



Jemena Gas Networks (NSW) Ltd

Former Wollongong Gasworks Site – Demolition and
Vegetation Removal Project

Statement of Environmental Effects

June 2019

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1. Introduction

1.1 Overview

This Statement of Environmental Effects (SEE) has been prepared by GHD Pty Ltd (GHD) on behalf of Jemena Gas Networks (NSW) Ltd (Jemena) to support a Development Application (DA) to be submitted to Wollongong City Council (Council).

Jemena seeks development consent to demolish three existing commercial buildings to natural ground level and remove the majority of existing vegetation and structures, on the former Wollongong Gasworks site ('the project'). The former gasworks site is located at 120 – 122 Smith Street, Wollongong (the 'site') (refer to Figure 1.1)

The project is required to facilitate the remediation of the former gasworks site. This will allow redevelopment of the site for a mixture of commercial and residential land uses at some stage in the future. In accordance with Clause 14 of the State Environmental Planning Policy 55 (SEPP 55) the proposed remediation works are categorised as Category 2 remediation works and therefore do not require development consent. As such, this SEE assesses potential impacts arising from the proposed demolition works which require development consent under Clause 2.7 of the Wollongong Local Environmental Plan 2009 (LEP) and other works required to prepare the site for remediation. Any future development of the site will be subject to a separate DA process.

1.2 Background

The former Wollongong Gasworks operated between 1883 and 1977. The original gasworks was located on two lots – Lot 253 DP 787299 to the west and Lot 241 DP 879683 to the east. Lot 241 was later subdivided into Lots 2411 (south) and 2412 (north). The aboveground gasworks infrastructure was demolished; with in-filling of subsurface infrastructure occurring in the 1980s.

Site investigations have identified a range of contaminants of potential concern associated with the historical use of the site. Remediation of Lot 2412 DP 1097900 (now known as the Collegians site) was undertaken in 2005, including the removal of the in-ground gasworks structures and excavation of gasworks impacted materials. These excavated materials were stockpiled into two stockpiles on Lot 253 DP 787299 and were removed in late 2018.

For the purposes of this SEE, the site comprises of Lot 253 DP 787299 and Lot 2411 DP 1097900 (refer to Figure 1.2).

Jemena are now undertaking a staged approach to the remediation of the site in accordance with the following phases:

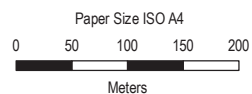
- Phase 1 involved the removal of the two stockpiles on Lot 253 DP 787299 in late 2018.
- Phase 2 will include the demolition and removal of all buildings and vegetation on the site to ground level to allow full characterisation of the extent of contamination at the site and to finalise the remediation methodology.
- Phase 3 will include the remediation works in accordance with the prescribed methodology in a Remediation Action Plan (RAP) approved by an EPA accredited site auditor
- Phase 4 will involve the potential future development of the site. The remediation will make the site suitable for commercial land use at ground level with no basements and medium to high-density residential land use on the top floors with minimal access to soils.

This SEE focuses on Phase 2 only.



Legend

- Site Boundary
- Waterways
- Streets
- Railway



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



Former Jemena Wollongong Gasworks site
120 – 122 Smith Street

Project No. 21-28174
Revision No. 0
Date 13/06/2019

Site Location Plan

FIGURE 1.1



Legend

- Site Boundary
- Former stockpiles (removed in late 2018)
- Collegians Football Club
- Structures to be demolished
- Railway
- Streets
- Lots

Paper Size ISO A4
0 20 40 60 80
Meters

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



Former Jemena Wollongong Gasworks site
120 – 122 Smith Street

Project No. 21-28174
Revision No. 0
Date 21/06/2019

Site context and lots

FIGURE 1.2

1.3 The proponent

The proponent is Jemena Gas Networks (NSW) Ltd.

Jemena Gas Networks (NSW) Ltd, is a subsidiary of Jemena Limited, a leading national infrastructure company in Australia that builds, owns and maintains a combination of major electricity, gas and water assets.

1.4 Consultation with Council and other stakeholders

An initial Council briefing on the project was undertaken on 15 May 2019. The meeting was attended by Jemena and GHD representatives. The project team provided a brief presentation including an outline of the project (Phase 2), the proposed remediation works (Phase 3) and likely scope of any future redevelopment works during Phase 4. Consideration of the planning approval pathway for all phases of the development were discussed at the meeting.

Council provided in principle agreement to the approach proposed, which included confirming that the key issues for the project, namely construction noise and vegetation removal, warrant specialist assessment while all other issues would be dealt with qualitatively in the SEE.

Following the Council meeting, GHD on behalf of Jemena issued Council with further information regarding the planning approval for the project and subsequent remediation. This letter, dated 27 May 2019, provided further justification as to why the remediation works, which will be delivered as Phase 3, are considered Category 2 works in accordance with SEPP 55, and therefore do not require development consent.

1.5 Purpose of this report

The purpose of this SEE is to:

- describe the land to which the DA relates
- describe the form of the proposed works
- define the statutory planning framework within which the DA is to be assessed and determined
- assess the proposed development against the matters for consideration listed under Section 4.15 of the *Environmental Planning and Assessment Act 1979* (EP&A).

This SEE has been prepared in accordance with the requirements of schedule 1 of the Environmental Planning and Assessment Regulation 2000 (EP&A Regulation). It assesses the potential environmental impacts of the project and recommends mitigation measures to minimise impacts and protect the environment where possible.

The SEE is structured as follows:

- Section 1 – provides an introduction
- Section 2 – locates the site and provides information on the existing environment of the site and surrounds and present and past use
- Section 3 – describes the project
- Section 4 – assesses the project against the requirements of relevant legislation and environmental planning instruments
- Section 5 – provides an assessment of the potential impacts of the project on the environment

- Section 6 – considers the suitability of the project and whether the project is in the public interest
- Section 7 – provides a conclusion to the SEE.

2. Locality and site analysis

This chapter provides a description of the site location and surrounds, ownership and historical use.

2.1 Regional context

The suburb of Wollongong is located in the south east region of New South Wales in the Wollongong City Council local government area (LGA). Wollongong is located off the coast in South East NSW. The suburb is a commercial hub which services a large catchment of the southeast region of NSW.

Land uses in the Wollongong area are characterised by a mix of commercial, infrastructure and residential development.

2.2 Site location and description

The site is located at 120 – 122 Smith Street between Illawarra Railway to the west and Thorsby Drive overpass to the north, on the northern edge of the Wollongong's commercial core.

The site consists of two lots identified as Lot 253 DP 787299 in the west and Lot 2411 DP 1097900 in the east. It covers an area of about 1.6 hectares and is roughly an 'L' shape.

The site layout and positioning of the abovementioned lots is shown in Figure 1.2.

Surrounding land use is predominantly residential and commercial/industrial land as shown on Figure 1.2 and described below:

- North – commercial use by the Collegians Football Club (Collegians), including buildings and asphalt carpark (formerly part of the gasworks site) in the north east. Thorsby Drive overpass is further to the north and is immediately adjacent to the site's northernmost boundary.
- South – a small portion of the Collegians site carpark in the east then Smith Street and a mixture of commercial (south west), high rise residential (south) and low density residential (south east) beyond.
- East – commercial use by Collegians, including buildings (commercial offices, indoor recreation including gaming, functions and hospitality) and asphalt carpark (formerly part of the gasworks).
- West – north-south running Illawarra Railway corridor with low density residential land use beyond

2.3 Site ownership

The site is owned by Jemena Gas Networks (NSW) Ltd, which is a subsidiary of Jemena Limited.

2.4 Existing site conditions

This section describes the existing conditions at the site and surrounding areas. The site layout and immediate vicinity is presented in Figure 1.2. Photos of the site are presented in Appendix A.

2.4.1 Built environment

The site is roughly an 'L' shape and is generally flat with a gentle slope down towards the northwest.

The western half of the site (Lot 253 DP 787299) is accessed via a locked gate at the entrance to a small gravel driveway off Smith Street. This lot is bordered by a 1.8 metre chain wire fence covered in shade cloth on the western, southern and eastern boundaries. The western lot is currently vacant, with the exception of vegetation discussed in section 2.4.2. The surface of the western lot consists of grass and gravel.

Vehicle access to the eastern half of the site (Lot 2411 DP 1097900) is via a hardstand driveway also off Smith Street, which provides access to two bitumen car parks, one at the front (southern end) of the lot and one at the back (northern end) of the lot which extends around the eastern side of the site. In addition to the car parks the eastern lot contains three buildings consisting of:

- a two storey office
- a single storey octagon shaped office, the entry to which is from Smith Street
- an industrial warehouse.

One tenant is currently occupying the offices and will be ending their lease on 28 June 2019 and the warehouse was previously used by Jemena for storage purposes.

A retaining wall of about one metre height separates the car park at the front of the site from the buildings and car park at the back.

The eastern lot is fenced along its western boundary (the same chain wire fence that separates the western lot) and northern boundary (1.8 metre fence) however the eastern and south eastern boundaries with Collegian are boarded by buildings on the Collegian site and the front of the lot is not fenced.

2.4.2 Natural environment

The site is roughly an 'L' shape and is generally flat with a gentle slope down towards the northwest. The ground surface of the western lot ranges from about 9 metres Australian Height Datum (AHD) in the south to 8 metres AHD in the north, while the eastern lot ranges from about 10 metres AHD in the east to 8 metres AHD in the north west.

Vegetation on the western lot consists of grass, exotic shrubs and weeds and trees border the western and northern boundaries of the site. Trees are also located along the eastern boundary outside the site fence line. A vegetated embankment marks the northern boundary of the western lot and contains various shrubs and trees. This embankment is outside the site fence line.

On the eastern lot landscaped areas consisting of small shrubs and trees surround the existing buildings and front carpark and a number of trees also boarder the western boundary of the lot. A number of trees are also located along the northern boundary of the lot, but are within the Collegian property.

3. Description of the project

This chapter of the SEE provides a detailed description of the project including the description of the works to be physically undertaken as part of the demolition works and vegetation removal on the site.

3.1 The project

Jemena proposes to prepare the site, including full vegetation removal, and the demolishing and removal of three commercial buildings, to allow for subsequent remediation works. The demolition and subsequent remediation works will render the site suitable for future commercial and residential mixed use.

A site plan illustrating the locations of the structures to be demolished and vegetation to be removed is provided in Figure 1.2. It is proposed to remove all vegetation on the site. The works will only be to grade with no sub-surface intrusive works being undertaken.

3.2 Demolition works

3.2.1 Methodology

The demolition methodology would be finalised during the detailed planning for these works and engagement of the demolition contractor. The demolition methodology for the project would generally involve the stages described below.

Site establishment and mobilisation

This would involve the following activities:

- mobilisation of site plant and equipment
- installation of cyclone fencing along the front of site along with Class A hoarding where the site abuts the adjacent carpark
- establishment of the site office/amenities and laydown areas
- installing site environment management and traffic controls
- supplying power, water and other utilities to the site office/amenities
- vegetation clearance and tree removal on both lots of the site (as required) (further information is provided in section 5.3).

Building demolition

This would involve the following activities:

- disconnection of utilities and services
- hazardous materials removal and disposal by a licensed contractor
- soft stripping of internal building materials
- demolition of the existing two commercial buildings and warehouse to ground level using an excavator, tipper, cranes or other conventional methods using a top-down approach
- removal of the existing hardstand surfaces beneath the buildings
- temporary propping and/or waterproofing provided for structural integrity of adjacent structures (where necessary).

Site reinstatement

Site reinstatement would involve dismantling of the site compound, removal of all plant, equipment and demolition materials, from the site. The cyclone fencing and Class A hoarding will be retained to secure the site for the subsequent remediation works areas. Additionally any exposed soil will be spray grassed and permanent sediment control measures will be installed across the site until the Phase 3 works begin.

Materials such as bricks, tiles, timber, plastics and metals would be sorted where practicable and sent to a waste facility with recycling capabilities. Further information regarding the waste materials that would be likely to be produced is provided in section 5.7.

3.2.2 Construction hours and workforce

The demolition works would occur during to the recommended standard hours for construction work as outlined in the Interim Construction Noise Guidelines (ICNG) (DECC 2009) which are:

- Monday to Friday 7:00 am to 6:00 pm
- Saturday 8:00 am to 1:00 pm
- No works on Sundays or Public Holidays.

There would potentially be a requirement for works outside of standard hours, these would potentially include:

- the delivery of materials outside standard hours as requested by police or other authorities for safety reasons
- emergency work, for example where required to avoid the loss of life or damage to property, or to prevent environmental harm.

Noise generating works outside standard construction hours would require the formal written consent of Jemena and require justification in accordance with the ICNG.

It is estimated that a workforce of up to ten staff would be required during the demolition and removal works.

3.2.3 Plant and equipment

Plant and equipment likely to be used during demolition and vegetation removal may include, but is not limited to, the following:

- 35 tonne excavator (with pulveriser and hammer attachment when required)
- 10 tonne tipper
- 20 tonne franna crane (if required)
- front end loader or backhoe
- generators
- chainsaw and mulcher
- hand tools.

It is estimated that up to ten heavy vehicles (trucks) and ten light vehicles (worker vehicles) would need to access the site each day during the demolition period.

3.2.4 Access and heavy vehicle routes

Access to the site would be via the two existing entries off Smith Street in Wollongong. Parking of plant and equipment, and the majority of worker vehicles, would be within the site.

Further information regarding access and traffic movements, including parking requirements and impacts is provided in section 5.6.

3.2.5 Program

The project is anticipated to take up to four months to complete.

Subject to the receipt of the necessary approvals including development consent, the project is currently programmed to commence in July 2019.

3.2.6 Environmental management during demolition

A construction environmental management plan (CEMP) would be prepared for the works by the civil contractor prior to works commencing. The CEMP will be informed by, and expand on, the management controls documented in this SEE.

The key objectives of the CEMP would include:

- ensuring that the works are carried out in accordance with statutory requirements and relevant non-statutory policies
- ensuring that the works are carried out in accordance with the assessments detailed in this SEE to mitigate the potential for adverse environmental impacts
- ensuring that employees engaged to undertake the works comply with the conditions detailed in the CEMP
- identifying management responsibilities and reporting requirements to demonstrate compliance with the CEMP.

The CEMP would be a working document and would be amended should strategies initially implemented be found to be inadequate to manage environmental impacts. The CEMP would typically:

- establish environmental goals and objectives
- detail the conditions of approval or determination
- list actions, timing and responsibilities for implementing actions that arise from the mitigation measures recommended in this SEE
- detail statutory requirements
- provide a framework for reporting on relevant matters on an ongoing basis
- detail training requirements for personnel in environmental awareness and best practice Environmental Management System
- outline emergency procedures, including contact names and corrective actions
- detail process surveillance and auditing procedures
- list complaint-handling procedures
- detail quality assurance procedures.

4. Statutory and policy compliance

This chapter provides the statutory and planning framework for the Project and considers provisions of relevant State and Commonwealth legislation, plans and policies.

4.1 Environmental Planning and Assessment Act 1979

4.1.1 Overview

All development in NSW is assessed in accordance with the provisions of the EP&A Act and the EP&A Regulation. The EP&A Act institutes a system for environmental planning and assessment, including approvals and environmental impact assessment requirements for proposed developments. Implementation of the EP&A Act is the responsibility of the Minister for Planning, statutory authorities and local councils.

Part 4 of the EP&A Act provides for control of “development” that - depending on the nature of the development - requires development consent from local council, a regional planning panel or the state government.

The need or otherwise for development consent is set out in environmental planning instruments including State Environmental Planning Policies (SEPPs) and Local Environmental Plans (LEPs) which are made under Part 3 of the EP&A Act.

4.1.2 Environmental Planning Instruments

Wollongong Local Environmental Plan 2009

Permissibility

In accordance with the Wollongong Local Environmental Plan 2009 (Wollongong LEP), the site is zoned B6 Enterprise Corridor.

The objectives of the B6 zone are:

- to promote businesses along main roads and to encourage a mix of compatible uses
- to provide a range of employment uses (including business, office, retail and light industrial uses)
- to maintain the economic strength of centres by limiting retailing activity
- to encourage activities which will contribute to the economic and employment growth of Wollongong
- to allow some diversity of activities that will not:
 - significantly detract from the operation of existing or proposed development, or
 - significantly detract from the amenity of nearby residents, or
 - have an adverse impact upon the efficient operation of the surrounding road system.

The objectives of the project is to demolish existing structures to facilitate the subsequent remediation works required to make the site safe for mixed use (commercial and residential) development and is considered consistent with the objectives of the B6 zoning.

The Wollongong LEP includes a land use table, which specifies the development consent, development for which consent is required, and prohibited development. Under the EP&A Act, the demolition of buildings fall within the definition of development.

Clause 2.7 states that:

The demolition of a building or work may be carried out only with development consent.

Note: If the demolition of a building or work is identified in an applicable environmental planning instrument, such as this plan or State Environmental Planning Policy (Exempt and Complying Development Codes) 2008, as exempt development, the Act enables it to be carried out without development consent.

As the demolition of the commercial buildings does not fall within the complying parameters of the State Environmental Planning Policy (Exempt and Complying Development Codes) (discussed in further in this section), a development consent is required for the project.

Acid Sulfate Soils

The Wollongong LEP identifies the site as being located on Class 4 and 5 acid sulfate soils. Clause 7.5(2) stipulates that development consent is required for works more than two metres below the natural ground surface, or works by which the water table is likely to be lowered more than one metre below the natural ground surface, on Class 4 acid sulfate soil land.

Development consent is required for works on Class 5 acid sulfate soil land within 500 metres of adjacent Class 1, 2, 3 or 4 land that is below five metres AHD and by which the water table is likely to be lowered below one metre AHD on adjacent Class 1, 2, 3 or 4 land.

The project will only be to grade with no sub-surface intrusive works being undertaken. Therefore, development consent is not required under the Wollongong LEP.

Earthworks

Pursuant to Clause 7.6(2), development consent is required for earthworks unless the work is exempt development under the Wollongong LEP or the consent authority is satisfied the work is of a minor nature.

The project will only be to grade with no sub-surface intrusive works being undertaken. Therefore, development consent is not required under the Wollongong LEP.

Floor space ratio

No buildings will be constructed as part of the project, therefore the floor space ratio considerations shown in the Wollongong LEP floor space ratio maps are not relevant to the project.

Height of Building

No buildings will be constructed as part of the project, therefore height of buildings considerations shown on Wollongong LEP height of building maps are not relevant to the project.

Minimum lot size

No subdivision is proposed as part of the project, therefore the minimum subdivision lot size is not relevant to the project.

Natural resource sensitivity - biodiversity

The site has not been identified as natural resource sensitivity-biodiversity, as shown on Council's LEP natural resource sensitivity - biodiversity maps.

Section 5.3 of this SEE provides an assessment of the potential impacts the demolition works may have on biodiversity.

State Environmental Planning Policy (Coastal Management) 2018

State Environmental Planning Policy (Coastal Management) 2018 (the Coastal Management SEPP) aims to promote an integrated and coordinated approach to land use planning in the coastal zone. Clause 13 of the Coastal Management SEPP stipulates that development consent must not be granted on land that is within the coastal environment area unless the consent authority has considered whether the proposed development will have an adverse effect on coastal environmental values.

The site is not located within the Coastal Management Area map.

State Environmental Planning Policy (Vegetation in Non-Rural Areas) 2017

State Environmental Planning Policy (Vegetation in Non-Rural Areas) 2017 (the Vegetation in Non-Rural Areas SEPP) aims to protect the biodiversity values of trees and other vegetation in non-rural areas, preserving the amenity of non-rural areas through the preservation of trees and other vegetation.

Clause 7(1) states that “a person must not clear vegetation in any non-rural area of the State to which Part 3 [of this SEPP] applies without the authority conferred by a permit granted by the council under that Part.” Part 3, Clause 9(1) states that the vegetation to which this applies is identified within the Wollongong Development Control Plan (DCP) 2009.

Chapter E17 of the Wollongong DCP requires prescribed trees to obtain a Tree Management Permit or development consent prior to its removal. A prescribed tree is:

- a. Are three (3) metres or more in height; or
- b. Have a diameter of 200mm or more at a height of one (1) metre from the ground; or
- c. Have a branch spread of three (3) metres or more.

A list of exempt tree species and exempt circumstances is included in the DCP.

An Arboricultural Assessment was undertaken as part of this SEE and is provided as Appendix B and is summarised in section 5.3. On the basis of this assessment 35 prescribed trees would require removal from the site and therefore development consent is required for the project.

The removal of existing vegetation on the site has been included in the scope of this development application.

State Environmental Planning Policy (Infrastructure) 2007

Clause 85 of State Environmental Planning Policy (Infrastructure) 2007 (the Infrastructure SEPP) defines the notification requirements if the development is on land adjacent to a rail corridor.

The project would not:

- have an adverse effect on rail safety
- involve the placing of a metal finish on a structure and the rail corridor concerned is used by electric trains
- involve the use of a crane in air space above any rail corridor.

Therefore, the consent authority is not required to give written notice of the application to the rail authority for the rail corridor.

4.1.3 Statutory approval pathway

The provisions of the Wollongong LEP permit the project to be undertaken with development consent.

A DA is therefore required to be submitted to Council to be assessed under Part 4 of the EP&A Act.

The project will be considered integrated development if it requires any of the additional licences or approvals under other NSW legislation listed in section 4.46 of the EP&A Act. Of the listed legislation the project does not require any additional licenses or approvals (refer to section 1.4). The project is not therefore considered integrated development.

Section 4.15 of the EP&A Act outlines the matters that must be taken into consideration by a consent authority when assessing a DA under Part 4 of the EP&A Act.

Table 4.1 provides a summary of matters listed under Section 4.15 and a reference to where they have been addressed within the SEE.

Table 4.1 Section 4.15 of the EP&A Act – matters for consideration

Matters for consideration	Report section
(a) the provisions of:	
(i) any environmental planning instrument	Section 4.1.2
(ii) any draft environmental planning instrument that is or has been placed on public exhibition and details of which have been notified to the consent authority (unless the Director-General has notified the consent authority that the making of the draft instrument has been deferred indefinitely or has not been approved), and	Not applicable
(iii) any development control plan, and	Section 4.1.4
(iiia) any planning agreement that has been entered into under section 7.4 of the EP&A Act, or any draft planning agreement that a developer has offered to enter into under section 7.4, and	Not applicable
(iv) the EP&A Regulation (to the extent that they prescribe matters for the purposes of this paragraph), that apply to the land to which the development application relates	Not applicable
(b) the likely impacts of the development, including environmental impacts on both the natural and built environments, and social and economic impacts in the locality	Section 5
(c) the suitability of the site for the development	Section 6.1
(d) any submissions made in accordance with the EP&A Act or the EP&A Regulation	Any submissions will be considered as part of the development assessment process
(e) the public interest.	Section 6.2

4.1.4 Wollongong Development Control Plan 2012

The project has been assessed against the relevant provisions of Council's Development Control Plan (DCP) 2009 in Appendix C.

The project is generally considered to be consistent with the provisions of the DCP.

4.2 Other relevant state legislation

This section outlines other legislation that may be relevant to the project, taking into consideration the fact that the project will be to grade, with no sub-surface intrusive works proposed.

4.2.1 Biosecurity Act 2015

The *Biosecurity Act 2015* repealed the *Noxious Weeds Act 1993* on 1 July 2017. This Act specifies the duties of public and private landholders as to the control of priority weeds. Under this Act, priority weeds have been identified for Local Government Areas and assigned duties for control. Part 3 provides that any person who deals with biosecurity matter (ie weeds) and who knows, or ought reasonably to know, the biosecurity risk posed or likely to be posed by the biosecurity matter has a duty to ensure that, so far as is reasonably practicable, the biosecurity risk is prevented, eliminated or minimised.

None of the exotic species identified on site are listed as a priority weed by the Department of Primary Industries, for the Wollongong LGA. Mitigation measures that would assist with the control of priority weeds are provided in section 5.3.3.

4.2.2 Biodiversity Conservation Act 2016

The *Biodiversity Conservation Act 2016* (BC Act) commenced on 25 August 2017 and has repealed the *Threatened Species Conservation Act 1995*. The BC Act lists a number of threatened species, populations and ecological communities to be considered in deciding whether there is likely to be a significant impact on threatened biota, or their habitats. If any of these could be impacted by the project, an assessment of significance that addresses the requirements of section 7.3 of the BC Act must be completed to determine the significance of the impact.

The project is not expected to have a significant impact on any protected species or ecological communities as the site has been disturbed as a result of its existing and past uses and does not contain any native vegetation that might provide habitat for protected species or ecological communities. The potential for impacts to flora and fauna due to the project is discussed further in section 5.3.

4.2.3 Contaminated Land Management Act 1997

The CLM Act enables the EPA to respond to contamination that is causing a significant risk of harm to human health or the environment, and sets out criteria for determining whether such a risk exists. The EPA can request clean-up from the present land occupier. CLM Act requires notification to EPA of a new contamination discovery.

Jemena notified the site to EPA in 2012. The EPA requested further investigation be undertaken to characterise contamination at the site. The demolition works will enable access to characterise the extent of existing contamination in areas that have not been previously accessibly, to inform the subsequent remediation of the site. Any assessment and remediation undertaken as part of the project and subsequent works would be undertaken in accordance with those guidelines "made or approved" by the NSW EPA under Section 105 of the CLM Act.

4.2.4 Heritage Act 1977

The *Heritage Act 1977* is concerned with all aspects of the conservation of heritage places and items. Heritage items of state significance are listed on the State Heritage Register.

A search of the Office of Environment and Heritage (OEH) heritage database indicated there are no items of heritage significance within 200 metres of the site with the exception of a row of Canary Island Date Palms on Robinson Street (the closest is located approximately 188 metres south west of the site), which have local heritage significance.

Given the distance to the closest heritage items and the nature of the works proposed the project would be unlikely to impact on any items of non-Aboriginal heritage.

4.2.5 National Parks and Wildlife Act 1974

The *National Parks and Wildlife Act 1974* (NPW Act) provides the basis for legal protection and care of native fauna and flora and Aboriginal places and objects within NSW.

In accordance with Section 90 of the NPW Act Aboriginal heritage impact permits must be obtained prior to the commencement of any project that would, or would be likely to, impact on Aboriginal objects or places. A search of the Aboriginal Heritage Information Management System (AHIMS) indicated that there are no Aboriginal Heritage items on or within 200 metres of the site (Appendix D).

The project would involve works down to ground level. The site was previously used as a gasworks site, and contained sub-surface infrastructure. Therefore, the potential to encounter previously unidentified Aboriginal sites or artefacts is considered negligible. Implementation of the mitigation measures in section 5.5.3 would assist in mitigating risks to Indigenous heritage.

4.2.6 Pesticides Act 1999

This Act regulates the safe and correct use of pesticides from the point of sale, to protect the environment and community.

The Pesticides Regulation 2017 provides for licensing of ground applicators of pesticides. Additionally, commercial users of pesticides, which includes anyone using pesticides as part of their business must keep records of their pesticide use.

The application of pesticides will likely be undertaken as part of the vegetation clearance and removal. Any provider of services that uses pesticides to control weeds or pests affecting plants and soils will be required to hold a ground applicator licence. The contractor would need to ensure an appropriately licensed provider undertakes the application of pesticides.

4.2.7 Water Management Act 2000

The objectives of the Water Management Act (WM Act) are to provide for the sustainable and integrated management of the water sources of the State for the benefit of both present and future generations.

The WM Act regulates the extraction and use of water and the carrying out of activities in or near water sources in NSW. 'Water sources' is defined very broadly to include any river, lake, estuary or place where water occurs naturally on or below the surface of the ground.

There are two kinds of activity approvals under Section 91 of the WM Act these are controlled activity approvals and aquifer interference approvals.

The project will not impact upon water front land and therefore does not require a controlled activity approval.

The project will not involve sub-surface works that have the potential to interfere with a groundwater aquifer therefore an aquifer interference approval is not required.

4.3 Commonwealth legislation

4.3.1 Environment Protection and Biodiversity Conservation Act 1999

The Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) prescribes the Commonwealth's role in environmental assessment, biodiversity conservation and the management of protected areas and species, populations and communities and heritage items.

The approval of the Commonwealth Minister for the Environment is required for an action:

- which has, would have or is likely to have, a significant impact on 'matters of national environmental significance'
- likely to have a significant impact on the environment in general (for actions by Commonwealth agencies or actions on Commonwealth land) or the environment on Commonwealth land (for actions outside Commonwealth land).

An EPBC Act protected matters search was undertaken on 10 June 2019 for a two kilometre radius around the site. The results of the search are summarised in Table 4.2 below. As no potential impacts are predicted, approval under the EPBC Act would not be required.

Table 4.2 EPBC Act protected matters located within one kilometre of the project

Protected matter	Matter located within search radius	Comments	Potential impact
World Heritage Properties	None	There are no World Heritage Properties identified within a two kilometre radius of the project.	Nil
National Heritage Places	None	There are no National Heritage Places identified within a two kilometre radius of the project.	Nil
Wetlands of international significance (Ramsar sites)	None	There are no wetlands of international significance were identified within a two kilometre radius of the project.	Nil
Listed threatened species and ecological communities	70 species and 2 communities	An assessment of the potential impacts of the project on listed threatened species and communities has been undertaken. No significant impacts are expected from the works. Refer to section 5.3.	No
Listed migratory species	53	No significant impacts are expected from the works.	No
Nuclear actions	None	n/a	Nil
Commonwealth Marine Areas	None	n/a	Nil
Great Barrier Reef Marine Park	None	n/a	Nil
Commonwealth land	8	Eight Commonwealth land sites have been identified within the search radius. However, these sites would not be impacted by the project.	Nil

5. Likely impacts of the development

This chapter contains an assessment of the impacts of the project in accordance with the matters for consideration under Section 4.15 of the EP&A Act. It describes the existing environment, assesses the potential impacts of the Project, and recommends mitigation measures.

5.1 Soils, contamination and water quality

5.1.1 Existing environment

The local geology consists of Permian undifferentiated siltstones, shales and sandstones, which form part of the Berry Formation of the Shoalhaven Group. The site stratigraphy intersected during the previous investigations was reported to consist of fill soils underlain by natural clay then sandstone, siltstone or shale. Generally, fill was encountered between 0 to 1.5 metres below ground level, clay from 1 to 6 metres below ground level, and sandstone/shale between about 6 to 8 metres below ground level.

Historically, a creek ran to the north along the western side of the Collegians carpark (Lot 2412 DP 1097900). This creek reportedly flooded during times of heavy rain and was backfilled upon the commencement of the gasworks operations. This has since been culverted.

The Wollongong LEP identifies the site as being located on Class 4 and 5 acid sulfate soils. The former creek line, was identified as an area with low probability for acid sulfate soil within the soil profile at depths greater than 3 metres.

Due to the topography of the site, the majority of surface water is expected to flow to the swale along the northern boundary of the site before discharging into the stormwater culvert on the Collegians site.

Stormwater that flows towards the north is directed towards off-site stormwater drains via the swale. These drains continue to direct water to the north. Stormwater from the southern site boundary (Smith Street) also flows north to this drainage system via large underground stormwater pipes within the backfilled former creek underneath the site.

The nearest water body is Fairy Creek approximately 670 metres to the north of the site (refer to Figure 5.1). This creek eventually discharges into Fairy/Para Creek Lagoon system and ultimately into the Tasman Sea. The piped stormwater easement at the site (collecting stormwater from up gradient of the site and connected to the swale along the northern site boundary) acts as a tributary to Fairy Creek.

Two groundwater bearing zones have been identified beneath the site. The first is a shallow water bearing zone near the fill and clay/bedrock interface. Shallow groundwater has been identified at a depth of about 1.5 to 2.5 metres below ground level across the majority of the site.

A deeper groundwater aquifer has also been identified within the bedrock underlying the site with a water bearing zone identified between 7 and 19 metres below ground level within the shale and sandstone bedrock.

Groundwater in both shallow and deep aquifers generally flows north to northeast; however, groundwater in the shallow unit is probably influenced by the stormwater easement and former gasworks infrastructure buried beneath the site.



Based on the site investigation undertaken by GHD in 2016 and the draft Remedial Action Plan prepared by Senversa (Senverson, 2018), concentrations of contaminants of potential concern (COPC) comprising of polycyclic aromatic hydrocarbons (PAHs) and total recoverable hydrocarbons (TRHs) above the nominated criteria were reported in soil collected at several depths. However, the majority of impacts were identified within the upper two metres below ground level (bgl) or greater than four metres below ground level.

Concentrations of benzene, cyanide and PAHs above the nominated criteria were reported in groundwater collected from wells screened in the shallow groundwater aquifer.

5.1.2 Potential impact

The project would temporarily expose the natural ground surface and sub-surface through the removal of vegetation and overlying structures (such as buildings). The exposure of soil to runoff and wind, and vehicle movements over exposed soil can increase soil erosion potential, which can result in dust generation and an increase in sediment loads entering the stormwater system and/or local runoff, and therefore nearby receiving waterways.

The removal of vegetation and overlying structures may disturb any contamination and hazardous materials present in soil. It is expected that a minimal amount of soil underlying the buildings will be displaced as a result of hardstand removal. If inadequately managed, the disturbance of areas of contamination has the potential for:

- direct contact and/or inhalation by site workers, users, and visitors
- impacts to surrounding environmental receivers (including surrounding ecosystems and flora and fauna, where present)
- mobilisation and migration of surface and subsurface contaminants via leaching, runoff and/or subsurface flow, impacting nearby soils, surface water, and groundwater.

Soil erosion impacts and impacts associated with exposing contaminated soil are expected to be minimal for the project as a result of the topography of the site, the amount of plant and equipment that will be used on the site, and the temporary nature of exposure.

The potential for these impacts would be minimised by implementing the mitigation measures described in section 5.1.3.

If inadequately managed, construction activities have the potential to result in the contamination of soil due to spills and leaks of fuel, oils, and other hazardous materials. These potential impacts would be minimal with the implementation of standard mitigation measures, provided in section 5.1.3.

Jemena's existing asbestos register for the site indicates that the two story office building and warehouse contains asbestos containing material (ACM) in a number of locations including the walls and utilities (pits and gaskets) located on the site. Therefore the demolition of buildings and clearance of structures to ground level may result in the disturbance of hazardous materials. Mishandling of hazardous material waste has the potential to contaminate soils. Mitigation measures are provided in section 5.1.3 to minimise the potential impacts of hazardous materials.

5.1.3 Mitigation measures

The following mitigation measures would be included in the Construction Environmental Management Plan (CEMP) and implemented to minimise potential impacts on soils and water quality during construction of the project:

- A pre-demolition hazardous materials survey of buildings and structures will be undertaken to identify presence of asbestos containing material, synthetic mineral fibres, lead paint and polychlorinated biphenyls.
- SafeWork NSW would be notified prior to any asbestos removal works.
- Hazardous materials removal will be undertaken prior to building demolition by an appropriately licensed contractor.
- Sediment and erosion control measures will be implemented in accordance with *Managing Urban Stormwater: Soils and Construction Volume 1* (Landcom, 2004) commonly known as 'the Blue Book' and *Managing Urban Stormwater: Soils and Construction Volume 2A* (DECC, 2008).
- Any designated tracks on the site, particularly in the western lot, will be stabilised prior to works commencing and vehicle and machinery movement will be confined to designated tracks and work areas.
- Any soil disturbed during the project will be stockpiled on the site in designated lay down areas for treatment and disposal as part of the remediation works. Stockpiled soil will be covered with high density polyethylene (HDPE) sheeting or similar.
- Machinery will be checked periodically to ensure that there is no oil, fuel or other liquids leaking.
- Fuels, chemicals and liquids will be stored according to the following requirements:
 - they will be stored in sealed vessels within watertight bunded areas away from designated stormwater or drainage lines
 - bunded areas for chemical storage will have impervious floors and have the capacity to retain 110% of the total volume of all liquids stored within
 - the fuels and chemicals stored must be compatible (ie will not react with each other). The safety data sheets will be consulted in this regard
 - the storage facility will be undercover
 - all containers will be labelled with the details of the contents
 - they will be recorded on a register and the relevant Safety Data Sheets will be kept on site
 - the storage facility will inspected for compliance to the above requirements.
- A functioning spill kit will be kept on site and any chemical/fuel spills will be immediately cleaned up.
- If the storage or handling of dangerous goods/hazardous chemicals contained in Schedule 11 of the Work Health and Safety Regulation 2017 is proposed at volumes greater than those specified in the schedule then notification to SafeWork NSW will be required.
- Refuelling, fuel decanting and vehicle maintenance work will take place within the work compound in the site.
- Works will cease during heavy rainfall events when there is a risk of sediment loss off-site or ground disturbance due to water logged conditions.

5.2 Noise and vibration

A noise and vibration impact assessment (NVIA) for the project was undertaken by GHD and is provided in Appendix E. A summary of this assessment is provided in the sections below.

5.2.1 Existing environment

The noise environment surrounding the site is characteristic of an urban environment intermittent rail noise from the nearby Illawarra line rail corridor and consistent road noise from Princes Highway.

Nearby noise sensitive receivers include residences directly south of the site (across Smith Street) and to the west of the site, beyond the rail corridor. The site is also surrounded by a variety of commercial businesses immediately to the north, south west and east of the site.

Sensitive residential receivers are summarised in Table 5.1 while all sensitive receivers in proximity to the site (including commercial, educational institutes, places of worship and active recreation areas) are shown on Figure 5.2.

Table 5.1 Identified noise sensitive receivers (residential)

Residential street	Approximate distance from site
Smith Street	Directly adjacent – south
Young Street	30 m - south
Belmore Street	60 m - south
Victoria Street	110 m - south
Denison Street	130 m - west
New Dapto Road	200 m - west
Keira Street	220 m - east
Market Street	220 m - south
Keira Lane	230 m - south
Regent Street	240 m - south
Campbell Street	250 m - north
Gipps Street	320 m - north
Thomas Street	320 m - east
Bligh Street	350 m - west
Hay Street	370 m - north
First Street	380 m - east
Rawson Street	400 m - south
Church Street	440 m - east
Macquarie Street	440 m - west
Waters Place	450 m - south
View Street	475 m - north
Crawford Avenue	480 m - north
Edward Street	490 m - north
Vickery Street	800 m - west

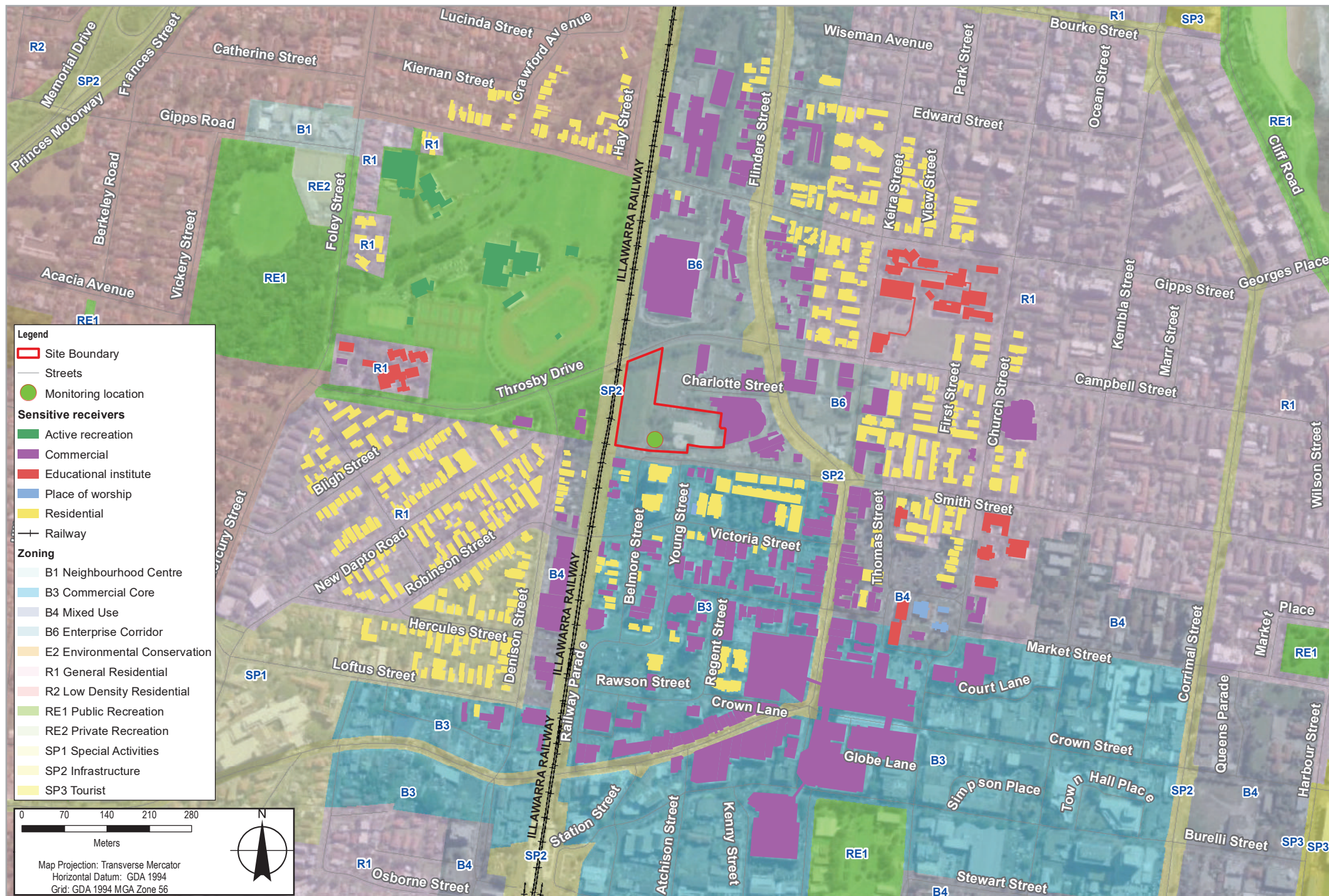


FIGURE 5.2: Sensitive receivers and land use map

Data source: General topo - NSW LPI DT08 2012, 2015. Aerial imagery - Created by: ecastelblanco

5.2.2 Assessment approach


Ambient noise

In order to determine the ambient noise levels, long-term noise monitoring was undertaken on the site for a period of nine days from 22 May 2019 to 31 May 2019 in accordance with the Noise Policy for Industry (NPI)(EPA, 2017) long-term monitoring method. The location of the noise monitor on the site is shown in Figure 5.2 and was considered representative of the background noise levels experienced by the most affected noise receivers (the residential properties on Smith Street).

The methodology for the noise monitoring included the following:

- Noise monitoring was undertaken using a SVAN 977 environmental noise logger. The noise logger was programmed to accumulate L_{A90} , L_{A10} , and L_{Aeq} noise descriptors continuously over the entire monitoring period. Details of the noise monitoring equipment are provided in Table 5.2.
- A calibration check was performed on the noise monitoring equipment using a sound level calibrator with a sound pressure level of 94 dB(A) at 1 kHz. At completion of the measurements, the meter's calibration was re-checked to ensure the sensitivity of the noise monitoring equipment had not varied. The noise loggers were found to be within the acceptable tolerance of ± 0.5 dB(A).
- The data collected by the logger was downloaded and analysed, and any invalid data removed. Invalid data generally refers to periods of time where average wind speeds were greater than 7 m/s, or when rainfall occurred. Meteorological data was sourced from the Bureau of Meteorology's Bellambi AWS weather station (number 068228), located approximately 6.75 kilometres northeast of the site.

Table 5.2 Unattended noise monitoring details

Location	Equipment details	Equipment settings	Photograph
120-122 Smith Street	SVAN 979 SN: 27100	A-weighted Fast time response Pre and post calibration variance: -0.3 dB	

The measured ambient and background noise levels are shown in Table 5.3.

Table 5.3 Noise monitoring results

Location	Rating background level, L_{A90}			Ambient level, L_{Aeq}		
	Day 7 am to 6 pm	Evening 6 pm to 10 pm	Night 10 pm to 7 am	Day 7 am to 6 pm	Evening 6 pm to 10 pm	Night 10 pm to 7 am
120-122 Smith St, Wollongong	46	45	37	55	53	51

Construction noise modelling

Noise modelling was undertaken using CandaA 2019. CandaA is a computer program for the calculation, assessment and prognosis of noise exposure. CandaA calculates environmental noise propagation according to *ISO 9613-2 'Acoustics – Attenuation of sound during propagation outdoors'*.

The following noise modelling assumptions were made:

- surrounding land was modelled assuming a mix of 50 per cent soft and 50 per cent hard ground with a ground absorption coefficient of 0.5
- atmospheric absorption was based on an average temperature of 10°C and an average humidity of 70%
- atmospheric propagation conditions were modelled with noise enhancing wind conditions for noise propagation (downwind conditions) or an equivalently well-developed moderate ground based temperature inversions
- modelled scenarios take into account the shielding effect from surrounding buildings and structures on and adjacent to the site
- noise sources for each scenario are in some cases modelled at different locations. As such the noise modelling assesses the noise source at multiple locations and takes the maximum L_{Aeq} received noise level.

Typical construction equipment sound levels have been used to model the noise sources at the site, with the equipment likely to be used as per that in section 3.2.3 and noise data sourced from the Australian Standards *AS2436 – Guide to noise and vibration control on construction, demolition and maintenance sites*.

Table 5.4 presents the sound power level for construction equipment proposed for each construction scenario. The activity sound power level has been calculated based on the two noisiest plant to determine the worst-case noise impacts during construction. The activity noise levels have been used to predict the noise levels that would be expected during construction works.

Table 5.4 Equipment and sound power levels, dB(A)

Plant description	Sound power level	Construction scenario		
		CS01	CS02	CS03
Activity Sound Power Level		106	123	113
Concrete saw (5mins)	112		✓	
Crane (mobile)	102			
Excavator	102		✓	✓
Excavator with hammer attachment	123		✓	
Front end loader	112		✓	✓
Generator diesel	99			✓
Hand tools (electric)	97	✓	✓	✓
Truck (> 20 tonne)	102	✓	✓	
Vehicle (Light commercial eg 4WD)	104	✓	✓	✓
Mulcher	106			✓

Construction equipment would likely move about the site altering the received noise for individual receivers. During any given period, the equipment to be used would operate at maximum sound power levels for only brief stages. At other times, the equipment would produce lower sound levels while carrying out activities not requiring full power. It is highly unlikely that all construction equipment would be operating at their maximum sound power levels at any one time. Certain types of equipment would only be present on site for brief periods during construction. Therefore, noise predictions are considered conservative.

5.2.3 Noise and vibration criteria

The EPA recommends management levels and goals when assessing construction noise and vibration. These are outlined in the following guidance documents:

- Interim Construction Noise Guideline (ICNG) (DECC, 2009)
- NSW EPA - Assessing Vibration: a technical guideline (DEC, 2006)
- *Road Noise Policy* (RNP) (DECCW, 2011).

The ICNG provides guidelines for the assessment and management of construction noise. The ICNG focuses on applying a range of work practices to minimise construction noise impacts rather than focusing on achieving numeric noise levels.

Detailed noise and vibration criteria are provided in Appendix E.

A summary of the relevant criteria used in the assessment is as follows:

- construction noise criteria, provided in Table 5.5
- construction traffic noise criteria, provided in Table 5.6
- human comfort vibration criteria, provided in Table 5.7
- structural damage vibration criteria, provided in Table 5.8.

Table 5.5 Project specific construction noise management levels

Receiver Type	Time of day	Management level
Residential	Recommended standard hours	Noise affected: 56
		Highly affected: 75
	Outside recommended standard hours ¹	Day: 51
		Evening: 50
Commercial premises Educational institutes Places of worship Active recreation areas	When in use	Night: 42
		70 dB(A) (external)
		45 dB(A) (internal)
		55 dB(A) (external) ²
		45 dB(A) (internal)
		55 dB(A) (external) ²
		65 dB(A) (external)

Note 1: The *Noise Policy for Industry* (EPA, 2017) defines day, evening and night time periods as:

- Day: the period from 7 am to 6 pm Monday to Saturday or 8 am to 6 pm on Sundays and public holiday
- Evening: the period from 6 pm to 10 pm
- Night: the remaining periods.

Note 2: These receivers have been assessed externally. This conversion is based on a partially opened window with a R_w of 10 dB

Table 5.6 Road traffic noise criteria, dB(A)

Type of development	Day 7 am to 10 pm	Night 10 pm to 7 am
Existing residence affected by additional traffic on arterial roads generated by land use developments	60 $L_{Aeq}(15 \text{ hour})$	55 $L_{Aeq}(9 \text{ hour})$
Existing residence affected by additional traffic on local roads generated by land use developments	55 $L_{Aeq}(1 \text{ hour})$	50 $L_{Aeq}(1 \text{ hour})$

Table 5.7 Human comfort intermittent vibration limits

Receiver type	Period	Intermittent vibration dose value ($m/s^{1.75}$)	
		Preferred value	Maximum value
Residential	Day (7 am and 10 pm)	0.2	0.4
	Night (10 pm and 7 am)	0.13	0.26
Offices, schools, educational institutes and places of worship	When in use	0.4	0.8

Table 5.8 Structural damage vibration criteria

Type of building	Peak component particle velocity in frequency range of predominant pulse	
	4 Hz to 15 Hz	15 Hz and above
Reinforced or framed structures. Industrial and heavy commercial buildings	50 mm/s at 4 Hz and above	50 mm/s at 4 Hz and above
Unreinforced or light framed structures. Residential or light commercial type buildings	15 mm/s at 4 Hz increasing to 20 mm/s at 15 Hz	20 mm/s at 15 Hz increasing to 50 mm/s at 40 Hz and above.

5.2.4 Potential impact

Construction noise

The construction noise levels were modelled as described in section 5.2.2 and a summary of the results are shown in Table 5.9 and Table 5.10. It is anticipated that all construction works will take place during standard construction hours. As such, no assessment for out of hours work and sleep disturbance has been conducted.

Table 5.9 Summary of noise impacts at sensitive residential receivers

Result	Construction scenario		
	Site establishment	Demolition	Vegetation clearing
Highest noise level, dB(A)	71	84	77
Number of exceedances above NA ¹ management level	14 receivers above 56 dB(A) ²	102 receivers above 56 dB(A) ²	29 receivers above 56 dB(A) ²
Highest exceedance above NA ¹ management level, dB	15	28	21
Number of exceedances above HNA ³ management level	0 receivers above 75 dB(A)	5 receivers above 75 dB(A)	1 receiver above 75 dB(A)
Highest exceedance above HNA ³ management level, dB	-	9	2
Worst affected receiver	2-12 Young Street, Wollongong	2-12 Young Street, Wollongong	2-12 Young Street, Wollongong

1) NA refers to the Noise Affected management level

2) The criteria for the NA management level is 56 dB(A) measured externally

3) HNA refers to the Highly Noise Affected management level

4) The criteria for the HNA management level is 75 dB(A) measured externally

Table 5.10 Summary of noise impacts at sensitive non-residential receivers

Receiver Type	Result	Construction scenario		
		Site establishment	Demolition	Vegetation clearing
Commercial	Number of exceedances above management level	3 receivers above 70 dB(A) ¹	11 receivers above 70 dB(A) ¹	6 receivers above 70 dB(A) ¹
	Highest noise level, dB(A)	97	92	92
	Highest exceedance, dB	27	22	22
	Worst affected receiver	3 Charlotte Street, Wollongong NSW	3 Charlotte Street, Wollongong NSW	3 Charlotte Street, Wollongong NSW

Receiver Type	Result	Construction scenario		
		Site establishment	Demolition	Vegetation clearing
Educational institute	Number of exceedances above management level	0 receivers above 55 dB(A) ²	4 receivers above 55 dB(A) ²	0 receivers above 55 dB(A) ²
	Highest noise level, dB(A)	46	61	53
	Highest exceedance, dB	-	6	-
	Worst affected receiver	Weerona College UOW	Weerona College UOW	Weerona College UOW
Place of worship	Number of exceedances above management level	receivers above 55 dB(A) ³	2 receivers above 55 dB(A) ³	2 receivers above 55 dB(A) ³
	Highest noise level, dB(A)	63	78	69
	Highest exceedance, dB	8	23	14
	Worst affected receiver	Wollongong Seventh-Day Adventist Church	Wollongong Seventh-Day Adventist Church	Wollongong Seventh-Day Adventist Church
Active recreation	Number of exceedances above management level	0 receivers above 65 dB(A) ⁴	1 receiver above 65 dB(A) ⁴	0 receivers above 65 dB(A) ⁴
	Highest noise level, dB(A)	55	66	62
	Highest exceedance, dB	-	1	-
	Worst affected receiver	The Snakepit Stadium	The Snakepit Stadium	The Snakepit Stadium

- 1) The criteria for the management level for Commercial receivers is 70 dB(A) measured externally
- 2) The criteria for the management level for Educational institutes is 55 dB(A) measured externally
- 3) The criteria for the management level for Places of worship is 55 dB(A) measured externally
- 4) The criteria for the management level for Active recreational areas is 65 dB(A) measured externally

A full list of the sites and predicted noise levels are found in Appendix C of the NVIA provided in Appendix E.

The results indicate that the noise management levels will be exceeded at various stages of the project and mitigation measures would be required. These are discussed in section 5.2.5. The predicted noise levels have been assessed on a 'worst-case' basis, assuming that all construction machinery would be operating at the same time. The model predicts that 102 exceedances of the noise management level of 56dB(A) will occur at residential receivers up to 175 metres away from the site. It is predicted that five exceedances will occur above the highly noise affected management level of 75 dB(A), at residential receivers up to 60 metres away from the site. The closest of these highly affected receivers is 2 – 12 Young Street which is located directly south of the site across Smith Street, and consists of nine stories of residential apartments, the majority of which with a direct line of sight to potential construction activities. It

is logical that the highest exceedance for residential receivers would occur at this location and over multiple stories.

Exceedances of the construction noise management levels are generally anticipated for construction projects of this scale and can be controlled with appropriate mitigation measures discussed in section 5.2.5. The noise impacts would be limited to the construction period and would not have lasting effects on the community.

The maximum noise impacts would be expected during the demolition works due to the operation of an excavator with hammer attachment. The demolition works, including hardstand removal under the existing buildings, would be undertaken in close proximity to sensitive residential receivers (2 - 12 Young Street, Wollongong).

Construction traffic

The RNP recommends that *“any increase in the total traffic noise level should be limited to 2 dB above that of the corresponding ‘without construction’ scenario.”* The project would generate heavy and light vehicle movements as per those noted in section 3.2.3.

Access to the site would be along the following roads listed below:

- Local Roads – Smith Street, Belmore Street, Young Street, Victoria Street, Throsby Drive
- Arterial Roads – Princes Highway

A significant increase in traffic volumes would be required in order to increase road traffic noise by 2 dBA (a doubling in traffic roughly corresponds to a 3 dBA increase). Due to the existing traffic volumes along these roads and the small amount of construction vehicles that would be used during the project, it is considered unlikely that construction traffic generation along these roads would cause construction traffic noise impacts. Therefore, construction traffic noise impacts are not anticipated.

Construction vibration

The project has the potential to impact human comfort and/or cause structural damage to buildings. Potential vibration inducing activities identified during the project include, bulk earthworks, construction traffic movements and demolition works, which would be a source of intermittent or continuous vibration. Of the equipment used during these activities use of an excavator was determined to have the greatest potential to impact human comfort and/or cause structural damage to buildings.

Based on the Construction Noise Vibration Strategy (TfNSW, 2018) the predicted safe working buffer distances for use of an excavator with a hammer attachment whereby the structural damage and human comfort criteria may be exceeded are as follows:

- Human comfort
 - 900 kg excavator with hammer attachment – within 23 metres
 - 1600 kg excavator with hammer attachment – within 73 meters
- Standard structures
 - 900 kg excavator with hammer attachment – within 4 metres
 - 1600 kg excavator with hammer attachment – within 22 meters

There are no residential structures within 23 metres of the location of the proposed demolition works. Three residential structures has been identified within 73 metres of the project, being:

- 2-12 Young Street
- 85-87 Smith Street

- 71-83 Smith Street.

These are located across the street from the site and, as such, could potentially experience human comfort impacts if the larger excavator is used.

Only the Collegians Rugby League Foot Club located directly adjacent to the site is located within the vibration safe working buffer distance of 22 metres, therefore has the potential for structural damage if the 1600 kg excavator with hammer attachment is used.

Section 5.2.5 provides mitigation measures for potential construction vibration impacts.

5.2.5 Mitigation measures

The following mitigation measures would be included in the CEMP and implemented to minimise potential noise and vibration impacts:

- A noise and vibration sub-plan will be prepared and implemented as part of the CEMP, including a detailed list of measures to minimise the potential for noise and vibration impacts. The sub-plan will address all aspects of construction, including:
 - locations of sensitive receivers
 - a risk assessment
 - communication and notifications
 - complaints management.
- Construction works will be carried out during standard construction hours (Monday – Friday 7 am to 6 pm and Saturday 8 am to 1 pm).
- Property owners/occupiers in the vicinity of the site will be informed in advance of the project, with the notification including details and timing of the project, contact details for any complaints or concerns, and details regarding the noise control measures that will be implemented.
- All site workers will be inducted and educated as to the potential for noise and vibration impacts of sensitive receivers and land uses and encouraged to take practical and reasonable measures to minimise impact during the course of their activities. This will include toolbox talks potentially covering measures such as:
 - all relevant project specific and standard noise mitigation measures
 - permissible hours of work
 - all deliveries and movements should be during standard construction hours
 - delivery vehicles will be fitted with straps rather than chains for unloading, where possible
 - construction employee parking areas
 - site opening/closing times (including deliveries)
 - avoid shouting and slamming doors
 - construction traffic routes
 - any limitations on high noise generating activities
 - where practicable, machines will be switched off when not being used, rather than left idling for prolonged periods
 - avoiding dropping materials from height and metal to metal contact where practicable
 - relevant licence and approval conditions
 - location of nearest sensitive receivers
 - environmental incident procedures.

- Community consultation prior to rock breaking activities will take place in order to schedule time periods for rock breaking. This will consider:
 - respite periods with affected residences
 - scheduling of activities around times of high background noise (local road traffic or when other noise sources are active) where possible to provide masking or to reduce the amount that construction noise intrudes above the background.
- Avoid simultaneous use of equipment where possible.
- Where practicable, noisy or vibration causing plant will be located as far away from sensitive receptors as possible.
- Structures such as site shed placement, earth bunds, fencing and noise barriers, will be used where practicable to shield residential receivers from noise.
- Localised hoarding will be implemented around rock breaking activities, prior to the commencement of works. A product such as EchoBarrier or similar will be used.
- Site set-up will maximise the distance between plant and equipment and noise and vibration sensitive receivers.
- Machines will be switched off when not being used rather than left idling for prolonged periods.
- Stationary noise sources will be enclosed or shielded.
- Machines found to produce excessive noise compared to industry standard practice will be removed from the site or stood down until repairs or modifications can be made.
- Generators and compressors will be checked to ensure that noise is minimised, with particular attention to residential grade exhaust mufflers.
- Traffic flow, parking and loading/unloading will be planned to minimise reversing movements at the site.
- Quieter demolition methods will be used where reasonable and feasible.
- All vehicles, plant and machinery, including silencers will be maintained and serviced in accordance with manufacturer's specifications.
- The noise levels of plant and equipment must have operating Sound Power or Sound Pressure levels compliant with levels in Table 5.4.
- A noise monitoring audit program will be implemented to ensure equipment remains within the more stringent of the manufacturer's specifications or Table 5.4.
- Truck drivers will be informed of designated vehicle routes, loading/unloading areas and parking locations to minimise reversing movements as well as the requirement to minimise engine idling.
- Non-tonal reversing beepers (or an equivalent mechanism) will be fitted and used on construction vehicles and mobile plant regularly used on-site.
- The size of the excavator with hammer attachment will be limited to 900 kg. If this is not feasible compliance vibration monitoring will be undertaken where works are required within the safe working buffer distances of identified structures (Collegians Rugby League Football Club) and may include:
 - site tests to review the measured frequency content to determine the structural damage criteria as per Table 5.8

- continuous vibration monitoring with a visual alarm installed to warn the equipment operator when the structural damage vibration criteria (considering frequency content) is exceeded.

5.3 Flora and fauna

5.3.1 Existing environment

The site is located in an urban area. Planted trees and vegetation are scattered throughout the eastern lot and border the western lot. The vegetation on the site is described briefly in section 2.4.2 and further information is provided below.

The site is highly disturbed and is fragmented from larger patches of native vegetation. It is exposed to edge effects from weeds, noise and dust. It may also be disturbed from artificial lighting from the adjacent pedestrian footpath and Collegians carpark.

Records and potential occurrences of threatened species, populations and endangered ecological communities were extracted from the following databases for the locality in June 2019:

- NSW Office of Environment and Heritage BioNet (Atlas of NSW Wildlife) for records of threatened species, populations and endangered ecological communities listed under the BC Act. The search radius for the database review was limited to a 10 kilometre radius search from the centre point of the site.
- Commonwealth Department of the Environment Protected Matters Search Tool for matters of national environmental significance listed under the EPBC Act. The search radius for the database review was limited to a 2 kilometre radius search from the centre point of the site.

Database searches (Appendix D) identified seven threatened flora species and 57 threatened fauna species (frog, birds, mammals) listed under the BC Act as having been previously recorded in the locality.

The protected matters search identified two threatened ecological communities, 12 threatened flora species and 57 threatened fauna species (two fish, three frog, ten reptiles, 12 mammals, 32 birds) and 53 migratory species listed under the EPBC Act as potentially occurring in the locality.

No matters of national environmental significance listed under the EPBC Act, such as World or National Heritage Places, Wetlands of International Importance or Commonwealth marine Areas were identified in the protected matters search as potentially occurring in the locality.

An Arboricultural Assessment was undertaken by GHD. The assessment is included in Appendix B and is summarised in this section.

The methodology of the Arboricultural Assessment included:

- review of the Wollongong LEP and Wollongong DCP
- review of the Nominal Excavation Areas Drawing, as part of the draft remedial action plan, prepared by Senversa, dated 07/08/2018
- review of photographs of the Wollongong gasworks site taken in 1980 by W.A. Bayley.
- a site inspection, which was undertaken on 22 May 2019 and involved surveys to describe vegetation on the site and an arboricultural assessment of trees within areas likely to be affected by the future remediation activities. The surveyed trees and tree groups are identified on Figure 5.3.

The assessment noted that the vegetation on the site consists of a mixture of mature and early-mature trees, including numbers of specimens which are indigenous to the Wollongong LGA. The mature specimens are approximately 30 years old and appear to have been planted after the construction of several buildings adjacent to Smith Street. There are also a number of self-recruited or re-sprouted specimens within the existing garden beds and open spaces.

The vegetated embankment along the northern boundary consists largely of self-recruited invasive exotic trees and shrub species such as Canary Island Date Palm (*Phoenix canariensis*), African Olive (*Olea europaea* subsp. *Cuspidate*), Hackberry (*Celtis sincensis*), and Camphor laurel (*Cinnamomum camphora*), and Small-leaved Privet (*Ligustrum sinense*) (group 17 as shown in Figure 5.3). However, two indigenous wattle species and an Illawarra Flame Tree are also found in this area. Additionally, self-recruited invasive weeds including African Olive, Hackberry, and Camphor laurel were found growing in a small thicket in the south west corner of the site, adjacent to the boundary fence (group 1 as shown in Figure 5.3). None of the exotic species identified on site are listed as a priority weed by the Department of Primary Industries, for the Wollongong LGA.



Legend

- Trees to be retained
- Site Boundary

- Tree removal
- Streets
- Railway

Paper Size ISO A4
0 10 20 30 40
Meters

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



Former Jemena Wollongong Gasworks site
120 – 122 Smith Street

Surveyed trees and tree groups

Project No. 21-28174
Revision No. 0
Date 17/06/2019

FIGURE 5.3

Data source: General topo - NSW LPI/DOB 2012, 2015. Aerial imagery - Created by: ecateblanco

While original vegetation on the site would have consisted of Coastal Grassy Red Gum Forest or Lowland Woollybutt-Melaleuca Forest, vegetation clearing of the floodplain, and subsequently, the site, would have commenced soon after European settlement (Fuller 2011; Hazelton and Tille 1990; NSW NPWS 2002). A photo taken by W.A Bayley and included as Figure 3.2 in the Arboricultural Assessment provided in Appendix B show the original gasworks structures on the site, and a marked absence of vegetation. Therefore, the existing vegetation on the site has either been planted or self-recruited.

While most planted specimens are in moderate health and form, the trees demonstrated signs of crowding, and unsuitable growing conditions, with an abundance of surface roots.

No threatened ecological communities are present on the site. However, there is one threatened species, Magenta Lilly Pilly (*Syzygium paniculatum*), located between the existing buildings on site (group 8 as shown on Figure 5.3). This species is listed as an endangered species under the BC Act and vulnerable under the EPBC Act.

A complete species list of the vegetation within the site is provided in Appendix B of the Arboricultural Assessment (provided in Appendix B) and Figure 5.3 shows the location of trees and tree groups that were surveyed during the arboricultural assessment.

5.3.2 Impact assessment

Direct impacts

Vegetation removal across the site will be undertaken to facilitate future remediation. All trees and vegetation within the site will be removed. This includes the removal of 35 trees indigenous to the Wollongong LGA, six non-indigenous Australian specimens and 100 exotic specimens. A complete list as shown in the Arboricultural Assessment provided in Appendix B.

The removal of invasive weeds and exotic species (predominantly in groups 1 and 17 as shown in Figure 5.3) is considered locally beneficial as the existing specimens provide a large number of propagules.

Threatened flora Magenta Lilly Pilly, will be removed during the project however this has been planted and does not occur in natural habitat. Therefore, it is unlikely to have the conservation significance of a threatened species within its natural habitat and distribution. Given the disturbed nature of the site, other threatened flora species are considered unlikely to occur.

The site would provide limited habitat resources for most native fauna species. There are no creeks, waterways, aquatic vegetation or drainage lines on the site which could potentially provide habitat for threatened species such as the Green and Golden Bell Frog (*Litoria aurea*) which have previously been identified in industrial areas around Wollongong. Opportunistic bird species such as the Australian Magpie (*Cracticus tibicen*) and Noisy Miner (*Manorina melanocephala*) are likely to use the site. Reptiles such as small lizards including Lampropholis species may use the site for refuge and foraging habitat.

There is potential for injury to or mortality of native fauna where native vegetation is to be disturbed. Less mobile, small terrestrial fauna (such as common frogs and reptiles) that may be sheltering in vegetation within the site are at most risk. The project may also cause temporary displacement of more mobile fauna. No bird nests were recorded in any of the trees during the site inspection and it is unlikely that the indigenous trees are sufficiently old for the development of hollows. Based on the disturbed nature of the site and surrounds and the limited amount of vegetation likely to be disturbed or cleared the potential for direct impacts to habitat and/or fauna is considered minimal.

There are two groups of vegetation (group 14 and 16 in Figure 5.3) located immediately adjacent to the northern boundary of the eastern lot and to the south east of the site in the

Collegians site, that may be impacted by the project. It is estimated that the proposed works will occur within less than 10 percent of the tree protection zones (TPZ) of these specimens. Therefore, these trees should be retained with the protective measures included in section 5.3.3. Works within the root zone of a tree can damage its root system, affect tree stability and tree health to such an extent that it can lead to the decline and possible death of the tree over a period of years. The trees in group 16 border a carpark off Smith Street. Care would need to be taken if this carpark is used as access or parking for construction vehicles, or for storage of materials. The potential impact on these trees can be mitigated through measures outlined in section 5.3.3. However, the impact on the TPZ of trees to be retained is likely to be minimal as no sub-surface works are proposed as part of the project.

Indirect impacts

Indirect impacts on fauna may be experienced as a result of increased noise and the presence of construction personnel and machinery on site. Impacts would be minimised by implementing safeguards identified in section 5.2.5.

Weeds invasion and edge effects

'Edge effects' refers to increased noise and light or erosion and sedimentation at the interface of intact vegetation and cleared areas. Edge effects may result in impacts such as changes to vegetation type and structure, increased growth of exotic plants, increased predation of native fauna or avoidance of habitat by native fauna.

Weed invasion and edge effects are already present at the site. The potential for the project to exacerbate existing edge effects and weed invasion would be limited, given the existing levels of disturbance.

There is the potential for minor, additional impacts on native vegetation in the broader study area through transmission of weed propagules on vehicles or equipment and through disturbance of vegetation and surface soil, which may provide increased opportunities for weed recruitment.

5.3.3 Mitigation measures

In addition to the measures specified in section 5.1 the following measures would be included in the CEMP and be implemented to minimise potential impacts on flora and fauna:

- The contractor will develop a vegetation management plan as part of the CEMP, and includes the following:
 - the location of native vegetation to be retained, exotic plants to be cleared, and native trees to be trimmed or removed
 - control measures to minimise impacts to vegetation on the site, including impacts to those trees to be retained
 - the locations and management of weeds (including priority weeds) at the site, including weed control methods and disposal requirements in accordance with the NSW *Biosecurity Act 2015* and/or the Weeds of National Significance Weed Management Guide
 - hygiene measures to prevent the introduction and spread of weeds and pathogens
 - revegetation requirements, which would be developed in consultation with Council.

All staff will be inducted and informed of the ecological values of the site, including the limits of vegetation clearing and the areas of vegetation to be retained, as shown on Figure 5.3.

- Fences will be erected to differentiate no-go-zones beyond the site.
- Plant and vehicle movement will be restricted to the site and other clearly defined areas.

- Trees that are proposed for retention (trees in group 14 and 16 – refer to Figure 5.3) will be protected prior to and during demolition works. Protection measures will include the provision of fencing around the TPZ of individual trees or groups, or alternatively as a continuous line along the limit of soil disturbance. Fencing will comply with AS, 2009. Australian Standard AS 4940-2009 Protection of trees on development sites details how the TPZ is calculated.
- Any root pruning required within the TPZs should be approved by the project arborist and any digging and pruning of roots (only roots < 5 cm may be pruned) within the TPZ should be conducted by hand for a clean cut.
- The following actions will not be permitted within the TPZ of trees to be retained:
 - storage of materials, plants or equipment
 - installation of site sheds or portable toilets
 - excavations, ripping or cultivation of soils
 - modification of existing soil level or addition of fill materials
 - disposal of waste materials and chemicals (both solid or liquid)
 - mechanical removal of vegetation
 - pedestrian or vehicular movement.
- Vegetation pruning and tree branch lopping, where required, will be undertaken by a suitable qualified person (arborist) to ensure the stability and growth habit of the tree is not adversely impacted.
- Prior to commencement of tree felling, trees should either be bumped by a machine, or rapped several times with a heavy implement, in order to encourage any sheltering fauna to leave the tree. Tree felling should not commence until it is evident that no fauna species are occupying the tree.
- Tree removal should be carried out according to the guidelines outlined in SafeWork Australia (2016).
- Fauna will be handled by an appropriately experienced wildlife carer or licensed ecologist.
- Plant and equipment will be received on site free of soil and organic matter. A visual inspection of plant and equipment will be undertaken and documented, while vehicles will utilise the vehicle wash bay.
- Once the project is completed, the retained trees (trees in group 14 and 16 – refer to Figure 5.3) should be re-inspected by the project arborist who should carry out a more in-depth assessment that would prescribe remedial work where necessary to reduce the risk to pedestrians or parked vehicles.
- The retained trees (trees in group 14 and 16 – refer to Figure 5.3) should be monitored after completion of the project to assess their health, vigour and to identify potential hazards.

5.4 Air quality and odour

5.4.1 Existing environment

The site is located in a predominantly suburban environment, adjacent to roads and the rail corridor. Sources of air pollution in the study area are likely to include:

- emissions from vehicles
- emissions or dust from trains

- smoke from wood fires and potentially backyard burn-off.

A review of sites which hold current EPLs in the suburb of Wollongong was undertaken in June 2019. The search found one site within one km of the project with an EPL (Wollongong Hospital). This site is not listed on the national pollutant inventory managed by DotE (2016) and is unlikely to contribute to the existing air environment near the site.

Sensitive receptors

Sensitive receivers with the potential to be affected by air quality impacts during the project are summarised in Table 5.11 and shown in Figure 5.2.

Table 5.11 Nearest sensitive receivers

Receiver	Summary
3 Charlotte Street	Commercial receiver to the north east of the site - Collegians Football Club (Collegians)
85, 89, 91, 93 Smith Street and 5 – 15 Belmore Street	Residential receivers to the south of the site.
2 Belmore Street	Commercial receiver to the south west of the site - Daniel Engineering Pty
1A Denison Street	Commercial receiver to the west of the site - Community health for Adolescents in Need

5.4.2 Potential impact

During the project the following activities would potentially result in air quality impacts:

- clearing of groundcover vegetation
- removal of hardstand surfaces under the existing buildings
- demolition of buildings
- use of construction vehicles, generating exhaust fumes.

Potential air quality impacts would predominantly be from the generation of dust, however there is the potential for odours due to the potential exposure of contaminated soil.

The impacts of dust generation would be short-term, during the construction phase only and would be addressed by the implementation of management measures identified in section 5.4.3.

Dust and odours have the potential to impact on the amenity of the surrounding environment.

Impacts to local air quality as a result of the project will be low, given the low number of vehicles and the relatively short duration (one month) of demolition works. As demolition of the existing commercial buildings would only be undertaken to grade with no sub-service intrusive works, impacts due to odours from contaminated soil, the generation of dust and exhaust emissions would be highly localised, short term and temporary. These impacts would be minimised by the implementation of the mitigation measures outlined below.

As asbestos containing materials may be present in the existing buildings, air monitoring and control measures would need to be put in place to control risks associated with generation of airborne asbestos fibres during the demolition of structures on the site. This would be undertaken in general accordance with SafeWork NSW guidelines.

5.4.3 Mitigation measures

In addition to the mitigation measures provided in section 5.1.3, the following mitigation measures would be included in the CEMP and implemented to minimise potential air quality and odour impacts:

- Materials transported to and from the site will be covered to reduce dust generation in transit.
- During loading and unloading the drop height of the excavator will be minimised to limit the height from which material is dropped into trucks.
- Regular boundary surveys will be undertaken to determine if offensive odour is occurring. If odour is noted, work practices will be altered accordingly and odour suppressant sprays will be used, if required.
- If dust generation is evident, measures such as water application, minimising vehicle movements and reducing vehicle speed limits will be carried out to minimise dust impacts.
- Access points will be inspected to determine whether sediment is being transferred to the surrounding road network and would be swept as required to control dust generation.
- All construction plant and machinery will be fitted with emission control devices complying with the Australian Design Standards.
- All vehicles, plant and machinery will be maintained and serviced in accordance with manufacturer's specifications.
- Any dust complaints will be logged as an incident, investigated as soon as possible and measures taken to manage any impacts identified.
- Machinery will be turned off when not in use and not left to idle for prolonged periods.

5.5 Heritage

5.5.1 Existing environment

The site is a former industrial site that has been developed and occupied with buildings and carparking areas since the 1980s, and therefore consists of a largely disturbed landscape.

A search of the Aboriginal Heritage Information Management System (AHIMS) in June 2019 was completed for a 200 metre radius around the site (see Appendix D). The search indicated no Aboriginal objects or places had previously been registered in the search area.

A search of the Office of Environment and Heritage (OEH) heritage database on 17 June 2019 indicated there are no items of heritage significance within 200 metres of the site with the exception of a row of Canary Island Date Palms on Robinson Street (the closest is located approximately 188 metres south west of the site) which have local heritage significance (refer to Appendix D). Beyond 200 metres of the site, there is a row of California Bungalows and a Row of Workers' Cottages, approximately 240 metres to the south west. Additionally, a number of houses, lodges and the Wollongong Primary School has been identified to the east of the site (refer to Figure 5.1).

5.5.2 Potential impact

The project will involve the movement of vehicles and equipment, and the removal of hardstand surfaces under the existing buildings that could potentially disturb unidentified archaeological or Aboriginal objects, sites.

Given the distance to locally significant Canary Island Date Palms and the nature of the works proposed the potential to impact heritage items would be negligible.

The site has been subject to extensive ground disturbance associated with the construction of the former gasworks facility and associated sub-surface infrastructure and the site does not contain any landscape features that could indicate the likely existence of Aboriginal objects. Additionally the project will only be to grade with no sub-surface intrusive works being undertaken.

Therefore, the potential to encounter previously unidentified Aboriginal sites or archaeological artefacts is considered negligible. Any potential impacts would be managed through the implementation of the mitigation measures provided in section 5.5.3.

5.5.3 Mitigation measures

The following mitigation measures would be implemented to minimise potential impacts on aboriginal heritage:

- In the event of an unexpected find of a heritage item (or suspected item), all works would cease and OEH contacted to advise on a course of action.
- In the unlikely event that suspected human remains were found, all work must cease, the site secured and the NSW Police notified to advise on a course of action. If the remains were found to be archaeological, OEH would be contacted to assist in determining appropriate management.

5.6 Traffic, transport and access

5.6.1 Existing environment

Existing road network

The following roads surround the site and are shown in Figure 5.1:

- Smith Street, which functions as a local road, providing access to commercial and residential properties to the south of Smith Street.
- Belmore Street and Young Street are local roads which run perpendicular to Smith Street, connecting Smith Street to Victoria Street, and roads further south (Governors Lane, Railway Parade).
- Victoria Street is a local road south of the site which runs parallel to Smith Street, providing access across the railway corridor and residential development to the west.
- Throsby Drive is a two-laned local road which runs along the rear of the site. There is no direct access off Throsby Drive into the site, which is a steeply vegetated embankment.
- Princes Highway enters the northern suburbs of Wollongong and the Illawarra region via the Bulli Pass, and carries inter-city traffic, acting as a local arterial route within this area. Princes Highway intersects both Smith Street and Throsby Drive to the west of the site.

The main users of Smith Street would be those accessing properties near the site, including commercial and residential properties, whose access is at the bend of Belmore Street and Smith Street, and Young Street, respectively.

Site access and existing vehicle movements

Access to the site is via two existing entries off Smith Street in Wollongong. Parking of plant and equipment, and the majority of worker vehicles, would be within the site. People accessing the site are currently limited to the operation of the commercial buildings. These buildings will be

vacated in July, prior to the commencement of the project. Access to the site would then be restricted to the construction workers, Jemena employees, and authorised members undertaking the works.

5.6.2 Potential impact

The project would result in heavy vehicle movements associated with the delivery of plant and equipment during site establishment and demobilisation. This would occur at the start and the end of the project. There would also be ongoing heavy vehicle movements throughout the project, associated with the transportation of waste materials.

The number of heavy vehicle movements required to transport machinery and materials to and from the site will be unlikely to exceed 20 movements (ten trips) a day over the duration of the project.

The construction workforce is estimated to be approximately ten people. As a result, there would be a maximum of approximately 20 daily light vehicle movements generated by the project at peak periods. Light vehicle movements would largely be confined to the start and end of the working day.

Access to the small carpark directly south west of the site may be limited during the project, due to vehicles and equipment accessing the site and construction workers potentially using the car park to park their vehicles. Movement along Smith Street may also be temporarily slowed while vehicles and equipment access the site. Increased movement of construction vehicles may temporarily increase road safety hazards for pedestrians and other cars.

The small number of vehicle movements generated by the project would be unlikely to significantly affect the safety or capacity of the local road network.

5.6.3 Mitigation measures

The following measures would be included in the CEMP and be implemented to minimise potential traffic and access impacts:

- A traffic management plan will be prepared in accordance with the Australian Standard 1742.3-2002: Manual of Uniform Traffic Control Devices and the NSW Roads and Maritime Services QA Specification G10 "Traffic Control at Worksites", Version 4, and will be approved by Jemena before implementation. It will be prepared in consultation with Council and Roads and Maritime Services.
- The traffic management plan will include measures to provide safe access points to the site from the adjacent road network, safety barriers where necessary, temporary speed restrictions when necessary, specific controls for partial road closures and changed road conditions, adequate sight distances and prominent warning signage. The plan will also include measures to restrict public access to the site.
- Consultation with the potentially affected community will be undertaken by Jemena's Community Liaison Manager in accordance with the Stakeholder Management Plan which has been prepared for the Wollongong Remediation project. Consultation activities will include website updates, regular community newsletters, targeted works notifications and provision of an 1800 number and email address. A community consultation briefing will also be undertaken on site prior to works commencing.
- Property access will be maintained at all times unless otherwise agreed with affected property owners. Where changes to access arrangements are necessary, owners and tenants will be advised and consulted in regard to alternative access.
- Construction vehicles including worker vehicles will be parked within the site at all times.

- Heavy vehicle movements to and from site will be avoided during peak traffic periods.

5.7 Waste

5.7.1 Existing environment

A description of the site is provided in section 2.4. Further information relevant to the management of waste is provided below.

Lot 253 DP 787299 remains unsealed, while Lot 2411 DP 1097900 is largely sealed. The existing commercial buildings consist of a two storey office, a single storey office, and industrial warehouse occupy the majority of Lot 2411 DP 1097900, located in the southeast portion of the site. These buildings occupy approximately 30 percent of Lot 2411 DP 1097900. The external areas comprising of bitumen paved roads, and carparking occupies approximately 50 percent of Lot 2411 DP 1097900.

Potential waste streams that would be generated by the project are listed in Table 5.13.

5.7.2 Potential impact

Impacts associated with aspects of waste generation during demolition activities are presented in Table 5.12.

Table 5.12 Impacts associated with aspects of waste management

Aspect of waste management	Potential impacts
Generation of waste	<ul style="list-style-type: none"> • Energy and water consumption associated with packaging • Impacts associated with extraction of resources
Storage of waste on-site	<ul style="list-style-type: none"> • Sediment laden runoff • Odours and dust • Health and safety of site users and neighbouring community • Littering • Site access restrictions
Storage and segregation of waste on-site	<ul style="list-style-type: none"> • Cross-contamination of wastes • Reduction in reuse of materials • Contamination of recycling facilities
Storage and disposal of liquid and/or contaminated waste	<ul style="list-style-type: none"> • Contamination of soils, groundwater and surface water
Waste transportation	<ul style="list-style-type: none"> • Dust, noise and odours • Mud tracking on road
Non-classified or incorrectly classified waste transport and disposal	<ul style="list-style-type: none"> • Regulatory non-compliance • Contamination of recycling facilities/landfills • Contamination of soils, groundwater and surface water
Unlicensed waste contractors transporting waste	<ul style="list-style-type: none"> • Regulatory non-compliance • Potential illegal dumping of waste

A Site Waste Minimisation and Management Plan (SWMMP) has been prepared by GHD and is provided in Appendix F.

Based on the SWMMP, Table 5.13 provides the potential classification of the different waste streams likely to be produced by the project, in accordance with the NSW EPA Waste Classification Guidelines Part 1: Classifying Waste (EPA, 2014). Where these wastes are either

reusable or recyclable, the SWMMP would be implemented to ensure the waste is managed in accordance with the waste hierarchy.

Table 5.13 Expected waste streams and likely classifications

Activity	Potential waste streams	Likely classification
Activities at site office/compound	Putrescibles (food and other organic waste)	General solid waste (putrescible)
	Paper/cardboard	General solid waste (non-putrescible)
	Containers (cans, plastic, glass)	
	Other office waste	
Site establishment		
Vegetation clearance and tree removal	Vegetation/garden organics	General solid waste (non-putrescible)
Establishment of the site office/compound and laydown areas	Packaging	General solid waste (non-putrescible)
Utilities (supplying power, water and other utilities to the site office/compound)	Excavated material	Restricted solid waste General solid waste (non-putrescible)
	Pipe/conduit and cable offcuts	General solid waste (non-putrescible)
Building demolition		
Hazardous materials removal	Hazardous/special waste eg asbestos	Special waste or Hazardous waste or Restricted solid waste
Soft stripping of internal building materials	Furniture	General solid waste (non-putrescible)
	Fixtures and fittings	
	Floor coverings	
Demolition of existing buildings and warehouse	Timber	General solid waste (non-putrescible)
	Concrete	
	Metal	
	Glass	
	Plasterboard	
	Bricks/pavers	
	Tiles	
Removal of hardstand surfaces under existing buildings	Concrete	General solid waste (non-putrescible)
	Asphalt	

5.7.3 Mitigation measures

All waste on site would be managed in accordance with the SWMMP provided in Appendix F.

5.8 Land use, visual and social-economic issues

5.8.1 Existing environment

Land use and socio-economic environment

The site contains buildings that are currently used for commercial purposes. Land use surrounding the site consists predominantly of commercial, residential and other land uses consistent with the suburban setting. Surrounding land uses are described further in section 2.

Visual amenity

The visual appearance of the area surrounding the site is generally characteristic of a commercial and residential area.

5.8.2 Potential impact

Land use

The site compound and use of equipment would be confined to the site. No activities would be undertaken outside the site.

The project would have a positive impact on the land use of the site, as it would enable future remediation and subsequent redevelopment of the site.

Visual amenity

The existing commercial buildings will be demolished and vegetation removed from the site. The buildings are not considered to be of any specific aesthetic significance and the works are needed to remediate the site for potential future development. The final urban form for the site will be determined as part of a future planning stage and the demolition works are not predicted to result in major changes to the visual amenity of the local area.

Socio-economic

The impact assessment has identified that the project has the potential to result in limited, short-term impacts on the amenity of the surrounding community and/or users of adjoining areas during vegetation removal and demolition works. Potential impacts, which include air quality, noise, traffic and access, and visual impacts, are assessed in sections 5.4.2, 5.2.4, 5.6.2, and visual amenity above, respectively. No significant impacts are identified.

The project would facilitate subsequent remediation works on site. This is a positive impact resulting in minor short-term increase in employment opportunities and procurement of local goods and services. Undertaking the project and subsequent remediation works will allow for the site to be utilised in a more constructive commercial or residential use in the future. This is consistent with the surrounding land uses, providing further opportunities for employment of local residents.

5.8.3 Mitigation measures

Visual

The following mitigation measures would be implemented to minimise potential impacts on visual amenity:

- The site compound and use of plant and equipment will be confined to the site.
- Shade cloth will be used to minimise dust dispersion and provide visual shields.
- The site would be maintained in a neat and tidy manner.
- Class A hoarding will be installed in the area abutting the car park at the front of the site.

Socio-economic

The following mitigation measures would be implemented to minimise potential socio-economic impacts:

- Consultation with the potentially affected community will be undertaken by Jemena's Community Liaison Manager in accordance with the Stakeholder Management Plan which has been prepared for the Wollongong Remediation project. Consultation activities will include website updates, regular community newsletters, targeted works notifications and

provision of an 1800 number and email address. A community consultation briefing will also be undertaken on site prior to works commencing.

- Sydney Trains will be notified of the project in accordance with the procedure outlined on the following webpage <https://www.transport.nsw.gov.au/sydneytrains/commercial/building-near-railway>
- Accurate public information signs will be displayed while work is in progress and until site restoration has been completed.
- Consideration will be given to sourcing local goods and services during construction where appropriate.

Additionally, mitigation measures identified in previous sections of this SEE would be implemented to mitigate social and economic impacts. Refer to the following sections for these measures:

- traffic mitigation measures in section 5.6.3
- air quality mitigation measures in section 5.4.3
- noise mitigation measures in section 5.2.5.

5.9 Hazard and risk

5.9.1 Existing environment

The site setting is described in section 2. The urban setting of the project means that there is the potential for the community to be impacted if project activities are not properly managed.

The site contains a number of underground utilities that are required to support the day to day operations of the existing commercial buildings. These services are expected to be disconnected prior to the project commencing.

Overhead power lines are also located on the same side of Smith Street as the site.

5.9.2 Potential impact

There is potential for underground utilities that occur in and near the site to be impacted by the project, particularly where utilities are located directly beneath existing hardstand surfaces. There is the potential for collision with overhead power lines as plant and equipment access the site and undertake works in proximity to the overhead power lines

The potential rupture of underground utilities during removal of hardstand surfaces under the existing buildings or collision of plant and equipment with aboveground services could pose risks to workers and public safety. Rupture or contact with services during works could also result in releases and/or short-term outages.

The project requires the removal of buildings and structures. Hazards and risks associated with building demolition include:

- unplanned structure collapse
- falls from one level to another
- falling objects
- the location of above and underground services
- exposure to any hazardous chemicals and materials (such as asbestos fibres, lead dust, and biological material)
- noise from plant and explosives used in demolition work

- proximity of the building or structure being demolished to other buildings or structures.

To minimise exposure to these hazards and risks, a risk assessment would be carried out prior to works commencing. The risk assessment would include:

- an assessment of the structural integrity of the structure to be demolished
- an assessment of the method of demolition, including sequencing, scheduling, plant and equipment, and the layout of work areas
- a hazardous material survey for those buildings and structures suspected of containing hazardous materials (particularly asbestos).

Demolition would be carried out by a licensed demolition contractor, in accordance with relevant regulatory requirements.

Other construction activities could result in impacts to the health and safety of site workers, users, visitors, and the local community if improperly managed. These include:

- potential exposure to contaminated soil through inhalation, ingestion or direct contact
- the operation of vehicles and construction equipment on site
- the transportation of equipment and waste to and from site.

In addition to the above, there is the potential for risks to pedestrians/public safety resulting from unauthorised access to the site.

NSW workplace safety laws require construction sites to have adequate site security, which includes appropriate fencing. All construction work would be isolated from the general public. The contractor would need to ensure that the site is secure at all times, and take all possible actions to prevent entry by unauthorised persons.

Health and safety risks during the project would be managed by the implementation of standard workplace health and safety requirements. A work health and safety management plan, and safe work method statements would be developed in accordance with regulatory requirements.

Any potential impacts would be managed through the implementation of the mitigation measures provided in section 5.9.3.

5.9.3 Mitigation measures

- All works will be undertaken in accordance with the Health and Safety plan prepared for the site.
- Service searches (such as dial before you dig and an onsite search with a services locator) will be conducted prior to the project commencing.
- All live services on the site will be disconnected prior to the project commencing.
- Plant and equipment movements near overhead power lines will be managed in accordance with the relevant utility providers requirements. This could include the use of a spotter or use of tiger tails.
- Appropriate PPE will be worn at all times and direct contact with contaminated spoil would be limited.
- The site would be fenced and fencing will be regularly monitored to ensure there are no holes or gaps.
- The site gates will remain closed during works. Where the gate needs to be opened (due to vehicle movements) a spotter would be used to limit public access.

5.10 Privacy

The project is located within an enterprise corridor area which anticipates a mixture of uses and redevelopment of land. The project would not impeded the future development of adjoining properties for commercial or industrial related uses.

5.11 Overshadowing

No built structures will be constructed as part of the project therefore there would be no impact from potential overshadowing on the adjoining industrial property.

6. Suitability of site and public interest

6.1 Suitability of site

The site is considered to be suitable for the project for the following reasons:

- The project is permissible with development consent.
- The works will comply with best practices demolition and vegetation removal processes.
- The project will facilitate the subsequent remediation of the site, hence making it suitable from a contamination perspective for use that is consistent with the surrounding existing uses and site zoning.
- The project is not likely to result in significant adverse impact to the natural or human environment.

The implementation of mitigation measures documented throughout the SEE and supporting specialist reports will minimise environmental harm to the local environment and potential impacts to nearby properties.

6.2 Public interest

The project is considered to be in the public interest as it will facilitate the remediation of the site, which will improve the health and safety of the surrounding environment.

A large portion of the site is currently unoccupied and has limited use. The project will facilitate completion of remediation works, which will make the site suitable for mixed commercial and residential use, thus enabling the site to be used for purposes consistent with the surrounding land uses and zoning of the site.

7. Conclusion

The SEE has been prepared to support a DA for vegetation removal and demolition works at the former gasworks site at 120 – 122 Smith Street, Wollongong, which operated between 1883 and 1977.

The main potential impacts/issues identified by the SEE are as follows:

- The project has the potential to result in noise and vibration impacts to nearby sensitive receivers, particularly during the demolition works. These works would be undertaken during standard construction hours and potential impacts would be minimised through implementation of the mitigation measures provided in section 5.2.4.
- The project has the potential to result in air quality and odour impacts to nearby sensitive receivers due to the demolition of building and structures, including structures containing ACM, and the potential exposure of contaminated soil. However, the impacts would be temporary and would be minimised by implementing the mitigation measures in section 5.4.3.
- The project has the potential to impact trees located on the site through clearing required to facilitate the works, or damage to the tree protection zones. The project would not remove any intact or remnant native ecological communities, or trees with conservation significance and impacts to vegetation being retained would be minimised by implementing the mitigation measures listed in section 5.3.3

These impacts can be adequately mitigated by the measures identified in this SEE. Additionally, the project would facilitate the subsequent remediation of the site, which would result in an overall positive impact in relation to land use and reduce ongoing risks to human and environmental receptors.

Based on these considerations the project as described in this SEE is considered appropriate for approval.

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