive receptors during all construction and operational works and to comply with the General Environmental Duty (GED) under the EP Act and *Environmental Protection (Air) Policy* 2019
- the Contractor will be required to manage dust generation through the use of dust suppression on areas of exposed earth, minimising the extent and duration of soil exposure, maintaining all revegetated areas until established
- limit vehicle speeds on unsealed surfaces to below 30 km/h. Haul vehicles to always cover loads while moving
- burning of waste of any kind is not to be undertaken at the project site at any time
- if complaints are received, undertake air quality assessments in proximity to sensitive receptors and with respect to the complaint.

## 1.5 Noise

### 1.5.1 Environmental values

There are several ecological environmental receptors located within the 2.5 km buffer zone, including an Of Concern Regional Ecosystem (E*ucalyptus tereticornis* and/or Eucalyptus spp. Woodland on alluvial plains (RE 11.3.4)), essential wildlife habitat and several waterways.

The nearest sensitive residential receptor is located approximately 2.4 km to the east of the site, and there are two commercial properties within the 2.5 km buffer zone, including an electrical substation to the north and the Yarwun bauxite processing plant and associated by-product storage facilities immediately to the south (refer Figure 1–10).

### 1.5.2 Sensitive places

The proposed industrial activity is located in the High Impact Industrial Precinct of the Strategic Development Area (SDA). The Precinct is strategically located away from sensitive receptors. With the exception of vehicle access, the majority of plant items are also located within enclosures which are either partially closed or fully enclosed which will reduce noise emissions externally from the site.

A noise and vibration assessment for operations at the site has not been undertaken. Noting this, a similar assessment has been conducted for the Gibson Island Hydrogen Plant and these indicative levels of plant during construction and operations has been used. Operational activities will be undertaken in two, twelve-hour shifts resulting in 24/7 continuous operation. Day shift will start at 6:00am, and night shift will start at 6:00pm each day. It is estimated that 20 personnel will be onsite at peak during day shift activities.

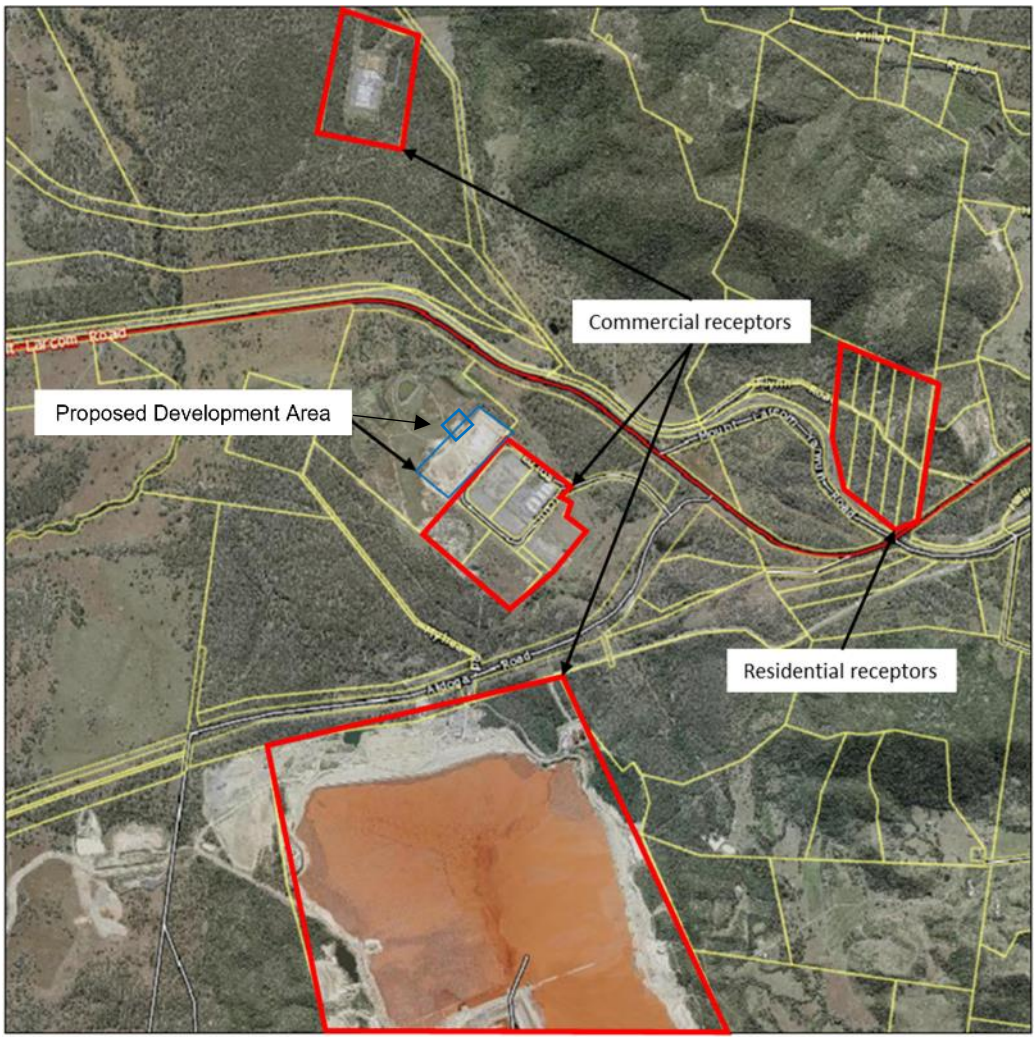



*Figure 1–10: Sensitive places surrounding the Proposed Development Area*

### 1.5.3 Noise objectives and criteria

Queensland's EP Act forms part of a legislative framework that regulates noise from domestic, commercial and industrial premises.

Environmental nuisance is defined in the EP Act as unreasonable interference or likely interference with an environmental value caused by, for example, noise. The *Environmental Protection (Noise) Policy* 2019 (Qld) (EPP Noise) identifies the environmental values of the acoustic environment to be protected and enhanced.

By identifying environmental values, the EPP Noise assists in informing whether environmental nuisance under the EP Act has been caused.

The EPP Noise identifies the environmental values of the acoustic environment to be enhanced or protected to achieve the objective of the EP Act; that is, ecologically sustainable development.

The environmental values under the policy are:

- the qualities of the acoustic environment that are conducive to protecting the health and biodiversity of ecosystems; and
- the qualities of the acoustic environment that are conducive to human health and wellbeing, including by ensuring a suitable acoustic environment for individuals to do any of the following—
  - sleep
  - study or learn
  - be involved in recreation, including relaxation and conversation.
- the qualities of the acoustic environment that are conducive to protecting the amenity of the community.

Under the policy, a 'sensitive receptor' means: "*An area or place where noise is measured*."

Under the policy, an 'acoustic quality objective' means: "*For a sensitive receptor, means the maximum level of noise that should be experienced in the acoustic environment of the sensitive receptor*."

Acoustic quality objectives for specific sensitive receptors under the policy are stipulated in Schedule 1 of the Environmental Protection (Noise) Policy. Those stipulated in Schedule 1 of the Noise EPP applicable to the Project are presented in Table 1-2.

***Table 1-2: Qld Environmental Protection (Noise) Policy 2019 acoustic quality objectives applicable to the Project***

| Receptor | Time of day | Acoustic quality objectives | | | Environmental value |
|---|---|---|---|---|---|
| | | $dBL_{Aeq,1hr}$ | $dBL_{A10,1hr}$ | $dBL_{A1,1hr}$ | |
| Residence (for outdoors) | Daytime and evening | 50 | 55 | 65 | Health and wellbeing |
| Residence (for indoors) | Daytime and evening | 35 | 40 | 45 | Health and wellbeing |
| | Night-time | 30 | 35 | 40 | Health and wellbeing, in relation to ability to sleep |
| Commercial or retail activity (for indoors) | When the activity is open for business | 45 | - | - | Health and wellbeing, in relation to the ability to converse |

**Table note:**

- Daytime means 7 am to 6 pm
- Evening means 6 pm to 10 pm
- Night-time means 10 pm to 7 am
- LAeq,1hr means an A-weighted sound pressure level of a continuous steady sound, adjusted for tonal character, that within a 1-hour period has the same mean square sound pressure of a sound that varies with time
- LA10,1hr means the A-weighted sound pressure level, adjusted for tonal character or impulsiveness, that is exceeded for 10% of a 1-hour period when measured using a fast-standardised response time
- LA1,1hr means the A-weighted sound pressure level, adjusted for tonal character or impulsiveness, that is exceeded for 1% of a 1-hour period when measured using a fast-standardised response time.

### 1.5.4 Noise sources

#### 1.5.4.1 Construction

The construction of the site is proposed to occur in three stages:

- Stage 1: site preparation
- Stage 2 and 3: construction and installation of equipment and buildings
- Stage 4: commissioning.

The number of plant and equipment for each staging, with their associated sound power levels are identified in Table 1-3. Plant selections are subject to change once a construction programme has been established by the site contractor. These construction scenarios represent a worst-case assessment based on the preliminary plant proposed for the build. A reassessment may be required if there are significant changes to the construction staging.

Construction noise at the nearest commercial receiver and residential receptor has been predicted with all plant, in each construction stage, operating simultaneously (which would rarely be the case in practice); and assuming that all plant is located at the nearest site boundary closest to the receiver. This represents a worst-case, and therefore conservative, assessment scenario at the receivers.

The predicted noise levels for construction are shown in Table 1-3.

*Table 1-3: Source noise levels for proposed construction plant*

| Plant | Sound power level (dB) for Octave band centre frequency (Hz) | | | | | | | Total, dB(A) |
|---|---|---|---|---|---|---|---|---|
| | 63 | 125 | 250 | 500 | 1k | 2k | 4k | |
| Dump truck | 113 | 102 | 106 | 101 | 101 | 102 | 95 | 107 |
| Excavator | 109 | 108 | 108 | 111 | 110 | 107 | 104 | 114 |
| Bulldozer | 105 | 114 | 103 | 103 | 110 | 108 | 101 | 113 |
| Loader | 115 | 110 | 105 | 106 | 101 | 98 | 92 | 107 |
| Bitumen trucks | 108 | 97 | 94 | 98 | 99 | 97 | 92 | 103 |
| Asphalt unit | 98 | 106 | 107 | 100 | 105 | 96 | 94 | 104 |
| Compactor | 98 | 106 | 107 | 100 | 105 | 96 | 94 | 107 |
| Scraper | 105 | 114 | 103 | 103 | 110 | 108 | 101 | 113 |
| Water truck | 108 | 97 | 94 | 98 | 99 | 97 | 92 | 103 |
| Curbing unit | 106 | 105 | 100 | 100 | 99 | 97 | 90 | 104 |
| Piling rig | 108 | 107 | 101 | 102 | 101 | 101 | 92 | 106 |
| Backhoe | 114 | 108 | 106 | 105 | 109 | 111 | 110 | 117 |
| Roller (smooth) | 115 | 113 | 103 | 101 | 103 | 101 | 97 | 108 |
| Concrete truck | 108 | 97 | 94 | 98 | 99 | 97 | 92 | 103 |
| Forklift | 108 | 105 | 102 | 102 | 102 | 99 | 93 | 106 |
| Flatbed truck | 105 | 94 | 91 | 95 | 96 | 94 | 89 | 100 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Mobile crane | 108 | 107 | 101 | 102 | 101 | 101 | 92 | 106 |
| Hiab truck | 105 | 94 | 91 | 95 | 96 | 94 | 89 | 100 |
| Generator | 108 | 102 | 85 | 82 | 81 | 76 | 73 | 89 |
| Telescopic crane | 108 | 107 | 101 | 102 | 101 | 101 | 92 | 106 |
| Hand tools | 93 | 93 | 91 | 84 | 83 | 86 | 88 | 94 |

**Table note:**

Plant sound power levels have been referenced from:

- British Standard BS5228-1:2009 + A1:2014 Code of practice for noise and vibration control on construction and open sites – Part 1: Noise; and
- Australian Standards AS2436-2010 Guide to noise and vibration control on construction, demolition and maintenance sites.

### 1.5.4.2 Operation

Table 1-4 presents the source noise levels during operational phases of the proposed plant. Predicted noise emissions have been calculated for the FFI project site operating in isolation. The noise predictions for the FFI site operating in isolation have been presented from modelling conducted for a similar plant in Gibson Island and are regarded as a suitable proxy, given the similarity between projects and absence of any similar plants within proximity.

*Table 1-4: Source noise levels for proposed operational plant*

| Plant | Sound power level (dB) for Octave band centre frequency (Hz) | | | | | | | | | Total, dB(A) |
|---|---|---|---|---|---|---|---|---|---|---|
| | 31.5 | 63 | 125 | 250 | 500 | 1k | 2k | 4k | 8k | |
| Pumps (100kW, 1600-1800 rpm) | 93 | 94 | 95 | 97 | 97 | 100 | 97 | 93 | 87 | 104 |
| Pumps (75kW, 1600-1800 rpm) | 93 | 94 | 95 | 97 | 97 | 100 | 97 | 93 | 87 | 103 |
| Pumps (75kW, 3600 rpm) | 90 | 91 | 92 | 94 | 94 | 97 | 94 | 90 | 84 | 100 |
| Electrolyser pump | 93 | 94 | 95 | 97 | 97 | 100 | 97 | 93 | 87 | 104 |
| Cooling tower | 108 | 111 | 111 | 108 | 105 | 101 | 98 | 95 | 87 | 107 |
| Power transformer | 80 | 89 | 92 | 87 | 87 | 79 | 72 | 64 | 52 | 86 |
| Distribution transformer | 80 | 89 | 92 | 87 | 87 | 79 | 72 | 64 | 52 | 86 |
| Compressor | 107 | 103 | 108 | 107 | 105 | 108 | 113 | 110 | 103 | 116 |
| Transformer | 80 | 89 | 82 | 87 | 87 | 79 | 72 | 64 | 52 | 86 |
| Condensers | 72 | 77 | 75 | 78 | 74 | 67 | 65 | 57 | 51 | 75 |

**Table note:**

- power and distribution transformers are only associated with the electrolyser unit substations.

### 1.5.5 Noise impact assessment

**Risk: Low**

The proposed industrial activity is located in the High Impact Industrial Precinct of the SDA. The impacts are not considered significant with regard to the magnitude of noise levels above the criteria.

### 1.5.6 Noise mitigation measures

It is recommended strategies are considered and, where appropriate, outlined in a Construction Management Plan to mitigate potential impacts, such as:

- install site hoardings or boundary barriers prior to construction activities commencing
- orient construction trucks and plant away from sensitive receivers as much as possible to minimise noise impacts
- strategically group plant together to minimise noise impacts from multiple directions
- manage on site vehicle speeds and avoid/minimise using broadband/audible reversing alarms
- strategically locate site ingress and egress points to minimise travel within the site. Maintain site paths to avoid unnecessary noise sources such as from vehicles striking potholes and loose items
- work within the nominated construction hours of work, including start up meetings and closure periods
- utilise lowest noise plant to complete construction works and implement low noise work practices
- locate site buildings, staff access areas and laydown yards to minimise disturbance to the community
- utilise temporary enclosures works and/or works undertaken outside the typical construction hours to shield high noise generating activities
- ensure noise attenuation measures are implemented on fixed and mobile plant such as mufflers and silencers to minimise noise impacts
- turn off plant when not in use and avoid idling when possible
- keep out-of-use plant located away from sensitive receivers
- avoid heavy handling of materials and equipment to prevent sudden noise events
- undertake site inductions for all employees, contractors and subcontractors, with the induction including noise mitigation measures and management actions to be adopted by all site personnel.

## 1.6 Waters, including wetlands and stormwater management

### 1.6.1 Site plan

The Proposed Development Area is located approximately 250 m north-west from the Euroa Circuit boundary within the lot. The Proposed Development Area is not affected by flooding.

Process-water has been calculated to be between 15-27 $m^3$ per day, dependent on the quantum of electrolysers under commissioning and will be captured on-site and stored.

Site-water will be broken into the following two categories with their respective capture process:

- Stormwater – to be channelled to a drainage easement to North and East of the Proposed Development Area, where man-made basins are located, including a retention basin and a wetland.
- Process-water – to be captured and trucked for treatment offsite to ensure no discharge to natural environment occurs.

The site ultimately discharges into Larcom Creek to the northwest. Mapped waterway at the Site are shown in Figure 1–11.

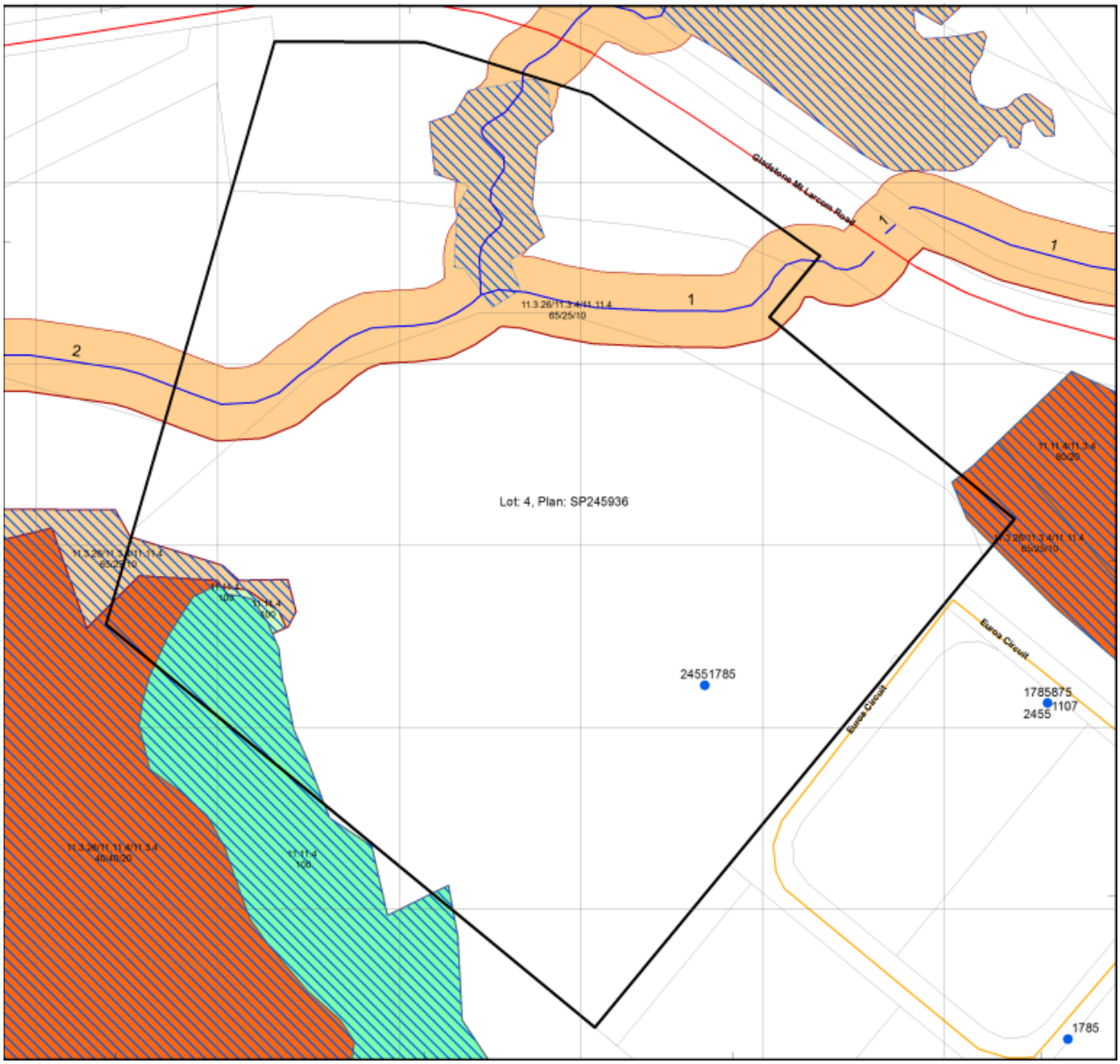



*Figure 1–11: Mapped waterways surrounding the project site*

### 1.6.2 Rainfall

Gladstone airport (approximately 23 km from the project site) receives approximately 866mm of annual rainfall, the majority falling between December and March. Table 1-5 outlines the climate statistic for the weather station.

*Table 1-5 Climate statistic from Gladstone Airport*

| Rainfall | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mean rainfall (mm) | 136.4 | 165.9 | 118.3 | 41.2 | 38.4 | 39.1 | 32.4 | 31.8 | 27.5 | 63.3 | 61.7 | 103.3 | 866.5 | 28 | 1994 2023 |
| Decile 5 (median) rainfall (mm) | 118.6 | 110.6 | 63.2 | 27.4 | 19.2 | 18.9 | 14.6 | 15.4 | 16.4 | 53.2 | 46.2 | 88.2 | 786.3 | 29 | 1994 2023 |
| Mean number of days of rain ≥ 1 mm | 8.5 | 8.5 | 7.2 | 3.9 | 3.6 | 3.8 | 3.0 | 2.6 | 2.8 | 4.9 | 4.8 | 7.1 | 60.7 | 28 | 1994 2023 |

### 1.6.3 Flood hazard

Following review of the GRCPS, it has been determined that the site is not located in a flood hazard area (refer Figure 1–12). Therefore, it is considered that a focused flood risk assessment and Flood Management Plan is not required.


*Figure 1–12: Flood hazard mapping of the surrounding area*

### 1.6.4 Surface water

Surface waters on site drain to Larcom Creek and eventually to Calliope River, which ultimately empties into the GBR catchment (Fitzroy Region). Table 1-6 from the *Queensland Water Quality Guidelines 2009* outlines the regional guideline values for physio-chemical indicators.

Current water quality conditions within the Calliope River catchment are influenced by a number of anthropogenic activities, including grazing, agriculture, industry and urban-based activities. Based on the extent of catchment clearing and existing land use patterns, the condition of the Calliope River catchment was reported as poor to moderate in the 1992 National Land and Water Audit (C & R Consulting 2005). While the catchment has undergone extensive clearing, with up to 66% of native vegetation removal estimated (Accad et al 2003), one factor influencing the in-stream water quality is the presence of a relatively thin, riparian corridor (predominantly native vegetation) along the entire freshwater length of the Calliope River

Within this area, the Calliope River is characterised by a series of large, deep waterholes. This is supported by the EPA wetland mapping which characterises the reach as a riverine system (i.e., wetlands and refuge habitats contained within the river channel). Similar habitats were identified on Farmer Creek and Larcom Creek. These in-stream freshwater pools provide important habitat for native fish of the area.

*Table 1-6: Regional guideline values for physio-chemical indicators*

**Table 3.2.1a: Regional guideline values for physico-chemical indicators – Central Coast region fresh and estuarine waters**

| Central region water type | Physico-chemical indicator (see Appendix E) and guideline[9] value (slightly to moderately disturbed systems) | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Amm N | Oxid N | Org[6] N | Total N | FiltR P | Total P | Chl-a | DO (% sat[b])[1,2,3] | | Turb | Secchi | SS | pH[4,5] | | Conductivity | Temperatu |
| | (µg/L) | (µg/L) | (µg/L) | (µg/L) | (µg/L) | (µg/L) | (µg/L) | lower | upper | (NTU) | (m) | (mg/L) | lower | upper | (µS/cm) | (°C) |
| Open coastal, midshelf & offshore | See Table 3.2.1b which covers guidelines for these waters, which are within the Great Barrier Reef Marine Park. | | | | | | | | | | | | | | | Managers need to de their own upper and lower guideline values, us the 80th ar 20th percentiles respective of ecosyst temperatu distributior (ANZECC 2000). |
| Enclosed coastal | 8 | 3 | 180 | 200 | 6 | 20 | 2.0 | 90 | 100 | 6 | 1.5 | 15 | 8.0 | 8.4 | n/a | |
| Mid-estuarine and tidal canals, constructed estuaries, marinas and boat harbours | 10 | 10 | 260 | 300 | 8 | 25 | 4.0 | 85 | 100 | 8[8] | 1.0[8] | 20[8] | 7.0 | 8.4 | n/a | |
| Upper estuarine | 30 | 15 | 400 | 450 | 10 | 40 | 10.0 | 70 | 100 | 25[8] | 0.4[8] | 25[8] | 7.0 | 8.4 | n/a | |
| Lowland streams[10] | 20 | 60 | 420 | 500 | 20 | 50 | 5.0 | 85 | 110 | 50 | n/a | 10 | 6.5 | 8.0 | See Appendix G | |
| Upland streams[10] | 10 | 15 | 225 | 250 | 15 | 30 | n/a | 90 | 110 | 25 | n/a | – | 6.5 | 7.5 | See Appendix G | |
| Freshwater lakes/ reservoirs | 10 | 10 | 330 | 350 | 5 | 10 | 5.0 | 90 | 110 | 1–20 | nd | nd | 6.5 | 8.0 | See Appendix G | |
| Wetlands[7] | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | |

### 1.6.5 Groundwater

No Groundwater Dependent Ecosystems (GDEs) have been identified within the study area, or in the 2.5 km buffer surrounding the site. It should be noted that extensive groundwater monitoring bores are located immediately to the south of the site (refer to Figure 1–13), further information may be available from these bores. It is recommended that further testing is undertaken to determine the depth of groundwater within the site.

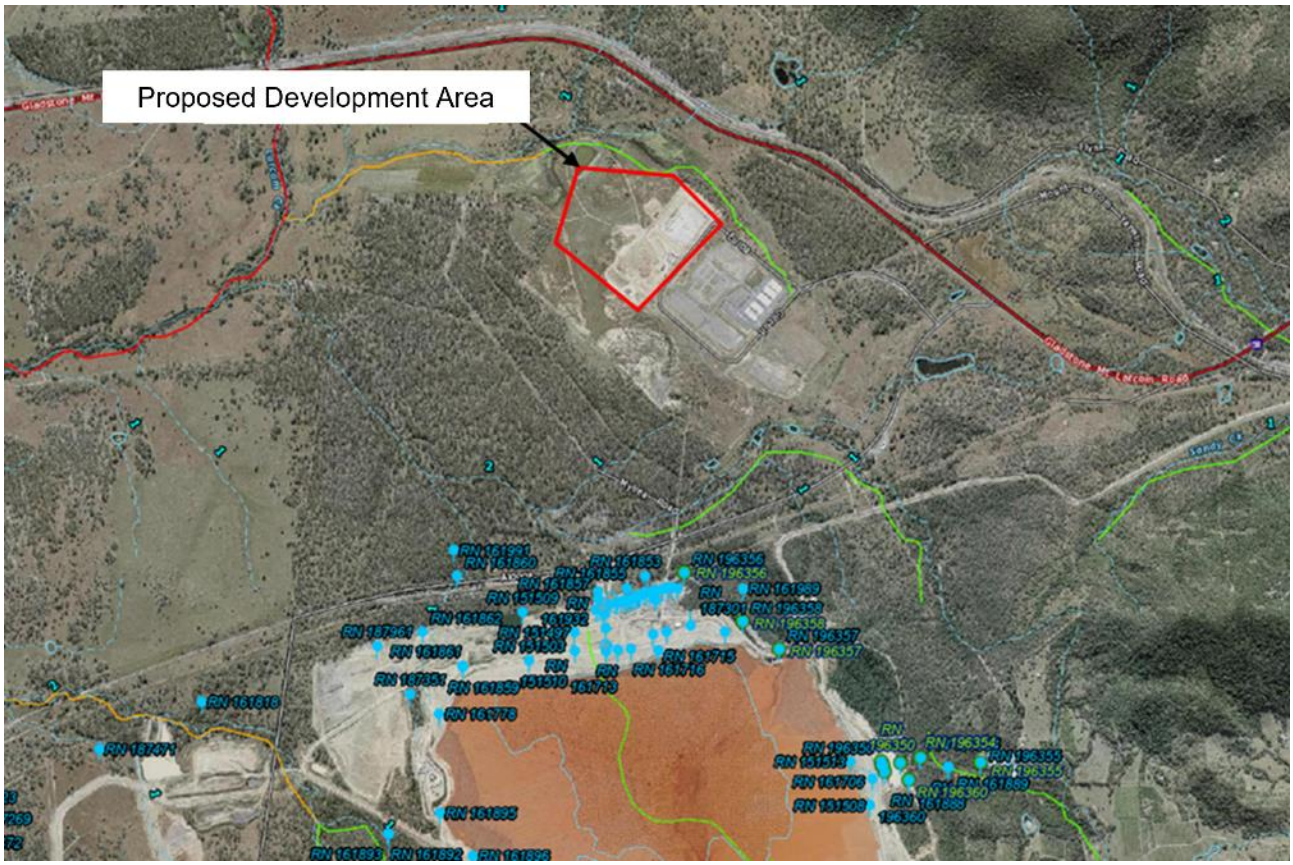



*Figure 1–13: Groundwater monitoring locations*

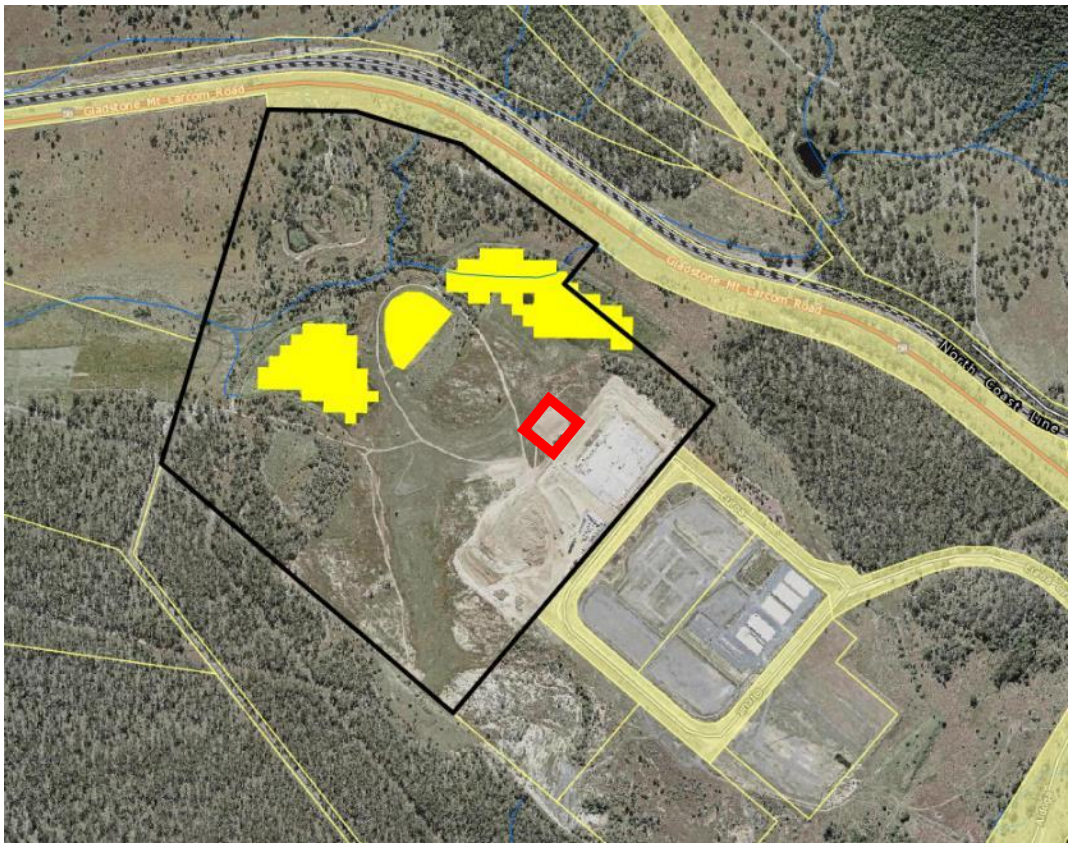
### 1.6.6 Discharges and impacts to groundwater

The proposed development will not have any discharges to groundwater.

### 1.6.7 Impacts to wetlands

No impacts to wetlands are expected from works.

The Queensland Globe Map indicates that there are three Lacustrine wetlands with habitat type artificial/ highly modified wetlands approximately 100m to the north/north-west of the boundary of the Proposed Development Area, this appears to be a mapping error as these are the previously constructed stormwater detention and treatment devices (refer Figure 1–14).




Subject Site

Proposed Development Area

*Figure 1–14: Wetlands area Source: Queensland Globe Map*

### 1.6.8 Great Barrier Reef catchment waters

The Calliope River catchment flows directly into the Capricorn and Curtis Coast section of the Great Barrier Reef Marine Park and subsequently have strict management plans and water quality objectives being implemented under Queensland's *Environmental Protection (Water) Policy 2019* and the DESI *Industry releases to barrier reef catchments waters.* No releases of waters with increased suspended solids or dissolved inorganic nitrogen are proposed to be released to the Calliope River catchment.

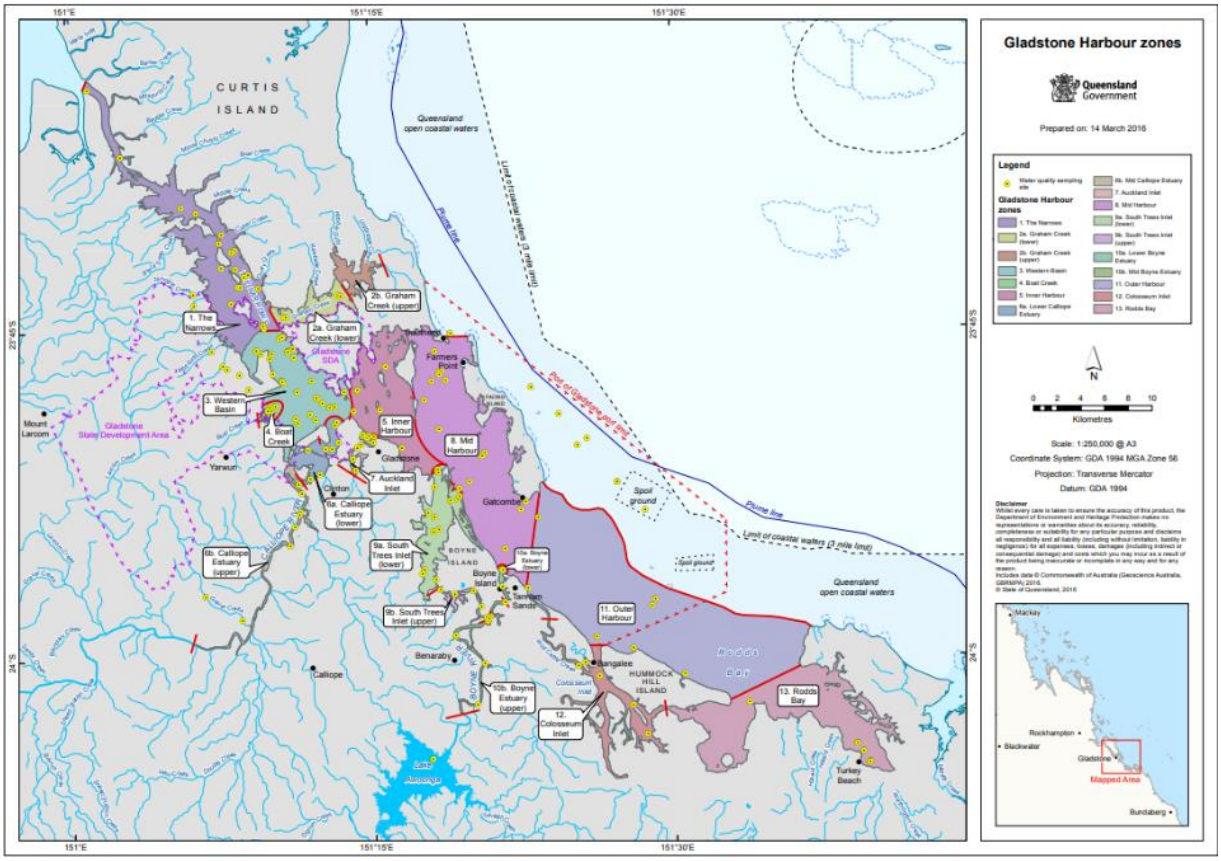



*Figure 1–15: Great Barrier Reef catchment waters*

### 1.6.9 Water impact assessment

**Risk: Low**

Unnamed tributary (drainage feature as per the *Water Act 2000*) of Larcom Creek runs across the north of the site. Surface waters on site drain to Larcom Creek and eventually to Calliope River. Works will not occur within any unmapped watercourses on site.

The current management measures associated with process-water

The design should minimise impacts to overland flows and impacts to surrounding watercourses and unmapped watercourses (e.g., the installation of underground rather than above ground piping where possible).

### 1.6.10 Water values mitigation measures

- design standards considered as part of the design to include:
  - State Planning Policy Code (Water Quality Appendix 2)
  - IECA Best Practice Erosion and Sediment Control document.
- erosion and sediment control design for the project should be consistent with IECA BPESC documents, including the development of a conceptual ESCP to guide the Contractor to develop site specific ESCP's during construction
- a stormwater management plan will be developed prior to works and submitted to Gladstone Regional Council which will indicate, at minimum:

- stormwater releases to receiving environment to achieve Stormwater Design objectives of the State Planning Policy Appendix 2 at minimum
- appropriate design for spill containment for process-water will be required to be developed.

### 1.6.11 Water management plans

Specific water management plans associate with construction will be compiled as required for other site works (including bulk earthworks and construction of facilities).

Due to the management of process-water, site management plans are only required stormwater and are to be finalised as condition of approval of the attached application.

The Stormwater Management Plan will outline the hydrologic and hydraulic analysis performed to design the stormwater infrastructure to support the new facility in a way that discharges from the drainage network correspond with those that would have occurred under predevelopment conditions. The plan follows the following steps:

- evaluation of the existing environmental conditions of the site
- describing the proposed development and its effect on stormwater quality
- calculating peak flow for pre and post development conditions
- assessing the current sizing of detention volumes required to maintain the flow to the pre-development condition
- identifying potential sources of contaminants and determination of measures for achieving the water quality objective.

## 1.7 Waste

### 1.7.1 Waste storage

Minimal amounts of waste will be created during operations. When the facility is operational, the majority of waste produced from the site will originate from the office component of the development. This waste will be stored in a storage facility on site and will be collected by a private collection service.

### 1.7.2 Wastewater infrastructure

When the facility is operational, the majority of waste produced from the site will originate from the office component of the development. This waste will be stored in a storage facility on site and will be collected by a private collection service weekly. Sewage from toilets and kitchen will be generated on a maximum rate of 1.5 $m^3$/d and will be sent to Gladstone Electrolyser Manufacturing facility located at Lot 1 SP245955. The existing treatment plant has the capacity to assimilate this flow. The treated wastewater is reused for irrigation.

Industrial wastewater consists primarily of the reject water from the water treatment, a reverse osmosis (RO) system. The reject contains the solids and salts removed from the water supply (potable water). The key parameters are presented in Table 1-7. The wastewater flow averages 4.5 $m^3$/h and as operations are restricted to commissioning the wastewater flow will be limited to 15-27 $m^3$ per day.

If for any reason the RO system experience issues, such as membranes clogging, the total flow of the wastewater will increase however is not expected to be occur to a level to not be captured as the normal wastewater stream.

*Table 1-7: Wastewater quality parameters*

| Parameter | Units | Average |
|---|---|---|
| **Total flow** | $m^3$/d | 90 |
| **Aluminium total** | mg/L | 0.177 |
| **Alkalinity (total)** | mg/L | 264 |
| **Calcium** | mg/L | 66 |
| **Chloride** | mg/L | 132 |
| **Conductivity** | µS/cm | 1135 |
| **DOC** | mg/L | 12.36 |
| **Hardness total** | mg/L | 322 |
| **Magnesium** | mg/L | 38 |
| **Manganese total** | mg/L | 0.005 |
| **Potassium** | mg/L | 11 |
| **pH** | - | 7.0 |
| **Sodium** | mg/L | 124 |
| **Suspended solids** | mg/L | 15 |
| **Sulphate** | mg/L | 115 |
| **Anti-scalant** | L/h | 0.5 |

### 1.7.3 Waste mitigation measures

Maximise waste avoidance, resource recovery, reuse and recycling as established by the waste hierarchy (Qld Waste Management Resource Recovery Strategy).

Avoid inappropriate disposal of waste by the following:

- a Waste Management Plan should be developed to manage risks during all operational works
- assign a secure location for storage of re-usable and recyclable materials on-site
- no waste or litter to be burnt on site
- hazardous substances will be properly stored and disposed of in accordance with legislative provisions and the EMP(C)
- ensure all regulated wastes (including off-site disposal of wastewater streams) are disposed of at an appropriately licensed facility.

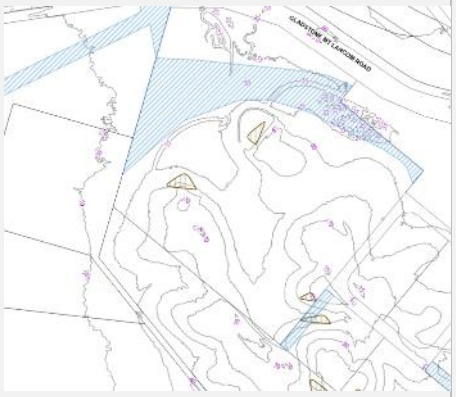
# 2. Desktop Environmental Values Assessment Summary

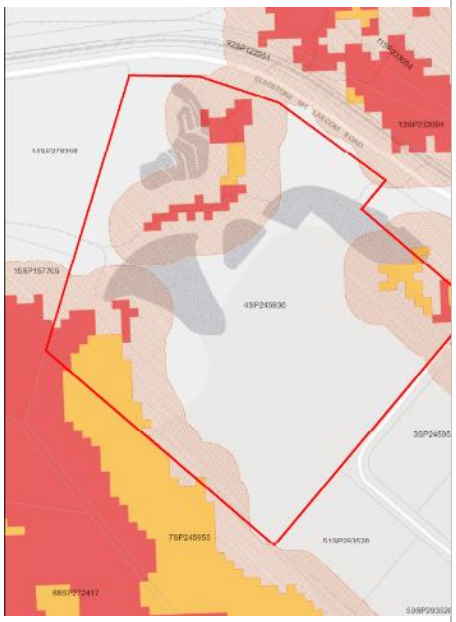
The environmental values associated with and surrounding the proposed project location are summarised within Table 2-1.

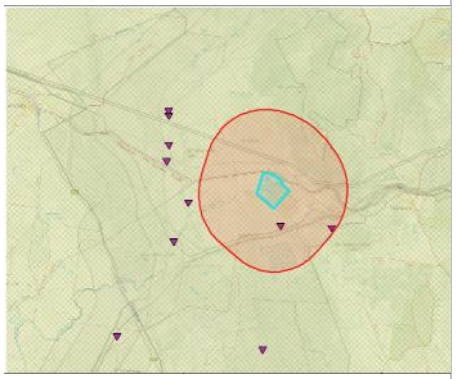
The environmental values that have been assessed include:

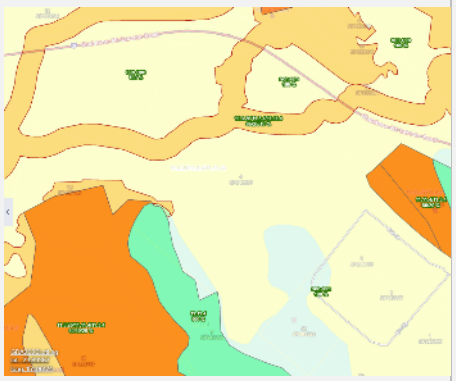
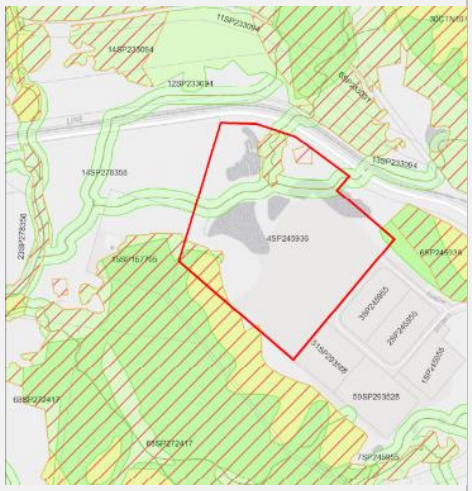
A. Soil
B. Land Use
C. Cultural Heritage
D. Biodiversity (Flora and Fauna)
E. Air
F. Noise and Vibration
G. Water including wetland and stormwater management.

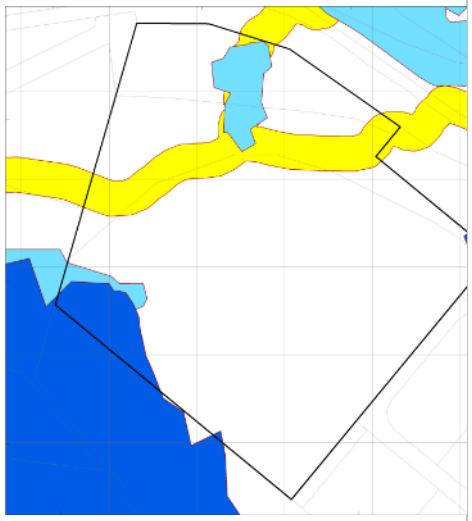
*Table 2-1: Desktop environmental values assessment.*

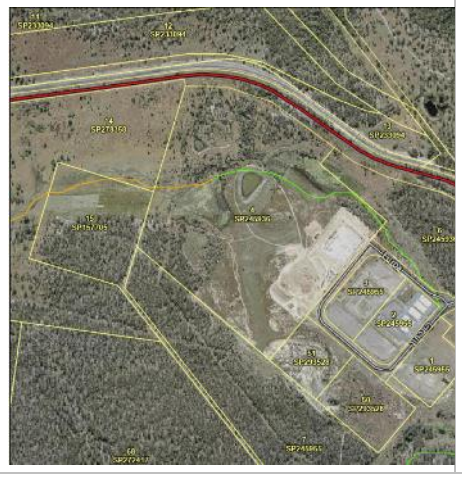
| Mapping / Diagram | Area | Environmental Value/s | Risk (without controls) and Mitigation Measures |
|---|---|---|---|
| **Soil** | | | |
| N/A | Lot 4 SP245936 | A contaminated land search undertaken on 2 July 2021 concluded that the site is not included on the Environmental Management Register (EMR) or the Contaminated Land Register (CLR). Refer to **Error! Reference source not found.**. | N/A |
| N/A | Lot 4 SP245936 | The GRCPS does not identify Acid Sulfate Soils on site. The Australian Soil Resource Information System (ASRIS) shows the general vicinity to have Extremely Low and Low Probability of Acid Sulfate Soils | N/A |
| N/A | Lot 4 SP245936 | No areas with substantial potential for UXO have been identified within the Study area. | N/A |
|  | Lot 4 SP245936 | Topography | **Risk: Low**<br>The Steep Land Overlay plan from the GRCPS indicates that four small areas of steep land are identified within the lot boundary. |

| Mapping / Diagram | Area | Environmental Value/s | Risk (without controls) and Mitigation Measures |
|---|---|---|---|
| **Land Use** | | | |
|  | Lot 4 SP245936 + 2.5 km | The site is located within the Gladstone State Development Area. | **Risk: N/A**<br>As detailed in Section 2.2 of the Gladstone State Development Area Development Scheme (May 2022), the strategic vision for the SDA includes supporting development that aligns with the Queensland Government's strategic priorities for the region, particularly related to the hydrogen industry. |
|  | Lot 4 SP245936 + 2.5 km | Bushfire prone area. | **Risk: Moderate**<br>Design to consider proximity to areas of High, Medium and Potential bushfire intensity areas within the proposed development site.<br>A Bushfire Management Plan will need to be developed. |
| N/A | N/A | The works are not mapped within a Priority Development Area. | N/A |

| Mapping / Diagram | Area | Environmental Value/s | Risk (without controls) and Mitigation Measures |
|---|---|---|---|
| N/A | N/A | The works are not within a Strategic Environmental Area. | N/A |
| **Cultural heritage** | | | |
|  | Lot 4 SP245936 | Aboriginal or Torres Strait Islander cultural heritage site points or polygons or National Heritage Areas (Indigenous values) are not recorded within the site boundaries, however two items of significance labelled as "artefact scatter" are located to the south and south-east, within a 2.5 km buffer zone. | **Risk: Low**<br>The Site is located within the Bailai, Gurang, Gooreng Gooreng, Taribelang Bunda People Cultural Heritage party boundary and the first Nations Bailai, Gurang, Gooreng Gooreng, Taribelang Bunda People Aboriginal Corporation RNTBC Cultural Heritage body boundary.<br>An approved CHMP (Aldoga South Road Extension Project) between the Port Curtis Coral Coast (PCCC) Registered Native Title Claimants and the Minister for Economic Development Queensland covers the Site.<br>No Cultural Heritage sites included on the Cultural Heritage Database and Register are mapped within the Site boundary, however two sites are mapped approximately 1 km south of the Site and south-east of the Site. It is recommended that a cultural heritage assessment occur in accordance with the *Aboriginal Cultural Heritage Act 2003* Duty of Care Guidelines and in consultation with the Bailai, Gurang, Gooreng Gooreng, Taribelang Bunda People.<br>A "Stop Works" procedure must be developed prior to any ground disturbing or clearing works commencing. |
| N/A | Lot 4 SP245936 | There are no National or State Heritage places mapped within the Study area. | N/A |

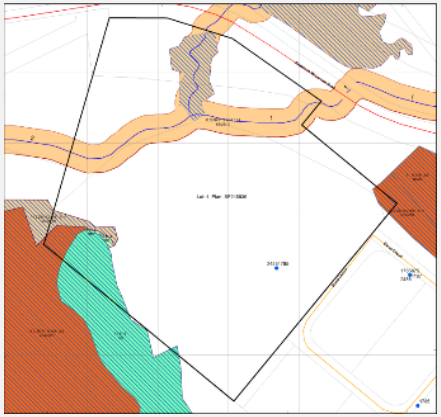
| Mapping / Diagram | Area | Environmental Value/s | Risk (without controls) and Mitigation Measures |
|---|---|---|---|
| **Biodiversity (Flora & Fauna)** | | | |
|  | Lot 4 SP245936 + 2.5 km | The works have the potential to impact various Regional Ecosystems (RE) surrounding the unnamed tributary protected under the *Vegetation Management Act 1999* (VM Act), including the following *Of Concern* status RE:<br>• Eucalyptus tereticornis and/or Eucalyptus spp. Woodland on alluvial plains (11.3.4)<br>Note this RE is located within Category B, C and R vegetation. | **Risk: Low**<br>• Avoid project design within vegetation protected under the VM Act, in particular RE 11.3.4.<br>• If the RE's are to be impacted, a flora survey will be required during detailed design to confirm there are no Threatened Ecological Communities (TEC's) onsite.<br>• If the Threatened Ecological Community is determined to be present, a referral for impacts to Matters of National Environmental Significance may be required. |
| N/A | Lot 4 SP245936 + 2.5 km | DCCEEW Protected Matters (EPBC Act) | No EPBC protected matters identified on site. |
|  | Lot 4 SP245936 + 2.5 km | The works have the potential to impact on multiple MSES. | **Risk: Low**<br>Avoid project design within the following MSES:<br>• MSES - Regulated vegetation (intersecting a watercourse)<br>• MSES - Wildlife habitat (endangered or vulnerable)<br>• MSES - Regulated vegetation (category B)<br>• MSES - Regulated vegetation (category C)<br>• MSES - Regulated vegetation (category R)<br>• MSES - Regulated vegetation (essential habitat) |

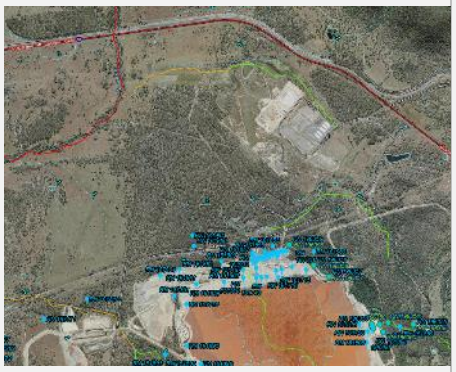
| Mapping / Diagram | Area | Environmental Value/s | Risk (without controls) and Mitigation Measures |
|---|---|---|---|
| | | | Avoid project design within native vegetation and essential habitat areas where possible.<br>Where avoidance is not possible, a Development Approval for clearing native vegetation under the *Planning Act 2016* may be required. |
|  | Lot 4 SP245936 + 2.5 km | The works have the potential to impact on regulated vegetation on site. | **Risk: Low**<br>The following regulated vegetation categories exist on site and must be considered during design:<br>• Category B area (Remnant vegetation)<br>• Category C area (High-value regrowth vegetation)<br>• Category R area (Reef regrowth watercourse vegetation) |
| Information based on desktop PDF Report. No mapping available. | Lot 4 SP245936 + 2.5 km | Potential for the following threatened species to occur within the study area:<br>• Yellow-bellied glider (*Petaurus australis australia)* - Vulnerable under the *Nature Conservation Act 1992* (NC Act) and the EPBC Act.<br>• Powerful Owl (*Ninox strenua*) – Vulnerable under the NC Act. | **Risk: Low**<br>Avoid project design within native vegetation where possible.<br>Confirm the presence/absence of species protected under the NC Act and EPBC Act by an ecological survey during the detailed design phase. |

| Mapping / Diagram | Area | Environmental Value/s | Risk (without controls) and Mitigation Measures |
|---|---|---|---|
| | | • Squatter pigeon (southern sub-species) (*Geophaps scripta scripta*) – Vulnerable under the NC Act and the EPBC Act.<br>• Central greater glider (*Petauroides armillatus*) – Endangered under the NC Act and the EPBC Act.<br>• White-throated needletail (*Hirundapus caudacutus*) – Vulnerable under the NC Act and EPBC Act.<br>• *Plantae Equisetopsid a Menyanthace ae Nymphoides indica* – Special Least Concern under the NC Act.<br>• *Plantae Equisetopsid a Orchidaceae Cymbidium canaliculatum* – Special Least Concern under the NC Act. | |
|  | Lot 4 SP245936 + 2.5 km | The works have the potential to impact green (low risk) and amber (moderate risk) waterways for waterway barrier works under the *Fisheries Act 1994*. | **Risk: Low**<br>Avoid project design within waterways for waterway barrier works under the *Fisheries Act 1994*.<br>Confirm that the works are able to comply with the *Accepted development requirements for operational work that is constructing or raising waterway barrier works (01 October 2018)*. Alternatively, a Development Approval for Operational work that is constructing or raising waterway barrier works will be required.<br>The design is to minimise overland flows and impacts to surrounding waterways. |

| Mapping / Diagram | Area | Environmental Value/s | Risk (without controls) and Mitigation Measures |
|---|---|---|---|
|  | Lot 4 SP245936 + 2.5 km | High-risk areas on the Protected Plants Flora Survey Trigger Map are located within the proposed project site. | **Risk: Low**<br>Avoid project design within native vegetation and high-risk areas mapped within the protected plants flora survey trigger map where possible.<br>Where avoidance is not possible, a Flora Survey in accordance with the Flora Survey Guidelines – Protected Plants is to be undertaken.<br>If protected plants under the NC Act are identified and are likely to be impacted by works, an Impact Management Plan will be required. |
| N/A | Lot 4 SP245936 | No Koala Priority Areas, Koala Habitat Areas or Koala Key Resource Areas are mapped within the Study area. | **Risk: Low**<br>Avoid project design within native vegetation where possible.<br>The Study area is not mapped within a koala habitat area. However, should vegetation clearing be proposed, an ecological survey is recommended during detailed design to determine the presence/absence of koalas within the Study area. |
| N/A | Lot 4 SP245936 | No Wetland Protection Areas are mapped within the Study area. | N/A |
| N/A | Lot 4 SP245936 | No Fish Habitat mapped within the Study area. | N/A |
| N/A | Lot 4 SP245936 | No protected areas and forests have been mapped within the site. | N/A |

| Mapping / Diagram | Area | Environmental Value/s | Risk (without controls) and Mitigation Measures |
|---|---|---|---|
| **Air** | | | |
|  | Lot 4 SP245936 + 2.5 km | Air quality impacts on sensitive receptors within a 2.5 km radius, including ecological, residential and commercial places. | **Risk: Low**<br>It is understood that there will be no discharge of contaminants to air during the operations of the facility.<br>Impacts during the operational phase of the project may include dust from unstabilised surfaces and vehicle emissions. These will need to be addressed through mitigation practices. |
| **Noise and Vibration** | | | |
|  | Lot 4 SP245936 + 2.5 km | Noise and vibration impacts on sensitive receptors within a 2.5 km radius, including ecological, residential and commercial places. | **Risk: Low**<br>The proposed industrial activity is located in the High Impact Industrial Precinct of the SDA.<br>There are several ecological environmental receptors located within the 2.5 km buffer zone, including an *Of Concern* Regional Ecosystem (Eucalyptus tereticornis and/or Eucalyptus spp. Woodland on alluvial plains (11.3.4)), essential wildlife habitat and several waterways.<br>The nearest sensitive residential receptor is located approximately 2.4 km to the east of the site, and there are two commercial properties within the 2.5 km buffer zone, including an electrical substation to the north and the Yarwun bauxite processing |

| Mapping / Diagram | Area | Environmental Value/s | Risk (without controls) and Mitigation Measures |
|---|---|---|---|
| | | | plant and associated by-product storage facilities immediately to the south. |
| **Water** | | | |
|  | Multiple Mapped and Unmapped Watercourses<br><br>Lot 4 SP245936 + 2.5 km | Works have the potential to impact mapped and unmapped watercourses protected under the *Water Act 2000*. | **Risk: Low**<br>Unnamed tributary (drainage feature as per the *Water Act 2000*) of Larcom Creek runs across the north of the site.<br>Surface waters on site drain to Larcom Creek and eventually to Calliope River.<br>Stormwater to be managed as per storm water management plan (to be completed prior to operational works). |
| **N/A** | Lot 4 SP245936 + 2.5 km | Flood Hazard | The proposed site location is not within the flood hazard zone according to GRCPS mapping overlay. |

| Mapping / Diagram | Area | Environmental Value/s | Risk (without controls) and Mitigation Measures |
|---|---|---|---|
|  | Lot 4 SP245936 + 2.5 km | Groundwater Dependent Ecosystems (GDEs) | **Risk: Low**<br>No GDEs have been identified within the study area, or in the 2.5 km buffer surrounding the site.<br>It should be noted that extensive groundwater monitoring bores are located immediately to the south of the site – see map – further information may be available from these bores.<br>It is recommended that further testing is undertaken to determine the depth of groundwater within the site. |

# Appendix A **MSES Report**

# Appendix B **PMST Report**

# Appendix C **Site Works Plan**

Queensland Government

**Department of Environment and Science**

Environmental Reports

# Matters of State Environmental Significance

For the selected area of interest
Lot: 4 Plan: SP245936

# Environmental Reports - General Information

The Environmental Reports portal provides for the assessment of selected matters of interest relevant to a user specified location, or area of interest (AOI). All area and derivative figures are relevant to the extent of matters of interest contained within the AOI unless otherwise stated. Please note, if a user selects an AOI via the "central coordinates" option, the resulting assessment area encompasses an area extending for a 2km radius from the point of interest.

All area and area derived figures included in this report have been calculated via reprojecting relevant spatial features to Albers equal-area conic projection (central meridian = 146, datum Geocentric Datum of Australia 1994). As a result, area figures may differ slightly if calculated for the same features using a different co-ordinate system.

Figures in tables may be affected by rounding.

The matters of interest reported on in this document are based upon available state mapped datasets. Where the report indicates that a matter of interest is not present within the AOI (e.g. where area related calculations are equal to zero, or no values are listed), this may be due either to the fact that state mapping has not been undertaken for the AOI, that state mapping is incomplete for the AOI, or that no values have been identified within the site.

The information presented in this report should be considered as a guide only and field survey may be required to validate values on the ground.

Please direct queries about these reports to: Planning.Support@des.qld.gov.au

# Disclaimer

Whilst every care is taken to ensure the accuracy of the information provided in this report, the Queensland Government makes no representations or warranties about its accuracy, reliability, completeness, or suitability, for any particular purpose and disclaims all responsibility and all liability (including without limitation, liability in negligence) for all expenses, losses, damages (including indirect or consequential damage) and costs which the user may incur as a consequence of the information being inaccurate or incomplete in any way and for any reason.

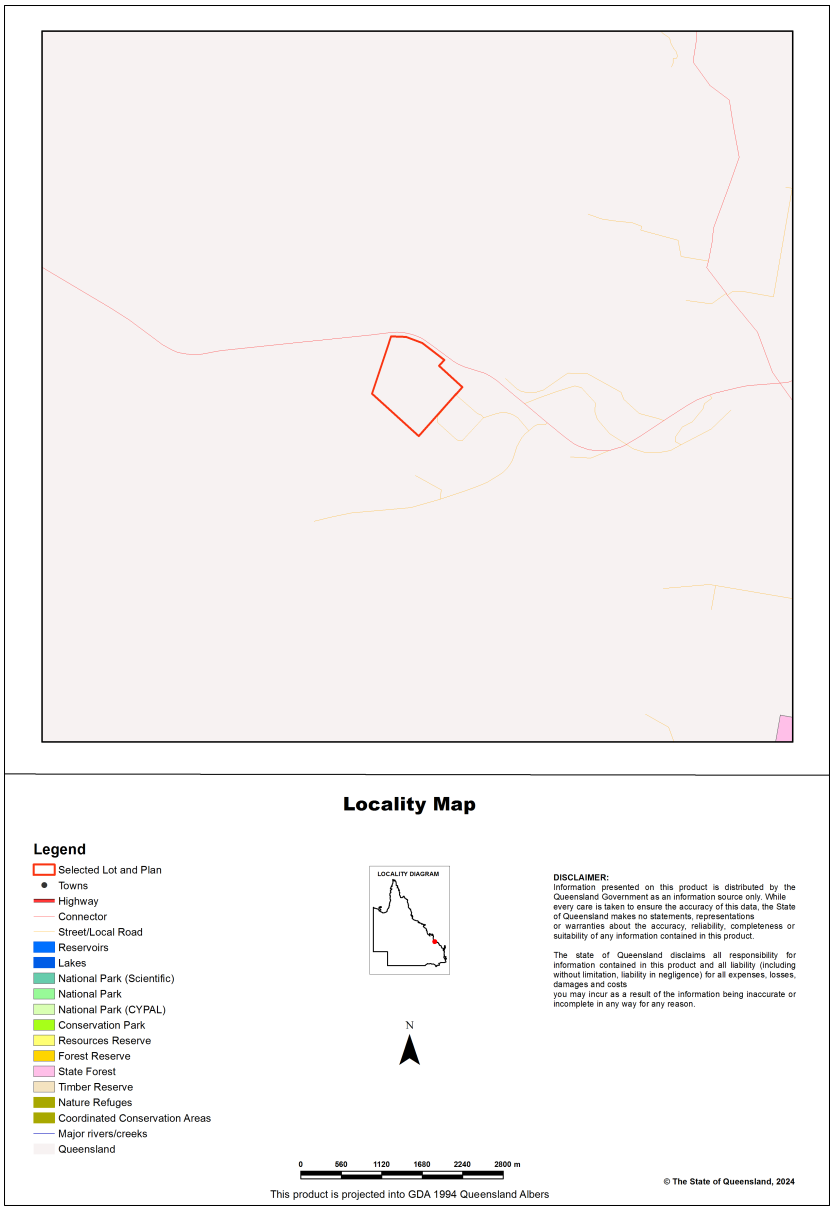
# Table of Contents

# Assessment Area Details

The following table provides an overview of the area of interest (AOI) with respect to selected topographic and environmental values.

**Table 1: Summary table, details for AOI Lot: 4 Plan: SP245936**

| | |
|---|---|
| Size (ha) | 99.83 |
| Local Government(s) | Gladstone Regional |
| Bioregion(s) | Brigalow Belt |
| Subregion(s) | Mount Morgan Ranges |
| Catchment(s) | Calliope |



# Matters of State Environmental Significance (MSES)

## MSES Categories

Queensland's State Planning Policy (SPP) includes a biodiversity State interest that states:

'The sustainable, long-term conservation of biodiversity is supported. Significant impacts on matters of national or state environmental significance are avoided, or where this cannot be reasonably achieved; impacts are minimised and residual impacts offset.'

The MSES mapping product is a guide to assist planning and development assessment decision-making. Its primary purpose is to support implementation of the SPP biodiversity policy. While it supports the SPP, the mapping does not replace the regulatory mapping or environmental values specifically called up under other laws or regulations. Similarly, the SPP biodiversity policy does not override or replace specific requirements of other Acts or regulations.

The SPP defines matters of state environmental significance as:

- Protected areas (including all classes of protected area except coordinated conservation areas) under the *Nature Conservation Act 1992* ;

- Marine parks and land within a 'marine national park', 'conservation park', 'scientific research', 'preservation' or 'buffer' zone under the *Marine Parks Act 2004* ;

- Areas within declared fish habitat areas that are management A areas or management B areas under the Fisheries Regulation 2008;

- Threatened wildlife under the *Nature Conservation Act 1992* and special least concern animals under the Nature Conservation (Wildlife) Regulation 2006;

- Regulated vegetation under the *Vegetation Management Act 1999* that is:

    • Category B areas on the regulated vegetation management map, that are 'endangered' or 'of concern' regional ecosystems;

    • Category C areas on the regulated vegetation management map that are 'endangered' or 'of concern' regional ecosystems;

    • Category R areas on the regulated vegetation management map;

    • Regional ecosystems that intersect with watercourses identified on the vegetation management watercourse and drainage feature map;

    • Regional ecosystems that intersect with wetlands identified on the vegetation management wetlands map;

- Strategic Environmental Areas under the *Regional Planning Interests Act 2014* ;

- Wetlands in a wetland protection area of wetlands of high ecological significance shown on the Map of Queensland Wetland Environmental Values under the Environment Protection Regulation 2019;

- Wetlands and watercourses in high ecological value waters defined in the Environmental Protection (Water) Policy 2009, schedule 2;

- Legally secured offset areas.

## MSES Values Present

The MSES values that are present in the area of interest are summarised in the table below:

**Table 2: Summary of MSES present within the AOI**

| | | |
|---|---|---|
| 1a Protected Areas- estates | 0.0 ha | 0.0 % |
| 1b Protected Areas- nature refuges | 0.0 ha | 0.0 % |
| 1c Protected Areas- special wildlife reserves | 0.0 ha | 0.0 % |
| 2 State Marine Parks- highly protected zones | 0.0 ha | 0.0 % |
| 3 Fish habitat areas (A and B areas) | 0.0 ha | 0.0 % |
| 4 Strategic Environmental Areas (SEA) | 0.0 ha | 0.0 % |
| 5 High Ecological Significance wetlands on the map of Referable Wetlands | 0.0 ha | 0.0 % |
| 6a High Ecological Value (HEV) wetlands | 0.0 ha | 0.0 % |
| 6b High Ecological Value (HEV) waterways | 0.0 km | Not applicable |
| 7a Threatened (endangered or vulnerable) wildlife | 9.14 ha | 9.2% |
| 7b Special least concern animals | 0.0 ha | 0.0 % |
| 7c i Koala habitat area - core (SEQ) | 0.0 ha | 0.0 % |
| 7c ii Koala habitat area - locally refined (SEQ) | 0.0 ha | 0.0 % |
| 7d Sea turtle nesting areas | 0.0 km | Not applicable |
| 8a Regulated Vegetation - Endangered/Of concern in Category B (remnant) | 1.3 ha | 1.3% |
| 8b Regulated Vegetation - Endangered/Of concern in Category C (regrowth) | 4.19 ha | 4.2% |
| 8c Regulated Vegetation - Category R (GBR riverine regrowth) | 9.28 ha | 9.3% |
| 8d Regulated Vegetation - Essential habitat | 8.53 ha | 8.5% |
| 8e Regulated Vegetation - intersecting a watercourse | 1.3 km | Not applicable |
| 8f Regulated Vegetation - within 100m of a Vegetation Management Wetland | 0.0 ha | 0.0 % |
| 9a Legally secured offset areas- offset register areas | 0.0 ha | 0.0 % |
| 9b Legally secured offset areas- vegetation offsets through a Property Map of Assessable Vegetation | 0.0 ha | 0.0 % |

## Additional Information with Respect to MSES Values Present

### MSES - State Conservation Areas

**1a. Protected Areas - estates**

(no results)

**1b. Protected Areas - nature refuges**

(no results)

**1c. Protected Areas - special wildlife reserves**

(no results)

**2. State Marine Parks - highly protected zones**

(no results)

**3. Fish habitat areas (A and B areas)**

(no results)

Refer to **Map 1 - MSES - State Conservation Areas** for an overview of the relevant MSES.

### MSES - Wetlands and Waterways

**4. Strategic Environmental Areas (SEA)**

(no results)

**5. High Ecological Significance wetlands on the Map of Queensland Wetland Environmental Values**

(no results)

**6a. Wetlands in High Ecological Value (HEV) waters**

(no results)

**6b. Waterways in High Ecological Value (HEV) waters**

(no results)

Refer to **Map 2 - MSES - Wetlands and Waterways** for an overview of the relevant MSES.

### MSES - Species

**7a. Threatened (endangered or vulnerable) wildlife**

Values are present

**7b. Special least concern animals**

Not applicable

**7c i. Koala habitat area - core (SEQ)**

Not applicable

**7c ii. Koala habitat area - locally refined (SEQ)**

Not applicable

**7d. Wildlife habitat (sea turtle nesting areas)**

Not applicable

**Threatened (endangered or vulnerable) wildlife habitat suitability models**

| Species | Common name | NCA status | Presence |
|---|---|---|---|
| *Boronia keysii* | | V | None |
| *Calyptorhynchus lathami* | Glossy black cockatoo | V | None |
| *Casuarius casuarius johnsonii* | Sthn population cassowary | E | None |
| *Crinia tinnula* | Wallum froglet | V | None |
| *Denisonia maculata* | Ornamental snake | V | None |
| *Litoria freycineti* | Wallum rocketfrog | V | None |
| *Litoria olongburensis* | Wallum sedgefrog | V | None |
| *Macadamia integrifolia* | | V | None |
| *Macadamia ternifolia* | | V | None |
| *Macadamia tetraphylla* | | V | None |
| *Melaleuca irbyana* | | E | None |
| *Petaurus gracilis* | Mahogany Glider | E | None |
| *Petrogale persephone* | Proserpine rock-wallaby | E | None |
| *Pezoporus wallicus wallicus* | Eastern ground parrot | V | None |
| *Phascolarctos cinereus* | Koala - outside SEQ* | E | None |
| *Taudactylus pleione* | Kroombit tinkerfrog | E | None |
| *Xeromys myoides* | Water Mouse | V | None |

**For koala model, this includes areas outside SEQ. Check 7c SEQ koala habitat for presence/absence.*

**Threatened (endangered or vulnerable) wildlife species records**

| Scientific name | Common name | NCA status | EPBC status | Migratory status |
|---|---|---|---|---|
| *Petauroides armillatus* | central greater glider | E | E | None |
| *Geophaps scripta scripta* | squatter pigeon (southern subspecies) | V | V | None |

| Scientific name | Common name | NCA status | EPBC status | Migratory status |
|---|---|---|---|---|
| *Petaurus australis australis* | yellow-bellied glider (southern subspecies) | V | V | None |
| *Ninox strenua* | powerful owl | V | None | None |

**Special least concern animal species records**

(no results)

**Shorebird habitat (critically endangered/endangered/vulnerable)**

Not applicable

**Shorebird habitat (special least concern)**

Not applicable

**Nature Conservation Act 1992 (NCA) Status- Endangered (E), Vulnerable (V) or Special Least Concern Animal (SL). Environment Protection and Biodiversity Conservation Act 1999 (EPBC) status: Critically Endangered (CE) Endangered (E), Vulnerable (V)*

*Migratory status (M) - China and Australia Migratory Bird Agreement (C), Japan and Australia Migratory Bird Agreement (J), Republic of Korea and Australia Migratory Bird Agreement (R), Bonn Migratory Convention (B), Eastern Flyway (E)*

To request a species list for an area, or search for a species profile, access Wildlife Online at:
https://www.qld.gov.au/environment/plants-animals/species-list/

Refer to **Map 3a - MSES - Species - Threatened (endangered or vulnerable) wildlife and special least concern animals, Map 3b - MSES - Species - Koala habitat area (SEQ)** and **Map 3c - MSES - Wildlife habitat (sea turtle nesting areas)** for an overview of the relevant MSES.

## MSES - Regulated Vegetation

For further information relating to regional ecosystems in general, go to:
https://www.qld.gov.au/environment/plants-animals/plants/ecosystems/
For a more detailed description of a particular regional ecosystem, access the regional ecosystem search page at:
https://environment.ehp.qld.gov.au/regional-ecosystems/

**8a. Regulated Vegetation - Endangered/Of concern in Category B (remnant)**

| Regional ecosystem | Vegetation management polygon | Vegetation management status |
|---|---|---|
| 11.3.26/11.3.4/11.11.4c | O-subdom | rem_oc |
| 11.3.26/11.11.4c/11.3.4 | O-subdom | rem_oc |

**8b. Regulated Vegetation - Endangered/Of concern in Category C (regrowth)**

| Regional ecosystem | Vegetation management polygon | Vegetation management status |
|---|---|---|
| 11.3.26/11.3.4/11.11.4c | O-subdom | hvr_oc |

**8c. Regulated Vegetation - Category R (GBR riverine regrowth)**

| Regulated vegetation map category | Map number |
|---|---|
| R | 9150 |

**8d. Regulated Vegetation - Essential habitat**

Values are present

**8e. Regulated Vegetation - intersecting a watercourse****

A vegetation management watercourse is mapped as present

**8f. Regulated Vegetation - within 100m of a Vegetation Management wetland**

Not applicable

Refer to **Map 4 - MSES - Regulated Vegetation** for an overview of the relevant MSES.

**MSES - Offsets**

**9a. Legally secured offset areas - offset register areas**

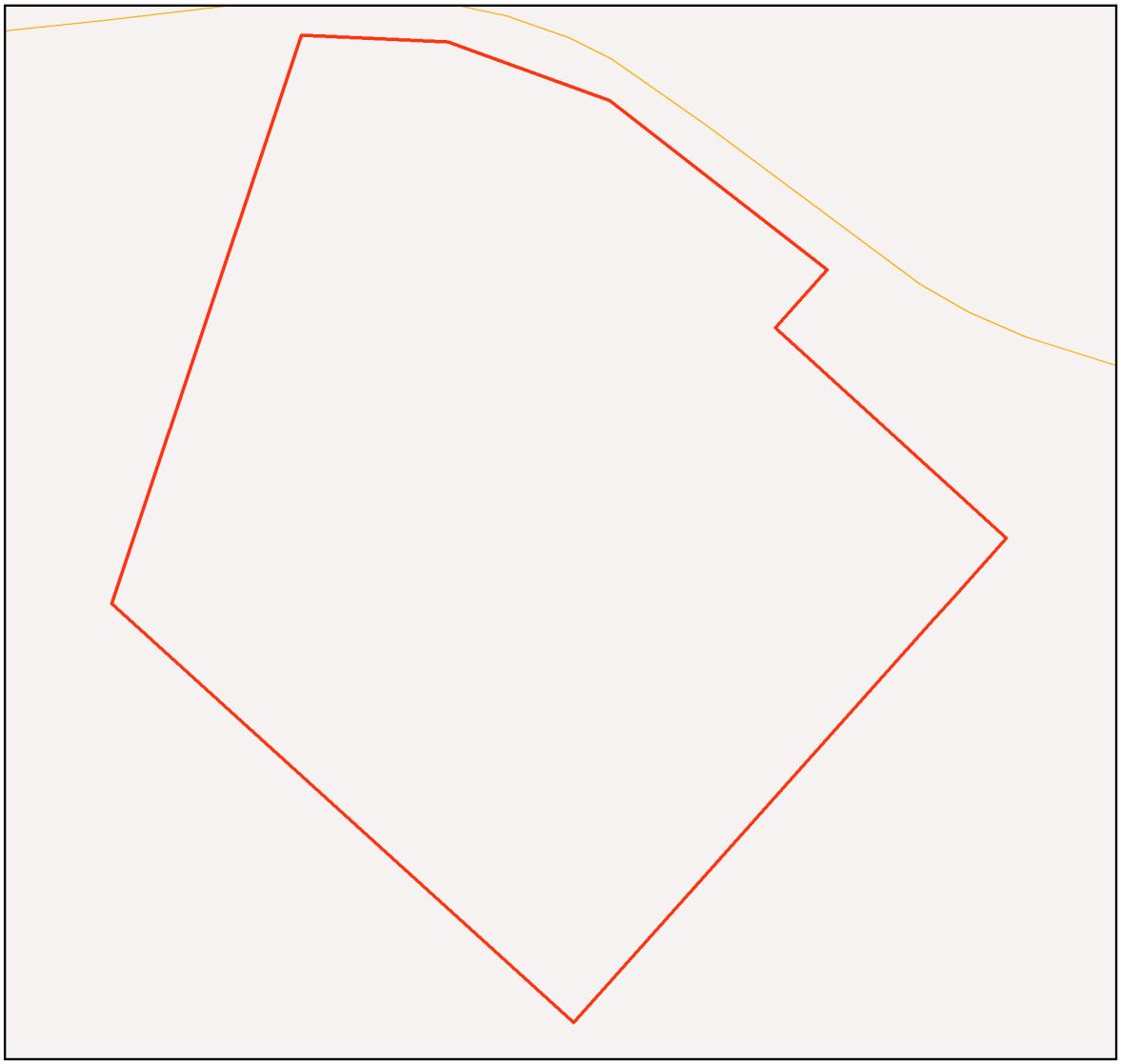
(no results)

**9b. Legally secured offset areas - vegetation offsets through a Property Map of Assessable Vegetation**

(no results)

Refer to **Map 5 - MSES - Offset Areas** for an overview of the relevant MSES.

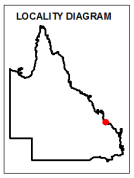
# Map 1 - MSES - State Conservation Areas



## MSES - State Conservation Areas

**Area of Interest**

- Selected Lot and Plan
- Towns
- Freeways/Highways
- Secondary roads
- Major rivers/creeks
- Protected area (estates, nature refuges, special wildlife reserves)
- Declared fish habitat area (A and B areas)
- Marine park (highly protected)





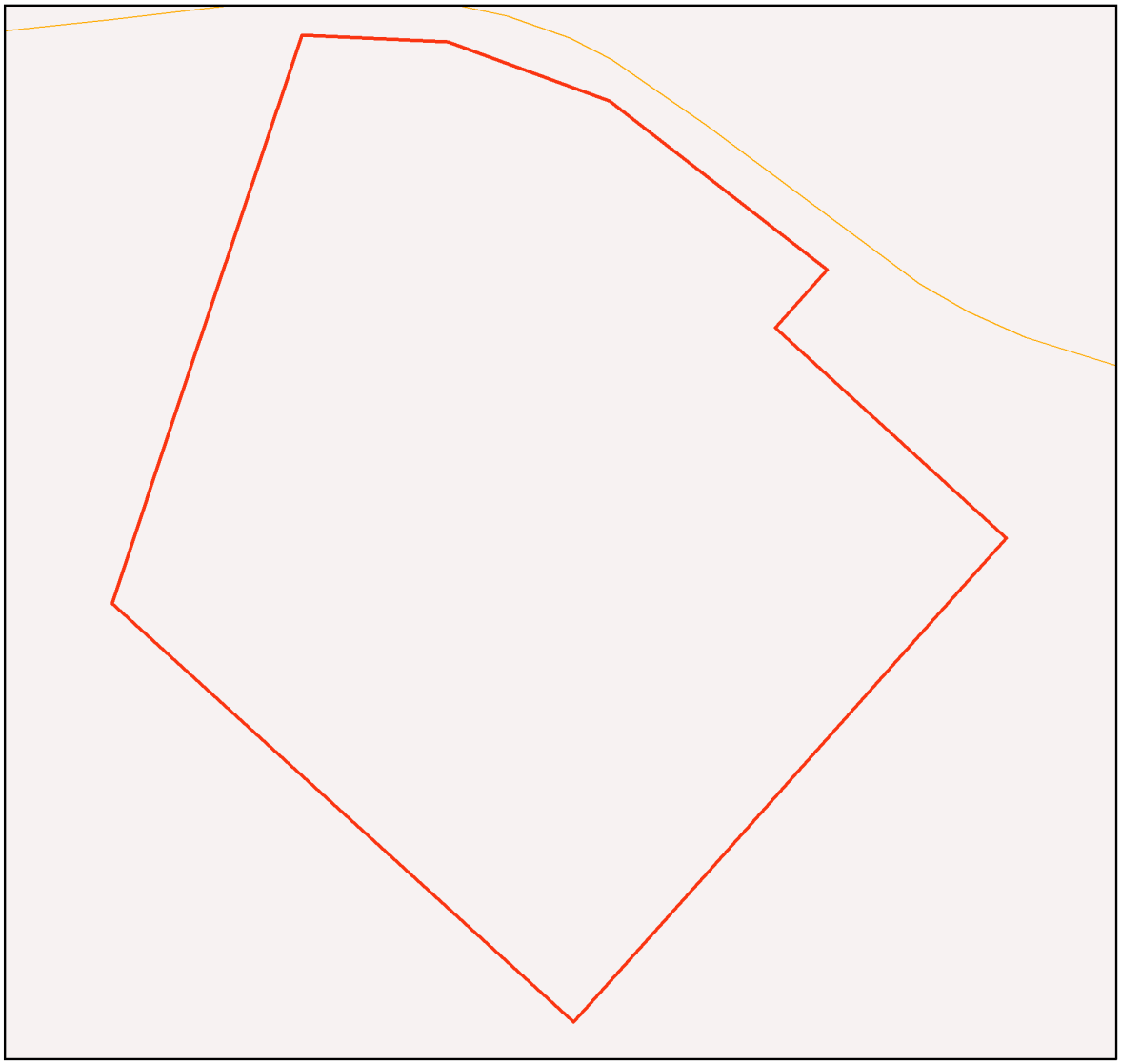

N

0 80 160 240 320 400 m



This product is projected into GDA 1994 Queensland Albers

# Map 2 - MSES - Wetlands and Waterways

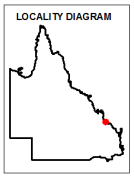


## MSES - Wetlands and Waterways

**Area of Interest**

- Selected Lot and Plan
- Towns
- Freeways/Highways
- Secondary roads
- Major rivers/creeks
- Declared high ecological value waters (watercourse)
- Strategic environmental area (designated precinct)
- Declared high ecological value waters (wetland)
- High ecological significance wetlands

LOCALITY DIAGRAM





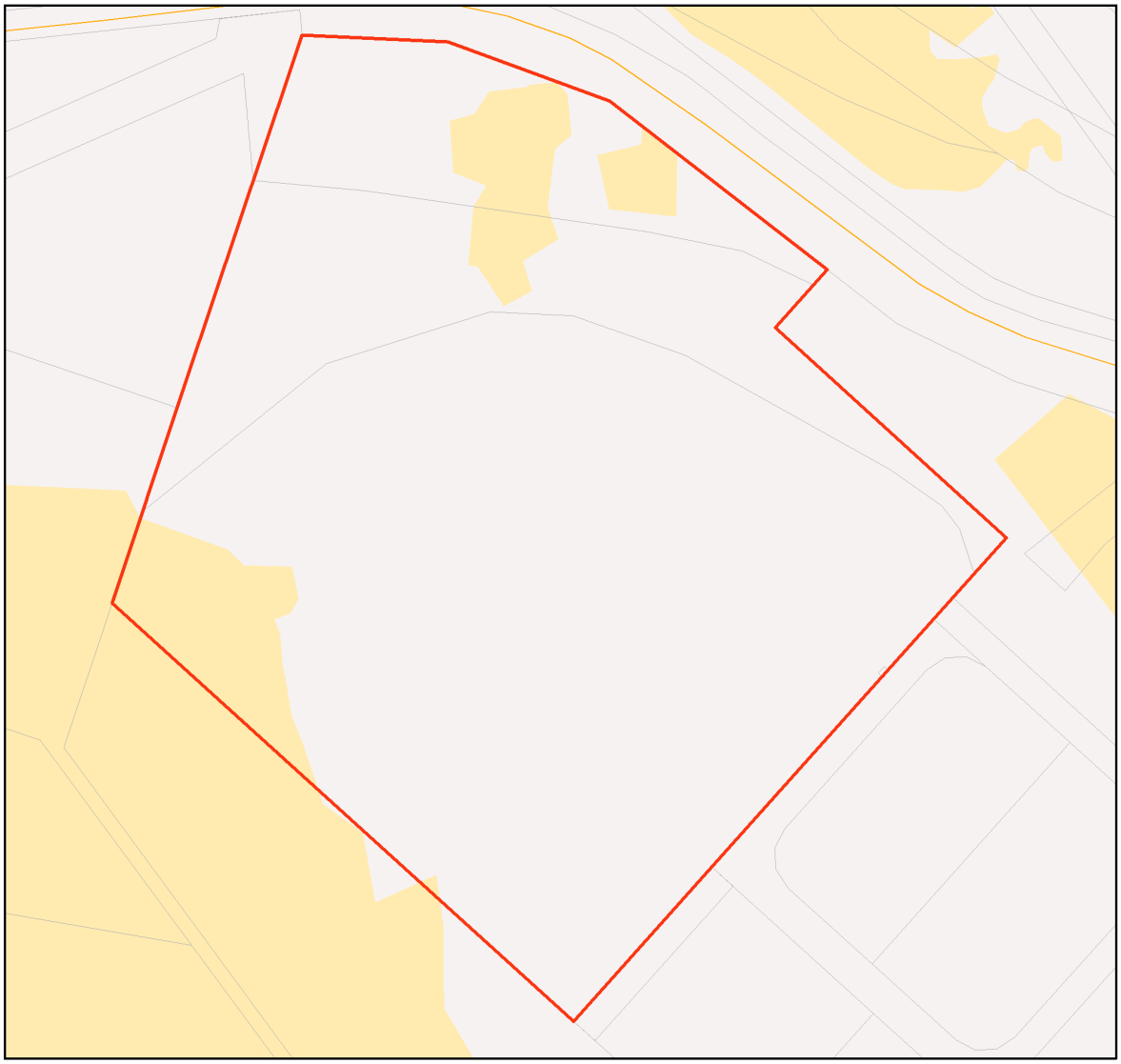
N

0 80 160 240 320 400 m



This product is projected into GDA 1994 Queensland Albers

# Map 3a - MSES - Species - Threatened (endangered or vulnerable) wildlife and special least concern animals

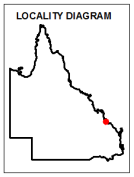


## MSES - Species
## Threatened (endangered or vulnerable) wildlife and special least concern animals

**Area of Interest**

- Selected Lot and Plan
- Towns
- Freeways/Highways
- Secondary roads
- Major rivers/creeks
- Wildlife habitat (special least concern)
- Wildlife habitat (endangered or vulnerable)

LOCALITY DIAGRAM





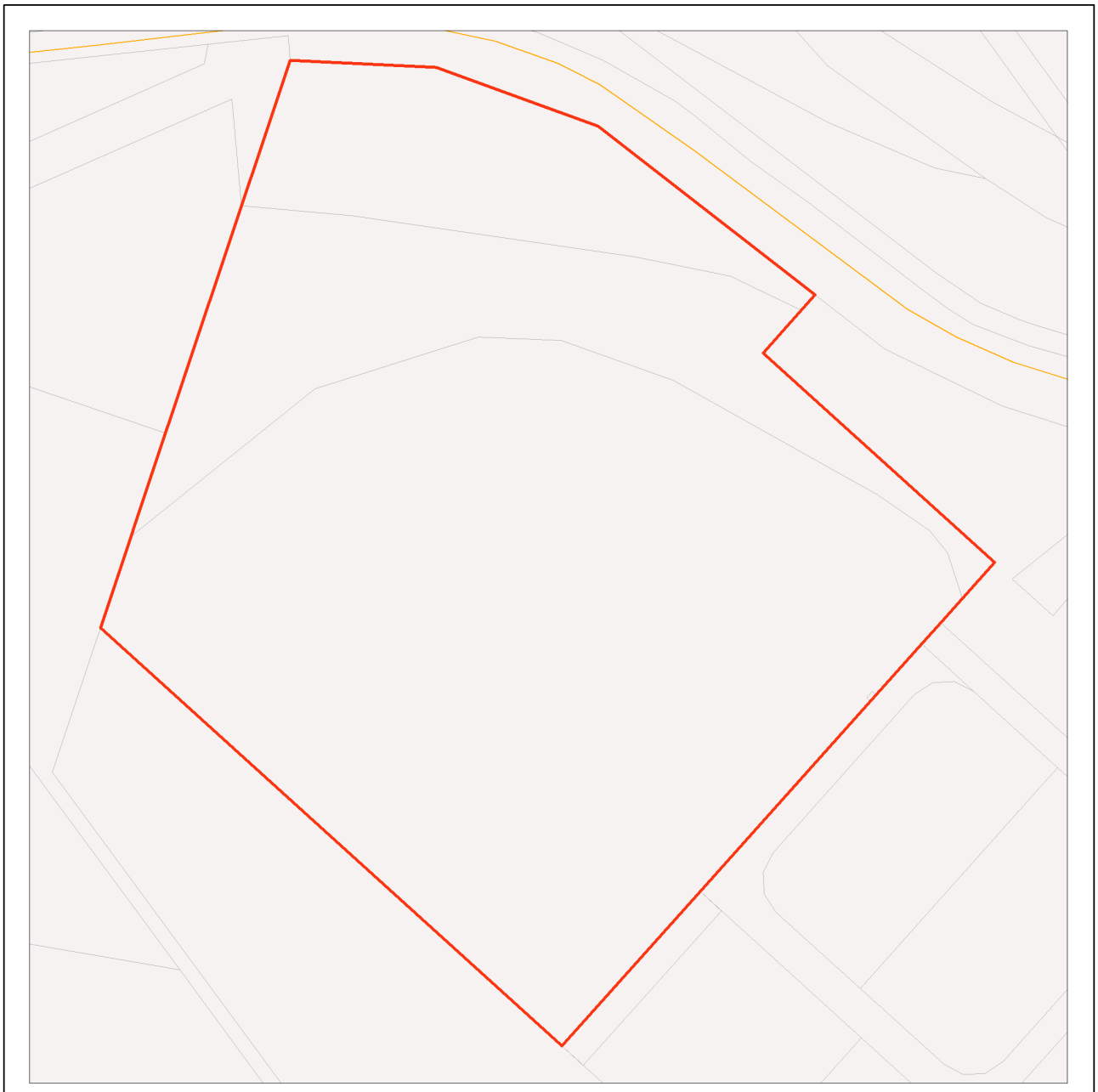
N

0 80 160 240 320 400 m



This product is projected into GDA 1994 Queensland Albers

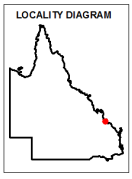
# Map 3b - MSES - Species - Koala habitat area (SEQ)



## MSES - Species
## Koala habitat area (SEQ)

**Area of Interest**
- Selected Lot and Plan
- Towns
- Freeways/Highways
- Secondary roads
- Major rivers/creeks
- Koala habitat area (core)
- Koala habitat area (locally refined)

LOCALITY DIAGRAM



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The represented layers for SEQ 'koala habitat area-core' and 'koala habitat area- locally refined' in MSES are sourced directly from the regulatory mapping under the Nature Conservation (Koala) Conservation Plan 2017. Whilst every effort is made to ensure the information remains current, there may be delays between updating versions. Please refer to the original mapping for the most recent version. See https://environment.des.qld.gov.au/wildlife/animals/living-with/koalas/mapping

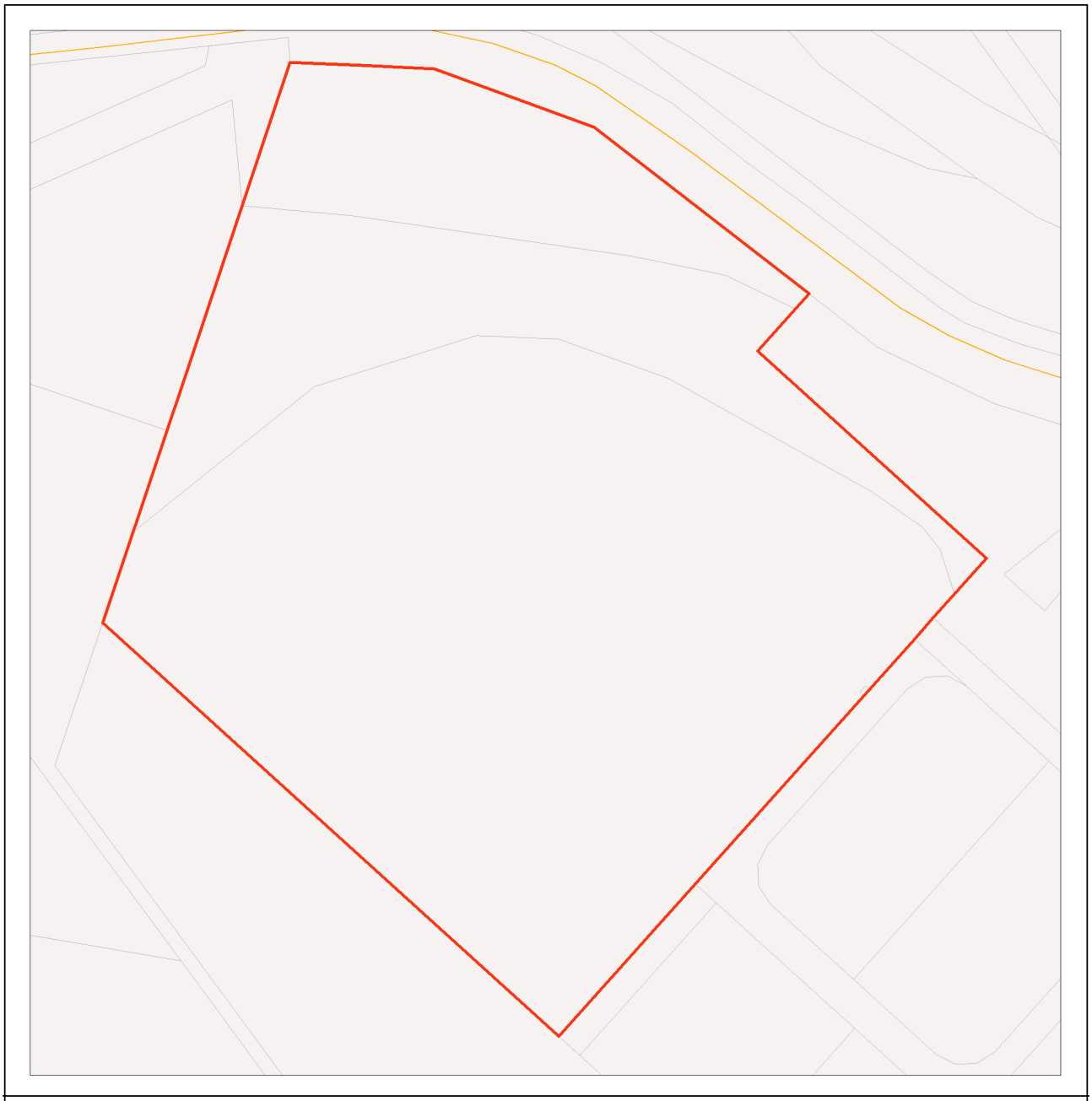
The koala habitat mapping within South East Queensland uses regional ecosystem linework compiled at a scale varying from 1:25,000 to 1:100,000. Linework should be used as a guide only. The positional accuracy of regional ecosystem data mapped at a scale of 1:100,000 is +/- 100 metres.



0 75 150 225 300 375 m

This product is projected into GDA 1994 Queensland Albers

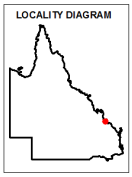
# Map 3c - MSES - Wildlife habitat (sea turtle nesting areas)



## MSES - Wildlife habitat (sea turtle nesting areas)

**Area of Interest**
- Selected Lot and Plan
- Towns
- Freeways/Highways
- Secondary roads
- Major rivers/creeks
- Wildlife habitat (sea turtle nesting areas)

LOCALITY DIAGRAM



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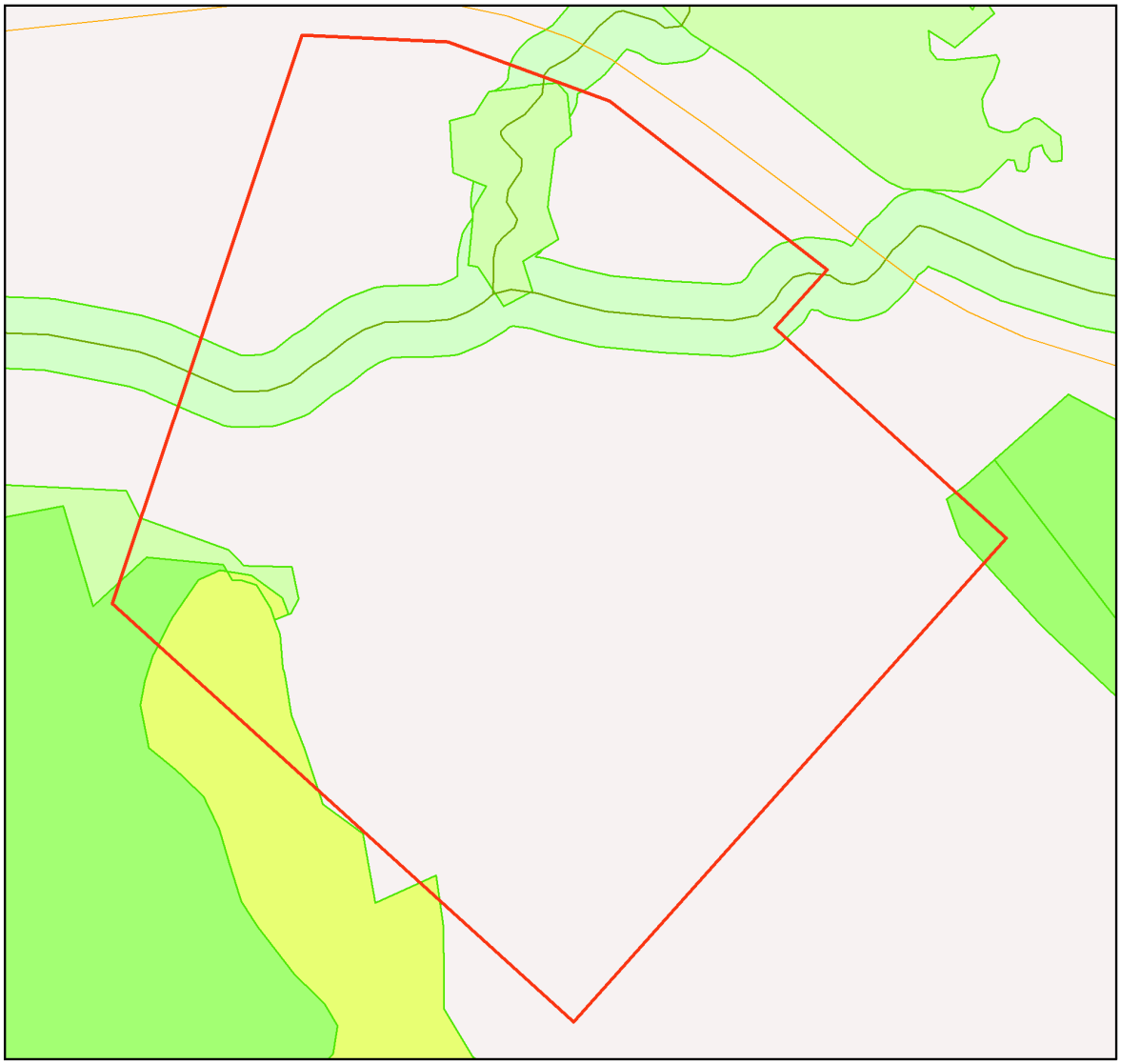
MSES mapping of sea turtle nesting areas identifies beaches where the recorded number of turtle nests are over 1% of the turtle species or genetic stock. The linework is also deliberately extended along nearby rocky coastlines and headlands to recognise that significant numbers of nesting adults and hatchlings can become disoriented by light pollution from development on rocky coastlines and headlands while navigating offshore from nesting beaches.

0 75 150 225 300 375 m



This product is projected into GDA 1994 Queensland Albers

# Map 4 - MSES - Regulated Vegetation

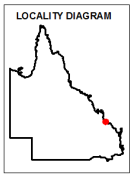


## MSES - Regulated Vegetation

**Area of Interest**

- Selected Lot and Plan
- Towns
- Freeways/Highways
- Secondary roads
- Major rivers/creeks
- Regulated vegetation (intersecting a watercourse)
- Regulated vegetation (100m from wetland)
- Regulated vegetation (category B - endangered or of concern)
- Regulated vegetation (category C - endangered or of concern)
- Regulated vegetation (category R - GBR riverine)
- Regulated vegetation (essential habitat)

LOCALITY DIAGRAM



N

0 80 160 240 320 400 m

This product is projected into GDA 1994 Queensland Albers

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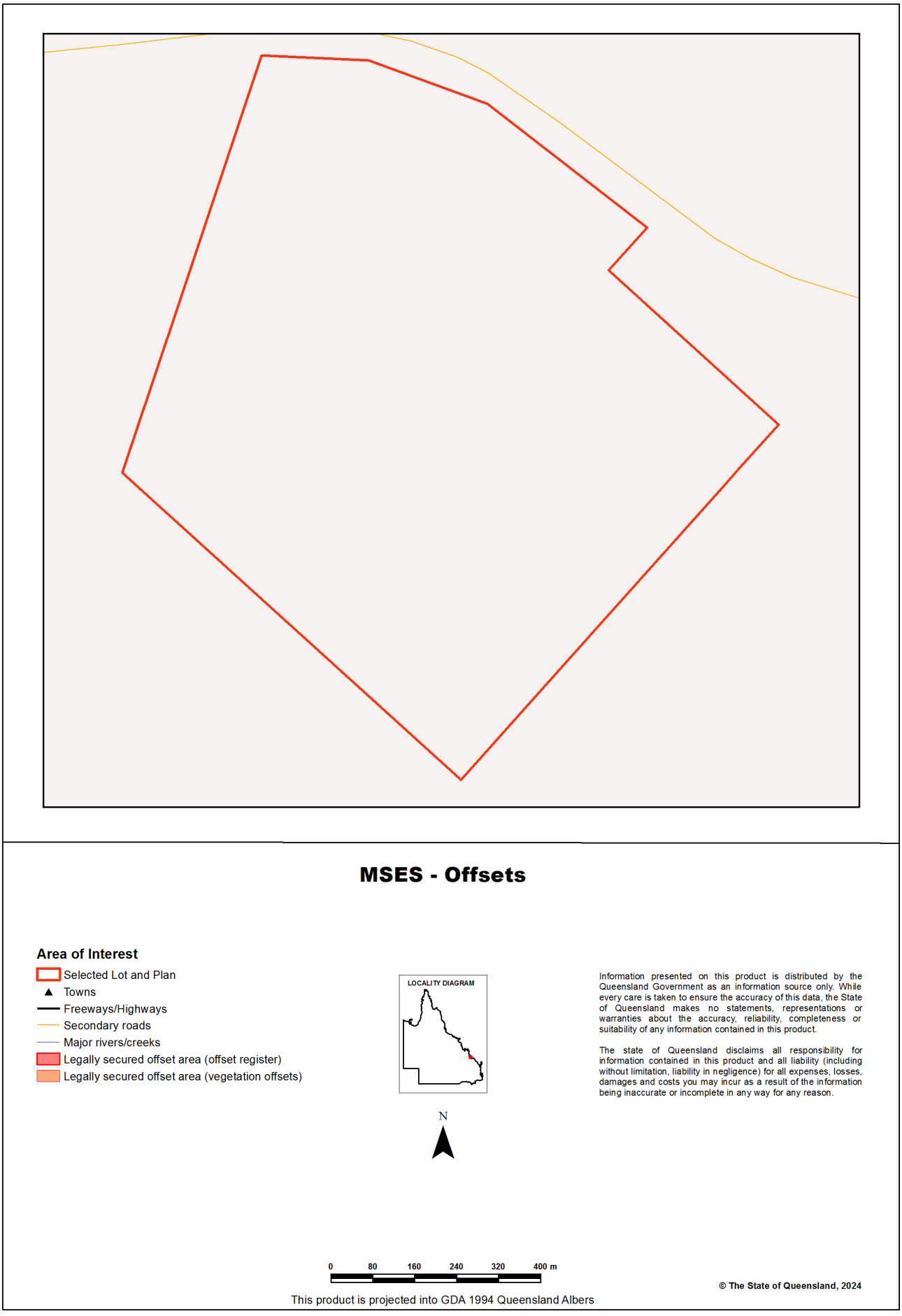
# Map 5 - MSES - Offset Areas



# Appendices

## Appendix 1 - Matters of State Environmental Significance (MSES) methodology

MSES mapping is a regional-scale representation of the definition for MSES under the State Planning Policy (SPP). The compiled MSES mapping product is a guide to assist planning and development assessment decision-making. Its primary purpose is to support implementation of the SPP biodiversity policy. While it supports the SPP, the mapping does not replace the regulatory mapping or environmental values specifically called up under other laws or regulations. Similarly, the SPP biodiversity policy does not override or replace specific requirements of other Acts or regulations.

The Queensland Government's "Method for mapping - matters of state environmental significance for use in land use planning and development assessment" can be downloaded from:

http://www.ehp.qld.gov.au/land/natural-resource/method-mapping-mses.html .

## Appendix 2 - Source Data

**The datasets listed below are available on request from:**

http://qldspatial.information.qld.gov.au/catalogue/custom/index.page

- Matters of State environmental significance

Note: MSES mapping is not based on new or unique data. The primary mapping product draws data from a number of underlying environment databases and geo-referenced information sources. MSES mapping is a versioned product that is updated generally on a twice-yearly basis to incorporate the changes to underlying data sources. Several components of MSES mapping made for the current version may differ from the current underlying data sources. To ensure accuracy, or proper representation of MSES values, it is strongly recommended that users refer to the underlying data sources and review the current definition of MSES in the State Planning Policy, before applying the MSES mapping.

Individual MSES layers can be attributed to the following source data available at QSpatial:

| **MSES layers** | **current QSpatial data (http://qspatial.information.qld.gov.au)** |
|---|---|
| Protected Areas-Estates, Nature Refuges, Special Wildlife Reserves | - Protected areas of Queensland<br>- Nature Refuges - Queensland<br>- Special Wildlife Reserves- Queensland |
| Marine Park-Highly Protected Zones | Moreton Bay marine park zoning 2008 |
| Fish Habitat Areas | Queensland fish habitat areas |
| Strategic Environmental Areas-designated | Regional Planning Interests Act - Strategic Environmental Areas |
| HES wetlands | Map of Queensland Wetland Environmental Values |
| Wetlands in HEV waters | HEV waters:<br>- EPP Water intent for waters<br>Source Wetlands:<br>- Queensland Wetland Mapping (Current version 5)<br>Source Watercourses:<br>- Vegetation management watercourse and drainage feature map (1:100000 and 1:250000) |
| Wildlife habitat (threatened and special least concern) | - WildNet database species records<br>- habitat suitability models (various)<br>- SEQ koala habitat areas under the Koala Conservation Plan 2019<br>- Sea Turtle Nesting Areas records |
| VMA regulated regional ecosystems | Vegetation management regional ecosystem and remnant map |
| VMA Essential Habitat | Vegetation management - essential habitat map |
| VMA Wetlands | Vegetation management wetlands map |
| Legally secured offsets | Vegetation Management Act property maps of assessable vegetation.<br>For offset register data-contact DES |
| Regulated Vegetation Map | Vegetation management - regulated vegetation management map |

## Appendix 3 - Acronyms and Abbreviations

| | |
|---|---|
| AOI | - Area of Interest |
| DES | - Department of Environment and Science |
| EP Act | - *Environmental Protection Act 1994* |
| EPP | - Environmental Protection Policy |
| GDA94 | - Geocentric Datum of Australia 1994 |
| GEM | - General Environmental Matters |
| GIS | - Geographic Information System |
| MSES | - Matters of State Environmental Significance |
| NCA | - *Nature Conservation Act 1992* |
| RE | - Regional Ecosystem |
| SPP | - State Planning Policy |
| VMA | - *Vegetation Management Act 1999* |

# EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Please see the caveat for interpretation of information provided here.

Report created: 24-Jan-2024

# Summary

## Matters of National Environment Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

| | |
|---|---|
| World Heritage Properties: | None |
| National Heritage Places: | None |
| Wetlands of International Importance (Ramsar | None |
| Great Barrier Reef Marine Park: | None |
| Commonwealth Marine Area: | None |
| Listed Threatened Ecological Communities: | 5 |
| Listed Threatened Species: | 37 |
| Listed Migratory Species: | 16 |

## Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at https://www.dcceew.gov.au/parks-heritage/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

| | |
|---|---|
| Commonwealth Lands: | None |
| Commonwealth Heritage Places: | None |
| Listed Marine Species: | 21 |
| Whales and Other Cetaceans: | None |
| Critical Habitats: | None |
| Commonwealth Reserves Terrestrial: | None |
| Australian Marine Parks: | None |
| Habitat Critical to the Survival of Marine Turtles: | None |

## Extra Information

This part of the report provides information that may also be relevant to the area you have

| | |
|---|---|
| State and Territory Reserves: | None |
| Regional Forest Agreements: | None |
| Nationally Important Wetlands: | None |
| EPBC Act Referrals: | 24 |
| Key Ecological Features (Marine): | None |
| Biologically Important Areas: | None |
| Bioregional Assessments: | None |
| Geological and Bioregional Assessments: | None |

# Details

## Matters of National Environmental Significance

### Listed Threatened Ecological Communities [ Resource Information ]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.
Status of Vulnerable, Disallowed and Ineligible are not MNES under the EPBC Act.

| Community Name | Threatened Category | Presence Text | Buffer Status |
|---|---|---|---|
| Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales and South East Queensland ecological community | Endangered | Community may occur within area | In buffer area only |
| Coolibah - Black Box Woodlands of the Darling Riverine Plains and the Brigalow Belt South Bioregions | Endangered | Community may occur within area | In feature area |
| Poplar Box Grassy Woodland on Alluvial Plains | Endangered | Community may occur within area | In feature area |
| Semi-evergreen vine thickets of the Brigalow Belt (North and South) and Nandewar Bioregions | Endangered | Community likely to occur within area | In buffer area only |
| Weeping Myall Woodlands | Endangered | Community may occur within area | In feature area |

### Listed Threatened Species [ Resource Information ]

Status of Conservation Dependent and Extinct are not MNES under the EPBC Act.
Number is the current name ID.

| Scientific Name | Threatened Category | Presence Text | Buffer Status |
|---|---|---|---|
| BIRD | | | |
| Calidris acuminata Sharp-tailed Sandpiper [874] | Vulnerable | Species or species habitat may occur within area | In feature area |
| Calidris canutus Red Knot, Knot [855] | Vulnerable | Species or species habitat may occur within area | In feature area |
| Calidris ferruginea Curlew Sandpiper [856] | Critically Endangered | Species or species habitat may occur within area | In feature area |

| Scientific Name | Threatened Category | Presence Text | Buffer Status |
|---|---|---|---|
| Charadrius leschenaultii<br>Greater Sand Plover, Large Sand Plover [877] | Vulnerable | Species or species habitat may occur within area | In feature area |
| Cyclopsitta diophthalma coxeni<br>Coxen's Fig-Parrot [59714] | Critically Endangered | Species or species habitat may occur within area | In feature area |
| Erythrotriorchis radiatus<br>Red Goshawk [942] | Endangered | Species or species habitat likely to occur within area | In feature area |
| Falco hypoleucos<br>Grey Falcon [929] | Vulnerable | Species or species habitat likely to occur within area | In feature area |
| Gallinago hardwickii<br>Latham's Snipe, Japanese Snipe [863] | Vulnerable | Species or species habitat known to occur within area | In feature area |
| Geophaps scripta scripta<br>Squatter Pigeon (southern) [64440] | Vulnerable | Species or species habitat known to occur within area | In feature area |
| Hirundapus caudacutus<br>White-throated Needletail [682] | Vulnerable | Species or species habitat likely to occur within area | In feature area |
| Neochmia ruficauda ruficauda<br>Star Finch (eastern), Star Finch (southern) [26027] | Endangered | Species or species habitat likely to occur within area | In feature area |
| Numenius madagascariensis<br>Eastern Curlew, Far Eastern Curlew [847] | Critically Endangered | Species or species habitat may occur within area | In feature area |
| Rostratula australis<br>Australian Painted Snipe [77037] | Endangered | Species or species habitat likely to occur within area | In feature area |
| Turnix melanogaster<br>Black-breasted Button-quail [923] | Vulnerable | Species or species habitat known to occur within area | In feature area |
| MAMMAL | | | |

| Scientific Name | Threatened Category | Presence Text | Buffer Status |
|---|---|---|---|
| [Dasyurus hallucatus](#) | | | |
| Northern Quoll, Digul [Gogo-Yimidir], Wijingadda [Dambimangari], Wiminji [Martu] [331] | Endangered | Species or species habitat likely to occur within area | In feature area |
| [Macroderma gigas](#) | | | |
| Ghost Bat [174] | Vulnerable | Species or species habitat likely to occur within area | In feature area |
| [Petauroides volans](#) | | | |
| Greater Glider (southern and central) [254] | Endangered | Species or species habitat likely to occur within area | In feature area |
| [Petaurus australis australis](#) | | | |
| Yellow-bellied Glider (south-eastern) [87600] | Vulnerable | Species or species habitat may occur within area | In feature area |
| [Phascolarctos cinereus (combined populations of Qld, NSW and the ACT)](#) | | | |
| Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104] | Endangered | Species or species habitat likely to occur within area | In feature area |
| [Pteropus poliocephalus](#) | | | |
| Grey-headed Flying-fox [186] | Vulnerable | Foraging, feeding or related behaviour may occur within area | In feature area |
| PLANT | | | |
| [Atalaya collina](#) | | | |
| Yarwun Whitewood [55417] | Endangered | Species or species habitat known to occur within area | In feature area |
| [Bosistoa transversa](#) | | | |
| Three-leaved Bosistoa, Yellow Satinheart [16091] | Vulnerable | Species or species habitat known to occur within area | In feature area |
| [Bulbophyllum globuliforme](#) | | | |
| Miniature Moss-orchid, Hoop Pine Orchid [6649] | Vulnerable | Species or species habitat likely to occur within area | In buffer area only |
| [Cossinia australiana](#) | | | |
| Cossinia [3066] | Endangered | Species or species habitat may occur within area | In feature area |

| Scientific Name | Threatened Category | Presence Text | Buffer Status |
|---|---|---|---|
| [Cupaniopsis shirleyana](#)<br>Wedge-leaf Tuckeroo [3205] | Vulnerable | Species or species habitat known to occur within area | In feature area |
| [Cycas megacarpa](#)<br>[55794] | Endangered | Species or species habitat known to occur within area | In feature area |
| [Cycas ophiolitica](#)<br>[55797] | Endangered | Species or species habitat may occur within area | In feature area |
| [Dichanthium setosum](#)<br>bluegrass [14159] | Vulnerable | Species or species habitat likely to occur within area | In feature area |
| [Eucalyptus raveretiana](#)<br>Black Ironbox [16344] | Vulnerable | Species or species habitat likely to occur within area | In feature area |
| [Macadamia integrifolia](#)<br>Macadamia Nut, Queensland Nut Tree, Smooth-shelled Macadamia, Bush Nut, Nut Oak [7326] | Vulnerable | Species or species habitat may occur within area | In buffer area only |
| [Parsonsia larcomensis](#)<br>Mt Larcom Silk Pod [64587] | Vulnerable | Species or species habitat known to occur within area | In feature area |
| [Samadera bidwillii](#)<br>Quassia [29708] | Vulnerable | Species or species habitat known to occur within area | In feature area |
| REPTILE | | | |
| [Delma torquata](#)<br>Adorned Delma, Collared Delma [1656] | Vulnerable | Species or species habitat may occur within area | In feature area |
| [Denisonia maculata](#)<br>Ornamental Snake [1193] | Vulnerable | Species or species habitat may occur within area | In feature area |
| [Egernia rugosa](#)<br>Yakka Skink [1420] | Vulnerable | Species or species habitat may occur within area | In feature area |

| Scientific Name | Threatened Category | Presence Text | Buffer Status |
|---|---|---|---|
| [Furina dunmalli](#)<br>Dunmall's Snake [59254] | Vulnerable | Species or species habitat may occur within area | In feature area |
| [Hemiaspis damelii](#)<br>Grey Snake [1179] | Endangered | Species or species habitat may occur within area | In feature area |

## Listed Migratory Species [ Resource Information ]

| Scientific Name | Threatened Category | Presence Text | Buffer Status |
|---|---|---|---|
| **Migratory Marine Birds** | | | |
| [Apus pacificus](#)<br>Fork-tailed Swift [678] | | Species or species habitat likely to occur within area | In feature area |
| **Migratory Marine Species** | | | |
| [Crocodylus porosus](#)<br>Salt-water Crocodile, Estuarine Crocodile [1774] | | Species or species habitat likely to occur within area | In feature area |
| **Migratory Terrestrial Species** | | | |
| [Cuculus optatus](#)<br>Oriental Cuckoo, Horsfield's Cuckoo [86651] | | Species or species habitat may occur within area | In feature area |
| [Hirundapus caudacutus](#)<br>White-throated Needletail [682] | Vulnerable | Species or species habitat likely to occur within area | In feature area |
| [Monarcha melanopsis](#)<br>Black-faced Monarch [609] | | Species or species habitat likely to occur within area | In feature area |
| [Myiagra cyanoleuca](#)<br>Satin Flycatcher [612] | | Species or species habitat known to occur within area | In feature area |
| [Rhipidura rufifrons](#)<br>Rufous Fantail [592] | | Species or species habitat known to occur within area | In feature area |
| [Symposiachrus trivirgatus as Monarcha trivirgatus](#)<br>Spectacled Monarch [83946] | | Species or species habitat may occur within area | In feature area |
| **Migratory Wetlands Species** | | | |

| Scientific Name | Threatened Category | Presence Text | Buffer Status |
|---|---|---|---|
| Actitis hypoleucos<br>Common Sandpiper [59309] | | Species or species habitat may occur within area | In feature area |
| Calidris acuminata<br>Sharp-tailed Sandpiper [874] | Vulnerable | Species or species habitat may occur within area | In feature area |
| Calidris canutus<br>Red Knot, Knot [855] | Vulnerable | Species or species habitat may occur within area | In feature area |
| Calidris ferruginea<br>Curlew Sandpiper [856] | Critically Endangered | Species or species habitat may occur within area | In feature area |
| Calidris melanotos<br>Pectoral Sandpiper [858] | | Species or species habitat may occur within area | In feature area |
| Charadrius leschenaultii<br>Greater Sand Plover, Large Sand Plover [877] | Vulnerable | Species or species habitat may occur within area | In feature area |
| Gallinago hardwickii<br>Latham's Snipe, Japanese Snipe [863] | Vulnerable | Species or species habitat known to occur within area | In feature area |
| Numenius madagascariensis<br>Eastern Curlew, Far Eastern Curlew [847] | Critically Endangered | Species or species habitat may occur within area | In feature area |

## Other Matters Protected by the EPBC Act

| Listed Marine Species | | | [ Resource Information ] |
|---|---|---|---|
| Scientific Name | Threatened Category | Presence Text | Buffer Status |
| Bird | | | |
| Actitis hypoleucos<br>Common Sandpiper [59309] | | Species or species habitat may occur within area | In feature area |

| Scientific Name | Threatened Category | Presence Text | Buffer Status |
|---|---|---|---|
| [Anseranas semipalmata](#)<br>Magpie Goose [978] | | Species or species habitat may occur within area overfly marine area | In feature area |
| [Apus pacificus](#)<br>Fork-tailed Swift [678] | | Species or species habitat likely to occur within area overfly marine area | In feature area |
| [Bubulcus ibis as Ardea ibis](#)<br>Cattle Egret [66521] | | Species or species habitat may occur within area overfly marine area | In feature area |
| [Calidris acuminata](#)<br>Sharp-tailed Sandpiper [874] | Vulnerable | Species or species habitat may occur within area | In feature area |
| [Calidris canutus](#)<br>Red Knot, Knot [855] | Vulnerable | Species or species habitat may occur within area overfly marine area | In feature area |
| [Calidris ferruginea](#)<br>Curlew Sandpiper [856] | Critically Endangered | Species or species habitat may occur within area overfly marine area | In feature area |
| [Calidris melanotos](#)<br>Pectoral Sandpiper [858] | | Species or species habitat may occur within area overfly marine area | In feature area |
| [Charadrius leschenaultii](#)<br>Greater Sand Plover, Large Sand Plover [877] | Vulnerable | Species or species habitat may occur within area | In feature area |
| [Gallinago hardwickii](#)<br>Latham's Snipe, Japanese Snipe [863] | Vulnerable | Species or species habitat known to occur within area overfly marine area | In feature area |
| [Haliaeetus leucogaster](#)<br>White-bellied Sea-Eagle [943] | | Species or species habitat likely to occur within area | In feature area |

| Scientific Name | Threatened Category | Presence Text | Buffer Status |
|---|---|---|---|
| Hirundapus caudacutus<br>White-throated Needletail [682] | Vulnerable | Species or species habitat likely to occur within area overfly marine area | In feature area |
| Merops ornatus<br>Rainbow Bee-eater [670] | | Species or species habitat may occur within area overfly marine area | In feature area |
| Monarcha melanopsis<br>Black-faced Monarch [609] | | Species or species habitat likely to occur within area overfly marine area | In feature area |
| Myiagra cyanoleuca<br>Satin Flycatcher [612] | | Species or species habitat known to occur within area overfly marine area | In feature area |
| Numenius madagascariensis<br>Eastern Curlew, Far Eastern Curlew [847] | Critically Endangered | Species or species habitat may occur within area | In feature area |
| Pterodroma cervicalis<br>White-necked Petrel [59642] | | Species or species habitat may occur within area | In feature area |
| Rhipidura rufifrons<br>Rufous Fantail [592] | | Species or species habitat known to occur within area overfly marine area | In feature area |
| Rostratula australis as Rostratula benghalensis (sensu lato)<br>Australian Painted Snipe [77037] | Endangered | Species or species habitat likely to occur within area overfly marine area | In feature area |
| Symposiachrus trivirgatus as Monarcha trivirgatus<br>Spectacled Monarch [83946] | | Species or species habitat may occur within area overfly marine area | In feature area |
| Reptile | | | |
| Crocodylus porosus<br>Salt-water Crocodile, Estuarine Crocodile [1774] | | Species or species habitat likely to occur within area | In feature area |

## Extra Information

| EPBC Act Referrals | | | | [ Resource Information ] |
|---|---|---|---|---|
| Title of referral | Reference | Referral Outcome | Assessment Status | Buffer Status |
| | | | | |
| Aldoga Solar Farm Project | 2020/8773 | | Post-Approval | In buffer area only |
| Gladstone - Fitzroy Pipeline | 2007/3501 | | Post-Approval | In buffer area only |
| Controlled action | | | | |
| Aldoga Aluminium Smelter Gladstone | 2001/160 | Controlled Action | Post-Approval | In feature area |
| Blackwater to Gladstone Gas Pipeline Project | 2011/6034 | Controlled Action | Completed | In feature area |
| Construct and operate 447km high pressure gas transmission pipeline | 2009/4976 | Controlled Action | Post-Approval | In feature area |
| Construction of a high pressure buried gas pipeline, Kogan to Gladstone, QLD | 2009/5029 | Controlled Action | Post-Approval | In buffer area only |
| Development of the Yarwun Coal Terminal | 2012/6348 | Controlled Action | Completed | In feature area |
| Gas Pipeline with Alternative Pipleine to Supply Natural Gas Liquefaction Park | 2008/4096 | Controlled Action | Post-Approval | In buffer area only |
| HPAL Nickel Plant | 2005/2376 | Controlled Action | Post-Approval | In buffer area only |
| install & operate gas pipeline | 2005/2059 | Controlled Action | Post-Approval | In buffer area only |
| Lot 7 Borrow Pits, Aldoga Road, Gladstone, Qld | 2018/8381 | Controlled Action | Post-Approval | In buffer area only |
| Nickel and cobalt laterite mine, High-pressure acid leach plant, | 2005/2257 | Controlled Action | Completed | In buffer area only |

| Title of referral | Reference | Referral Outcome | Assessment Status | Buffer Status |
|---|---|---|---|---|
| Controlled action | | | | |
| slurry pipeline | | | | |
| Queensland Curtis LNG Project - Pipeline Network | 2008/4399 | Controlled Action | Post-Approval | In buffer area only |
| Stage 1 and 2 borrow pits, stockpiles, haul roads and Stage 3 red mud dam, Aldoga, Qld | 2017/8107 | Controlled Action | Completed | In buffer area only |
| Not controlled action | | | | |
| Aldoga Livestock Handling Facility | 2017/7905 | Not Controlled Action | Completed | In buffer area only |
| Aldoga Power Station | 2012/6265 | Not Controlled Action | Completed | In feature area |
| Aldoga Solar Farm, Aldoga, QLD | 2018/8251 | Not Controlled Action | Completed | In buffer area only |
| Gladstone Steel Making Facility | 2009/4786 | Not Controlled Action | Completed | In buffer area only |
| Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia | 2015/7522 | Not Controlled Action | Completed | In feature area |
| Moura Link - Aldoga Rail Project | 2007/3773 | Not Controlled Action | Completed | In buffer area only |
| Proposed clay borrow pit and associated haul roads and stockpiles, Gladstone, Qld | 2017/7858 | Not Controlled Action | Completed | In buffer area only |
| Rail deviation including construction of 2 new rail lines | 2009/4884 | Not Controlled Action | Completed | In buffer area only |
| Not controlled action (particular manner) | | | | |
| Powerlink Gladstone to Larcom Creek 275kV Transmission Line | 2003/1229 | Not Controlled Action (Particular Manner) | Post-Approval | In feature area |
| Referral decision | | | | |
| Gas Transmission Pipeline to supply Natural Gas Liquefaction Park | 2008/4061 | Referral Decision | Completed | In buffer area only |

# Caveat

## 1 PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National Importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

## 2 DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

Where data are available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance

## 3 DATA SOURCES

Threatened ecological communities

For threatened ecological communities where the distribution is well known, maps are generated based on information contained in recovery plans, State vegetation maps and remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species

Threatened, migratory and marine species distributions have been discerned through a variety of methods. Where distributions are well known and if time permits, distributions are inferred from either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc.) together with point locations and described habitat; or modelled (MAXENT or BIOCLIM habitat modelling) using

Where little information is available for a species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc.).

In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More detailed distribution mapping methods are used to update these distributions

## 4 LIMITATIONS

The following species and ecological communities have not been mapped and do not appear in this report:

- threatened species listed as extinct or considered vagrants;
- some recently listed species and ecological communities;
- some listed migratory and listed marine species, which are not listed as threatened species; and
- migratory species that are very widespread, vagrant, or only occur in Australia in small numbers.

The following groups have been mapped, but may not cover the complete distribution of the species:

- listed migratory and/or listed marine seabirds, which are not listed as threatened, have only been mapped for recorded
- seals which have only been mapped for breeding sites near the Australian continent

The breeding sites may be important for the protection of the Commonwealth Marine environment.

Refer to the metadata for the feature group (using the Resource Information link) for the currency of the information.

# Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact us page.



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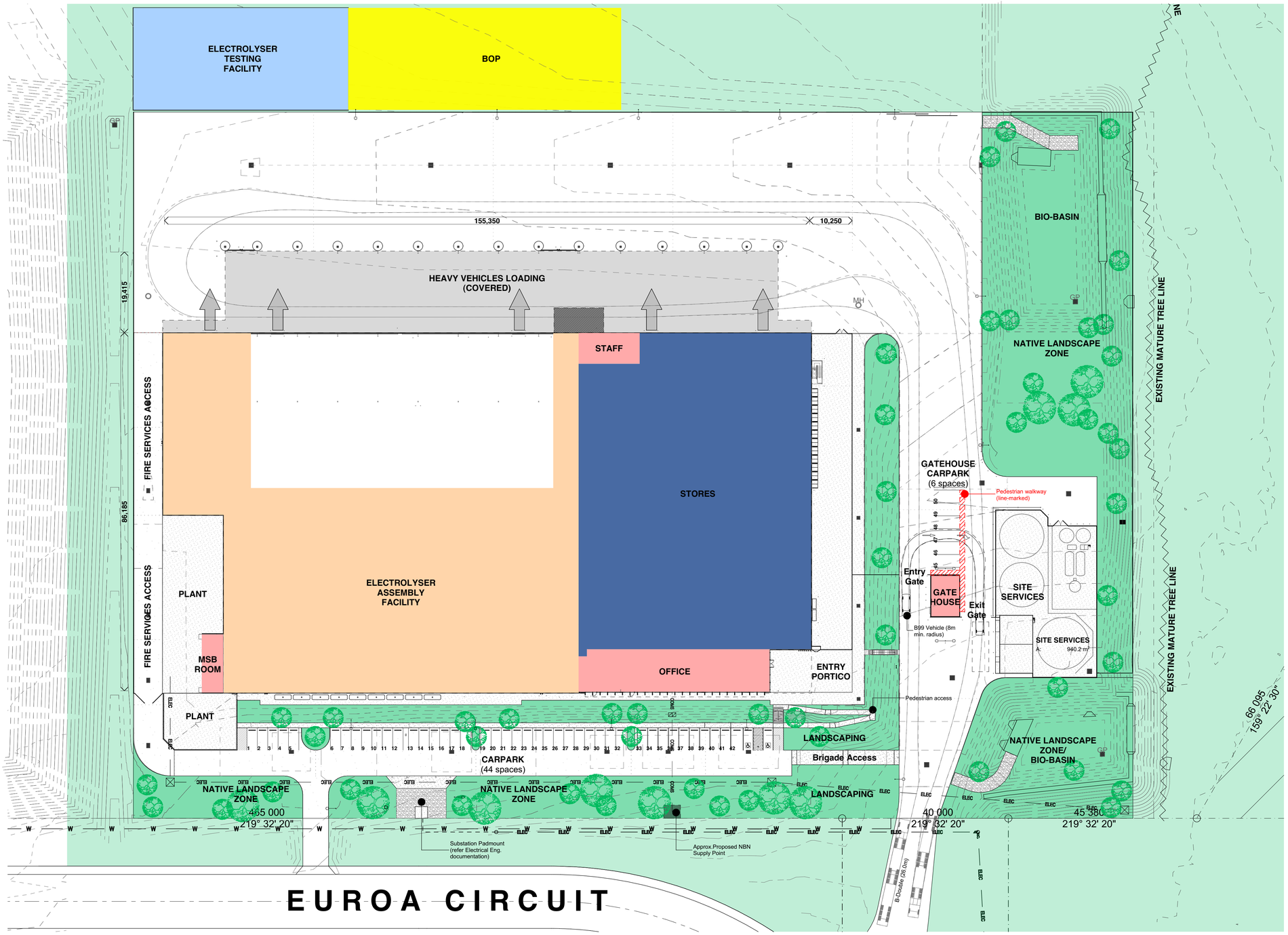


## VEHICLE CIRCULATION NOTES:

1. Design Heavy Vehicle is a 26.0 m long B-Double Transport.
2. All heavy-vehicles are to remain in forward gear for all normal manoeuvres on site.
3. Design Light Vehicle is the B99 model from *AS 2890.1 Off Street Parking Facilities.*
4. Gatehouse staff parking is designed to sweep into the carpark in one (1) movement, forward direction. Leaving the carpark is also in one (1) movement forward.
5. Carpark widths for gatehouse staff are increased to 3.1 m to facilitate single movement parking.
6. All vehicles are to be limited to 10 km/h once inside the security perimeter.
7. Gatehouse is manned 24/7, with electric security gates always in the closed position, unless opened upon guard command.
8. All vehicles - including fully laden B-Double transports - shall come to a complete 'dead' stop before passing through the gates in either direction. This is to ensure that vehicle movements are sufficiently slow near the gatehouse, to allow an emergency stop to occur and to allow sufficient time between sighting a vehicle and making way.
9. Operational requirements will be detailed in the facility operations manual, and varied as required to suit facility activities.

## OTHER:

1. Plant areas to house mechanical and electrical equipment.

elevation ARCHITECTURE
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| Revision | | |
|---|---|---|
| 10 | DA Minor Change | 05/05/2022 |
| 11 | DA Minor Change | 11/11/2022 |
| 12 | DA Minor Change | 1/12/2022 |
| 13 | Preliminary DA Set - Testing Facility | 18/01/2024 |
| 14 | Preliminary DA Set - Testing Facility | 23/01/2024 |

**Project**
FFI GEM Centre - Electrolyser Facility, Phase 1
Euroa Circuit, Aldoga Gladstone QLD 4694 Australia

**Client**
Hutchinson Builders

**Architect**
Greg Adsett, Dalbert Ton

**Drawn**
DT, PH, KF

**Stage**
Design Development

**Status**
**Preliminary** (NOT FOR CONSTRUCTION)

**Project No.**
1295-01

**Scale**
1:500 at A1

Site Works Plan

# A-DA-01.02

**14**
**Revision**


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