

Mr Russell Brooks
Senior Approvals and Stakeholder Manager
Jemena Gas Networks (NSW) Ltd
Level 1, 567 Collins Street
Melbourne, VIC, 3000

27/11/2020

Dear Mr Brooks

**Western Sydney Green Gas Project (SSD-10313)
Environmental Management Strategy**

I refer to the Environmental Management Strategy submitted in accordance with Condition C1 of Schedule 3 of the Development Consent for the Western Sydney Green Gas Project (SSD-10313).

The Department has carefully reviewed the document and is satisfied it meets the requirements of the relevant Conditions of Consent.

Accordingly, the Planning Secretary has approved the Environmental Management Strategy (Revision 1, dated 12 November 2020). Please ensure that the approved plan is placed on the project website at the earliest convenience.

If you wish to discuss the matter further, please contact Wayne Jones on 6575 3406.

Yours sincerely



Stephen O'Donoghue
Director
Resource Assessments
As nominee of the Planning Secretary



Jemena Gas Networks (NSW) Ltd

Environmental Management Strategy

Western Sydney Green Gas Project

P2G-2099-PA-EV-003



An appropriate citation for this paper is:


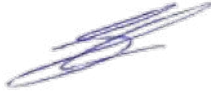
Environmental Management Strategy
Our Ref: P2G-2099-PA-EV-003

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Authorisation

Name	Job Title	Date	Signature
Reviewed by:			
Jarrod Irving	Project Manager	12/11/2020	
Approved by:			
Russell Brooks	Senior Approvals and Stakeholder Manager	12/11/2020	

History

Rev No	Date	Description of changes	Author
A	10/09/2020	Western Sydney Green Gas Project – Draft	Melissa Xu
0	15/10/2020	Documentation Updated and Issued for Use	Chris Griffiths
1	12/11/2020	Updated following consultation	Jarrod Irving

Owning Functional Area

Business Function Owner: Gas Distribution

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Abbreviations

Abbreviation	Definition
ASPIRE	Incident, inspection and action tracking system
ATR	Actions Tracking Register
BC Act	<i>Biodiversity Conservation Act 2016</i>
CEMP	Construction Environmental Management Plan
CoA	Condition of Approval
DP	Deposited Plan
DPI&E	Department of Planning, Industry and Environment
ECMS	Electronic Content Management System
EIS	Environmental Impact Statement
EP&A Act	<i>Environmental Planning and Assessment Act 1979</i>
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999 (Cwlth)</i>
EMS	Environmental Management Strategy
Jemena	Jemena Gas Networks (NSW) Limited
HRS	Hydrogen Refuelling Station
HAZOP	Hazard and Operability Study
HSE	Health, Safety and Environment
HSEQ	Health, Safety, Environment and Quality
HV	High Voltage
kW	Kilowatt
LV	Low Voltage
NRAR	Natural Resources Access Regulator
NSW	New South Wales
PEM	Proton Exchange Membrane
POEO Act	<i>Protection of the Environment Operations Act 1997</i>
P2G	Power to Gas
SAOP	Safety and Operating Plan
SCADA	Supervisory Control and Data Acquisition
SES	State Emergency Services
SIS	Safety Instrumented System
SSD	State Significant Development
WSPT	Western Sydney Park Trust
WSSGP	Western Sydney Green Gas Project

1. Introduction

1.1 Background

Jemena Gas Networks (NSW) Limited (Jemena) is undertaking the Western Sydney Green Gas Project (the Project), which involves trialling Power-to-Gas (P2G) technology by converting purchased green energy from the electricity mains network into hydrogen gas and injecting it into its secondary gas distribution network over a five year period. The Project would potentially facilitate ongoing development of commercially viable P2G systems in Jemena's NSW gas network.

The Project is located at the existing Jemena high pressure gas facility in Horsley Park (Horsley Park Facility), located in Western Sydney. The P2G facility will use renewable electricity to generate hydrogen, which can be injected into the natural gas network or used to generate electricity back to the grid by means of a hydrogen-powered micro-turbine.

The Project is subject to an environmental assessment and approval process under the *Environmental Planning and Assessment Act 1979* (EP&A Act) and is classified as State Significant Development (SSD).

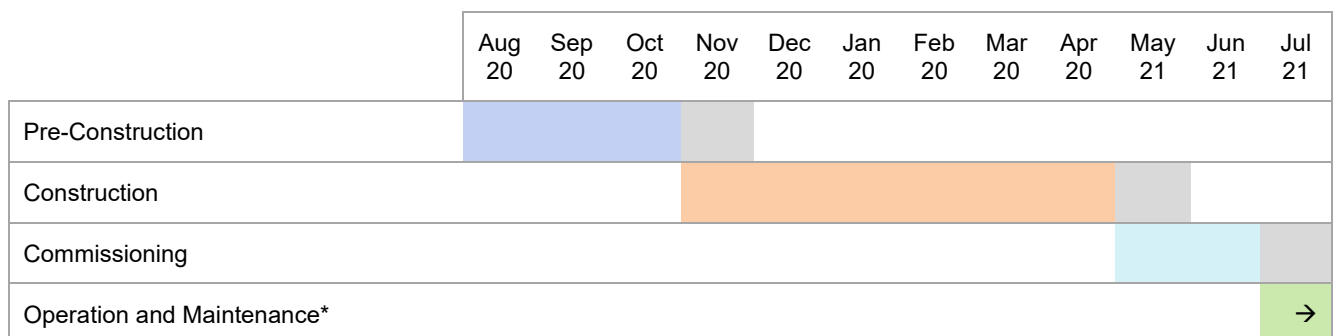
The delegate for the Minister for Planning and Public Spaces granted development consent on the 10 August 2020, requiring that the Project be carried out in general accordance with:

- Western Sydney Green Gas Project – Environmental Impact Statement (EIS), dated December 2019
- Western Sydney Green Gas Project – Response to Submissions, dated May 2020
- Additional information in a letter from Jemena dated 16 June 2020
- Western Sydney Green Gas Project Instrument of Consent (Application no. SSD 10313), dated 10 August 2020.

1.2 Timing and project phases

The Project has been split into four specific phases of works consisting of construction, commissioning, operation and decommissioning. The current project timeline is presented in Figure 1.1. As shown in this figure, construction works are anticipated to commence in October 2020, pending approval of the required management plans.

Figure 1.1 Project timing



Notes

* 5 year operation in accordance with condition of approval (CoA) A8

Grey – Potential carryover

The timing presented in Figure 1.1 is indicative only and subject to change. It is also noted that decommissioning isn't included. This will occur about five years from the commencement of operation.

1.3 Purpose

This Environmental Management Strategy (EMS) has been prepared to address the EMS requirements in CoA C1.

The purpose of this EMS is to provide a transparent framework to manage the environmental aspects of the Project in order to meet the statutory requirements, protect environmental values and sustain stakeholder confidence. In accordance with CoA C1, this EMS:

- Identifies the statutory approvals that apply to the Project
- Describes the roles, responsibilities, authority and accountability of all key personnel involved in environmental management
- Describes the procedures that would be implemented to keep the community and relevant agencies notified and for complaints management
- Provides a monitoring and audit regime to be implemented during construction.

Specific management measures have been incorporated into the Construction Environmental Management Plan (CEMP) (P2G-2099-PA-EV-001) and relevant sub-plans that support this EMS, including:

- Erosion and Sediment Control Plan (P2G-2099-PA-EV-002)
- Construction Noise and Vibration Management Plan (P2G-2099-PA-EV-006)
- Construction Air Quality Management Plan (P2G-2099-PA-EV-007)
- Cultural Heritage Management Plan (P2G-2099-PA-EV-008)
- Construction Traffic Management Plan (P2G-2099-PA-HS-002).

The construction contractor will be required to undertake works in accordance with this EMS and the mitigation measures identified in the CEMP and aspect-specific documents.

In addition to the documents noted in Section 1.1, the development of this EMS has been informed by feedback from Fairfield City Council and Western Sydney Parklands Trust as per Section 1.5.

1.4 Document Scope

This document has been prepared for the Western Sydney Green Gas project. **The scope of this EMS currently covers the construction phase of the Project only.**

As the commissioning activities are currently being refined, the EMS will be updated to include the commissioning and operational phases of the Project and submitted at least one month prior to the commencement of the commissioning of the Project.

The EMS will again be updated at a later stage to include the activities associated with the decommissioning phase.

1.5 Consultation

There are many specific consultation requirements for the EMS, and many of the associated management plans, strategies and programs have been developed in consultation with relevant stakeholders and agencies. Consultation required for the management plans, strategies and audits programs is detailed within Table 1-1.

Table 1.1: Consultation Requirements

Approval Condition	Document	Phase Required ✓ - Completed ○ - To be Completed/Revised ◆ - Previous Revision Maintained				Dept of Planning, Industry and Environment	Transport for NSW	Fairfield City Council	Western Sydney Parklands Trust	Fire Rescue NSW	Rural Fire Services	NSW SES
		C ⁽¹⁾	C ⁽²⁾	O ⁽³⁾	D ⁽⁴⁾							
B1 (a)	Construction Safety Study	✓	○	-	-	S						
B1 (b)	Hazard and Operability Study	✓	◆	◆	-	S						
B1 (c)	Final Hazard Analysis	✓	◆	◆	-	S						
B1 (d)	Fire Safety Study	✓	◆	◆	-	S				C	C	
B2	Safety and Operating Plan	✓	◆	◆	○	S						
B3 (a)	Emergency Plan	-	○	◆	-	S		C				C
B3 (b)	Safety Management Study	-	○	◆	-	S						
B4	Pre-Startup Compliance Report	-	○	◆	-	S						
C1	Environmental Management Strategy	✓	○	○	-	S		C	C			
B8	Traffic Management Plan	✓	○	○	-	S	C	C	C			
C9	Independent Environmental Audit	-	-	○	-	S		C				

S – Satisfaction

C – Consultation

(1) Construction

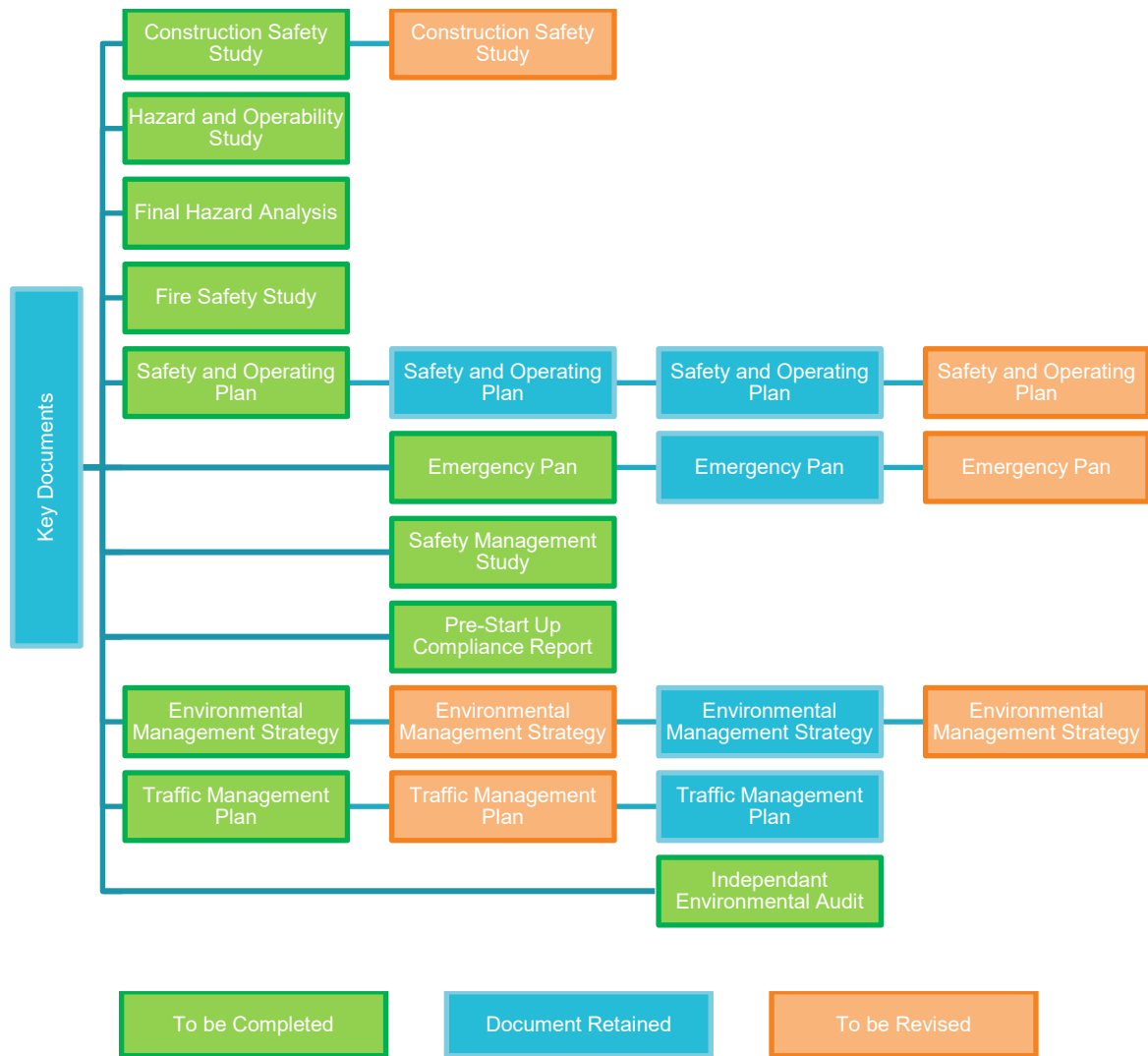
(2) Commissioning

(3) Operations and Maintenance

(4) Decommissioning

1.5.1 Consultation During Project Phases

As noted in Section 1.2 there are four phases of the Project and the management plans and strategies in Table 1.1 are required to support these different phases. Figure 1.2 shows which documents are required to support each phase. Consultation with the relevant stakeholders will be undertaken to ensure relevant requirements are incorporated prior to the commencement of each stage.

Figure 1.2 Documents required to support the Project

1.5.2 EMS Consultation

In accordance with CoA C1(a), the EMS has been prepared in consultation with:

- Fairfield City Council (Council); and
- Western Sydney Parklands Trust (WSPT)

Comments from the consultation process have been incorporated into this plan where appropriate and are summarised in the table below.

Table 1–2: Consultation Summary

Date	Consultation / Comments	Outcomes
15 Oct 2020	Email correspondence with: <ul style="list-style-type: none"> • Western Sydney Parklands Trust • Fairfield City Council 	
22 Oct 2020	Fairfield City Council – Biodiversity and Biosecurity.	No objections raised, noted.
2 Nov 2020	Fairfield City Council – Traffic and Heritage Team	No objections raised, noted.

Date	Consultation / Comments	Outcomes
3 Nov 2020	Fairfield City Council – Asset Team	Reference to Traffic Management Plan, previously amended in accordance with Council comments 7 Oct 2020.
3 Nov 2020	Western Sydney Parklands Trust	Comments noted, minor amendments made to the EMS and Erosion Sediment Control Plan.
5 Nov 2020	Fairfield City Council – Engineering Team	Noted concerns around stormwater design. Jemena provided the stormwater management report in accordance with CoA B15(b), of the Development Consent. The <i>Stormwater Management Report</i> dated 9 November 2020 is included in Appendix I.

1.6 Approved Documentation

In accordance with CoA C1(f) approved strategies, plans and programs are to be included in the EMS, the below documentation are included within this EMS.

Approval Condition	Document					Comments
		Completed	Consultation Underway	Consultation Completed	Approved	
B1(a)	Construction Safety Study	✓	✓	-	-	DPI&E review underway
-	Construction Health and Safety Management Plan	✓	✓	-	-	Included in B1(a) submission
-	Construction Emergency Response Plan	✓	✓	-	-	Included in B1(a) submission
-	Construction Environmental Management Plan	✓	✓	-	-	Included in B1(a) submission
-	Construction Quality Management Plan	✓	✓	-	-	Included in B1(a) submission
B1(b)	Hazard and Operability Study	✓	✓	-	-	DPI&E review underway
B1(c)	Final Hazard Analysis	✓	✓	-	-	DPI&E review underway
B1(d)	Fire Safety Study	✓	✓	-	-	Consultation review underway
B2	Safety and Operating Plan	✓	✓	-	-	DPI&E review underway
B3(a)	Emergency Plan	-	-	-	-	To be completed
B3(b)	Safety Management Study	-	-	-	-	To be completed
B4	Pre-Startup Compliance Report	-	-	-	-	To be completed
C1	Environmental Management Strategy	✓	✓	-	-	This document
-	Construction Environment Management Plan	✓	✓	-	-	Appendix C
-	Construction Noise and Vibration Management Plan	✓	✓	-	-	Appendix D
-	Construction Air Quality Management Plan	✓	✓	-	-	Appendix E

Approval Condition	Document	Completed	Consultation Underway	Consultation Completed	Approved	Comments
-	Erosion and Sediment Control Plan	✓	✓	-	-	Appendix F
-	Cultural Heritage Management Plan	✓	✓	-	-	Appendix G
B8	Traffic Management Plan	✓	✓	-	-	DPI&E review underway
C9	Independent Environmental Audit	-	-	-	-	To be completed

2. Project Description

The Project involves the construction of a P2G hydrogen facility at the existing Horsley Park Trunk Receiving Station (the Horsley Park Facility), located in Western Sydney. The trial will be one of the most comprehensive hydrogen trials in Australia and will use renewable electricity for the production capacity 100 Nm³/h of hydrogen gas with a 500 kW Proton Exchange Membrane (PEM) electrolyser. Produced hydrogen gas will be injected into the existing natural gas distribution network at up to 2% by volume via a dedicated injection control panel.

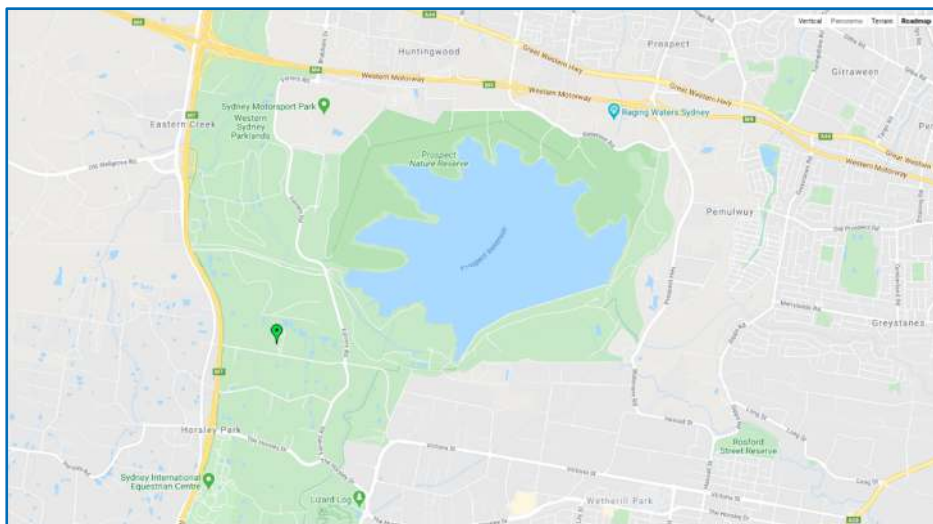
The Project also includes a gas-fuelled generator package (microturbine) that will initially be operated on natural gas to generate power for export to the grid. The microturbine will be converted to operate using natural gas and/or 100% hydrogen as the fuel source in late 2021.

Provision has been included for a future scope to utilise the generated hydrogen to fill transportable hydrogen cylinders and vehicle re-fuelling (discussed further in Section 2.8).

2.1 Location

The Horsley Park Facility is located at 194 – 202 Chandos Road, Horsley Park (Lot 1 DP 499001 and Lot 3 DP 1002746) in Western Sydney, NSW (refer to Figure 2.1).

Figure 2.1: Site Location



2.2 Key Features

The Project will involve the construction of a P2G facility, which will include the following:

- Electrolyser (including final water treatment, electrolyser stack, purification & cooling systems)
- Hydrogen buffer storage pipeline (buried carbon steel pipeline)
- Hydrogen gas control panel and grid injection panel (to manage injection into the Secondary Mains)
- Hydrogen microturbine
- Site control hut
- Power grid connection, including transformer and switchgear.

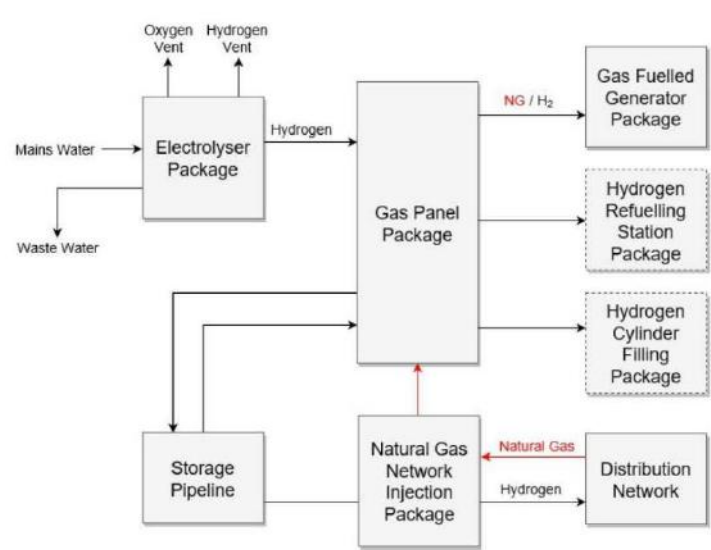
The Project will also require site piping and structural works, and site civil works, including a hardstand, foundations and footings. The general layout of the development is shown in Figure 2.2 below.

Figure 2.2: General Layout of Development



A general flow diagram of the Project is provided in Figure 2.3 below.

Figure 2.3: Flow Diagram and General Facility



2.3 Construction Activities

Construction activities for the Project will be undertaken over an approximate six-month period. The construction activities to be undertaken as part of the works are summarised in Table 2.1:

Table 2.1 Summary of Construction Activities

Construction Stage	Details
Preliminaries	<ul style="list-style-type: none"> • Long lead item procurement • Construction planning • Construction documentation • Post approval documentation submissions • Workshop fabrication • Weld and weld qualifications • Procurement of contractor-supplied equipment and sub-contractors.
Mobilisation and Site Establishment	<ul style="list-style-type: none"> • Mobilisation to site • Construction and HSE signage installation • Establishment of lay-down area, fencing and facilities • Site Security establishment • Housekeeping and set up of disposal/removal of waste facilities • Relocation of services, where required • Removal of fencing • Demarcation of construction area • Set up of environmental controls.
Site Civil Construction	<ul style="list-style-type: none"> • Topsoil removal and stockpiling • Access road and truck wash facilities • Piling installation • Material importation/re-use of material for facility areas • Pipe and cable installation and trenching • Hardstand construction; • Spoil and waste management • Ongoing site restoration (as required).
Hydrogen Buffer Storage Pipeline	<ul style="list-style-type: none"> • Excavation of pipeline trench and tie-in bell-holes • Transport, stockpiling and backfilling • Welding of pipeline strings • NDT and field-joint coating of welds • Lowering in of pipeline • Backfill of pipeline trench • Cleaning, hydro-testing and drying of pipeline.
Major Equipment Packages	<ul style="list-style-type: none"> • Receipt of equipment, off-loading and storage (as required) • Installation of packages including: <ul style="list-style-type: none"> – Electrolyser Package (process and electrical containers and separate cooler system) – Microturbine Package

	<ul style="list-style-type: none"> – Gas Panel Packages – Gas Injection Panel Package – Electrical Equipment Room, – High Voltage Switchgear and Kiosk Transformer (HV substation) – Waste water tank & irrigation system. • Trenching between packages • Electrical and instrumentation wiring of packages and connections
Electrical Works	<ul style="list-style-type: none"> • Trenching all electrical inter-connections • HV electrical cable installation up to and including termination on to the Utility Switching Station • Installation of all Electrical (HV and LV), Control and Instrumentation cables with the required labelling, including terminations • Inspections and testing • Installation of lightning and cathodic protection systems • Installation of facility safety signage and electrical labelling as required.
Mechanical and Structural Works	<ul style="list-style-type: none"> • Installation, connection and testing of: <ul style="list-style-type: none"> – Facility tubing and valves – Water piping system – Nitrogen cylinders and network • Installation of facility safety signage and applicable labelling as required.

The works noted above will be completed in a manner consistent with relevant laws, policies and guidelines.

The construction works will commence following approval of all relevant pre-construction deliverables, including the following:

- Construction Safety Study
- Hazard and Operability Study
- Final Hazard Analysis
- Fire Safety Study
- revision of the Safety and Operating Plan (SAOP)
- Traffic Management Plan
- this EMS document.

2.4 Commissioning Activities

The commissioning activities are still being refined, therefore this EMS will be updated and submitted one month prior to the commencement of commissioning activities.

2.5 Operational Activities

Although the operational phase is detailed in this section, this EMS does not apply to the operational phase of the project. This EMS will be updated to capture operational activities prior to them commencing.

The operation of the P2G Plant will be undertaken by remote telemetry to observe and monitor performance of the plant 24 hours a day by a Control Room. The site will be occasionally staffed by operators during normal working hours (7:00 am – 6:00 pm Monday to Friday), and in the event of equipment failure the system is designed to automatically isolate, and not impact upon the existing natural gas facilities.

The remote telemetry system will provide data via Supervisory Control and Data Acquisition (SCADA), which in turn will alert the control room staff of the condition of the site prompting a response in line with the response sheet for the site.

The Project facility will incorporate both manual (local) and automatic (both local and remote) features that will allow plant and equipment to be operated safely and efficiently.

The primary objective of the control system during operation will be to provide control over processing functions, protect plant, equipment and personnel, and enable simple and reliable plant shutdown, depressurisation, and isolation of equipment. The Project facility will be occasionally manned, with minimal operator involvement required, including for start-up, shutdown, and restart. The systems shall therefore monitor and control the facilities on a continuous basis under all operating and environmental conditions.

The Project facility will be provided with a local Programmable Logic Controller designed to control all major process functions, and a safety instrumented system (SIS) that will shut down (trip) a range of equipment and equipment packages, and close major isolation valves during emergency events or process trips. Hydrogen gas quality will be measured by a gas analyser, with data visible to the facility SCADA to enable plant adjustments to be made, if necessary.

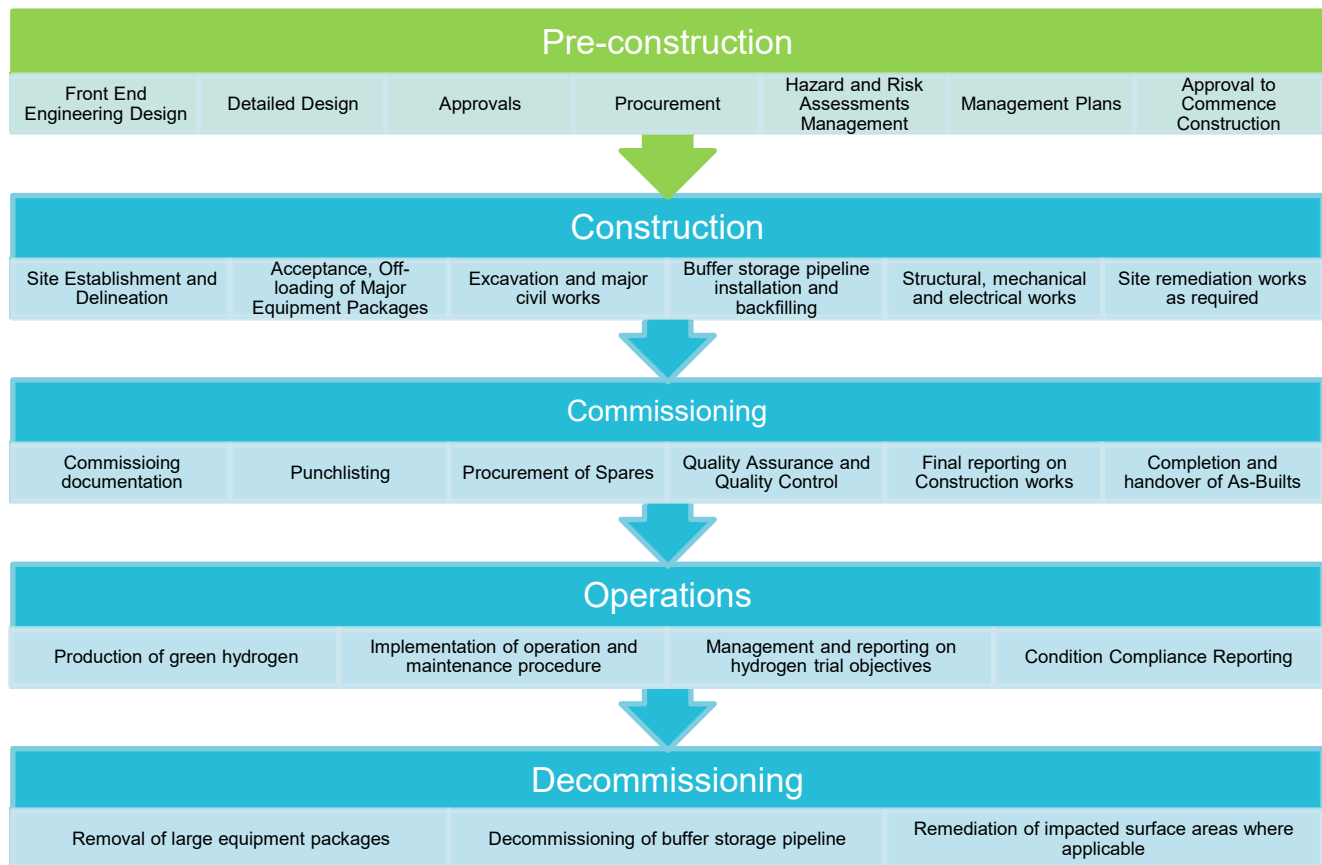
2.6 Decommissioning

Following the completion of construction this section will be appropriately revised to include decommissioning activities.

2.7 Sequencing

The key Project activities which would be undertaken across each phase of the Project are shown in Figure 2.4.

Figure 2.4 Project Sequencing



2.8 Future Scope

It is noted that all details within the future scope section are **not to be constructed** and do not have appropriate approvals to be constructed. However, given the fluid, ever changing energy environment, Jemena has allowed for future expansions within the Project's detailed design and designated them explicitly as holds within drawings. Provision for the following future scope has been included in the design:

- Hydrogen refuelling station (HRS)
- Cylinder filling package.

In accordance with Section 4.55 of the EP&A Act, an applicant may seek approval for modifications to a SSD development consent at any time. The development would remain substantially the same development as the originally approved as part of the development consent, which would require modification to authorise any future scope items that are not considered to form part of the approved development.

As detailed in Section 9.1, all management plans would be subject to review following the approval of any modification to the conditions of consent.

3. Statutory and Planning Framework

3.1 Legal and other requirements

A register of legal and other requirements for the Project is included in Appendix A. This register will be maintained throughout the Project and updated as required.

Any changes made to the legal requirements register will be communicated to the wider team where necessary through inductions, toolbox talks or other methods as described in Section 5.3.

3.2 Conditions of Approval

The conditions of approval relevant to the EMS are described in Table 3.1.

Table 3.1: Approval Conditions

Condition	Requirement	Addressed
Schedule 2 – Administrative Conditions		
STRUCTURAL ADEQUACY		
A9	The Applicant must ensure that all new buildings and structures, and any alterations or additions to existing buildings and structures, are constructed in accordance with the relevant requirements of the Building Code of Australia	Section 3.3
Demolition and Rehabilitation		
A10	The Applicant must ensure that all demolition work on site is carried out in accordance with <i>Australian Standard AS 2601-2001: The Demolition of Structures</i> , or its latest version.	Demolition works will be captured in subsequent revisions of this EMS
A11	The Applicant must: (a) rehabilitate the site progressively, as soon as reasonably practicable following disturbance; (b) minimise the disturbance area at any time; (c) employ interim rehabilitation strategies to minimise dust generation, soil erosion and weed incursion on parts of the site that cannot yet be permanently rehabilitated; and ...	<ul style="list-style-type: none"> Construction Environment Management Plan Erosion Sediment Control Plan Construction Traffic Management Plan
Operation of Plant and Equipment		
A13	The Applicant must ensure that all plant and equipment used on site, or in connection with the development, is: (a) maintained in a proper and efficient condition; and (b) operated in a proper and efficient manner.	<ul style="list-style-type: none"> Section 6.5 Construction Traffic Management Plan Construction Air Quality Management Plan
Part B Environmental Conditions – General		
RISKS AND HAZARDS		
Storage and Handling of Dangerous Goods		
B5	The Applicant must ensure that all dangerous goods and hazardous materials storage and handling undertake on-site is in accordance with:	<ul style="list-style-type: none"> Section 6.7

	<p>(a) the requirements of all relevant Australian Standards; and</p> <p>(b) the NSW EPA's Storing and Handling of Liquids: Environmental Protection – Participants Handbook if the chemicals are liquids, or its latest version.</p> <p>In the event of an inconsistency between the requirements listed from (a) to (b) above, the most stringent requirement must prevail to the extent of the inconsistency.</p>	<ul style="list-style-type: none"> Construction Environment Management Plan
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Construction and Operating Hours

B9

The Applicant must comply with the operating hours set out in Table 1.

Activity	Operating Hours
Operations excluding microturbines and blowdowns	24 hours a day 7 days a week
Microturbines	7 am to 10 pm 7 days a week
Construction and decommissioning activities	7am to 6pm Monday to Friday 8am to 1pm Saturday
Blowdowns (excluding emergency work)	at no time on Sundays and NSW public holidays

The following activities may be undertaken outside of the hours identified in Table 1 without the approval of the Secretary:

(a) the delivery of materials as requested by the NSW Police Force or other authorities for safety reasons;

(b) emergency work to avoid the loss of life, property and/or material harm to the environment;

(c) construction works that cause LAeq (15 mins) noise levels that are:

- no more than 5 dB(A) above the rating background level at any residence in accordance with the Interim Construction Noise Guideline (DECC, 2009), or its latest version; and
- no more than the noise management levels specified in Table 3 of the Interim Construction noise Guideline (DECC, 2009), or its latest version, at other sensitive land uses; and
- for continuous or impulsive vibration values, measured at the most affected residence, no more than those for human exposure to vibration, specified in Table 2.2 of Assessing vibration: a technical guideline (DEC, 2006), or its latest version; and
- for intermittent vibration values measured at the most affected residence, no more than those for human exposure to vibration, specified in Table 2.4 of Assessing vibration: a technical guideline (DEC, 2006), or its latest version;

(d) where a negotiated agreement has been reached with affected receivers; or

(e) works as approved through the out-of-hours work protocol outlined in the Environmental Management Strategy under Schedule 4 of this consent.

- Section 6.5
- Construction Environment Management Plan
- Construction Noise and Vibration Management Plan
- Construction Traffic Management Plan

Noise

B10	<p>The Applicant must:</p> <p>(a) minimise the noise generated by any construction or decommissioning activities on site in accordance with the best practice requirements outlined in the Interim Construction Noise Guideline (DECC, 2009), or its latest version;</p> <p>(b) implement all reasonable and feasible measures to minimise the operational noise of the development;</p> <p>(c) notify the occupants of residences within 200 metres of the site boundary and WSPT 24 to 48 hours prior to undertaking blow downs (excluding emergency works); and</p> <p>(d) comply with the operational noise levels within the Noise Policy for Industry (NSW EPA, 2017), or its latest version.</p>	<ul style="list-style-type: none"> Section 6.5 Construction Noise and Vibration Management Plan
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Air

B11	<p>The Applicant must minimise the:</p> <p>(a) dust emissions of the development, including wind-blown and traffic generated dust;</p> <p>(b) greenhouse gas emissions of the development;</p> <p>(c) surface disturbance of the development; and</p> <p>(d) other air emissions of the development.</p>	<ul style="list-style-type: none"> • Section 6.2 • Construction Traffic Management Plan • Erosion Sediment Control Plan • Construction Air Quality Management Plan
B12	<p>The Applicant must ensure that no offensive odours are emitted from the development, as defined under the POEO Act</p>	<ul style="list-style-type: none"> • Section 6.2 • Construction Air Quality Management Plan
Visual		
B13	<p>The Applicant must:</p> <p>(a) minimise the off-site visual impacts of the development, including the potential for any glare or reflection;</p> <p>(b) ensure the visual appearance of infrastructure (including paint colours) blends in as far as possible with the surrounding landscape; and</p> <p>(c) not mount any commercial advertising signs or logos on site, except where this is required for identification or safety purposes.</p>	<ul style="list-style-type: none"> • Section 6.8 • Construction Environment Management Plan
Lighting		
B14	<p>The Applicant must:</p> <p>(a) minimise the off-site lighting impacts of the development; and</p> <p>(b) ensure that any external lighting associated with the development:</p> <ul style="list-style-type: none"> • is installed as low intensity lighting (except where required for safety or emergency purposes); • does not shine above the horizontal; and • complies with Australian Standard AS4282 (INT) 1997 – <i>Control of Obtrusive Effects of Outdoor Lighting</i>, or its latest version. 	<ul style="list-style-type: none"> • Section 6.10 • Construction Environment Management Plan
Soil and Water		
B15	<p>The Applicant must:</p> <p>(a) ensure that the development does not cause any water pollution, as defined under section 120 of the POEO Act;</p> <p>(b) ensure that stormwater runoff from the development is managed using Water Sensitive Urban Design (WSUD) techniques consistent with the Western Sydney Parklands Design Manual and considers the Fairfield City Council Stormwater Management Policy; and</p> <p>(c) minimise any soil erosion associated with the construction of the development in accordance with the relevant requirements in the Managing Urban Stormwater: Soils and Construction (Landcom, 2004) manual, or its latest version.</p>	<ul style="list-style-type: none"> • Section 6.6 • Construction Environment Management Plan • Erosion Sediment Control Plan • Stormwater Management Plan (included in Appendix I)
B16	<p>The Applicant must:</p> <p>(a) minimise the waste generated by the development;</p> <p>(b) classify all waste generated on site in accordance with the EPA's Waste Classification Guidelines 2014 (or its latest version);</p> <p>(c) store and handle all waste on site in accordance with its classification;</p>	<ul style="list-style-type: none"> • Section 6.4 • Construction Environment Management Plan

	(d) not receive or dispose of any waste on site; and (e) remove all waste from the site as soon as practicable, and ensure it is sent to an appropriately licensed waste facility for disposal.	
Heritage		
B17	The Applicant must ensure the development does not cause any direct or indirect impacts on heritage items located outside the approved development footprint.	<ul style="list-style-type: none"> Section 6.3 Cultural Heritage Management Plan
B18	If historical and/or Aboriginal archaeological heritage items are unexpectedly discovered during construction of the development, all works must cease, and a suitably qualified and experienced archaeologist be brought in to assess the find. Depending on the nature of the discovery, additional assessment, recording and management measures may be required prior to the recommencement of works in the affected area. Heritage NSW and/or members of the relevant Local Aboriginal Land Council must be notified of this discovery in writing.	<ul style="list-style-type: none"> Section 6.3 Cultural Heritage Management Plan
Part C Environmental Conditions – General		
ENVIRONMENTAL MANAGEMENT		
Environmental Management Strategy		
C1(a)	The EMS must be prepared in consultation with Fairfield City Council and Western Sydney Parklands Trust	Section 1.5
C1(b)	The EMS must provide the strategic framework for environmental management of the development	Section 4
C1(c)	The EMS must identify the statutory approvals that apply to the development	Section 3.1 Section 3.3 Appendix A
C1(d)	The EMS must describe the role, responsibility, authority and accountability of all key personnel involved in the environmental management of the development	Section 5.1 and 5.2
C1(e)	The EMS must describe the procedures that would be implemented to:	
	<ul style="list-style-type: none"> keep the local community and relevant agencies informed about the operation and environmental performance of the development; 	Section 5.4.2
	<ul style="list-style-type: none"> receive, handle, respond to, and record complaints; 	Section 5.4.3
	<ul style="list-style-type: none"> resolve any disputes that may arise; 	Section 5.4.3
	<ul style="list-style-type: none"> respond to any non-compliance; and 	Section 5.5
	<ul style="list-style-type: none"> respond to emergencies; and 	Section 5.6
C1(f)	include:	
	<ul style="list-style-type: none"> the following sub-plans: 	
	<ul style="list-style-type: none"> – noise; 	Construction Noise and Vibration Management Plan
	<ul style="list-style-type: none"> – air quality; 	Construction Air Quality Management Plan
	<ul style="list-style-type: none"> – stormwater management including erosion and sediment controls during construction; and 	Erosion and Sediment Control Plan
	<ul style="list-style-type: none"> – heritage 	Cultural Heritage Management Plan

	<ul style="list-style-type: none"> copies of any strategies, plans and programs approved under the conditions of this consent; and 	Section Approved Documentation1.6 and Section 4.4
	<ul style="list-style-type: none"> a clear plan depicting monitoring to be carried out in relation to the development 	Section 7.2
C2	<p>Within 3 months, unless otherwise agreed with the Secretary, of:</p> <p>(a) the submission of an incident report under condition C5 below;</p> <p>(b) the submission of an audit report under condition C9 below; and</p> <p>(c) the approval of any modification to the conditions of this consent; or</p> <p>(d) a direction of the Secretary under condition A4 of schedule 2;</p> <p>the Applicant must review, and if necessary revise, the strategies, plans, and programs required under this consent to the satisfaction of the Secretary.</p> <p>Where this review leads to revisions in any such document, then within 4 weeks of the review the revised document must be submitted to the Secretary for approval, unless otherwise agreed with the Secretary.</p> <p><i>Note: This is to ensure the strategies, plans and programs are updated on a regular basis, and incorporate any recommended measures to improve the environmental performance of the development.</i></p>	Section 9.1
COMPLIANCE		
Incident Notification		
C3	The Applicant must immediately notify the Department, Council and any other relevant agencies immediately after it becomes aware of an incident. The notification must identify the development (including the development application number and name) and set out the location and nature of the incident.	Section 5.5.3
Non-Compliance Notification		
C4	<p>Within seven days of becoming aware of a non-compliance, the Applicant must notify the Department of the non-compliance. The notification must identify the development (including the development application number and name), set out the condition of this consent that the development is non-compliant with, why it does not comply and the reasons for the non-compliance (if known) and what actions have been, or will be, undertaken to address the non-compliance.</p> <p><i>Note: A non-compliance which has been notified as an incident does not need to also be notified as a non-compliance.</i></p>	Section 5.5.3
Compliance Reporting		
C5	The Applicant must provide regular compliance reporting to the Department on the development in accordance with the relevant Compliance Reporting requirements (DPE May 2020), or its latest version.	Section 8.2
NOTIFICATIONS		
Notification of Department		
C6	<p>Prior to commencing the construction, operations or decommissioning of the development or the cessation of operations, the Applicant must notify the Department and Council in writing of the date of commencement, or cessation, of the relevant phase.</p> <p>If any of these phases of the development are to be staged, then the Applicant must notify the Department and Council in writing prior to commencing the</p>	Section 8.1

	relevant stage, and clearly identify the development that would be carried out during the relevant stage.	
INDEPENDENT ENVIRONMENTAL AUDIT		
C9	<p>Unless the Secretary agrees otherwise, 12 months after the commencement of operations of the development and every three years thereafter, the Applicant must commission and pay the full cost of an Independent Environmental Audit of the development. This audit must:</p> <ul style="list-style-type: none"> (a) be prepared in accordance with the relevant Independent Audit Post Approval requirements (DPE 2020); (b) be conducted by a suitably qualified lead auditor and suitably qualified, experienced and independent team of experts in any field specified by the Secretary, whose appointment has been endorsed by the Secretary; (c) include consultation with Council and relevant agencies; (d) include a comprehensive Hazard Audit of the development in accordance with the Department's publication Hazardous Industry Planning Advisory Paper No. 5, 'Hazard Audit Guidelines' and include a review of the site Safety Management System and a review of all entries made in the incident register since the previous audit; (e) review the adequacy of any strategies, plans or programs required under the abovementioned approvals; (f) recommend appropriate measures or actions to improve the environmental performance of the development, and/or any strategy, plan or program required under the abovementioned approvals; and (g) be conducted and reported to the satisfaction of the Secretary. <p><i>Note: This audit must be undertaken in accordance with the Independent Audit requirements (DPE 2018).</i></p> 	Section 7.3.2
C10	<p>Within 12 weeks of commissioning this audit, or as otherwise agreed by the Secretary, the Applicant must submit a copy of the audit report to the Secretary, together with its response to any recommendations contained in the audit report and a timetable for the implementation of these recommendations as required.</p> <p>The Applicant must implement these recommendations, to the satisfaction of the Secretary.</p>	Section 7.3.2
ACCESS TO INFORMATION		
C11	<p>Unless the Secretary agrees otherwise, from the commencement of development under this consent, the Applicant must:</p> <ul style="list-style-type: none"> (a) make the following information publicly available on its website as relevant to the stage of the development: <ul style="list-style-type: none"> – the EIS; – the final general arrangement plans for the development; – current statutory approvals for the development; – approved strategies, plans or programs required under the conditions of this consent; – the proposed staging plans for the development if the construction, operation or – decommissioning of the development is to be staged; – how complaints about the development can be made; – a complaints register; – compliance reports; – any independent environmental audit, and the Applicant's response to the recommendations in – any audit; and 	Section 10

- | |
|--|
| <ul style="list-style-type: none"> – any other matter required by the Secretary; and (b) keep this information up to date. |
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3.3 Approvals, permits and licences

A summary of the approvals, licences and permits required for the Project is detailed in Table 3.2. Jemena will obtain the outstanding certificates as required throughout delivery of the Project.

In addition, as per Jemena's commitments in the Response to Submissions, if groundwater is encountered during construction Jemena will contact Natural Resources Access Regulator (NRAR) for advice regarding any necessary approvals or licences and gain any approvals as required.

Table 3.2 Approvals, Licences and Permits Summary Table

Legislation	Requirement	Agency	Responsibility	Timing
<i>Environmental Planning and Assessment Act 1979</i>	Development approval under the EP&A Act	Department of Planning, Industry and Environment	Jemena	Prior to the commencement of the development. Approval for the Project was granted on the 10 August 2020 by the delegate for the Minister for Planning and Public Spaces.
<i>Local Government Act 1993</i>	Building Code Construction Certificate and Occupation Certificate	Fairfield City Council or private certifier	Jemena	In accordance with CoA A9, a Construction Certificate and Occupation Certificate are required prior to the commencement of construction or use of relevant structures.
<i>Roads Act 1993</i>	Road and Footpath Occupation Permit	Fairfield City Council	Construction Contractor	In accordance with the Response to Submissions a permit will be sought from Council.

3.4 Standards and Guidelines

Compliance standards, policies and guidelines relevant to the project are detailed in the respective management plans. The requirements of these standards have been taken into account in the preparation of the EMS and will be considered during the preparation of the Safe Work Method Statements.

4. Environmental Management Framework

4.1 Jemena Environmental Management System

The Jemena Environmental Management System (Jemena EMS) is the key tool in managing the organisation's environmental responsibilities, issues and risks associated with construction, operations and maintenance activities. The Jemena EMS is based on the international standard for Environmental Management Systems, AS/NZS ISO14001:2004.

The Jemena EMS comprises the Jemena Environment Policy, environmental procedures, work instructions and environmental improvement plans. The Jemena EMS also incorporates an incident management database (ASPiRE), which provides for on-line reporting of environmental incidents.

The Environmental Management System is an integral component of Jemena's integrated HSEQ Management System.

4.2 Jemena Environmental Policy

The Jemena Environment Policy (JEM PO 0397) is a statement of Jemena's intentions, commitments and principles in relation to environmental management and reducing its environmental footprint. The policy has been developed and is reviewed by the Jemena HSE Council Environmental and Sustainability Department, and is reviewed for review and approval by both the Council and Jemena's Managing Director. Jemena requires its contractors and suppliers to adopt a similar commitment to the environment.

The Environment Policy is communicated at Inductions and during Training.

The Environment Policy is to be displayed, along with other relevant policies at all Jemena offices and depots. An electronic copy of the policy can be found on the Company Intranet under Policies and/or on the HSEQ Management System.

4.3 Project Environmental Management Strategy

This EMS provides the strategic framework to ensure environmental impacts are minimised during all phases of the Project and legislative and other requirements are fulfilled.

The EMS and relevant management plans have been prepared in consideration of the Instrument of Consent and the mitigation measures and commitments provided in the Project EIS and Response to Submissions (refer to Section 1.1).

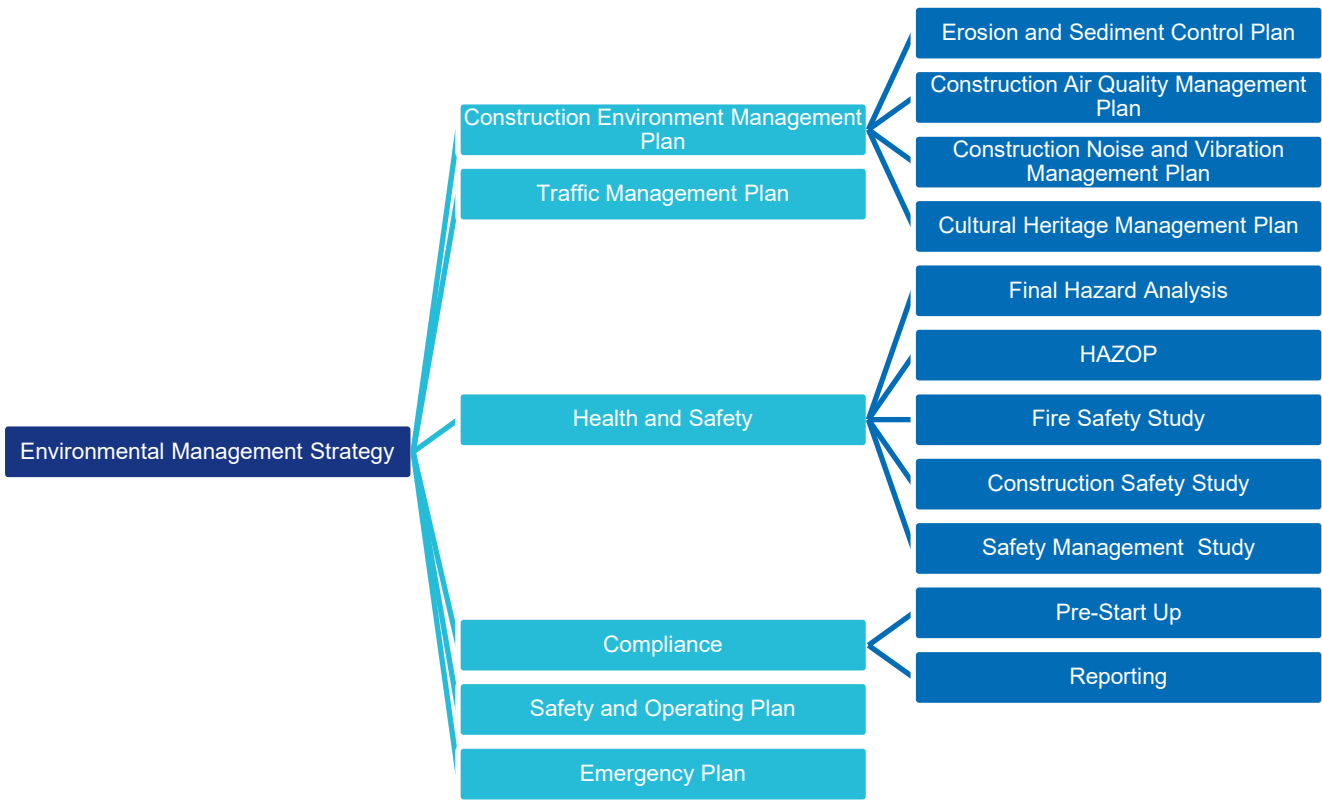
The EMS details the management plans which are being prepared to address specific environmental aspects or phases of the Project and outlines the environmental management procedures that are to be followed during all phases of the Project. The EMS is a live document and will continue to be reviewed and updated throughout the different phases of the Project.

4.4 Environment Management Plans and Procedures

A number of environmental management plans and procedures are required to support the EMS. They document the aspects, impacts, management measures, monitoring and reporting requirements for each key aspect or phase of the Project.

The conditions of approval and mitigation measures and commitments within the EIS and Response to Submissions define the content and issues to be addressed in most of the management plans and procedures. Figure 4.1 shows the management plans, studies and procedures that are being developed for the Project.

Figure 4.1 Environmental management plans and procedures



5. Implementation

5.1 Roles and Responsibilities

The management of activities with potential to impact the environment and the community will be the responsibility of all Jemena employees and contractors. All employees and contractors are responsible for complying with the documents referred to in this EMS.

The roles, responsibilities, of key organisations and Project personnel involved in the environmental management of the Project is summarised in Table 5.1. It is noted that specific roles during construction are provided within the CEMP. This will change during the Project's phases and will be updated prior to commissioning.

Table 5.1: Overarching Organisational Responsibility

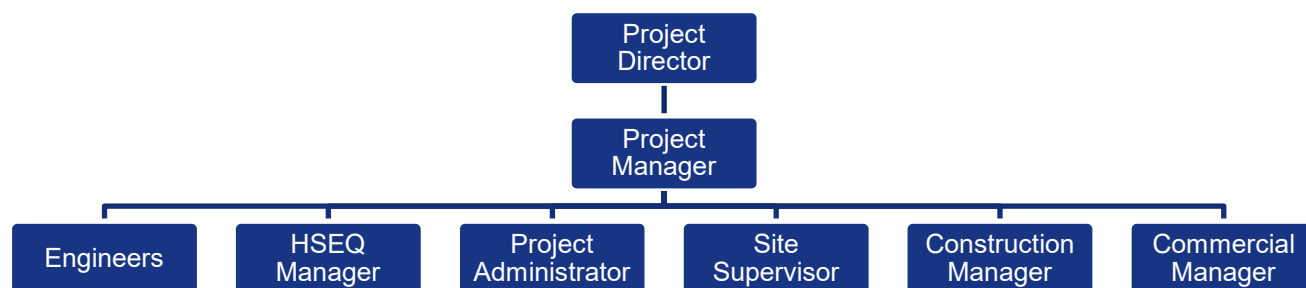
Organisation	Role	Responsibility
Minister for Planning and Public Spaces	Minister for Planning and Public Spaces	<ul style="list-style-type: none"> Review and approve the Project EMS Administer and enforce the Development Consent
Approval Authorities (Councils, Aboriginal groups, regulators etc.)	Regulation	<ul style="list-style-type: none"> Administer and enforce statutory approvals where relevant Review, comment and where necessary, approve relevant plans and documents as required by the EMS
Jemena	Project Director	<ul style="list-style-type: none"> Ensure overall compliance with the EIS and Development Consent Ensure notifiable environmental incidents are reported to the appropriate stakeholders May suspend work until adequate environmental safeguards implemented Ensure environmental compliance reporting obligations are adequately met
Jemena	Project Manager	<ul style="list-style-type: none"> Obtain the key approvals including: <ul style="list-style-type: none"> Revise and update the EMS in response to the relevant matters and recommendations contained in the Development Consent and submit to the Minister of Planning for approval. Implement its responsibilities under the EMS Mandate compliance with the EMS in Project contracts Review and accept environmental management documentation Liaise with regulators and other agencies as required Conduct stakeholder engagement and community consultation activities as required.
Jemena	HSEQ Manager	<ul style="list-style-type: none"> Monitor the implementation of the EMS. Monitor contractor compliance with the EMS, CEMP, approvals and approval conditions, including issues raised in audits and requiring corrective action to be taken where necessary. Determine whether the Project Manager has provided sufficient resources to meet environmental compliance obligations during the works. Provide environmental assistance as required.
Jemena	Supporting Team Members	<ul style="list-style-type: none"> Monitor contractor compliance with the EMS, CEMP, approvals and approval conditions, including issues raised in audits and requiring corrective action to be taken where necessary. Provide environmental assistance as required.

Contractors (Wasco Australia P/L (Wasco))	Construction Project Manager	<ul style="list-style-type: none"> • Comply with legislative and approval requirements, including this EMS • Obtain from regulatory authorities any additional permits and approvals required to design, construct and operate the Project works that are the subject of the Project contract (other than the approvals that would be obtained by Jemena) • Develop and implement a Project-specific environmental management system, or apply an existing or adapted corporate EMS to the specific activities relevant to the Project works that are the subject of the Project contract • Prepare a CEMP and other plans required by the Development Consent • Provide adequate resources to comply with all environmental requirements. • Implement, maintain and comply with the EMS, CEMP and other plans required by the Development Consent
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(1) Specific roles and responsibilities during construction are outlined in the CEMP.

5.2 Project Team Structure

The diagram below shows the Jemena project team structure relevant to ensuring compliance with this document.



5.3 Environmental Training

5.3.1 Inductions

Construction personnel, including sub-contractors will be required to attend a project induction prior to commencing work. The induction program includes environmental and heritage components designed to ensure that all personnel are aware of their environmental and heritage responsibilities. The induction will be modified depending on target audience (e.g. supervisors, crew) to ensure it remains relevant. The induction will include:

- Site hazards in an operational facility on a high-pressure gas site
- Relevant legislation and legislative requirements
- Roles and responsibilities
- General awareness of environmental and heritage management protocols and procedures
- Incident reporting, spill management and response
- Air quality and dust management
- Management of sensitive areas and Aboriginal/Historic heritage

Implementation

- Vegetation and habitat management including fauna
- Biosecurity and declared weeds
- Waste management
- Water management
- Access Conditions including stakeholder and public communication
- Emergency response
- Traffic management.

5.3.2 Toolbox

Toolbox talks will include relevant environmental management awareness training as well as site-specific environmental information that may be required to undertake a particular construction activity or task. Toolbox talks will also be delivered to continuously improve performance and in response to an environmental incident or non-conformance observed on the project or similar projects.

Toolbox talks will be scheduled as per the requirements of the CEMP. Attendance Record sheets will be used to record attendance at Toolbox talks.

Minutes of the meetings will be maintained and any actions raised are recorded and tracked to their completion. Feedback on progress will be provided to managers, contractors, employees / subcontractors at subsequent Toolbox talks or as required dependent on the urgency of the issue.

5.3.3 Pre-Start Meetings

Daily pre-start meetings will be held prior to commencing works each shift. This meeting itemises the work that will be undertaken during the day and where applicable the following environmental related components:

- Weather observations / forecast
- Work area restrictions, activities that may affect the works
- Environmental focus for the day (e.g. Housekeeping/ litter clean-up, water management, dust control, etc.)
- Feedback on environmental issues that have recently occurred within the area or other areas of the project
- Notices about up and coming events such as environment and community meetings, audits, environmental inspections
- Feedback on previous day's work practices
- Feedback from environment, community and stakeholder meetings.

All personnel undertaking work within the construction crew will sign onto the pre-start Attendance Record form.

5.4 Stakeholder Communication

As noted in the EIS, stakeholder and community consultation has been undertaken for the Project since 2018, in accordance with the WSGGP Stakeholder Management Plan developed specifically for the Project.

In accordance with the WSGGP Stakeholder Management Plan, external communication will continue during all phases of the Project to ensure that stakeholders are kept informed of planned works. Jemena aims to provide an open level of communication to all project personnel, contractors and other key stakeholders.

Key Environmental Stakeholders include, but not limited to:

Implementation

- Regulatory Authorities / Government Departments
- Other Asset Owners / Operators
- Community Groups / Landowners / General Public
- Local Council
- Local Emergency Services

All communication, liaison and engagement with stakeholders will be recorded in the Electronic Content Management System (ECMS).

5.4.1 Internal communication

The methods of internal (on site) communication will include the following, as described in Section 5.3:

- Inductions
- Toolbox talks
- Pre-start meetings.

5.4.2 External communication

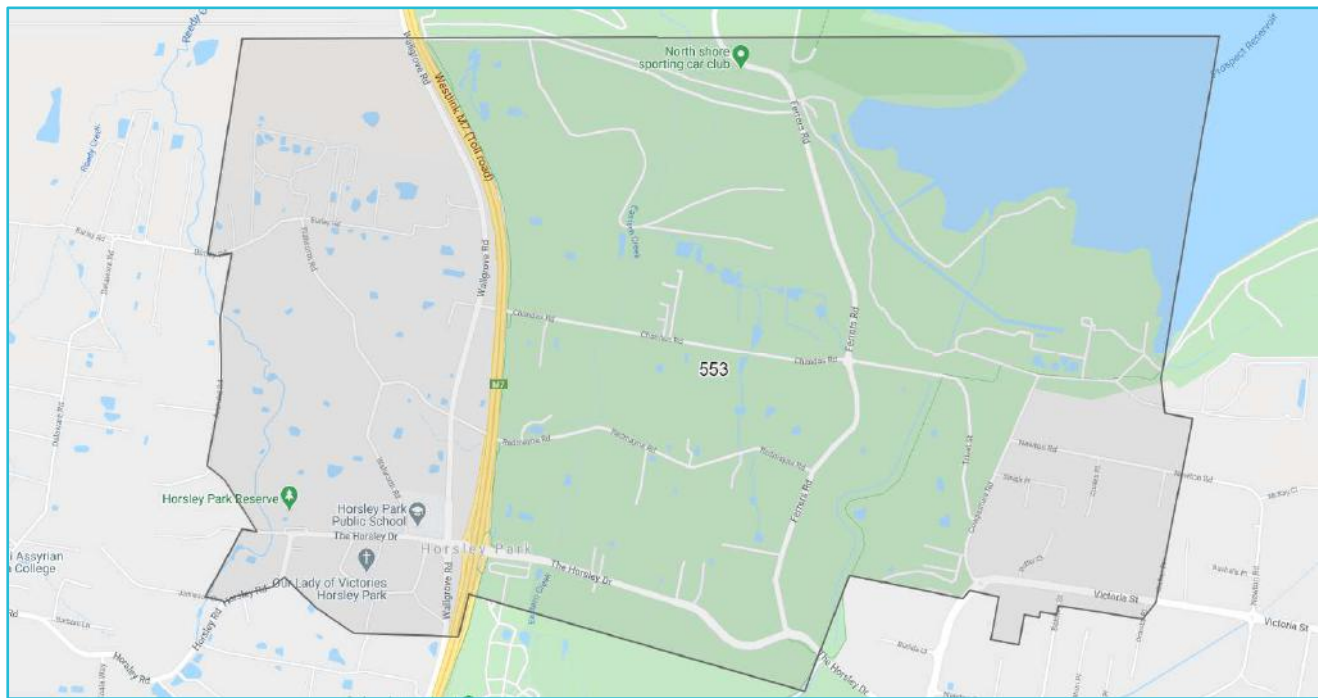
Jemena will use a range of tools to communicate with the community and its stakeholders. The full list is available within the WSGGP Stakeholder Management Plan and includes:

- Dedicated web page (Fact Sheets, Project Updates, FAQs, Feedback and Project Documentation) (<https://haveyoursay.jemena.com.au/western-sydney-green-gas-project>)
- Media releases (<https://jemena.com.au/about/newsroom>)

In addition to the above public communication activities, Jemena will conduct consultation briefings with key stakeholders. This will include:

- Face to face discussions and meetings
- Letters, emails, phone calls
- On site meetings
- 1300 community feedback on 1300 081 989.

Jemena will undertake direct engagement with residents and businesses in the vicinity of the existing Horsley Park site (see below) and all residents along Chandos Road. The notification area is shown on the figure below:



The planned and historical notifications are presented in the table below:

Date	Project Milestone	Consultation	Tools	Responsibility
From October 2019 and as necessary	Preparation of EIS	Email/letter/phone call updates (how we communicate our key milestones)	Emails/updated fact sheets	GW/DM
WB 23 Sep 2019	Preparation of EIS	Letter box drop of identified residents (introduction letter and request for meeting)	Letter	GW draft Project Team to approve
WB 30 Sep 2019	Preparation of EIS	Face to face meeting with Project Team (introduction to the project)	Fact sheet Map Business cards	GW + Daniel Magdi
5 December 2019	Submission of EIS	Community Information Session and H2 BBQ aligning with submission of EIS.	Pull-up banner Fact sheets Q&As Hydrogen BBQ	Project Team
October 2020	Prior to Commencement of Construction	Email/Letter/Notification for commencement of Construction	Emails / Letter Notification	Project Team
March/April 2021	Construction Complete	Email/Letter/Notification for commencement of Construction	Emails / Letter Notification	Project Team
May/June 2021	Commissioning complete	Opening tour and morning tea/BBQ aligning with completion of Construction works.	Pull-up banner Fact sheets Q&As Hydrogen BBQ	Project Team
TBA		Community Engagement as required.	Emails/updated fact sheets	Project Team

In addition, in accordance with CoA B10 (c), Jemena will notify the occupants of residences within 200 metres of the Project site boundary 24 to 48 hours prior to undertaking blow downs (excluding emergency works).

It is noted that in addition to the residents, Western Sydney Parklands Trust, Fairfield City Council and the local MP will be made aware of the community consultation.

5.4.3 Complaints and Dispute Management

The Jemena Project Team will be notified immediately of any issues, disputes or complaints raised by any relevant stakeholders such as members of the community. Jemena will ensure the most consistent and up to date information is provided and a suitable resolution is reached. All complaints and disputes will be recorded in ASPIRE and an investigation undertaken as appropriate.

The complaint investigation process will be completed in accordance Jemena's issues management procedure provided within **Appendix B**. Further information during construction will be provided by the contractor within 24 hours with responses / resolutions to the complaint to be communicated by the Jemena Project Team.

A stakeholder communication schedule will be maintained for the project and all complaints provided to DPI&E at the completion of every month (if applicable).

5.5 Incidents and Non-compliances

5.5.1 Types of Incidents and Non-Compliances

For the Project an environmental incident is considered to include the following but not limited to:

- A pollution incident (i.e. dust, noise, hydrocarbon spill, water pollution) that results in a complaint from a regulator or community member
- Where there is the potential for a legal breach
- Significant impact on people or the environment (flora and fauna) has been/ may be caused by the incident
- Native vegetation is accidentally or unintentionally damaged or removed
- Impacts on indigenous or non-indigenous heritage aspects
- Injury or fatality to a native fauna species (including listed species).

A non-compliance includes contravention of any of the conditions in the Instrument of Consent.

Environmental incidents will be responded to and reported as per Jemena's Incident Management Procedure. Environmental incidents are logged in the Jemena Incident Management System.

5.5.2 POEO Act Incident Notification

In accordance with the *Protection of the Environment Operations Act 1997* (POEO Act) the Environment Protection Authority (EPA) must be notified of pollution incidents that cause or threaten material harm to the environment.

'Material harm to the environment' includes on-site harm, as well as harm to the environment beyond the premises where the pollution incident occurred.

A 'pollution incident' includes a leak, spill or escape of a substance, or circumstances in which this is likely to occur. 'Pollution incident' is defined in the Dictionary to the Act as follows:

“Pollution incident means an incident or set of circumstances during or as a consequence of which there is or is likely to be a leak, spill or other escape or deposit of a substance, as a result of which pollution has occurred, is occurring or is likely to occur. It includes an incident or set of circumstances in which a substance has been placed or disposed of on premises, but it does not include an incident or set of circumstances involving only the emission of any noise.”

As the EPA is the appropriate regulatory authority (ARA), Jemena will notify EPA via the EPA Environment Line (telephone 131 555) in accordance with Part 5.7 of the POEO Act and will be managed through Jemena’s incident management procedure provided in Appendix H.

5.5.3 DPI&E Incident and Non-Compliance Notification

The Instrument of Consent defines an incident as “An occurrence or set of circumstances that causes or threatens to cause material harm and which may or may not be or cause a non-compliance”.

Jemena will report all incidents, to DPI&E, Council and any other relevant government agencies immediately after becoming aware of an incident. The notification will identify the Project, including the development application number (SSD 10313) and set out the location and nature of the incident.

Within seven days of becoming aware of a non-compliance, Jemena will notify DPI&E. The notification will identify the Project, including the development application number, set out the condition of consent that the Project is non-compliant with, why it does not comply and the reasons for the non-compliance (if known) and what actions have been, or will be, undertaken to address the non-compliance.

Note: A non-compliance which has been notified as an incident does not need to also be notified as a non-compliance.

5.6 Emergency Management

An emergency is defined as:

“An actual or imminent event or series of events which endangers or threatens to endanger life, property or the environment, and which requires a significant and coordinated response.”

During the construction phase the Project Emergency Response Plan will be implemented.

Prior to the commencement of the commissioning and operational phases the Jemena Incident and Emergency Management Procedures will be updated and attached to this document.

6. Environmental Management

The management and mitigation measures associated with construction related environmental impacts identified in the EIS and Development Consent are documented in the project specific environmental management plans.

6.1 Construction Operational Hours

Construction operational hours are 7am to 6pm Monday to Friday, 8am to 1pm Saturday and at no time on Sundays and NSW public holidays.

However, it is noted, as per the New Ministerial Orders (dated 31 March 2020):

Minister for Planning and Public Spaces made the Environmental Planning and Assessment (COVID-19 Development – Construction Work Days) Order 2020 allowing development to be carried out on weekends and public holidays as long as work was limited to weekday hours and doesn't involve high noise generating works. It is noted that there are conditions which must be abided and adhered too including the limits of operation of certain equipment and complying with the conditions of consent which restrict the hours of work or operation.

Noise and vibration management and mitigation measures are captured in the Construction Noise and Vibration Management Plan appended to the CEMP.

6.2 Air Quality

As a result of land disturbance required for the development and construction of the transmission line and substation there is a potential to create nuisance dust effects on surrounding areas/neighbours. There is also potential for further air emissions from diesel exhaust emissions from vehicles and machinery. These impacts and the mitigation measures are considered in the CEMP and ESCP.

Dust emissions may occur during the construction phase of the WSGG Project facility; however, these will be minimised through air quality mitigation measures.

Air quality management and mitigation measures will be captured in the Air Quality Management Plan appended to the CEMP.

6.3 Heritage

A search of the NSW OEH's (now the Biodiversity and Conservation Division (BCD) within DPIE) Aboriginal Heritage Management Information System (AHIMS) was undertaken of 9 September 2019 to identify whether any registered Aboriginal sites were present within, or adjacent to, the Project area. The AHIMS search identified 61 Aboriginal sites recorded in or near the proposal site and no Aboriginal places.

There is a recorded AHIMS site (45-5-2567) located approximately 20-30 m to the west of the western boundary of the proposal site. The WSGG Project will not impact upon AHIMS site 45-5-2567, as it is recorded outside of the Project area.

The location of the AHIMS site will be communicated to all personnel.

The Cultural Heritage Management Plan appended to the CEMP includes management and mitigation measures associated with unexpected finds protocol.

6.4 Waste

Potential impacts from construction waste generation include:

- Minor spills from hazardous fuel and chemical use can be an environmental issue. However, in the context of the materials and equipment utilised on this project, are typically small in scale and localised only. On site spill kits will be utilised to contain and remove any contaminated materials. Used spill kits shall be disposed of at a licenced waste facility.
- Minor pollution of the environment from other general wastes (e.g. packaging). Waste of this type will be collected and disposed of or recycled in appropriate on-site bins.
- Wastewater generated from the purification process. This will comprise of slightly elevated levels of minerals typically found in mains water only, without addition of any other substances.

Waste management and mitigation measures are captured in the CEMP.

6.5 Noise and Vibration

The assessment of the construction phase was undertaken in accordance with the requirements of the EPA Interim Construction Noise Guidelines and EPA's Assessing Vibration: A technical Guideline. Where the "noise affected" management level is predicted to be exceeded during construction, the Interim Construction Noise Guidelines requires that all feasible and reasonable work practices be employed. These shall be assessed in conjunction with the current and upcoming works and implemented to comply with the Guidelines. Where it is predicted that the "highly noise affected" management level will be exceeded, respite periods may need to be considered, such as limiting these works from the early and late portions of the allowable daily window.

Jemena will also ensure that all plant and equipment used on site, or in connection with the project, is:

- Maintained in a proper and efficient condition; and
- Operated in a proper and efficient manner.

This will be managed during construction through the implementation of control measures noted in the CEMP, Construction Noise and Vibration Management Plan, Construction Traffic Management Plan and the Construction Air Quality Management Plan.

6.6 Soil and Water

Soil erosion associated with the construction of the development will be minimised in accordance with the relevant requirements in the Managing Urban Stormwater: Soils and Construction (Landcom, 2004) manual, or its latest version

The Erosion and Sediment Control Plan (ESCP) and CEMP describe the control mechanisms to be implemented during the construction phase of the project.

All soil and water management and mitigation measures are captured in the CEMP and will be monitored during site inspections.

6.7 Storage and Handling of Dangerous Goods

Minor amounts of dangerous goods and hazardous materials will be required for the construction phase. These items will be stored and handled in accordance with:

- the requirements of all relevant Australian Standards; and
- the NSW EPA's Storing and Handling of Liquids: Environmental Protection – Participants Handbook if the chemicals are liquids, or its latest version.

Dangerous goods and hazardous materials management and mitigation measures are captured in the CEMP.

6.8 Minimising Visual Impact

Through regular inspection as outlined in the CEMP Jemena and contractors will ensure:

- To minimise the off-site visual impacts of the development, including the potential for any glare or reflection;
- The visual appearance of infrastructure (including paint colours) blends in as far as possible with the surrounding landscape; and
- To not mount any commercial advertising signs or logos on site, except where this is required for identification or safety purposes.

The CEMP notes specific construction controls to be implemented as part of the works.

6.9 Fire Management

Jemena will:

- Minimise the fire risks of the development, including managing vegetation fuel loads on-site by ensuring standard maintenance is carried out on all infrastructure sites, this will be maintained through construction and operation phases of the Project;
- Ensure that the development complies with the relevant objectives in the RFS's planning for bushfire protection 2019 (or latest version);
- Assist the RFS and emergency services as much as practicable if there is a fire in the vicinity of the site; and
- Notify the relevant local emergency management committee following construction of the development, and prior to commencing operations.

Fire management, mitigation measures and response are captured in the CEMP and Construction Emergency Response Plan.

6.10 Lighting

Jemena will:

- Minimise the off-site lighting impacts of the development; and
- Ensure that any external lighting associated with the development:
 - Is installed as low intensity lighting (except where required for safety or emergency purposes);
 - Does not shine above the horizontal; and
 - Complies with Australian Standard AS4282 (int) 1997 – control of obtrusive effects of outdoor lighting, or its latest version.

Light management and mitigation measures are captured in the CEMP and will be monitored during site inspections.

7. Performance Inspections, monitoring and auditing

7.1 Inspections

Project personnel will undertake environmental inspections on a weekly basis.

The purpose of the inspections are to:

- Provide a surveillance tool to ensure that safeguards are being implemented
- Identify where issues or impacts might be occurring (or have the potential to occur)
- Identify where ineffective environmental practices are being implemented
- Facilitate the identification and early resolution of issues/concerns.

Environmental observations may also be recorded during other project inspections, such as those encompassing operational, engineering, quality, health, safety and security aspects.

Should an inspection identify that project activities have resulted in or are likely to result in environmental harm, it will be reported to the Jemena Project Manager. Any corrective actions identified during inspections and observations will be communicated to relevant personnel and recorded in the incident management database (ASPiRE) or Actions Tracking Register (ATR) until they are successfully completed or closed-out.

7.2 Monitoring

Monitoring will be undertaken for environmental aspects of the Project to confirm the adequacy of implementation of the mitigation measures. Specific monitoring programs have been developed for high risk aspects of the Project and are included in the relevant management plans and are summarised in Table 7.1.

Table 7.1 Environmental Monitoring Summary

Activity	Management Plan	Frequency	Responsibility
Adequacy of all erosion controls	Erosion and Sediment Control Plan	Daily (during rainfall) Weekly (even if work not occurring) Within 24 hours prior to rainfall Within 18 hours following rainfall	Construction contractor
Visual monitoring of dust generation	Air Quality Management Plan	Daily	Construction contractor

7.3 Auditing

7.3.1 Internal

Regular internal compliance audits will be conducted during the construction and operations phases of the Project as per the Jemena HSE Audit Schedule.

7.3.2 External

In accordance with CoA C8, unless the Secretary agrees otherwise, Jemena will commission an Independent Environmental Audit of the Project 12 months after the commencement of operation and every three years after.

The audit will:

- Be prepared in accordance with the relevant Independent Audit Post Approval requirements (DPE 2020)
- Be conducted by a suitably qualified lead auditor and suitably qualified, experienced and independent team of experts in any field specified by the Secretary, whose appointment has been endorsed by the Secretary
- Include consultation with Council and relevant agencies
- Include a comprehensive Hazard Audit of the development in accordance with the Department's publication Hazardous Industry Planning Advisory Paper No. 5, 'Hazard Audit Guidelines' and include a review of the site Safety Management System and a review of all entries made in the incident register since the previous audit
- Review the adequacy of any strategies, plans or programs required under the abovementioned approvals
- Recommend appropriate measures or actions to improve the environmental performance of the development, and/or any strategy, plan or program required under the abovementioned approvals
- Be conducted and reported to the satisfaction of the Secretary.

Within 12 weeks of commissioning this audit, or as otherwise agreed by the Secretary, Jemena will submit a copy of the audit report to the Secretary, together with Jemena's response to any recommendations contained in the audit report and a timetable for the implementation of these recommendations as required.

8. Reporting

8.1 Notifications

Jemena will notify DPI&E prior to commencing the construction, operations or decommissioning of the Project or the cessation of operations. The notifications will be in writing and include the date of commencement, or cessation, of the relevant phase.

If any of these phases of the Project are to be staged, Jemena will notify DPI&E and Council in writing prior to commencing the relevant stage, and clearly identify the development that would be carried out during the relevant stage.

Procedures relating to the notifications of incidents and non-compliances are described in Section 5.5.

8.2 Compliance reporting

Jemena will provide regular compliance reporting to DPI&E on the Project in accordance with the requirements of *Compliance Reporting Post Approval Requirements* (DPI&E, 2020) or its latest version.

Compliance reporting will be provided during the operation and decommissioning phases of the Project in accordance with the schedule noted in Table

Table 8.1 Minimum Frequency of Compliance Reporting

Compliance Report	Phase	Timing	Minimum Frequency
Operation Compliance Report	Operation	Reporting required for the duration of operation or as otherwise agreed by the Secretary	At intervals no greater than 52 weeks from the date of commencement of operation (annually).
Post-Decommissioning Compliance Report	Decommissioning	Report to be submitted to the Secretary within 12 weeks of completion of decommissioning	Single report only

In accordance with CoA B4, Jemena will also provide a Pre-Startup Compliance Report to the Secretary for approval at least one month prior to commencing operation.

The Pre-Startup Compliance Report will detail the Project's compliance with the following documents, including the date of documentation preparation, the date that construction and commissioning commenced and the actions proposed and/or taken to implement the recommendations in these documents:

- Construction Safety Study
- Hazard and Operability Study
- Final Hazard Analysis
- Fire Safety Study.

9. Review and improvement

9.1 Revision

In accordance with CoA C2, unless the Planning Secretary agrees otherwise, within three months of the following, strategies, plans and programs will be reviewed and, if necessary revised:

- the submission of an incident report under CoA C5
- the submission of an audit report under CoA C9
- the approval of any modification to the conditions of the consent
- a direction of the Secretary under CoA A4.

Where this review results in revisions to the document, then within four weeks of the completion of the revision, unless the Secretary agrees otherwise, the revised document will be submitted to the Secretary for approval. The documents to be reviewed may include:

- Construction Safety Study
- Hazard and Operability Study
- Final Hazard Analysis
- Fire Safety Study
- Safety and Operating Plan
- Emergency Plan
- Safety Management Study
- Environmental Management Strategy
- Construction Environment Management Plan and aspect specific sub-plans
- Traffic Management Plan.

9.2 Continuous Improvement

Continuous improvement of the EMS will be achieved through ongoing monitoring and evaluation, implementation of preventative and corrective actions, communication with internal and external stakeholders and measuring progress against objectives and targets and program milestones. Opportunities for improvement will be implemented through changes to this EMS, the CEMP and sub-plans, procedures and programs as appropriate.

Environmental documentation will be revised if:

- There are relevant changes to environmental conditions or generally accepted environmental management practices
- Previous unforeseen environmental risks are identified
- Previously unidentified areas of contamination are discovered
- There is a change in relevant legislation that impacts on either the design outputs or construction activities
- There is a formal request made by DPI&E or other key stakeholders to make modifications

Review and improvement

- There is a non-conformance relevant to the CEMP (not of minor nature).

10. Access to Information

In accordance with CoA C11, the EMS and all plans and programs required by the Development Consent will be made publicly available on the Project website.

The Project employs various tools to ensure that the community is kept informed about the environmental performance of the site. Information is available on the internet at <https://haveyoursay.jemena.com.au/western-sydney-green-gas-project> and includes:

- EIS
- the final general arrangements plans for the development
- the current statutory approvals for the Project
- the approved strategies, plans or programs
- how complaints about the Project can be made
- a complaints register
- compliance reports
- any independent environmental audit, and Jemena's response to the recommendations in any audit.

11. Documentation and Record Keeping

In accordance with Jemena's Document Management procedure project records will be maintained to provide evidence of conformity to contractual requirements, regulatory requirements and to demonstrate the effective implementation of the EMS.

Records can be in the form of hard copy media or they can be in electronic or other media. Records to be retained include Training Certificates and Records, Project Inductions, Toolbox Meeting, HSEQ meeting Minutes, Incident Investigations and Reports, Site Inspections, Project Plans, Safety Data Sheets and Certificates supplied by subcontractors.

12. References

GAS-1499-PA-EV-001 – JGN NSW Distribution Network Operational Environmental Management Plan (OEMP)

GAS-499-PA-CU-002 – Western Sydney Green Gas Project Stakeholder Management Plan

Eco Logical Australia 2019. Western Sydney Green Gas Project - Environmental Impact Statement. Prepared for Jemena Gas Networks (NSW) Limited.

Appendix A – Legal and other requirements

Appendix A – Legal and other requirements

Legislation	Aspect	Reference	Requirement	Responsibility	Applicable
General					
<i>Cwlth Environment Protection and Biodiversity Conservation Act 1999</i>	Proposed action	Section 28	A person must not take an action that has, will have or is likely to have a significant impact on any of the matters of national environmental significance without approval	NA	No – No MNES have been identified as having potential to be impacted by the Project.
<i>Environmental Planning and Assessment Act 1979</i>	All	Section 4.38	Approval of the Minister required to carry out State Significant Development. Comply with the Conditions of Approval and the mitigation measures in the EIS and the statement of commitments in the Response to Submissions report	Jemena	Yes – Approval for the Project was granted on the 10 August 2020 by the delegate for the Minister for Planning and Public Spaces.
<i>Protection of the Environment Operations Act 1997</i>	Harming the environment	Section 115 Section 116 Section 117	Do not risk harming the environment by wilfully or negligently: <ul style="list-style-type: none"> disposing of waste unlawfully. causing any substance to leak, spill or otherwise escape (whether or not from a container); or causing any controlled substance to be emitted into the atmosphere. 	Jemena and Construction contractor	Yes – Management measures included in the Erosion and Sediment Control Plan, CEMP and Air Quality Management Plan
	Notification of pollution incidents	Section 148	Notify the EPA immediately of pollution incidents where material harm to the environment is caused or threatened.	Jemena and Construction contractor	Yes – Included within Section 5.5.2 of the EMS.
Water					
<i>Protection of the Environment Operations Act 1997</i>	Water pollution	Section 120	Do not cause water pollution	Jemena and Construction contractor	Yes – Management measures have been incorporated within the Erosion and Sediment Control Plan
<i>Water Management Act 2000</i>	Water use approval	Section 89 Section 90 Section 91	A water use approval confers a right on its holder to use water for a particular purpose at a particular location.	NA	No – In accordance with Part 4, Division 1.7, Section 4.41 (g) of the EP&A Act, a water use approval under Section 89, a water management work approval under Section 90 or an activity

Appendix A – Legal and other requirements

	Water management works approval Activity approval		Do not construct/use a water supply work, drainage work or flood work without the appropriate approval. Controlled activity approvals and aquifer interference approvals.		approval (other than an aquifer interference approval) under Section 91 of the WM Act is not required for SSD.
Biodiversity					
<i>Biodiversity Conservation Act 2016</i>	Flora and fauna	Section 7.9(2)	Legislation responsible for the conservation of biodiversity in NSW through the protection of threatened flora and fauna species, populations and Endangered Ecological Communities (EECs).	NA	No – As the Project does not propose to remove any native vegetation and the project site does not provide potential habitat for any threatened fauna species, Jemena submitted a Biodiversity Development Assessment Report (BDAR) Waiver to the Planning Agency Head and the Environment Agency Head on 29 August 2019. The BDAR Waiver was accepted on 11 September 2019. Therefore, no further assessment of threatened species or ecological communities is required.
<i>Biosecurity Act 2015</i>	Weed management	Section 22	Under Part 3 of the <i>Biosecurity Act 2015</i> , landowners or land managers have a general biosecurity duty to prevent, eliminate or minimise the biosecurity risk posed or likely to be posed by priority weeds. A biosecurity risk exists where priority weeds have the potential to negatively impact on agriculture, industry, the liveability of our city, human health or the environment. Invasive weeds are known as 'Biosecurity Matter' or 'Priority Weeds'.	Construction contractor	Yes – Management measures are provided in the CEMP
Aboriginal and non-Aboriginal heritage					
<i>Heritage Act 1977</i>	Heritage	Section 146	Notify the Heritage Council on discovery of a relic.	Jemena and Construction contractor	Yes A person who is aware or believes that he or she has discovered or located a relic must within a reasonable time notify the Heritage Council of the location of the relic, unless he or she believes on reasonable grounds that the Heritage Council is aware of the location of the relic, and within the period required by the Heritage Council, furnish the

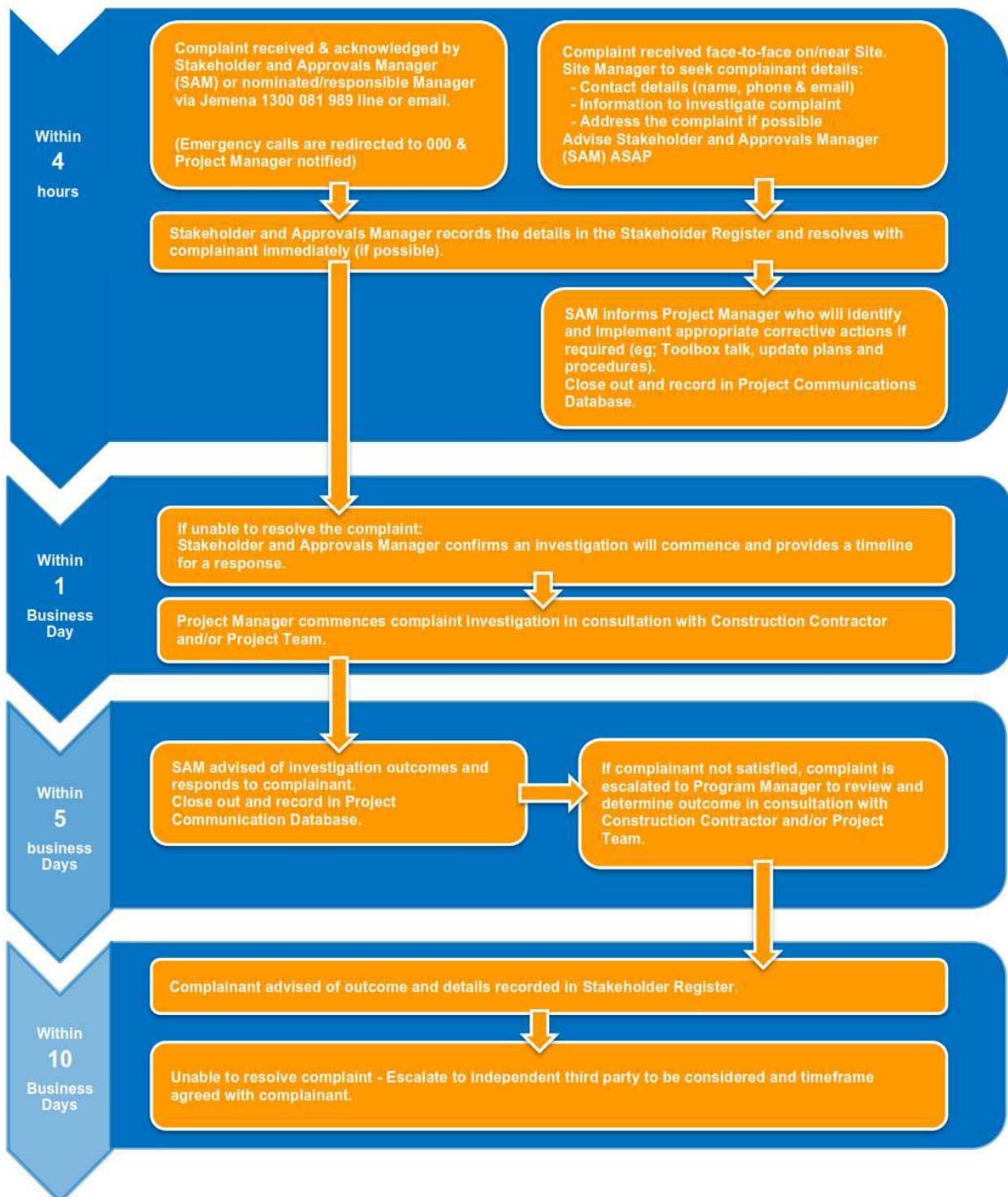
Appendix A – Legal and other requirements

					Heritage Council with such information concerning the relic as the Heritage Council may reasonably require. Notification requirements are included within the Cultural Heritage Management Plan.
<i>National Parks and Wildlife Act 1974</i>	Aboriginal places and objects	Section 89A	Notify the NPWS within reasonable time of becoming aware of the location or discovery of certain Aboriginal objects.	Jemena and Construction contractor	Yes – Notification requirements are included within the Cultural Heritage Management Plan.
Contaminated material					
<i>Protection of the Environment Operations Act 1997</i>	Land pollution	Section 142A – Section 142E	Do not cause or permit land pollution other than under authority of a licence or regulation (however it is not a land pollution offence to place virgin excavated natural material or lawful pesticides and fertilisers on land, or by placing matter on land that has been notified to the EPA as an unlicensed landfill and which is operated in accordance with the regulations.)	Jemena and Construction contractor	Yes – Management measures are provided in the CEMP and Erosion and Sediment Control Plan
<i>Contaminated Land Management Act 1997</i>	Reporting contamination	Section 60	Duty to report contamination.	Jemena and Construction contractor	Yes – If project activities have caused land contamination, or a landowner becomes aware of land that is contaminated, there is a legal duty under section 60 of the <i>Contaminated Land Management Act 1997</i> to notify the EPA.
Noise					
<i>Protection of the Environment Operations Act 1997</i>	Plant maintenance and operation	Section 139	Do not operate plant if it emits noise caused by failure to maintain or operate the plant in a proper and efficient manner.	Construction contractor	Yes – Management measures are provided in the CEMP and Construction Noise and Vibration Management Plan
Traffic					
<i>Roads Act 1993</i>	Road use	Section 138	Road occupancy licences (ROLs) required for any activity likely to impact on traffic flow	Jemena and Construction contractor	Yes – ROLs will be obtained as required.

Waste					
<i>Protection of the Environment Operations Act 1997</i>	Waste and transportation	Section 143	Only transport waste to a facility that can lawfully accept the waste.	Construction contractor	Yes – Management measures are provided in the CEMP
		Section 115	Do not dispose of waste in a manner that harms or is likely to harm the environment.	Construction contractor	Yes – Management measures are provided in the CEMP
<i>Protection of the Environment</i>	Waste and transportation	Regulation cl.49	Comply with general requirements for the transport of waste.	Construction contractor	Yes – Management measures are provided in the CEMP
		Regulation Part 3	Comply with record keeping requirements in relation to the transport of certain types of waste.	Construction contractor	Yes – Management measures are provided in the CEMP


Appendix B – Issues Management Procedure

Issues Management Procedure



Appendix C – Construction Environment Management Plan

Document Cover Sheet

 Wasco (Australia) Pty Ltd 60 Commercial Drive, Shailer Park QLD 4128, Australia	Supplier PO/Contract No:	4600009152
	Supplier Item Description:	Western Sydney Green Gas Project Construction Works
	Equipment/Tag No:	N/A

Project Name:	WSGG Project		
Supplier Document Title:	Construction Environmental Management Plan		
Supplier Document No:	2018-PRM-PLN-001	Supplier Rev No:	1
Jemena ECMS Document No:	<i>This Section To Be Completed By Jemena</i>	Jemena Rev No:	<i>This Section To Be Completed By Jemena</i>
Jemena Aconex Document No:	P2G-2099-PA-EV-001	Total No of Pages (incl cover page)	40

Document Revision History:

Rev	Issue Date	Key Reason for Issue (as above table)	Approved By/ Signature	Company Name	Notes (if not applicable N/A)
A	04.09.20	Issued for Review	MW	Wasco	
B	18.09.20	Issued for Review	MW	Wasco	
C	22.09.20	Issued for Review	MW	Wasco	
0	25.09.20	Issued for Use	MW	Wasco	
1	16.10.20	Issued for Use	MW	Wasco	

Key Reason for Issue:



IFR- Issued for Review	IFI- Issued for Information	IFU- Issued for Use
IFP- Issued for Purchase	IFC- Issued for Construction	AB- As Built





WESTERN SYDNEY GREEN GAS PROJECT

CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN



Document Number			2018-ENV-PLN-001		
Revision	Issue	Date	By	Check	Approve
1	Issued for Use	16/10/2020	AMH	DP	MW
0	Issued for Use	25/09/2020	DP	AF	MW
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1. PURPOSE

The purpose of this Construction Environmental Management Plan (CEMP) describe the control mechanisms to be implemented during the construction of Jemena Gas Networks (NSW) Limited's (Jemena or Client) Western Sydney Green Gas Project (the Project).

This CEMP has been prepared to cover construction activities associated with the Project which should be read and applied in conjunction with the Project Environmental Management Strategy (EMS).

The purpose of the CEMP is to ensure that appropriate environmental protection and impact minimisation techniques are implemented during construction. The purpose of this CEMP is to:

- Identify potential impacts of the project that will require monitoring and management during the project scope of works.
- Link Wasco's Environmental Management systems to Project systems
- Demonstrate the general intentions, approach and objectives with regard to Environmental Management
- Provide a framework for control of Project impacts
- Provide reference for the Project's environmental documents
- Set performance standards the Project is to achieve in its implementation.

To ensure the management of the Project is conducted in an environmentally sustainable manner, this CEMP has carefully considered and will interface with the following documents to meet good industry practice and Wasco (Australia) Pty Ltd (Wasco) environmental management objectives:



- Scope of Work and Specifications
- Client Health, Safety and Environmental Requirements
- State and Commonwealth legislation
- Conditions of Contract
- Wasco Integrated Management System
- Project Environmental Management Strategy (EMS).
- Western Sydney Green Gas Project – Environmental Impact Statement (EIS) (EcoLogical Australia, 2019)
- Approval Development Consent
- Response to Submissions.

Should there be any significant changes or amendments made to the contract or any significant risks be identified during the life of the project, this CEMP will be revised and changes to the plan will be made accordingly. All changes to the plan will be communicated to the appropriate parties prior to its implementation in accordance with either Wasco or Project Specific Document control procedures.

Note: This Construction Environment Management Plan does not address the operational and decommissioning phase of the project.

1.1 PROJECT DESCRIPTION



The Western Sydney Green Gas (WSGG) Project involves the construction of a power to gas (P2G) hydrogen facility at the existing Jemena Horsley Park Trunk Receiving Station, located in Western Sydney. The facility

	<p>Jemena Gas Networks (NSW) Ltd Western Sydney Green Gas Project</p>	
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will use renewable electricity to generate hydrogen, which can be injected into the natural gas network or used to generate electricity back to the grid by means of a hydrogen-powered micro-turbine or similar technology.



The Jemena Horsley Park Facility is located at 194 – 202 Chandos Road, Horsley Park (Lot 1 DP 499001 and Lot 3 DP 1002746)

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1.2 PROGRAM

The current construction project timeline is presented below, the construction works are anticipated to commence in October 2020, pending approval of the required management plans. The timing presented below are indicative only and subject to change.

	Aug 20	Sep 20	Oct 20	Nov 20	Dec 20	Jan 20	Feb 20	Mar 20	Apr 20	May 21	Jun 21	Jul 21
Pre-Construction												
Construction [#]												
Commissioning [#]												
Operation and Maintenance*												→

Notes

the phases that this management plan addresses

* 5 year operation in accordance with Condition A8 of the Development Consent SSD 10313

Grey – Float

1.3 CONSTRUCTION ACTIVITIES

The construction activities to be undertaken as part of the works are summarised below:



- Completion of pre-construction documentation, inductions and establishment of site amenities and delineation of construction;
- Coordination and management of site delivery, off-loading and installation of major equipment packages (inclusive of all electrical packages);
- Completion of construction, installation, testing and commissioning of carbon steel pipelines including buffer store;
- Completion of civil, structural, piping as well as mechanical, process and electrical of the P2G Facility, including the spray sealed coating of the turning circle; and
- Completion of pre-commissioning and commissioning works.

The works noted above will be completed works in a manner consistent with relevant laws, policies and guidelines.

The construction works will commence following approval of all relevant pre-construction deliverables in accordance with the Project Approvals.

1.4 SUPPORTING MANAGEMENT PLANS AND STRATEGIES

It is noted that the CEMP is supported by the following sub-plans, which should be read in conjunction with this document:

	<p align="center">Jemena Gas Networks (NSW) Ltd Western Sydney Green Gas Project</p>	
<p align="center">2018-ENV-PLN-001</p>	<p align="center">CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN</p>	<p align="center">Page 7 of 35</p>

- Erosion and Sediment Control Plan (ESCP) – The ESCP addresses stormwater management during the construction works
- Construction Noise and Vibration Management Plan (NVMP)
- Construction Air Quality Management Plan (AQMP)
- Construction Cultural Heritage Management Plan (CHMP)

It is noted the following documents additionally support the construction and commissioning of the Project in accordance with the development consent, including:

- WSGG Construction Traffic Management Plan (TMP), Wasco (Sep 2020); and
- WSGG Project Environmental Management Strategy (EMS), Jemena (Oct 2020)

1.5 CONSULTATION SUMMARY

In accordance with Schedule 4, Condition 1 of the Approval, the CEMP (and sub-plans) have been prepared in consultation with;

- Fairfield City Council (Council); and
- Western Sydney Parklands Trust (WSPT)



Comments from the consultation process have been incorporated into this plan where appropriate and are summarised in the EMS.

2. STATUTORY AND PLANNING FRAMEWORK

2.1 STATE LEGISLATION AND PLANNING INSTRUMENTS

State legislation, as well as state planning instruments relevant to the project are outlined below:

- | | |
|--------------------------------------|--|
| • Aboriginal Land Rights Act 1983 | • Ozone Protection Act 1989 |
| • Biodiversity Conservation Act 2016 | • Pipelines Act 1967 |
| • Biosecurity Regulation 2017 | • Pipelines Regulation 2013 |
| • Biosecurity Act 2015 | • Protection of the Env. Administration Act 1991 |
| • Biosecurity Regulation 2017 | • Protection of the Environment Legislation |

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- Contaminated Land Management Act 1997
- Dangerous Goods (Road & Rail Transport) Act 2008
- Dangerous Goods (Road & Rail Transport) Reg 2014
- Environmental Planning and Assessment Act 1979
- Environmental Planning and Assessment Reg 2000
- Environmentally Hazardous Chemicals Act 1985
- Environmentally Hazardous Chemicals Reg 2017
- Gas Supply (Safety & Network Mgmt) Reg 2013
- Heavy Vehicle (Fatigue Mgmt) National Ref (NSW)
- Heritage Act 1977
- Heritage Reg 2012
- Land Management (Native Vegetation) Code 2018
- National Parks and Wildlife Act 1974
- National Parks and Wildlife Reg 2019
- Miscellaneous Amendments Act 2017
- Protection of the Env. Operations (Clean Air) Reg 2010
- Protection of the Environment Operations Act 1997
- Protection of the Env. Operations (Gen.) Reg 2009
- Protection of the Env. Operations (Waste) Reg 2014
- Road Transport (General) Reg 2013
- Soil Conservation Act 1938
- Waste Avoidance and Resource Recovery Act 2001
- Water Management Act 2000
- Water Management (General) 2018
- Water Management Amendment Act 2010, 2014, 2018
- Work Health and Safety Act 2011
- Work Health and Safety Reg 2017
- WH&S (Mines and Petroleum Sites) Act 2013
- WH&S (Mines and Petroleum Sites) Reg 2014

2.2 COMMONWEALTH LEGISLATION



Commonwealth legislation, relevant to the Project are outlined below:

- Clean Energy Regulator Act 2011 (Cwth)
- Environment Protection and Biodiversity Conservation Act 1999 (Cwth)
- Environment Protection and Biodiversity Conservation Amendment (Wildlife Protection) Act 2001 (Cwth)
- Industrial Chemicals (Notification and Assessment) Act 1989 (Cwth)
- National Environment Protection Measures (Implementation) Act 1998 (Cwth)
- National Greenhouse and Energy Reporting Act 2007 (Cwth)



2.3 CONDITIONS OF APPROVAL

The Development Consent (SSD 10313) Approval conditions relevant to the Construction Environment Management Plan are presented in the table below. This CEMP responds to the specific relevant requirements of the Approval Development Consent, as follows:



Condition	Requirement	Addressed
Schedule 2 – Part A – Administrative Conditions		
STRUCTURAL ADEQUACY		

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Condition	Requirement	Addressed
A9	The Applicant must ensure that all new buildings and structures, and any alterations or additions to existing buildings and structures, are constructed in accordance with the relevant requirements of the Building Code of Australia	Section 15.1
DEMOLITION AND REHABILITATION		
A10	The Applicant must ensure that all demolition work on site is carried out in accordance with <i>Australian Standard AS 2601-2001: The Demolition of Structures</i> , or its latest version.	Section 15.1
A11	The Applicant must: (a) rehabilitate the site progressively, as soon as reasonably practicable following disturbance; (b) minimise the disturbance area at any time; (c) employ interim rehabilitation strategies to minimise dust generation, soil erosion and weed incursion on parts of the site that cannot yet be permanently rehabilitated; and	<ul style="list-style-type: none"> • AQMP • ESCP • Construction TMP
PROTECTION OF PUBLIC INFRASTRUCTURE		
A12	Unless the Applicant and the applicable authority agree otherwise, the Applicant must: (a) repair, or pay the full costs associated with repairing, any public infrastructure that is damaged by the development; and	Construction TMP
OPERATION OF PLANT AND EQUIPMENT		
A13	The Applicant must ensure that all plant and equipment used on site, or in connection with the development, is: (a) maintained in a proper and efficient condition; and (b) operated in a proper and efficient manner.	<ul style="list-style-type: none"> • AQMP • Construction TMP
Schedule 3 – Part B - Environmental Conditions – General		
HAZARDS AND RISKS		
Storage and Handling of Dangerous Goods		
B5	The Applicant must ensure that all dangerous goods and hazardous materials storage and handling undertake on-site is in accordance with: (a) the requirements of all relevant Australian Standards; and (b) the NSW EPA's Storing and Handling of Liquids: Environmental Protection – Participants Handbook if the chemicals are liquids, or its latest version. In the event of an inconsistency between the requirements listed from (a) to (b) above, the most stringent requirement must prevail to the extent of the inconsistency.	Section 15.11
AMENITY		
Construction and Operating Hours		

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Condition	Requirement	Addressed										
B9	<p>The Applicant must comply with the operating hours set out in Table 1.</p> <p><i>Table 1: Operating Hours</i></p> <table><tr><th>Activity</th><th>Operating Hours</th></tr><tr><td>Operations excluding microturbines and blowdowns</td><td>24 hours a day 7 days a week</td></tr><tr><td>Microturbines</td><td>7 am to 10 pm 7 days a week</td></tr><tr><td>Construction and decommissioning activities</td><td>7am to 6pm Monday to Friday 8am to 1pm Saturday</td></tr><tr><td>Blowdowns (excluding emergency work)</td><td>at no time on Sundays and NSW public holidays</td></tr></table> <p>The following activities may be undertaken outside of the hours identified in Table 1 without the approval of the Secretary:</p> <p>(a) the delivery of materials as requested by the NSW Police Force or other authorities for safety reasons;</p> <p>(b) emergency work to avoid the loss of life, property and/or material harm to the environment;</p> <p>(c) construction works that cause LAeq (15 mins) noise levels that are:</p> <ul style="list-style-type: none">no more than 5 dB(A) above the rating background level at any residence in accordance with the Interim Construction Noise Guideline (DECC, 2009), or its latest version; andno more than the noise management levels specified in Table 3 of the Interim Construction noise Guideline (DECC, 2009), or its latest version, at other sensitive land uses; andfor continuous or impulsive vibration values, measured at the most affected residence, no more than those for human exposure to vibration, specified in Table 2.2 of Assessing vibration: a technical guideline (DEC, 2006), or its latest version; andfor intermittent vibration values measured at the most affected residence, no more than those for human exposure to vibration, specified in Table 2.4 of Assessing vibration: a technical guideline (DEC, 2006), or its latest version; <p>(d) where a negotiated agreement has been reached with affected receivers; or</p> <p>(e) works as approved through the out-of-hours work protocol outlined in the Environmental Management Strategy under Schedule 4 of this consent.</p>	Activity	Operating Hours	Operations excluding microturbines and blowdowns	24 hours a day 7 days a week	Microturbines	7 am to 10 pm 7 days a week	Construction and decommissioning activities	7am to 6pm Monday to Friday 8am to 1pm Saturday	Blowdowns (excluding emergency work)	at no time on Sundays and NSW public holidays	<ul style="list-style-type: none">NVMPConstruction TMP
Activity	Operating Hours											
Operations excluding microturbines and blowdowns	24 hours a day 7 days a week											
Microturbines	7 am to 10 pm 7 days a week											
Construction and decommissioning activities	7am to 6pm Monday to Friday 8am to 1pm Saturday											
Blowdowns (excluding emergency work)	at no time on Sundays and NSW public holidays											
Noise												
B10	<p>The Applicant must:</p> <p>(a) minimise the noise generated by any construction or decommissioning activities on site in accordance with the best practice requirements outlined in the Interim Construction Noise Guideline (DECC, 2009), or its latest version;</p> <p>....</p>	<ul style="list-style-type: none">NVMP										
Air												
B11	<p>The Applicant must minimise the:</p> <p>(a) dust emissions of the development, including wind-blown and traffic generated dust;</p> <p>(b) greenhouse gas emissions of the development;</p> <p>(c) surface disturbance of the development; and</p> <p>(d) other air emissions of the development.</p>	<ul style="list-style-type: none">AQMPECSPConstruction TMP										

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Condition	Requirement	Addressed
Visual		
B13	The Applicant must: (c) not mount any commercial advertising signs or logos on site, except where this is required for identification or safety purposes.	Section 15.1
Lighting		
B14	The Applicant must: (a) minimise the off-site lighting impacts of the development; and (b) ensure that any external lighting associated with the development: • is installed as low intensity lighting (except where required for safety or emergency purposes); • does not shine above the horizontal; and • complies with <i>Australian Standard AS4282 (INT) 1997 – Control of Obtrusive Effects of Outdoor Lighting, or its latest version.</i>	Section 15.1
SOIL AND WATER		
Operating Conditions		
B15	The Applicant must: (a) ensure that the development does not cause any water pollution, as defined under section 120 of the POEO Act; (c) minimise any soil erosion associated with the construction of the development in accordance with the relevant requirements in the Managing Urban Stormwater: Soils and Construction (Landcom, 2004) manual, or its latest version.	ESCP
WASTE		
B16	The Applicant must: (a) minimise the waste generated by the development; (b) classify all waste generated on site in accordance with the EPA's Waste Classification Guidelines 2014 (or its latest version); (c) store and handle all waste on site in accordance with its classification; (d) not receive or dispose of any waste on site; and (e) remove all waste from the site as soon as practicable, and ensure it is sent to an appropriately licensed waste facility for disposal.	Section 15.5
HERITAGE		
Protection of Heritage Items		
B17	The Applicant must ensure the development does not cause any direct or indirect impacts on heritage items located outside the approved development footprint.	• CHMP
B18	If historical and/or Aboriginal archaeological heritage items are unexpectedly discovered during construction of the development, all works must cease, and a suitably qualified and experienced archaeologist be brought in to assess the find.	• CHMP



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Condition	Requirement	Addressed
	Depending on the nature of the discovery, additional assessment, recording and management measures may be required prior to the recommencement of works in the affected area. Heritage NSW and/or members of the relevant Local Aboriginal Land Council must be notified of this discovery in writing.	
Part B Environmental Conditions – General		
ENVIRONMENTAL MANAGEMENT		
Environmental Management Strategy		
C1(f)	include:	NVMP
	<ul style="list-style-type: none"> the following sub-plans: <ul style="list-style-type: none"> noise; 	
	<ul style="list-style-type: none"> air quality; 	AQMP
	<ul style="list-style-type: none"> stormwater management including erosion and sediment controls during construction; and 	ESCP
	<ul style="list-style-type: none"> heritage 	CHMP
	<ul style="list-style-type: none"> copies of any strategies, plans and programs approved under the conditions of this consent; and 	Environmental Management Strategy
	<ul style="list-style-type: none"> a clear plan depicting monitoring to be carried out in relation to the development 	Section 14.3 Section 14.2
COMPLIANCE		
Incident Notification		
C3	The Applicant must immediately notify the Department, Council and any other relevant agencies immediately after it becomes aware of an incident. The notification must identify the development (including the development application number and name) and set out the location and nature of the incident.	Section 14.7



3. STANDARDS AND CODES OF PRACTICE

The following list of Standards, Codes and Guidelines are not exhaustive. All crew must ensure they are aware of the standards, codes, and guidelines relevant to their work.



Document Description
APGA Code of Environmental Practice – Onshore Pipelines Rev 4 Sept 2017
Australian drinking Water Guidelines 6 (2011) – NHMRC Ver 3.4 Oct 2017
Australian and New Zealand Guidelines for Fresh and Marine Water Quality (October 2000)

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Document Description	
AS 1171:1998	Non-Destructive Testing – Magnetic particle testing of ferromagnetic products
AS/NZS ISO 14001:2015	Environmental management systems
AS/NZS ISO 14015-2003	Environmental management - Environmental assessment of sites and organizations
AS 1692-2006 Rec:2016	Tanks for flammable and combustible liquids
AS 1726-2017	Geotechnical Site Investigations
AS 1940-2017	Storage and handling of flammable and combustible Liquids
AS 2062: 1997	Non-Destructive Testing – Penetrant testing of products and compounds
AS 2168.2:2009	Non-Destructive Testing – Computerized radiography testing of metallic materials using X-rays and gamma rays.
AS 2207:2007	Non-Destructive Testing – Ultrasonic Testing of Fusion Welded Joints in Carbon and Low Alloy Steel
AS 2436-2010	Guide to noise control on construction, maintenance, and demolition sites
AS 2507-1998	Storage and handling of agricultural and veterinary chemicals
As 2550.1:2011	Cranes, Hoists and Winches – Safe Use
AS/NZS 2885.1-2018	Pipelines – Gas and liquid petroleum – Design and construction
AS/NZS 2885.2:2016	Pipelines – Gas and liquid petroleum- Welding
AS/NZS 2885.3:2012	Pipelines - Gas and liquid petroleum – Operation and maintenance
AS/NZS 2885.5:2012	Pipelines - Gas and liquid petroleum – Field pressure testing
AS 31000:2018	Risk management – Principles and guidelines
AS 3780:2008	The storage and handling of corrosive substances
AS 3833:2007	The storage and handling of mixed classes of dangerous goods, in packages and intermediate bulk containers
AS/NZS 5911-2013	General guidelines on the verification, validation, and assurance of environmental and sustainability reports
AS/NZS 60079	Electrical Equipment in Hazardous Area Series

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Document Description	
HB 203:2012	Managing environment-related risk
ASME B31.12:2019	Hydrogen Pipelines and piping
ISO 14001:2016	Environmental management systems – Requirements for guidance with use
Australian Dangerous Goods Code, 7.6, 2018	
National Code of Practice for Labelling of Workplace Substances Sept 2015	
National Code of Practice for Managing risks of hazardous chemicals in the workplace May 2018	
Land Access Code Department of Natural Resources and Mines September 2016 Version 2	

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4. ENVIRONMENTAL POLICY AND OBJECTIVES

Wasco is committed to responsible environmental management and all of its activities are conducted in accordance with the Wasco Workplace Health & Safety Policy and the Wasco Environmental Policy. Wasco is committed to the principles of Ecological Sustainable Development as per legislation and guidance documentation.

4.1 OBJECTIVES

Environmental objectives have been developed for this project based on the information and issues identified in the conditions of the contract and Wasco previous experience of conducting construction work. These objectives will provide a clear guide for management of environmental issues during construction.

It is emphasized that all activities related to all phases of the project should:

- Ensure adequate planning and resources
- Minimise harm to the environment
- Minimise waste
- Avoid disturbance to sites of cultural heritage significance
- Minimise social impacts to inhabitants of the area and its surrounds
- Achieve excellent reinstatement outcomes

Given the nature of activities proposed, the level of investigation and refinement undertaken to date and ongoing, and the standard of mitigation measures proposed by Wasco to minimise impacts, it is not likely that the construction works will result in any significant, long-term or irreversible environmental impacts.

Construction will result in short-term disturbance, which is minimised to the greatest extent practicable through implementation of a range of management measures.

4.2 INTEGRATED MANAGEMENT SYSTEM

Wasco operates a comprehensive Management System that provides a structure for managing business development and project delivery whilst addressing quality, health, safety and environmental requirements. The Management System has been designed to satisfy the requirements of national and international standards and is certified in:



- ISO 9001:2015 - Quality management systems
- ISO 14001:2015 - Environmental management systems

4.3 PROJECT MANAGEMENT

Within the framework provided by the corporate Management System, Wasco prepares project specific management documentation for each project, incorporating contract conditions and specific design requirements.

As set out in the rest of this document, we will achieve our environmental objectives by:

- Ensuring adequate planning and allocation of resources

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- Applying risk management principles
- Documenting procedures and plans
- Training personnel and contractors
- Measuring and reporting our performance
- Conducting a review of our performance

4.4 EMPOWERMENT TO STOP WORK

All persons working on the project are Empowered and obliged to call a stop to work where it is reasonable to believe that a continuation of such work will result in a non-conformance with a management action in the CEMP.

5. ROLES AND RESPONSIBILITIES



The Wasco Project Manager for construction of the (JGN) Western Sydney Green Gas (WSGG) Project has primary responsibility for the Project and acts to ensure that the project is managed in accordance with this CEMP, the SMP and site-specific procedures.

The Wasco Construction Manager ensures the day-to-day operations onsite comply with this CEMP and that staff are informed about, and understand, their environmental responsibilities as described in this plan.

Environmental management and compliance are the responsibility of all personnel involved in the project.

THE INDUCTION TRAINING OF ALL PERSONNEL INVOLVED IN THE PROJECT WILL ENSURE EACH INDIVIDUAL IS AWARE OF THE ENVIRONMENTAL OBJECTIVES AND THEIR INDIVIDUAL RESPONSIBILITY AND ACCOUNTABILITY FOR THEIR ACTIONS. SPECIFIC ENVIRONMENTAL PROJECT ROLES AND RESPONSIBILITIES ARE OUTLINED IN THE FOLLOWING TABLE:

Position	Responsibilities
Wasco - Project Manager	Responsible for the management of the Construction project, including all environmental aspects and regulatory aspects. Responsible for ensuring that relevant reporting is completed and submitted to the Client, and all aspects of health safety and environment conditions within the projects are followed. Reports directly to the Jemena Project Manager.
Wasco – Project Engineers	Responsible for ensuring that relevant reporting is completed and submitted to the Client, and all aspects of quality, health safety and environmental conditions within the project are followed. Reports to the Project Manager regarding the project's health safety and environmental performance and due diligence.
Wasco – Construction Manager	Responsible for overseeing and fulfilling the commitments contained in this CEMP during site works. Responsible for ensuring that construction is managed in accordance with the CEMP and site-specific procedures. Reports to the Project Manager regarding the project's environmental and safety performance and due diligence.

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Position	Responsibilities
Wasco- HSE Advisor	Coordinates the monitoring and audit program. Responsible for reporting on health, safety, and environmental compliance to the Construction Manager. Reports to the Construction Manager regarding the project's environmental performance and due diligence.
All personnel	Responsible for ensuring the day-to-day activities of their tasks comply with the CEMP, health and safety requirements, regulatory requirements and all other project obligations detailed in the associated project documents. All personnel are required to instil and abide by good housekeeping principles to ensure the minimization of waste, segregation of recyclable products and general care for the environment.

6. KEY WASCO CORPORATE SPECIFICATIONS



Wasco has developed a suite of documentation which outlines and defines key focuses for the company and their undertakings, these documents form the basis of site implemented procedures, policies, plans and registers.

Project Documents	Document
2018-HSS-REG-003	SDS Register
2018-HRE-REG-002	Project Training Matrix
2018-HSS-TRG-001	Project Induction
2018-HSS-REG-004	Project Risk Assessment
2018-ENV-PRC-004	Erosion and Sediment Control Procedure
2018-ENV-PLN-007	Project Traffic Management Plan
2018-HSS-PLN-001	Project Health and Safety Management Plan
2018-QAS-PLN-003	Project CARE Plan
2018-HSS-PLN-002	Project Emergency Response Plan
WAPL-HSS-PRC-001	Incident Reporting and Notification Procedure
WAPL-HSS-PRC-002	Incident Investigation Procedure

7. EMPLOYEE SELECTION, TRAINING AND QUALIFICATIONS

Project Employee Selection, Induction and Training are defined in the Project Health and Safety Management Plan (HSMP).

The Wasco Project Management Team has the responsibility for ensuring all Employees have the necessary skills and knowledge to fulfil the requirements of their positions including any environmental responsibilities.

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A training matrix of personnel qualifications including inductions and operators permits or licences will be maintained.

7.1 INDUCTIONS



Construction personnel, including sub-contractors are required to attend a project induction prior to commencing work. The induction program includes a significant environmental and heritage component designed to ensure that all personnel are aware of their environmental and heritage responsibilities. The induction will be modified depending on target audience (e.g. supervisors, crew) to ensure it remains relevant. The construction environmental and heritage induction component covers general environmental and heritage management issues, including:

- Jemena High Pressure Induction
- Site specific requirements relating to the Development Consent conditions
- Site hazards in an operational facility on a high-pressure gas site
- Relevant legislation and legislative requirements
- Roles and responsibilities
- General awareness of environmental and heritage management protocols and procedures
- Incident reporting, spill management and response
- Air quality and dust management
- Management of sensitive areas and Aboriginal/Historic heritage
- Vegetation and habitat management including fauna
- Biosecurity and declared weeds
- Waste management
- Water management
- Access Conditions including stakeholder and public communication
- Emergency response
- Traffic management
- Noise and vibration management
- Erosion and sediment control

In addition, meetings are conducted with supervisors and crew prior to commencement of construction activities to review the procedures, ITP, and SWMS relevant to that activity, including required environmental and heritage management actions. Daily pre-start meetings are held during the course of construction activities. These will periodically include Toolbox Talks providing information on specific environmental and heritage issues relevant to the current location and activity. The procedures and SWMS will be reviewed should any aspect of the work change, including changes to crew, work method or environmental conditions.

The Induction would also ensure all construction personnel are aware of their environmental and heritage responsibilities in compliance with the Commonwealth and New South Wales laws and have the necessary knowledge and skills to fulfil them.

All inductions are recorded in a training matrix. The register will be maintained throughout the construction period.

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8. ENVIRONMENTAL PROMOTION AND COMMUNICATION

Wasco recognises the importance of promoting environmental awareness and understanding to Employees, sub contactors and where appropriate to the wider community as part of working towards achieving environmental objectives. Environmental management is promoted through:

- Displaying the Environmental Policy Statement
- Communicating environmental objectives to Employees and contractors, through environmental inductions, toolbox talks, pre-start meetings and other means
- Sharing environmental performance data with Employees and contractors
- Periodic use of site noticeboards for display of environmental material
- Incorporating environmental considerations into pre-start meetings
- Displaying and presenting environmental incident response procedures
- Documenting of community interactions
- Communicating environmental inspection and audit results.

Environmental matters are communicated through the following internal communication channels:

- Project Management Progress Meetings
- Project Daily Field Progress Management Meetings
- Pre-start meetings/Team Briefings
- Toolbox Meetings/Briefings
- Noticeboards.

9. DESCRIPTION OF ACTIVITIES



Refer to Section 1.3 in conjunction with the Construction Risk Register 2018-HSE-REG-001 and Project Scope of Work

10. ASSESSMENT OF ENVIRONMENTAL IMPACTS AND RISKS

To manage the interactions with the environment that would result from construction of the Project, the potential aspects and impacts of the Project must first be established.

Environmental aspects are the elements of an activity which can interact with the environment, and impacts are the effect of that aspect on the environment. The environmental aspects and impacts that may result from construction of the Project are examined below. The significance of each impact is also assessed by allocating the likelihood and consequence of an environmental impact occurring using Client environmental risk models. The risk of impacts occurring is then reassessed in light of proposed mitigation measures.

The Project HAZID and Project Risk register will be used to record all risks, impacts, hazards and mitigation measures at the commencement of the Project.

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10.1 METHODOLOGY

The construction environmental aspects are identified in the project EIS, response to submissions, development consent conditions, baseline surveys and other provided studies. Management measures to address each of these generic construction environmental impacts and risks are detailed in the Environmental Management Protocols for the Project – Construction Environment Management Plan (CEMP) Section 18.

The construction environmental aspects will comply with the Client and legislative requirements.

10.2 CONTINUOUS REVIEW OF RISKS

Over the course of the Project, the Risk register will be reviewed and updated to ensure that as the Project progresses, new and changed risks and hazards are assessed and addressed. Where necessary, procedures, SWMSs, SOPs and ITPS may be revised.

11. ENVIRONMENTAL GUIDELINES – KEY ASPECTS



A project EIS, (EcoLogical Australia 2019) was prepared for Jemena in accordance with Schedule 2 of the Environmental Planning and Assessment Regulation 2000. The EIS, response to submissions and Development Consent conditions stipulate the mitigation details for the construction activities.

The Project EIS and Development Consent application SSD-10313 as issued to JGN will be used by all project personnel to ensure compliance. Wasco's environmental procedures use the following principles as a basis;

- A general environmental duty of care
- A duty to notify environmental harm
- The offence of causing serious or material environmental harm
- The offence of causing environmental nuisance
- The offence of depositing prescribed water contaminants in waters and related matters, and
- The offence to place contaminant where environmental harm or nuisance may be caused.

The relevant sections of the APGA Code of Environmental Practice – Onshore Pipelines Rev 4 Sept 2017 are also noted below.

Environmental Risk Area	Page
Native vegetation	39
Fauna	40
Biosecurity	40
Natural and Built Heritage	41
Aboriginal Heritage	42
Soil	44
Water	46
Waste	47
Emissions	48
Third Parties	49
Chemical and contamination	50

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12. WASTE MANAGEMENT

Construction waste will be classified in accordance with the Waste Classification Guidelines (EPA 2014), and if required, disposed of lawfully at a licensed waste facility.

Activities associated with the construction activities that have the potential to generate waste or adversely impact on sensitive receptors including workers and the environment due to waste include:



- Ablutions, food scraps and general personal waste from personnel, and associated odours caused by the inappropriate management and disposal of putrescible and sewage waste streams
- Draining or loss of containment of process fluids
- Oils, greases and fuels associated with plant and equipment
- Paints, lubricants and general construction chemicals
- Poor housekeeping causing occupational health and safety risks to workers

Waste management is intended to:

- Ensure contractual and regulatory compliance
- Ensure a waste management hierarchy and principles based on waste avoidance, reuse, recycling, recovery, treatment and disposal as a last resort are used when making waste management decisions.
- Ensure that the community is not negatively affected by waste generation.
- Ensure all waste, including chemicals are stored, collected, transported and disposed of in accordance with the appropriate standards.
- Adhere to waste tracking procedures for designated waste streams
- Minimise impacts to the environment from the management of waste
- Maintain a safe, efficient and amenable workplace by minimising fire risk, odours, hazards and obstructions.

12.1 IDENTIFIED PROJECT WASTE STREAMS

Sewage and Grey Water	<ul style="list-style-type: none"> • To be collected in designated tanks, supplied and plumbed for this purpose, attached to ablutions and lunch room facilities. • Regular scheduled emptying of tanks shall be completed by an authorised contractor.
General Waste	<ul style="list-style-type: none"> • Scrap timber and large items of general waste shall be collected in a general waste skip designated for this purpose. • Smaller or lighter general waste items, waste paper and food waste / scraps shall be collected in local, lined bins. Upon emptying, waste shall be fully contained and tied within suitable garbage bags prior to placement in the general waste skip to prevent escape due to wind.

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	<ul style="list-style-type: none"> As appropriate, general waste skip shall be collected / replaced by contractor
Recyclable containers	<ul style="list-style-type: none"> Aluminium cans and plastic water and beverage bottles shall be collected in a designated recycling bin for donation.
Waste paint	<ul style="list-style-type: none"> Waste paint shall be allowed to fully harden in original container and disposed of as per SDS requirements. This could be in general waste or by an authorised contractor
Oily rags	<ul style="list-style-type: none"> Oily rags shall be collected in a designated oily rag receptacle. It is anticipated that the Client's maintenance operations will have an existing process for disposal of oily rags
Hydrotest water	<ul style="list-style-type: none"> Hydrotest water shall be collected. For anticipated quantity of hydrotest water less than 100L, untreated test water may be disposed of via the greywater system. Operations to be contacted to confirm grey water can handle the quantity at the time of disposal. 3rd party may be required to dispose if site cannot handle the additional volume
Soil / spoil	<ul style="list-style-type: none"> Soil / spoil shall be removed from site by civil contractor, transported to and disposed at an authorised location / facility.
Waste concrete	<ul style="list-style-type: none"> Waste concrete shall be removed from site by civil contractor, transported to and disposed at an authorised location / facility.
Contaminate soil	<ul style="list-style-type: none"> Contaminated soil, where arise, shall be removed and stockpiled for disposal at a suitably licensed facility.



13. EMERGENCY RESPONSE

The Construction Manager, in consultation with the Project Management Team and the Client's Representative, will assess each project activity and potential external factors or influences that may lead to identifiable operational emergency conditions.

An Emergency Response Plan (2018-HSS-PLN-003 Emergency Response Plan) has been prepared by Wasco for the Project.

Environmental emergencies may include:

- Significant spills of fuels or other hazardous materials
- Bushfire
- Large scale trench flooding
- Release of contaminated water

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14. COMMUNICATION, MONITORING AND REPORTING

14.1 COMMUNICATION

External communication to surrounding stakeholders will be undertaken by Jemena prior to the commencement of construction works, this will include a notification of planned works and construction timelines.

In addition, activities may be undertaken outside of the hours notified in Development Consent conditions Table 1 without the approval of the Secretary in accordance with the Schedule 3 Condition 9 and only where negotiated agreement has been reached with affected receivers, this shall be communicated appropriately.

All relevant project communication will be made available to everyone on the community website <https://haveyoursay.jemena.com.au/western-sydney-green-gas-project>

14.2 COMPLAINT MANAGEMENT

Wasco will notify the Jemena Project Team immediately of any issues or complaints raised by any relevant stakeholder, so that the most consistent and up to date information is provided and a suitable resolution is reached. All complaints will be recorded by Wasco, and the complaint record must include the following details:

- Date and time of the complaint;
- The method by which the complaint was made;
- Any personal details of the complainant which were provided by the complainant or, if no such details we provided, a note to that effect;
- The nature of the complaint;
- The action taken in relation to the complaint, including any follow-up contact with the complainant; and
- If no action was taken, the reasons why no action was taken.



The complaint investigation process will be completed within 24 hours a responses / resolutions to the complaint is to be communicated by the Jemena Project Team for communication with the complainant.

14.3 MONITORING

Environmental records will include inspection reports undertaken by the HSE Advisor and/or Construction Supervisor or delegate. Any other required monitoring and data recorded will be captured and available to be provided when required.

The CEMP, and Project Risk Register specify control actions developed to reduce the risk associated with potential environmental impacts. These preventative actions have been incorporated into the relevant procedures.

During construction, additional preventative actions may be identified through review of SWMS, HAZOB cards and work processes. New preventative actions will be incorporated into SWMS, and where appropriate into the relevant procedures and the Project Risk Register.

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Corrective actions may be required to address an actual environmental impact (for instance a spill or erosion event) or near miss during construction and will be developed through incident and hazard investigations according to the Incident Reporting Procedure (WAPL-SYS-PRC-002). These corrective actions may include actions intended to prevent a recurrence, such as an update of relevant procedures and construction documentation, SWMS and training materials.

Corrective actions identified through incident and hazard investigations will be recorded in the Corrective Action Register as part of that system. Through this system, actions will be assigned to a responsible person, given a due date and tracked to completion.

14.4 INSPECTIONS

Weekly checklists (WAPL-HSS-FRM-003 Environmental Inspection Form) will be completed by the Project HSE advisor. These forms will be kept onsite and recorded in the project HSE folder.

The Project environmental performance data will be incorporated into the Weekly and Monthly Progress reports submitted to the Wasco Project Management Team and the Client, summarising:

- Environmental management activities including inspections
- Compliance with the Development Consent conditions via the application of construction phase management plans
- Environmental management documents (procedures, SWMSs etc) developed or reviewed
- Summary of environmental incidents or non-compliances
- Areas of concern.

The Project HSE Advisor will have overall responsibility for the timely submission of complete and accurate environmental reports.

14.5 KEY PERFORMANCE INDICATORS

- Closeout of all corrective actions by the due date.
- Environmental aspects monitored as required, undertaken via site inspections by project management.
- No incidents causing Environmental or Cultural Heritage impact.



14.6 INCIDENT INVESTIGATION

All incidents are required to be investigated in accordance with Wasco and the Client's incident investigation procedures. Closeout of actions must be completed by the due date.

Outcomes of incidents, the investigation and the remediation must be communicated as soon as possible to all personnel, Wasco management, and the Client.

14.7 INCIDENT REPORTING

The responsibility for initial reporting of an incident lies with the personnel and associated supervisor involved. All incidents shall be reported to the Construction Manager immediately after they occur and recorded using Rapid Incident as per the Wasco Incident Reporting Procedure (WAPL-SYS-PRC-002). The Project Manager or

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delegate shall report the incident to the Client Site Representative. Jemena shall pass notify relevant parties as required (Section 13.8).

Non-compliances with environmental procedures will be also reported in accordance with this procedure as an incident.

The CEMP and associated procedures include contingency actions, the majority of which are triggered when an environmental incident takes place.

14.8 INCIDENT NOTIFICATION

The Client, as the proponent for the Project, is required to report certain events to the EPA and DPI&E as soon as possible after an event occurs. In the event of a reportable incident, the Project Manager will report the required information to the Client Representative. Incidents shall be reported within 24 hours, in accordance with the Client's requirements. The Client will then communicate the incident to the EPA and DPI&E. A copy of all documented incidents will be retained at the site project office and within project archives for a minimum period of 5 years.

14.9 REPORTING

Wasco will report to Jemena and other agencies as required on issues related to the Project. Reporting will include:

- Notification of works commencement (including prior to construction commencement and completion)
- Monitoring records;
- Non-compliances; and
- Project website updates and inclusion of any revision of this plan.

14.10 AUDITS



Project audits will be conducted as identified and required, with a minimum of one every six months. The scope of such audits will include relevant project work sites and environmental compliance with the project requirements.

15. FIELD ACTIVITIES AND CONTROL MEASURES

A summary of control measures for the project are provided in the following subsections (15.1 to 15.12)

Detailed control measures for specific aspects of construction environmental management can be found in the following documents.

- 2018-ENV-PLN-002 Erosion and Sediment Control Plan
- 2018-ENV-PLN-003 Construction Air Quality Management Plan
- 2018-ENV-PLN-004 Construction Noise and Vibration Management Plan
- 2018-HSS-PLN-005 Cultural Heritage Management Plan
- 2018-HSS-PLN-001 Health and Safety Management Plan



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- 2018-HSS-PLN-002 Traffic Management Plan
- 2018-HSS-PLN-003 Project Emergency Response Plan
- 2018-HSS-PLN-004 Project CARE Plan
- 2018-HSS-REG-001 Construction Risk Register
- WAPL-HSS-PRC-001 Incident Reporting and Notification Procedure
- WAPL-HSS-PRC-002 Incident Investigation Procedure

Control measures to be implemented have been development in conjunction with Section 8 (Environmental Management) of the project EIS.

15.1 GENERAL CONDITIONS



Activities	Control Measures
Site Management	<ul style="list-style-type: none"> • All works are to be conducted according to the relevant Environmental Impact Statement (EIS), Development Consent (SSD 10313), Scope of Work (SOW), and permit to work (PTW) conditions. • If any variation is deemed necessary, the Client Site Representative will be notified.
Working Hours	<ul style="list-style-type: none"> • Project activities will be conducted between 7:00am and 6:00pm Monday to Friday and 7:00am to 1:00pm Saturdays. • No construction activities will occur on Sundays or Public Holidays. • In addition to the project hours above the project activities will also occur outside these hours strictly in accordance with Environmental Planning and Assessment (COVID-19 Development Construction Work Days) Order 2020
Training and Inductions	<ul style="list-style-type: none"> • Minimum training required for workers on this site includes: <ul style="list-style-type: none"> ○ Wasco Online Inductions ○ Client Site Induction. ○ White card construction industry • Wasco will create a site-specific induction for all workers on this site that includes pertinent elements of the CEMP. • Elements of the CEMP will be interjected in SWMS and daily toolbox meetings. • A specially designed visitor induction will include pertinent elements of the CEMP.
Records	<ul style="list-style-type: none"> • Records including but not limited to: Community/Landholder complaints, Prestart meeting, SDS copies, audits and incident report forms will be maintained, kept on-site and made available to all workers and client personnel as required.
Incident reporting	<ul style="list-style-type: none"> • All community, landholder, environmental incidents, inquiries, safety incidents and near misses shall be maintained and reported to the Wasco Project Team and Client Representative.

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Emergency response	<ul style="list-style-type: none"> All workers and visitors will be inducted on the site-specific Wasco Emergency Response Plan (2018-HSS-PLN-003).
Maintenance	<ul style="list-style-type: none"> Plant and equipment will be maintained to not present a hazard to the environment. Site supervisor will periodically ensure the effectiveness of equipment, plant and erosion and sediment control measures.
Biosecurity	<ul style="list-style-type: none"> All vehicles and plant operating on site will be washed down prior to their project commencement and after their project completion, to manage the introduction and spread of weed propagules.
Access	<ul style="list-style-type: none"> Fences and barricades will be maintained where required to secure the construction site and limit access to site. Traffic management will be carried out according to the site access conditions and Traffic Management Plan (2018-HSS-PLN-002) A site-specific traffic management plan will be established for the site and complied with.
Record keeping	<ul style="list-style-type: none"> Inspection records, incidents and non-compliances will be recorded and presented to the Project Team and Jemena as required.
Buildings and Structures	<ul style="list-style-type: none"> Any newly renovated, installed, or mobilised buildings (permanent or temporary) shall adhere to relevant requirements of the Building Code of Australia There is currently no planned activity for the removal/demolition of existing structures within the site, if this scope change, Contractor shall comply to <i>Australian Standard AS 2601-2001: The Demolition of Structures</i>
Signage	<ul style="list-style-type: none"> Site signage shall only be installed to assist in site identification, convey health and safety information and outline entry to site requirements
Lighting	<ul style="list-style-type: none"> Lighting installed shall comply with Australian Standard AS4282 (INT) 1997 – Control of Obtrusive Effects of Outdoor Lighting, or its latest version. Any temporary lighting will be positioned to minimise the off-site lighting impacts and should not shine above the horizontal Notify community or neighbours where light impacts during construction are anticipated.

15.2 AIR EMISSIONS

Air emission control measures to be in accordance with the Construction Air Quality Management Plan (2018-ENV-PLN-003) and Traffic Management Plan (2018-HSS-PLN-002)

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15.3 WATER MANAGEMENT



Quality Parameters	Control Measures
Stormwater	<ul style="list-style-type: none"> Storm water control measures to be in accordance with 2018-ENV-PLN-002 Erosion and Sediment Control Plan
Groundwater	<ul style="list-style-type: none"> Ground water control measures to be in accordance with 2018-ENV-PLN-002 Erosion and Sediment Control Plan
Hydro testing	<ul style="list-style-type: none"> Water will come from an approved source. The Water Source will be tested for Chemical and Bacterial Analysis as per the APGA guidelines. Biocide may be required for hydrotesting water subject to sample analysis as per APGA guidelines. Water disposal after Hydro Testing will be as per the site EIS, Development Consent, EPA waste classification guidelines. A test plan will be developed.

15.4 NOISE AND VIBRATION

Noise and vibration control measures to be in accordance with the Construction Noise and Vibration Management Plan (2018-ENV-PLN-004) and Traffic Management Plan (2018-HSS-PLN-002)

15.5 WASTE MANAGEMENT



Quality Parameters	Control Measures
General waste handling and storage	<ul style="list-style-type: none"> The waste management hierarchy is to be followed and implemented on site No wastes will be burnt or buried on site. Work areas will be kept clean and free of litter Waste storage will not be placed in a position that has the potential for the wastes to enter a waterway or any sensitive receptor. Designated waste receptacles will be used. (in accordance with its classification)
Waste minimisation	<p>Where possible, the works will be planned to minimise the generation of waste at site, including by:</p> <ul style="list-style-type: none"> Returning packaging to suppliers, purchasing in bulk, requesting cardboard or metal drums rather than plastic and using returnable packaging such as pallets and reels General wastes will be stored in bins provided for that purpose, which will be covered where possible.

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	<ul style="list-style-type: none"> Minimising the amount of construction material waste by maximising the use of offsite fabrication and painting. Recondition removed spoil for use as fill where possible.
Waste disposal and transport	<ul style="list-style-type: none"> Wastes will be segregated, stored and managed according to their classification. Waste will be removed from the site by, and disposed of, at an appropriately licensed waste disposal facility. Regulated wastes will be transported off site by a person holding appropriate licences and permits. Waste recycling where appropriate will be practiced. All wastes will be classified using the EPA Waste Classification Guidelines (2014) prior to disposal and transportation. All waste disposal receipts, and waste vehicle movements will be retained and included in a register.

15.6 LAND MANAGEMENT

Quality Parameters	Control Measures
Earthworks	<ul style="list-style-type: none"> Wasco will limit any earthworks to allocated areas. Works to be scheduled outside of predicted heavy rainfall times. Vehicles will commute on designated tracks and roads. All disturbance works will occur only within the area approved by the Client.
Stockpiling	<ul style="list-style-type: none"> Stockpiling control measures to be in accordance with the Erosion and Sediment Control Plan (2018-ENV-PLN-002)
Land contamination	<ul style="list-style-type: none"> Any potentially contaminated soil is to be immediately reported to the site supervisor for communication to Jemena within 24hrs. With no works to intrude into the potentially contaminated soil until appropriate measures and authority have been approved by Jemena. Any materials for off-site disposal needs to be sampled, analysed and compared against EPA 2014 waste classification guidelines prior to off-site disposal to a licensed facility If any contamination is discovered during work, operation will cease, and Jemena's Project Manager and Environmental Representative notified immediately.
Topsoil	<ul style="list-style-type: none"> If any contamination is discovered during work, operation will cease, and Jemena's PM and Environmental Representative notified immediately.

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	<ul style="list-style-type: none"> Any excavated contaminated materials will be isolated, stockpiled on an impermeable material, silt-fenced and covered until it is tested and processed according to EPA 2014 Waste Classification Guidelines Topsoil control measures to be in accordance with the Erosion and Sediment Control Plan (2018-ENV-PLN-002)
Soil Management	<ul style="list-style-type: none"> Soil management to be in accordance with the Erosion and Sediment Control Plan (2018-ENV-PLN-002)
Sediment Control	<ul style="list-style-type: none"> Sediment control measures to be in accordance with the Erosion and Sediment Control Plan (2018-ENV-PLN-002)
Reinstatement	<ul style="list-style-type: none"> Reinstatement to be in accordance with the Erosion and Sediment Control Plan (2018-ENV-PLN-002)
Rehabilitation	<ul style="list-style-type: none"> Rehabilitation to be in accordance with the Erosion and Sediment Control Plan (2018-ENV-PLN-002)

15.7 HERITAGE



Heritage control measures to be in accordance with the Cultural Heritage Management Plan (2018-HSS-PLN-005) and Traffic Management Plan (2018-HSS-PLN-002).

15.8 WEED AND PEST CONTROL

Weed and pest control measures to be in accordance with the Traffic Management Plan (2018-HSS-PLN-002).

15.9 FAUNA AND FLORA

Quality Parameters	Control Measures
Vegetation	<ul style="list-style-type: none"> The authorised clearing limits will be delineated and marked prior to any earthworks. Clearing of any vegetation shall be as per the client authorisations. Any discovered threatened species or communities are to be reported to Jemena in writing and works halted until DPI&E approval given.
Protected species	<ul style="list-style-type: none"> Adherence to legislation will be observed during construction works. Injured fauna shall be handled according to competency and legislation.
Fauna and habitat disturbance	<ul style="list-style-type: none"> Visual checks for fauna will be made before conducting and during earthworks Harm to fauna will be avoided, if such occurs, it will be reported to Client site representative as soon as it is possible to do so. All orphaned or injured fauna will be contained where possible and reported to WIRES on 1300-094-737 for collection.



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15.10 SEWAGE TREATMENT AND EFFLUENT MANAGEMENT

Quality Parameters	Control Measures
Transportable toilets	<ul style="list-style-type: none"> Wastes from portable toilets will be transported off site and disposed of in a municipal waste transfer station by a licensed transporter. Waste that is removed from site will be documented in the environmental management register with the accompanying waste certificate.

15.11 STORAGE AND HANDLING OF CHEMICALS, FLAMMABLE AND COMBUSTIBLE SUBSTANCES



Quality Parameters	Control Measures
Chemical storage and handling	<ul style="list-style-type: none"> All hazardous chemicals and dangerous goods will be stored and handled according to their SDS, applicable Australian Standards and the EIS/Development Consent conditions. The chemical contents will be appropriately labelled in accordance with the National Code of Practice for Labelling of Workplace Substances Sept 2015 All liquid based chemicals will be stored in approved plastic containers within bunded areas. Volumes stored will be reduced to the minimum required for operations. Bunded area equal to or greater than 110% of the contents. Spill kits, SDS, first aid kits and fire extinguishers suitable for containment will be made accessible to all workers. Spills response and notification procedure to be in accordance with Project Emergency Response Plan (the2018-HSS-PLN-003) Fuel or hazardous chemicals will not be stored or handled within 50 m of waterways or within 50 m of any wetlands, lakes or springs and will be stored within 150% bunded areas or container. A register of hazardous goods will be maintained. <ul style="list-style-type: none"> The storage and handling will be according to relevant legislation that includes, but not limited to: AS 1940:2017 The storage and handling of flammable and combustible liquid. all relevant Australian Standards; and the NSW EPA's Storing and Handling of Liquids: Environmental Protection – Participants Handbook if the chemicals are liquids, or its latest version. Suitable fire prevention equipment will be kept on-site and will be made available to all workers.

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Fuel storage and refuelling	<ul style="list-style-type: none"> • Refuelling locations will be offsite where possible • Onsite refuelling will occur as far away as practicable from natural drainage lines and sensitive receptors to reduce the possibility of soil contamination. • Remote petrol- or diesel-powered pumps located on site will be set within spill trays. They will be fuelled in-situ to lower the risk of associated water spillage caused by connecting and disconnecting water lines to pumps. • No auto lock nozzles are permitted on site
Transportation	<ul style="list-style-type: none"> • Hazardous goods will be transported by appropriately licenced carriers and according to SDS, relevant Australian Standards and regulatory guidelines. • All goods transported shall contain labels, signage and appropriate packaging.
Emergency preparedness	<ul style="list-style-type: none"> • All employees will undergo site specific training and induction, discussing hazards on site, emergency exits, location of safety equipment, and first aid. • The Emergency Response Plan (2018-HSS-PLN-003) in place will form the basis.

15.12 MONITORING AND REPORTING



Quality Parameters	Control Measures
General Operations	<ul style="list-style-type: none"> • A daily operations report through Envision will be completed to note the following <ul style="list-style-type: none"> ○ Any environmental issues ○ Toolbox and SWMS forms ○ Project progress against planned activities ○ Near misses and non-conformance ○ Records of induction and training
Site Supervisor	<ul style="list-style-type: none"> • Will keep records of the results of all monitoring required by this plan, in accordance with the EIS and development consent conditions for the project. • Ensure that hard copies of such records are conveniently located for examination by any authorised person. • Ensure that HSE and SWMS forms are completed prior to commencing work; and permits issued when necessary.

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Earthworks	<ul style="list-style-type: none"> • Earthworks will be monitored daily during the works to assess soil segregation, reinstatement and to assess erosion potential. • Compaction of the fill going into the reconstructed landscape will be monitored periodically. • All material disposed off-site to be tracked from the site to the licensed disposal facility • All material imported to site to be tracked from source to site • All material entering and leaving site to be tracked
Audit & Review	<ul style="list-style-type: none"> • A weekly environmental walk will be undertaken, and any raised issues entered into the risk register. • The CEMP will be reviewed at the conclusion of the project to assess its efficacy and identify needed changes in future CEMPs. • Corrective actions and non-conformance from incident reports and weekly environmental inspections will be included • The incident reports, corrective actions, non-conformance and efficiency of systems in place will be considered and new controls will be placed accordingly. • Compliance to land access conditions, reinstatement/rehabilitation requirements will be reviewed at the completion of the project.

16. ABBREVIATIONS

Abbreviation or Term	Description
AHD	Australian Height Datum
APGA	Australian Pipeline and Gas Association
APPEA	Australian Petroleum Production & Exploration Association
AS	Australian Standards
ASS	Acid Sulphate Soils
BCD	Biodiversity and Conservation Division
BoM	Bureau of Meteorology
CAR	Corrective Actions Register
CEMP	Construction Environmental Management Plan
Cwth	Commonwealth
Client	Jemena Gas Networks (NSW) Ltd
EIS	Environmental Impact Statement

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Abbreviation or Term	Description
EMS	Environmental Management System
EPA	Environmental Protection Authority
ERP	Emergency Response Plan
ESA	Environmentally Sensitive Area
ESCP	Erosion and Sediment and Control Plan
GHG	Greenhouse gas
HAZID	Hazard Identification process
HSE	Health, Safety and Environment
HSMP	Health and Safety Management Plan
IECA	International Erosion Control Association
ITP	Inspection and Test Plan
JGN	Jemena Gas Networks (NSW) Ltd
KM	Kilometre
MS	Meter station
NOHSC	National Standard for Construction Work
PASS	Potential Acid Sulphate Soils
PTW	Permit to Work
ROW	Construction Right-of-Way
SDS	Safety Data Sheet
SMP	Safety Management Plan
SOW	Scope of Work
SWMS	Safe Work Method Statement
VENM	Virgin Excavated Natural Material
WASCO	Wasco (Australia) Pty Ltd
WSGG	Western Sydney Green Gas Project

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Appendix 1 - Environmental Checklist

Workplace # & Location				
Activity				Date
Inspection By				
Signatures				

A = Acceptable			NI = Needs Improvements		UA = Unacceptable		N/A = Not Applicable		
#	Inspection Item	Verification	Compliance Achieved				Comments / Action Required	Person Responsible	Close Out Date
			A	NI	UA	NA			
1.	Current environmental policy displayed?	Visual inspection.							
2.	Is there an environmental management plan developed and approved for the workplace?	Review workplace document control folder for approved management plan.							
3.	Is a waste management plan developed and approved for the workplace?	Review workplace document control folder for approved management plan.							
4.	Has a spill response scenario been developed for the workplace and included in Emergency response management plan (ERMP)?	Review approved emergency response management plan.							
5.	Are environmental hazards reported?	Review of hazard report cards/ corrective actions register?							
6.	Are toolbox talks / training sessions conducted on the workplace aspects?	Review of toolbox talk meetings folder.							
7.	Surface water/sediment controls and watercourse protection measures set up?	Visual inspection.							
8.	Is there a designated refuelling area?	Visual inspection.							
9.	Are fuel tanks adequately bunded covered and drip trays in place?	Visual inspection.							


A = Acceptable		NI = Needs Improvements		UA = Unacceptable		N/A = Not Applicable		Person Responsible	Close Out Date		
#	Inspection Item	Verification	Compliance Achieved				Comments / Action Required				
			A	NI	UA	NA					
10.	Are hazardous substance stores available and all drums, containers stored appropriately?	Visual inspection.									
11.	Are all hazardous storage areas ventilated and bunded (110% capacity)?	Visual inspection.									
12.	Are all bunds maintained? (No standing water etc.)	Visual Inspection.									
13.	Concrete wash out provided and maintained?	Visual Inspection.									
14.	Drip trays under non bunded static plant (incl. pumps)?	Visual Inspection.									
15.	Spill kits available in appropriate locations?	Visual Inspection.									
16.	Spill kits appropriate to substances being used?	Visual Inspection.									
17.	Spill kits adequate to contain spill?	Visual Inspection.									
18.	Appropriate PPE available in the event of a spill?	Visual Inspection.									
19.	Signs displayed indicating protected areas (archaeological and cultural heritage)?	Visual Inspection.									
20.	Dust suppression in operation and adequate?	Visual Inspection.									
21.	Designated waste skips available or butt bins available?	Visual Inspection.									
22.	Waste bins located in office and crib rooms?	Visual Inspection.									
23.	Designated smoking area and bins filled with sand?	Visual Inspection.									
24.	Is the workplace kept neat and tidy?	Visual Inspection.									
25.	Recycling of materials occurring? Poly or steel pipe laydown	Visual Inspection.									

A = Acceptable		NI = Needs Improvements		UA = Unacceptable		N/A = Not Applicable		Person Responsible	Close Out Date		
#	Inspection Item	Verification	Compliance Achieved				Comments / Action Required				
			A	NI	UA	NA					
26.	Chemicals segregated as per their classification compatibility?	Visual Inspection.									
27.	Is there a workplace layout map with <ul style="list-style-type: none"> Spill kits; workplace/office layout; Stormwater drains; and Laydown / hazardous substance storage areas. 	Visual Inspection.									
28.	Warning signals working for temporary toilet facilities? Overflow alarm ect.	Test warning signals.									
29.	Are Employees and Subcontractors aware of their environmental responsibilities?	Spot check signed statement of responsibilities against names of personnel taken?									
30.	Is all waste removed by a licensed contractor to a licensed facility?	Review Contractors license?									
31.	Waste collection receipts available for all waste removed?	Review waste facility license?									
32.	Is all grey water discharged to sewer or septic systems?	Visual inspection.									
33.	Is environmental monitoring (e.g. dust, noise, vibration, water quality) being conducted (if applicable)?	Review noise monitoring results to identify areas of concern.									
34.	Current SDS folder held in all hazardous storage areas?	Review SDS folder to ensure there are no expired SDS's.									
35.	Are plant and equipment well maintained (smoky exhaust emissions) and checked regularly for potential leaks?	Visual inspection & review of maintenance records .									
36.	Asbestos waste handled by registered professionals?	Review qualifications and registrations.									
37.	Batteries stored correctly?	Visual inspection.									

A = Acceptable		NI = Needs Improvements		UA = Unacceptable		N/A = Not Applicable			
#	Inspection Item	Verification	Compliance Achieved				Comments / Action Required	Person Responsible	Close Out Date
			A	NI	UA	NA			
38.	Are workplace stormwater drains marked to remind that no wastewater should be discharged to these drains?	Visual inspection.							
39.	Stop valves in place and shut correctly?	Visual Inspection							
40.	Draining taps on bunding shut and in good working order?	Visual Inspection							
41.	How is hydro test water disposed of, or is it stored for later use.	Visual Inspection, records							
42.	Has Contaminated soil been stored as per EMP.	Visual inspection							
43.	Flammable materials stored in a locked cage?	Visual inspection.							

Appendix D – Construction Noise and Vibration Management Plan

Document Cover Sheet

 Wasco (Australia) Pty Ltd 60 Commercial Drive, Shailer Park QLD 4128, Australia	Supplier PO/Contract No:	4600009152
	Supplier Item Description:	Western Sydney Green Gas Project Construction Works
	Equipment/Tag No:	N/A

Project Name:	WSGG Project		
Supplier Document Title:	Construction Noise and Vibration Management Plan		
Supplier Document No:	2018-PRM-PLN-004	Supplier Rev No:	0
Jemena ECMS Document No:	<i>This Section To Be Completed By Jemena</i>	Jemena Rev No:	<i>This Section To Be Completed By Jemena</i>
Jemena Aconex Document No:	P2G-2099-PA-EV-006	Total No of Pages (incl cover page)	20

Document Revision History:

Rev	Issue Date	Key Reason for Issue (as above table)	Approved By/ Signature	Company Name	Notes (if not applicable N/A)
A	-	Issued for Review	MPW	Wasco	
B	16.09.20	Issued for Review	MPW	Wasco	
C	23.09.20	Issued for Review	MPW	Wasco	
0	16.10.20	Issued for Use	MPW	Wasco	

Key Reason for Issue:

IFR- Issued for Review	IFI- Issued for Information	IFU- Issued for Use
IFP- Issued for Purchase	IFC- Issued for Construction	AB- As Built





WESTERN SYDNEY GREEN GAS PROJECT

CONSTRUCTION NOISE AND VIBRATION MANAGEMENT PLAN

Document Number: 2018-ENV-PLN-004

Revision	Issue	Date	By	Check	Approve
0	Issued For Use	16.10.20	DP	AMH	MPW
C	For Client Review	23.09.20	DP	AMH	
B	For Client Review	16.09.20	EE	NS	
A	For Client Review		MCB	TAL	MPW

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1. INTRODUCTION

1.1 PROJECT DESCRIPTION

The Western Sydney Green Gas (WSGG) Project involves the construction of a power to gas (P2G) hydrogen facility at the existing Jemena Horsley Park Trunk Receiving Station, located in Western Sydney. The facility will use renewable electricity to generate hydrogen, which can be injected into the natural gas network or used to generate electricity back to the grid by means of a hydrogen-powered micro-turbine or similar technology.

The Jemena Horsley Park Facility is located at 194 – 202 Chandos Road, Horsley Park (Lot 1 DP 499001 and Lot 3 DP 1002746)

1.2 PROGRAM

The current construction project timeline is presented below, the construction works are anticipated to commence in October 2020, pending approval of the required management plans. The timing presented below are indicative only and subject to change.

	Aug 20	Sep 20	Oct 20	Nov 20	Dec 20	Jan 20	Feb 20	Mar 20	Apr 20	May 21	Jun 21	Jul 21
Pre-Construction												
Construction [#]												
Commissioning [#]												
Operation and Maintenance [*]												→

Notes

[#] the phases that this management plan addresses



^{*} 5 year operation in accordance with Condition A8 of the Development Consent SSD 10313

Grey – Float

1.3 CONSTRUCTION ACTIVITIES

The construction activities to be undertaken as part of the works are summarised below:

- Completion of pre-construction documentation, inductions and establishment of site amenities and delineation of construction;
- Coordination and management of site delivery, off-loading and installation of major equipment packages (inclusive of all electrical packages);
- Completion of construction, installation, testing and commissioning of carbon steel pipelines including buffer store;
- Completion of civil, structural, piping as well as mechanical, process and electrical of the P2G Facility, including the spray sealed coating of the turning circle; and
- Completion of pre-commissioning and commissioning works.

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The works noted above will be completed works in a manner consistent with relevant laws, policies and guidelines.

1.4 PROJECT APPROVALS

The delivery of the Project is facilitated by the Development Consent SSD 10313 approved by the Minister for Planning and Public Spaces, under Part 4, Division 4.7 of the *Environmental Planning and Assessment Act 1979* and, in accordance with Section 4.38 (Approval).

1.5 PURPOSE

The purpose of this plan is to ensure all works are carried out in a manner that minimises noise and vibration generation and impacts on surrounding neighbours and complies with the relevant regulatory approvals, standards and procedures.

Note: This Noise and Vibration Management Plan does not address the operational and decommissioning phase of the project.

This plan should be read in conjunction with the Construction Environmental Management Plan (CEMP)

1.6 OBJECTIVES

This Noise and Vibration Management Plan applies to all personnel working on the Western Sydney Green Gas Project. It addresses the measures to be taken during construction works in locations where nuisance and unnecessary noise and disturbance can occur. This includes noise management requirements as documented in the NSW Department of Planning, Industry and Environment (DPI&E) Development Consent conditions (SSD 10313) and the Western Sydney Green Gas Project Environmental Impact Statement (EIS).

This Plan does not intend to mitigate or address Health and Safety risks of site personnel; these will be managed through Health and Safety Plans and Procedures.



2. STATUTORY FRAMEWORK

2.1 LEGISLATION, STANDARDS AND GUIDELINES

Commonwealth and State legislation, as well as state planning instruments relevant to the project are outlined within Jemena's *Western Sydney Green Gas Project - Environment Management Strategy* (Sep 2020).

Legislation relevant to construction noise and vibration management include:

- Environmental Planning and Assessment Act 1979
- Protection of the Environment Operations (Noise Control) Regulation 2017
- Work Health and Safety Regulation 2017
- Assessing Vibration: A technical guideline
- Interim Construction Noise Guideline (DECC NSW 2009)

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There are several guidelines for noise and vibration management as follows:



- AS 1055.1-2018: Acoustics – Description and Measurement of Environmental Noise – General Procedures.
- AS 2436-2010 (R2016) Guide to noise and vibration control on construction, demolition, and maintenance sites.
- AS 1055.1-2018: Acoustics – Description and Measurement of Environmental Noise – General Procedures
- AS/NZS IEC 61672.1:2019 Electroacoustics – Sound level meters – Specifications
- AS 2436-2010 (R2016) Guide to noise and vibration control on construction, demolition, and maintenance sites

2.2 CONDITIONS OF APPROVAL



The Construction Noise and Vibration Management Plan is a sub-plan that forms part of the overarching Construction Environmental Management Plan (CEMP) 2018-ENV-PLN-001.

This noise and vibration management plan responds to the specific relevant requirements of the Approval Development Consent, as follows:

Condition	Requirement	Addressed												
Schedule 2 – Part A – Administrative Conditions														
OPERATION OF PLANT AND EQUIPMENT														
A13	The Applicant must ensure that all plant and equipment used on site, or in connection with the development, is: (a) maintained in a proper and efficient condition; and (b) operated in a proper and efficient manner.	Section 6.2 (11)												
Schedule 3 – Part B - Environmental Conditions – General														
TRAFFIC														
Traffic Management Requirements														
B7	The Applicant must: (f) minimise the traffic noise impacts of the development.	Section 6.2 and Traffic Mgmt Plan												
AMENITY														
Construction and Operating Hours														
B9	The Applicant must comply with the operating hours set out in Table 1. <table><tr><th colspan="2">Table 1: Operating Hours</th></tr><tr><th>Activity</th><th>Operating Hours</th></tr><tr><td>Operations excluding microturbines and blowdowns</td><td>24 hours a day 7 days a week</td></tr><tr><td>Microturbines</td><td>7 am to 10 pm 7 days a week</td></tr><tr><td>Construction and decommissioning activities</td><td>7am to 6pm Monday to Friday 8am to 1pm Saturday</td></tr><tr><td>Blowdowns (excluding emergency work)</td><td>at no time on Sundays and NSW public holidays</td></tr></table>	Table 1: Operating Hours		Activity	Operating Hours	Operations excluding microturbines and blowdowns	24 hours a day 7 days a week	Microturbines	7 am to 10 pm 7 days a week	Construction and decommissioning activities	7am to 6pm Monday to Friday 8am to 1pm Saturday	Blowdowns (excluding emergency work)	at no time on Sundays and NSW public holidays	Section 6.1
Table 1: Operating Hours														
Activity	Operating Hours													
Operations excluding microturbines and blowdowns	24 hours a day 7 days a week													
Microturbines	7 am to 10 pm 7 days a week													
Construction and decommissioning activities	7am to 6pm Monday to Friday 8am to 1pm Saturday													
Blowdowns (excluding emergency work)	at no time on Sundays and NSW public holidays													

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Condition	Requirement	Addressed
	<p>The following activities may be undertaken outside of the hours identified in Table 1 without the approval of the Secretary:</p> <p>....</p> <p>(c) construction works that cause LAeq (15 mins) noise levels that are:</p> <ul style="list-style-type: none"> no more than 5 dB(A) above the rating background level at any residence in accordance with the Interim Construction Noise Guideline (DECC, 2009), or its latest version; and no more than the noise management levels specified in Table 3 of the Interim Construction noise Guideline (DECC, 2009), or its latest version, at other sensitive land uses; and for continuous or impulsive vibration values, measured at the most affected residence, no more than those for human exposure to vibration, specified in Table 2.2 of Assessing vibration: a technical guideline (DEC, 2006), or its latest version; and for intermittent vibration values measured at the most affected residence, no more than those for human exposure to vibration, specified in Table 2.4 of Assessing vibration: a technical guideline (DEC, 2006), or its latest version; 	Section 6.1
	<p>(d) where a negotiated agreement has been reached with affected receivers; or</p> <p>....</p>	Section 7.2
	(e) works as approved through the out-of-hours work protocol outlined in the Environmental Management Strategy under Schedule 4 of this consent	6.1.1
Noise		
B10	<p>The Applicant must:</p> <p>(a) minimise the noise generated by any construction or decommissioning activities on site in accordance with the best practice requirements outlined in the Interim Construction Noise Guideline (DECC, 2009), or its latest version;</p>	Section 6
Part B Environmental Conditions – General		
COMPLIANCE		
Incident Notification		
C3	<p>The Applicant must immediately notify the Department, Council and any other relevant agencies immediately after it becomes aware of an incident. The notification must identify the development (including the development application number and name) and set out the location and nature of the incident.</p>	Section 7.6

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3. RESPONSIBILITIES

The roles, responsibilities, of all key personnel involved in the management of noise and vibration during construction works on the Project are summarised below.

Role	Responsibility
General Manager Systems & Facilities	Provide Wasco with advice in relation to environmental noise management and support the Project in complying with NSW State regulations
Construction Manager/HSE Advisor	Implement and maintain specific measures for noise and vibration for the duration of works, monitor the adequacy and effectiveness of these measures, provide training, monitoring, and reporting, regular auditing of operations
Construction Manager	Ensure adequate measures for noise and vibration are maintained for the duration of works and implemented in accordance with this Plan.
Site Supervisors	Coordinate implementation of this Plan
All Employees / Contractors	Responsible for minimising noise emissions and vibrations, reporting any noise complaints to their immediate supervisor.

4. PROJECT OVERVIEW



4.1 EXISTING ENVIRONMENTAL CONDITIONS

The nearest residential receivers and their distance to the nearest site boundary has been provided in Table 1. below.

Receiver reference	Address	Distance to nearest site boundary (m)
R1	187 – 201 Chandos Road	≈ 90
R3	203 – 209 Chandos Road	≈ 130
R6	168 – 174 Chandos Road	≈ 160

Table 1. Nearest residential receivers considered in assessment (Marshall Day Acoustics 2019)

An attended noise survey was carried out near the site on 11 September 2019, between the hours of 2 – 3 pm. This survey was undertaken in order to make observations of the noise environment at each of the noise logger locations and carry out spot measurements for noise logger validation purposes. Ambient and background noise levels at site were measured using two noise loggers, one near the southern site boundary (Logger One), and one on the southern side of Chandos Road opposite the site at a location considered to have a noise environment that was representative of the nearest residential receiver (Logger Two) (Figure 1).

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Both noise loggers measured 24-hour noise levels at 15-minute intervals between 12 September 2019 – 25 September 2019. The measured NPfI background noise levels are summarised in Table 2.

Period	Time of Day	RBL, $L_{A90,15min}$ (dB)	$L_{Aeq,15min}$ (dB)
Day	7 am – 6 pm	41	54
Evening	6 pm – 10 pm	43	52
Night	10 pm – 7 am	41	52

Table 2. NPfI time periods and measured background noise levels summary (Marshall Day Acoustics, 2019)

Review of logger data shows noise levels patterns consistent with a city fringe semi-rural setting. During weekday periods, noise levels typically increased and decreased with regard to expected traffic, rising during the early morning, dropping in the middle of the day and steadily rising in the early evening and into the night. In general, background levels were relatively consistent during weekday periods, with levels being noticeably lower on weekends.



Fig 1. Location of noise loggers (Marshall Day Acoustics, 2019)



5. ENVIRONMENTAL IMPACTS

Noise and vibration are transmitted through air, water or ground. Noise and/or vibration emitted can be of varying frequency and intensity. Construction activities that have the potential to emit noise and vibrations include, but are not limited to:

- Fixed plant (generator sets, etc.)
- Mobile equipment (light vehicles, trucks, heavy equipment, drill rigs, etc.)
- Warning devices (sirens, reversing alarms etc.)

Noise and vibration has the potential to impact the environment by:

- Disturbing habitat (e.g. birds may avoid the site during periods of excessive noise);
- Altering soil structure (e.g. vibrations from blasting may alter fauna warrens); and
- Interfering with existing feeding and breeding behaviour (e.g. Noise at night will disturb nocturnal feeders).

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Fauna can be alarmed by sudden loud noises and may temporarily vacate the immediate area, returning to normal behaviour when the noise has ceased. Irregular loud noise is expected to have a short-term behavioural impact on fauna.

Noise emissions, in particular those with tonality, modulation or impulsiveness may lead to adverse nuisance impacts to local community, landowners and businesses.

5.1 NOISE MANAGEMENT LEVELS

Noise Affected Management Levels as defined in the Department of Environment and Climate Change's (DECC) 2009 NSW Interim Construction Noise' Guideline (ICNG) have been determined with due regard to the measurement of ambient and background noise levels.

In Table 2 of the ICNG, the Rating Background Level (RBL) is used when determining the management level by adding 10 dB to the RBL for standard hours and adding 5 dB to the RBL for non-standard hours.

The RBL is an acoustics descriptor representing the overall background noise level measured in each relevant assessment period (during or outside the recommended standard hours). Background noise is the underlying level of noise present in the area, excluding the noise source under investigation.

The term RBL is described in detail in the NSW Industrial Noise Policy (EPA 2000) and is applied here in accordance with the ICNG to assess Project noise levels.

A summary of resultant noise management levels from the EIS for all unattended noise logging locations are presented below.



Receiver type	Management level type	ICNG Management Level, dB LAeq, 15min
Residential	Noise affected*	51 (external)
Residential	Highly noise affected**	75 (external)
Commercial	All	75 (external)

* level is the point above which there may be some community reaction to noise

** level represents the point above which there may be a strong community reaction to noise

Note the below table taken from the same report which details the summary of expected noise levels through construction once this technique is applied to the model (most extreme).

Receiver	Calculated noise level, dB LAeq, 15min	Noise affected		Highly noise affected	
		Criteria LAeq, 15min	Exceedance, dB	Management level, dB LAeq, 15min	Exceedance, dB
R1	54	51	4	75	-

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Receiver	Calculated noise level, dB LAeq, 15min	Noise affected		Highly noise affected	
		Criteria LAeq, 15min	Exceedance, dB	Management level, dB LAeq,15min	Exceedance, dB
R3	48	51	-	75	-
R6	48	51	-	75	-

As stated above, even in the most extreme of modelling noise levels are still quite acceptable to proceed, the report also notes as construction is only due to take place during daytime hours the likelihood of community impact is extremely low.

5.2 PROJECT ACTIVITIES



Activities conducted on the project that have the potential to generate noise and exceed the noise criteria are provided below. Please note that 'Rp 001 R01 20190608 - Western Sydney Green Gas Project - Environmental Noise Assessment' utilised conservative (and simultaneous works) values in their modelling, the report concluded that mitigation should be taken to not undertake simultaneous works of high noise activities. As seen below these activities are staggered throughout construction.

Task Name	Duration	Start	Finish
Remove Topsoil to Storage	4 days	Tue 13/10/20	Fri 16/10/20
Import, Place, Shape and Compact Hard Stand Areas	10 days	Mon 19/10/20	Thu 29/10/20
Set Out, Drive and Cut Piles	3 days	Wed 18/11/20	Fri 20/11/20
Trench, Bed, Lay, Place Marker Tape and Backfill	4 days	Tue 24/11/20	Fri 27/11/20

5.3 NOISE INTRUSIVE EQUIPMENT

See below for noise intrusive plant and equipment, this list was utilised when developing the noise modelling by Marshall Day Acoustics.

Activity	No(s)	Equipment	Source Reference	Activity L _w dB
Trenching, lay pipeline, cover	1	Tracked excavator (20t)	BS 5228-1:2009 Table C.6:11	103
	1	Tipper lorry	BS 5228-1:2009 Table C.8:20	107
	1	Semi-trailer/delivery truck	BS 5228-1:2009 Table C.11:11	114
	1	Wheeled backhoe loader	BS 5228-1:2009 Table C.4:66	97

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Civil and foundation works for major equipment and access road.	1	Concrete mixer truck (discharging) & concrete pump (pumping)	BS 5228-1:2009 Table C.4:28	103
	1	Tracked excavator (20t)	BS 5228-1:2009 Table C.6:11	103
	1	Semi-trailer/delivery truck	BS 5228-1:2009 Table C.11:11	114
	1	Tipper lorry	BS 5228-1:2009 Table C.8:20	107
	1	Wheeled backhoe loader	BS 5228-1:2009 Table C.4:66	97
Piping, tubing and cabling between major equipment	1	Mobile telescopic crane (100t)	BS 5228-1:2009 Table C.4:41	99
	1	Telescopic handler (4t)	BS 5228-1:2009 Table C.4:54	107
	1	Semi-trailer/delivery truck	BS 5228-1:2009 Table C.11:11	114
	1	Tracked excavator (20t)	BS 5228-1:2009 Table C.6:11	103
	1	Angle grinder	BS 5228-1:2009 Table C.4:93	109

5.4 VIBRATION



Information ascertained from *'Eco Logical Australia 2019. Western Sydney Green Gas Project - Environmental Impact Statement. Prepared for Jemena Gas Networks (NSW) Limited'*, outlines that due to the distance between the development site and the closest residential receivers, *"the risk of vibration impacts is considered to be insignificant"*. As such, a vibration impact study was not conducted. However, general controls shall still be implemented as per Section 6 to reduce construction activities which cause vibration wherever possible.

6. CONTROL MEASURES

This section presents the noise and vibration management strategy that will be applied to minimise off-site noise and vibration generated by the project. All workers will be made aware of the project specific noise and vibration controls and best practice measures for minimising noise and vibration impacts through a site induction process.

This strategy includes:

- Approved hours of work; and

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- Noise and vibration mitigation measures, including key management personnel and responsibilities.

6.1 APPROVED HOURS OF WORK

The DPI&E have provided consent conditions, including work hours, for the Project. The DPI&E conditions have the following approved work hours:

- Monday to Friday: 7:00am to 6:00pm
- 8:00 am and 1:00 pm on Saturday's
- Not be undertaken at any time on Sundays or public holidays.



Written approval is required from DPI&E and EPA for extension of work hours to those shown above.

DPI&E state that works may be conducted outside of the standard working hours in the following circumstances:

- the delivery of materials as requested by the NSW Police Force or other authorities for safety reasons;
- emergency work to avoid the loss of life, property and/or material harm to the environment;
- construction works that cause LAeq (15 mins) noise levels that are:
 - no more than 5 dB(A) above the rating background level at any residence in accordance with the Interim Construction Noise Guideline (DECC, 2009), or its latest version; and
 - no more than the noise management levels specified in Table 3 of the Interim Construction noise Guideline (DECC, 2009), or its latest version, at other sensitive land uses; and
 - for continuous or impulsive vibration values, measured at the most affected residence, no more than those for human exposure to vibration, specified in Table 2.2 of Assessing vibration: a technical guideline (DEC, 2006), or its latest version; and
 - for intermittent vibration values measured at the most affected residence, no more than those for human exposure to vibration, specified in Table 2.4 of Assessing vibration: a technical guideline (DEC, 2006), or its latest version;
- where a negotiated agreement has been reached with affected receivers; or
- works as approved through the out-of-hours work protocol outlined in the Environmental Management Strategy under Schedule 4 of this consent.

6.1.1 OUT OF HOURS PROTOCOL



If tasks require completion outside the 'Hours of Operation' Jemena will be notified in order to initiate management of out-of-hour protocols as specified in DPI&E Consent Conditions (B9), appropriate supervisory personnel will be in attendance to ensure noise generation is appropriately managed or eliminated to meet noise requirements outline within the protocol.

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6.2 NOISE AND VIBRATION MITIGATION MEASURES

Controls that are to be implemented to manage noise and vibration activities are listed below and aim to reduce risk.

No.	Control measure	Responsibility	Timing
General			
1.	Sensitive receptors to noise and vibration (e.g. affected communities, fauna habitat, shall be identified on CEMP.	HSE Advisor	Pre – construction
2.	All personnel shall be inducted on the WSGGP, site environmental conditions and sensitivities identified in the EIS via Project induction, daily prestart, toolboxes and CEMP. Records shall be kept of this induction and training.	HSE Advisor	Pre – construction
3.	All plant and machinery shall be fitted with mufflers, to reduce noise.	Construction Manager/ Supervisor	Pre – construction
4.	Notify the occupants of residences within 200 metres of the site boundary and WSPT 24 to 48 hours prior to undertaking blow downs (excluding emergency works.	Jemena	Pre – construction
5.	Construction works will only occur during the following times: • Monday to Friday 7:00 am to 6:00 pm, • Saturday 8:00 am to 1:00 pm.	Construction Manager/ HSE Advisor	Ongoing
6.	Noise levels for individual items of plant and equipment brought to a site must be checked for compliance with noise regulations prior to delivery on site.	Construction Manager/ Supervisor	Pre-mobilisation
7.	Minimising engine braking on approach to site and surrounding areas	Drivers	Ongoing
8.	Staggering vehicle and truck movements to site	Construction Manager/ Supervisor	Ongoing
9.	No deliveries to site outside of approved construction hours unless required for safety reasons or undertaken in accordance with the out of hours protocol	Construction Manager/ Supervisor	Ongoing

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No.	Control measure	Responsibility	Timing
Plant and Equipment			
10.	Select equipment that is likely to result in the lowest noise impact whilst still completing the task (i.e. electric rather than diesel/air-powered)	Plant Co-ordinator/ Project Manager	Pre-mobilisation
11.	All plant and equipment shall be (a) maintained in a proper and efficient condition; (b) operated in a proper and efficient manner.	Plant Co-ordinator/ Equipment Owner	Ongoing
12.	Repair, modify or replace any unduly noisy item with a quieter item.	Plant Co-ordinator/ Equipment Owner	Ongoing
13.	Records of compliance/maintenance checks shall be maintained.	Plant Co-ordinator/HSE Advisor	Ongoing
14.	Where applicable, ensure vibration transmission to ground from fixed plant is minimised.	Construction Manager/ Supervisor	Ongoing
15.	Where practical, shut down heavy equipment when not in active use, rather than letting it idle for long periods	All Personnel	Ongoing
16.	Minimize or eliminate the use of back-up beepers during construction activities providing there is compliance with Work Health and Safety requirements.	Construction Manager/ Supervisor	Ongoing
17.	Where noise emissions from a particular piece of equipment cannot practically achieve compliance with noise emission guidelines, restrict its use and/or to locations remote from sensitive receptors.	Construction Manager/ Supervisor	Ongoing
18.	Monitor sources of noise and vibration as required.	Construction Manager/ Supervisor	As required
Complaints			
19.	Noise complaints must be recorded, reported, and investigated in accordance with Section 7.3, and any client reporting procedures.	Construction Manager/ Supervisor	As required

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No.	Control measure	Responsibility	Timing
20.	All concerns/complaints shall be resolved in a timely manner, by considering all practicable means to mitigate noise/vibration impacts, either through changes of work schedule, use of alternative construction techniques, quieting and/or relocation of key equipment or the construction of effective temporary noise barriers.	Construction Manager/ Supervisor	Ongoing

6.3 SITE INDUCTIONS

A site specific induction is a compulsory requirement for all workers on the project. The site induction consists of a visual presentation (PowerPoint slide show) along with induction questionnaires to ensure workers have understood and will abide by the project requirements. The induction includes a specific section on site working hours and the requirements to minimize noise and vibration. The induction details:



- Site working hours
- The requirement to adhere to these hours unless an exemption or permission has been granted
- The requirement for soft start procedures each morning
- The requirement to minimize noise where possible
 - Turn off machines when not required
 - Maintain plant and machinery to minimize noise
 - Where possible, avoiding dropping items from height and metal on metal contact

7. MONITORING AND REPORTING

7.1 MONITORING

It is noted that the construction of the Project would result in minor temporary exceedances (up to 4 dB) of the construction noise criteria at the closest residential receiver, based on a conservative assessment. Given separation distances to residential receivers, potential construction vibration impacts would be negligible.

Due to the modelling indicating such a minor change in background noise there is no intention to undertake any level of active noise monitoring. In the instance of a complaint being issued against the project then field readings will be undertaken in locations previously utilised by Marshall Dry Acoustics to establish the Projects base line data.

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7.2 COMMUNICATION

External communication to surrounding stakeholders will be undertaken prior to the commencement of construction works, this will include a notification of planned works and construction timelines.

In addition, activities may be undertaken outside of the hours notified in Development Consent conditions Table 1 without the approval of the Secretary in accordance with the Schedule 3 Condition 9 and only where negotiated agreement has been reached with affected receivers, this shall be communicated appropriately.



All relevant project communication will be made available to everyone on the community website <https://haveyoursay.jemena.com.au/western-sydney-green-gas-project>

7.3 COMPLAINT MANAGEMENT

Wasco will notify the Jemena Project Team immediately of any issues or complaints raised by any relevant stakeholder, so that the most consistent and up to date information is provided and a suitable resolution is reached. All complaints will be recorded by Wasco in 2018-HSS-REG-011, and the complaint record must include the following details:

- Date and time of the complaint;
- The method by which the complaint was made;
- Any personal details of the complainant which were provided by the complainant or, if no such details were provided, a note to that effect;
- The nature of the complaint;
- The action taken in relation to the complaint, including any follow-up contact with the complainant; and
- If no action was taken, the reasons why no action was taken.

The Wasco complaint investigation process shall be completed within 24 hours of the occurrence by the project team. A response/resolution to the complaint will be communicated to the Jemena Project Team and from there Jemena will follow up the complaint as required.

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7.4 INSPECTIONS

Inspections shall be conducted weekly as part of a weekly HSE site inspection in accordance with 2018-HSS-PLN-001. Standalone inspections shall also be undertaken as required if concern is raised to Wasco Project Team.

No.	Inspection Type	Responsibility	Timing
1	Weekly HSE Site Inspection	HSE Advisor	Weekly
2	HAZOB/Incident Related Inspection	Project Team	As Required

7.5 COMPLIANCE AND REVISION

Regular monitoring and reporting of Noise and Vibration Plan compliance will be conducted in conjunction with regular Project reporting.

7.6 INCIDENT NOTIFICATION

All incidents, as defined in the Development Consent, will be reported to the, Council and any other relevant government agencies immediately after it becomes aware of an incident.

In the event of any incident, unless a significant hazard continues to exist, the scene will remain undisturbed until authorisation has been received from the Project Manager in consultation with Jemena and any designated Government Authority (in the case of a fatality, the police).

As soon as practicable verbally, but within 24 hours, the Project Manager will provide a report to Jemena outlining fully all material facts and circumstances concerning the incident that the Wasco Project Management Team is aware of or is able, by reasonable search and inquiry, to find out.



Jemena shall then pass on to the relevant parties as per condition of Development Consent outlined below.

A non-compliance includes contravention of a condition of Schedules 2, 3 or 4 of the DPI&E Development Consent. Within seven days of becoming aware of a non-compliance, Jemena must notify DPI&E. The notification must identify the development (including the development application number, location and name), nature of incident, set out the condition of this consent that the development is non-compliant with, why it does not comply and the reasons for the non-compliance (if known) and what actions have been, or will be, undertaken to address the non-compliance.

Note: A non-compliance which has been notified as an incident does not need to also be notified as a non-compliance.

7.7 REPORTING



Wasco will report to Jemena and other agencies as required on noise and vibration issues related to the Project. Reporting will include:

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- Notification of works commencement (including prior to construction commencement and completion)
- Monitoring records;
- Non-compliances; and
- Project website updates and inclusion of any revision of this plan.

8. DEFINITIONS


Term	Definition
Assessment location	An identified residence or other sensitive land use
A-weighting	An adjustment made to the sound level measurement to approximate the response of the human ear
Background noise level	The underlying level of noise present in the ambient noise when extraneous noise is removed and excluding noise from the construction project under consideration. This is described using the LA90 descriptor
CEMP	Construction Environmental Management Plan
Construction works	Includes the erection, installation, alteration, repair, maintenance, excavation, dismantling or demolition of, or addition to, any building or structure, or any work in connection with any of these activities, that is done at or adjacent to the place where the building or structure is located. Construction works occur on a site for a limited period of time only
dB(A)	A measure of A-weighted sound levels
Decibel (dB)	A measure of sound equivalent to 20 times the logarithm (to base 10) of the ratio of a given sound pressure to a reference pressure, and 10 times the logarithm (to base 10) of the ratio of a given sound power to a reference power
DPI&E	NSW Department of Planning, Industry and Environment
EIS	Western Sydney Green Gas Project Environmental Impact Statement
EPA	Environment Protection Authority
EPR	Environment Protection Regulation 2005
LAeq (15 min)	The A-weighted equivalent continuous (energy average) A-weighted sound pressure level of the construction works under consideration over a 15-minute period and excludes other noise sources such as from industry, road, rail and the community. Other descriptors may be used providing they can be justified as representing the characteristics of the construction noise.

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Term	Definition
Noise	Unwanted or offending or nuisance sound to which humans and fauna are involuntarily exposed to.
Rating background level	the overall single-figure background noise level for each assessment period. Determination of the rating background level is by the method described in the NSW Industrial Noise Policy (EPA 2000). This approach aims to result in the noise management level being met for at least 90% of the time periods (15 minutes each) over which reactions of annoyance can occur.
Vibration	human comfort vibration to be measured and assessed in accordance with Assessing vibration – a technical guideline (DEC 2006).

Appendix E – Construction Air Quality Management Plan

Document Cover Sheet

 Wasco (Australia) Pty Ltd 60 Commercial Drive, Shailer Park QLD 4128, Australia	Supplier PO/Contract No:	4600009152
	Supplier Item Description:	Western Sydney Green Gas Project Construction Works
	Equipment/Tag No:	N/A

Project Name:	WSGG Project		
Supplier Document Title:	Construction Air Quality Management Plan		
Supplier Document No:	2018-PRM-PLN-003	Supplier Rev No:	0
Jemena ECMS Document No:	<i>This Section To Be Completed By Jemena</i>	Jemena Rev No:	<i>This Section To Be Completed By Jemena</i>
Jemena Aconex Document No:	P2G-2099-PA-EV-006	Total No of Pages (incl cover page)	16

Document Revision History:

Rev	Issue Date	Key Reason for Issue (as above table)	Approved By/ Signature	Company Name	Notes (if not applicable N/A)
A	19.09.20	Issued for Review	MPW	Wasco	
B	23.09.20	Issued for Review	MPW	Wasco	
0	14.10.20	Issued for Use	MPW	Wasco	

Key Reason for Issue:

IFR- Issued for Review	IFI- Issued for Information	IFU- Issued for Use
IFP- Issued for Purchase	IFC- Issued for Construction	AB- As Built





WESTERN SYDNEY GREEN GAS PROJECT



CONSTRUCTION AIR QUALITY MANAGEMENT PLAN

Document Number: 2018-ENV-PLN-003

Revision	Issue	Date	By	Check	Approve
0	Issued for Use	14.10.20	DP	AMH	MPW
B	For Client Review	23.09.20	DP	AMH	MPW
A	For Client Review	16.09.20	EE	AMH	MPW

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1. INTRODUCTION

1.1 PROJECT DESCRIPTION

The Western Sydney Green Gas (WSGG) Project involves the construction of a power to gas (P2G) hydrogen facility at the existing Jemena Horsley Park Trunk Receiving Station, located in Western Sydney. The facility will use renewable electricity to generate hydrogen, which can be injected into the natural gas network or used to generate electricity back to the grid by means of a hydrogen-powered micro-turbine or similar technology.

The Jemena Horsley Park Facility is located at 194 – 202 Chandos Road, Horsley Park (Lot 1 DP 499001 and Lot 3 DP 1002746)

1.2 PROGRAM

The current construction project timeline is presented below, the construction works are anticipated to commence in October 2020, pending approval of the required management plans. The timing presented below are indicative only and subject to change.

	Aug 20	Sep 20	Oct 20	Nov 20	Dec 20	Jan 20	Feb 20	Mar 20	Apr 20	May 21	Jun 21	Jul 21
Pre-Construction												
Construction [#]												
Commissioning [#]												
Operation and Maintenance [*]												→

Notes

[#] the phases that this management plan addresses



^{*} 5 year operation in accordance with Condition A8 of the Development Consent SSD 10313

Grey – Float

1.3 CONSTRUCTION ACTIVITIES

The construction activities to be undertaken as part of the works are summarised below:

- Completion of pre-construction documentation, inductions and establishment of site amenities and delineation of construction;
- Coordination and management of site delivery, off-loading and installation of major equipment packages (inclusive of all electrical packages);
- Completion of construction, installation, testing and commissioning of carbon steel pipelines including buffer store;
- Completion of civil, structural, piping as well as mechanical, process and electrical of the P2G Facility, including the spray sealed coating of the turning circle; and
- Completion of pre-commissioning and commissioning works.

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The works noted above will be completed works in a manner consistent with relevant laws, policies and guidelines.

1.4 PROJECT APPROVALS

The delivery of the Project is facilitated by the Development Consent SSD 10313 approved by the Minister for Planning and Public Spaces, under Part 4, Division 4.7 of the *Environmental Planning and Assessment Act 1979* and, in accordance with Section 4.38 (Approval).

1.5 PURPOSE

The purpose of this plan is to ensure all works are carried out in a manner that minimises air quality impacts on surrounding neighbours and complies with the relevant regulatory approvals, standards and procedures.

Note: This Construction Air Quality Management Plan does not address the operational and decommissioning phase of the project.

This plan should be read in conjunction with the Construction Environmental Management Plan (CEMP)

1.6 OBJECTIVES

This Plan defines management strategies to minimise the potential for and impacts from emissions to air resulting from construction activities.

This Plan does not intend to mitigate or address Health and Safety risks; these will be managed through the Health and Safety Management Plan (2018-HSS-PLN-001) and its supporting documents.



The objectives of this Plan are to:

- Minimise impacts of dust generated during construction activities
- Minimise impacts of dust generated during transport of materials
- Minimise complaints from the community in relation to dust generated from construction activities
- Minimise greenhouse gas (GHG) emissions resulting from construction activities
- To avoid and minimise air quality impacts surrounding sensitive receivers (e.g. residential properties, schools, and native vegetation) during construction
- Protect, educate, and promote environmental awareness during construction; and
- Leave a positive environmental legacy post-construction

2. STATUTORY FRAMEWORK

2.1 LEGISLATION, STANDARDS AND GUIDELINES

Commonwealth and State legislation, as well as state planning instruments relevant to the project are outlined within Jemena's *Western Sydney Green Gas Project - Environment Management Strategy* (Sep 2020).

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Legislation relevant to air quality include:



- Protection of the Environment Operations Act 1997
- Protection of the Environment Operations (General) Regulation 2009
- National Environment Protection (Ambient Air Quality) Measure

2.2 CONDITIONS OF APPROVAL

The Construction Air Quality Management Plan is a sub-plan that forms part of the overarching Construction Environmental Management Plan (CEMP) 2018-ENV-PLN-001.

This air quality management plan responds to the specific relevant requirements of the Approval Development Consent, as follows:

Condition	Requirement	Addressed
Schedule 2 – Part A – Administrative Conditions		
OPERATION OF PLANT AND EQUIPMENT		
A11	The Applicant must: ... (b) minimise the disturbance area at any time; (c) employ interim rehabilitation strategies to minimise dust generation, soil erosion and weed incursion on parts of the site that cannot yet be permanently rehabilitated; and	Section 6.1 (25)
OPERATION OF PLANT AND EQUIPMENT		
A13	The Applicant must ensure that all plant and equipment used on site, or in connection with the development, is: (a) maintained in a proper and efficient condition; and (b) operated in a proper and efficient manner.	Section 6.1 (26-33)
Schedule 3 – Part B – Environmental Conditions – General		
AMENITY		
Air		
B11	The Applicant must minimise the: (a) dust emissions of the development, including wind-blown and traffic generated dust; (b) greenhouse gas emissions of the development; (c) surface disturbance of the development; and (d) other air emissions of the development.	Section 6.1 (26-33)

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Condition	Requirement	Addressed
B12	The Applicant must ensure that no offensive odours are emitted from the development, as defined under the POEO Act.	Section 6.1 (10)
Part B Environmental Conditions – General		
COMPLIANCE		
Incident Notification		
C3	The Applicant must immediately notify the Department, Council and any other relevant agencies immediately after it becomes aware of an incident. The notification must identify the development (including the development application number and name) and set out the location and nature of the incident.	Section 7.5

3. RESPONSIBILITIES



The roles, responsibilities, of all key personnel involved in the management of air quality during construction works on the Project are summarised below.

Role	Responsibility
General Manager Systems & Facilities	Provide Wasco with advice in relation to air quality and support the Project in complying with NSW State regulations
HSE Advisor	Manage activities to assess air quality and provide training, monitoring and reporting on the day-to-day operation of the Plan, regular auditing of operations.
Construction Manager	Ensure air quality and dust control measures are implemented in accordance with this Plan.
Site Supervisors	Coordinate implementation of this Plan.
All Employees / Contractors	Responsible for minimising greenhouse gas emissions and reporting air quality and dust control issues to their immediate supervisor. Aware of the requirements to control dust and odour emissions from the site.

4. AIR QUALITY IMPACTS

Atmospheric emissions produced from construction activities are likely to include the following, but not limited to:

- Vegetation clearing and grubbing
- Bulk earthworks/ground disturbance

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- Transport, loading, and unloading of topsoil and fill from trucks
- Vehicle movements, especially on unsealed roads
- Wind erosion on cleared areas and stockpiles

Atmospheric emissions have the potential to impact the environment. Examples include but not limited to:

- Reduced visual amenity
- Odour emissions
- Dust fallout affecting flora and fauna outside the designated impact footprint
- Discharge of inhalable particulates and atmospheric pollutants
- Greenhouse gas emissions

Air emissions also create adverse impacts through generating public complaints and can lead to prosecution by the Regulator where emissions are determined to exceed prescribed levels.

5. SITE CONDITION

5.1 EXISTING CONDITIONS



The below information is an extract from 'Eco Logical Australia 2019. Western Sydney Green Gas Project - Environmental Impact Statement. Prepared for Jemena Gas Networks (NSW) Limited' which was supplied to Wasco as part of the project documentation.

5.1.1 CLIMATE

The monthly and annual climate statistics between the years 1997-2019 for the Horsley Park Equestrian Centre AWS 067119 monitoring station (approximately 2.2 km south of the proposal site) is outlined in Table 1.

Month	Mean Maximum Temperature (°C)	Mean Minimum Temperature (°C)	Daily Wind Run (km)	Mean Rainfall (mm)	Mean Number of Days of Rain ≥ 1 mm
January	30.1	17.9	212	75.6	7.6
February	28.9	17.8	204	103.6	7.1
March	26.9	16.2	177	83.3	8.0
April	23.9	13.0	174	70.3	6.8
May	20.6	9.0	157	41.9	5.0
June	17.6	7.2	174	74.7	6.3
July	17.4	5.8	177	35.2	5.0
August	19.0	6.4	198	36.8	4.0
September	22.4	9.3	211	35.1	4.9
October	24.7	11.8	202	58.8	5.8
November	26.4	14.4	215	78.6	7.0
December	28.4	16.3	211	66.4	7.1
Annual	23.9	12.1	193	757.3	74.6

Table 1 Climate data from the Horsley Park Equestrian Centre AWS (Benbow Environmental 2019)

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5.1.2 SEASONAL WIND TRENDS

Between the years 2014-2018, winds mostly arrive at the proposal site from the south west (16-20% of the time). Winds arrive at the proposal site from other directions less than 12% of the time, with wind blowing from the east and north east less than 8% of the time. The average wind speed between 2014 and 2018 was 2.07 m/s and the calms frequency was 19% (Benbow Environmental 2019).

5.1.3 TERRAIN AND STRUCTURAL EFFECT ON DISPERSION

Although there are small ridges to the west and east of the proposal site, katabatic flow is unlikely to affect emissions as there is sufficient distance and northerly directions of the site are relatively flat (Benbow Environmental 2019).

5.1.4 LOCAL AIR QUALITY



Ambient air quality data for NO_x, PM₁₀ and PM_{2.5} from the nearest air quality monitoring station, located in William Lawson Park, Myrtle Street (approximately 6 km south of the proposal site) obtained for 2007- 2018 are outlined in Table 2.

Year	NO Average (mg/m ³)	No2 Average (ppb)	PM ₁₀ Average (mg/m ³)	PM _{2.5} Average (mg/m ³)
2007	N/A	N/A	0.018	N/A
2008	N/A	N/A	0.018	N/A
2009	N/A	20.70	0.026	N/A
2010	N/A	22.58	0.015	N/A
2011	N/A	18.82	0.016	N/A
2012	N/A	18.82	0.017	N/A
2013	N/A	20.70	0.019	N/A
2014	N/A	18.82	0.018	N/A
2015	N/A	20.70	0.018	0.0082
2016	9.82	18.82	0.019	0.0087
2017	9.82	18.82	0.019	0.0077
2018	8.59	16.93	0.022	0.0085
2007-2018	9.45	19.57	0.019	0.0083

Table 2 Summary of ambient air quality from Prospect Air Quality Monitoring Station (Benbow Environmental 2019)

6. CONTROL MEASURES



This section presents the strategy that will be applied to minimise air quality impacts by the project. All workers will be made aware of the project specific controls and best practice measures for minimising air quality impacts through a site induction process.

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6.1 AIR QUALITY MITIGATION MEASURES

Controls that are to be implemented to manage air quality are listed below and aim to reduce risk.



No.	Control Measure	Responsibility	Timing
General			
1.	Mobile plant movements shall be restricted to designated routes. Plant / machinery shall be turned off when not in use.	All	At all times
2.	No burning permitted on-site.	All	At all times
3.	All cleared vegetation shall be windrowed on site.	Construction Manager/Supervisor	At all times
4.	Control the emission of smoke, dust, fumes, and other pollution into the atmosphere in accordance with State legislation and regulations.	All	At all times
5.	Minimise or avoid dust-generating activities in dry and windy conditions	Construction Manager/Supervisor	At all times
6.	Use geo-textiles, hessian, or mulched vegetation on localised areas to minimise dust emissions	Construction Manager/Supervisor	As required
7.	Deep rip smooth surfaces and leave areas rough and cloddy to reduce wind velocity	Construction Manager/Supervisor	As required
8.	Ensure all dust control devices are maintained according to manufacturer's requirements.	Construction Manager/Supervisor	At all times
9.	Ensure all effluent is removed promptly by an authorised carrier	Construction Manager/Supervisor	As required
10.	Ensure odour causing sources are frequently and promptly managed to mitigate odour pollution from site	Construction Manager/Supervisor	As required
Stockpiles and Spoil			
11.	Soils shall be stockpiled only when necessary and for short durations. Stockpile heights shall be kept to less than 3m. Stockpiles which have potential to give rise to windblown dust shall be wetted, covered, or other methods to reduce the likelihood of wind blown dust being generated.	Construction Manager/Supervisor	At all times
12.	Locate stockpiles away from waterways, drainage lines and residences	Construction Manager/Supervisor	At all times

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13.	Minimize the handling of stockpiles, number of stockpiles and the time of exposure	Construction Manager/Supervisor	At all times
14.	Topsoil stockpiles with slopes preferably no greater than 6:1 (horizontal: vertical)	Construction Manager/Supervisor	At all times
15.	Topsoil shall be stockpiled separately and in stockpiles no higher than 3 metres	Construction Manager/Supervisor	At all times
16.	Ensure all construction related stockpiles are regularly watered to prevent dust emissions during high wind conditions. If stockpiles are to be maintained for longer than 28 days, other management options including covering or hydroseeding may be investigated to prevent dust erosion from these long-term stockpiles. Stockpiled materials e.g. sand, aggregate, cut material, shall be stabilised to reduce dust generation	Construction Manager/Supervisor	As required
Dust Emissions			
17.	Clearing shall be conducted in a staged manner to limit exposed areas.	Construction Manager/Supervisor	As required
18.	Loose, uncovered areas of soil shall be stabilised as soon as possible following clearing.	Construction Manager/Supervisor	As required
19.	Any disturbed areas no longer required shall be rehabilitated, as soon as practicable, to promote soil stability and prevent dust generation.	Construction Manager/Supervisor	As required
20.	Weather forecasts shall be examined to identify when conditions may contribute to dust emissions.	Construction Manager/Supervisor	As required
21.	Vehicle speeds shall be restricted to minimise dust generation.	Construction Manager/Supervisor	At all times
22.	Dust suppression techniques shall be employed where material cannot be stabilised e.g. water carts, sprays, dust guards, wind breaks or covers.	Construction Manager/Supervisor	At all times
23.	When using water to suppress dust for construction, ensure it does not create run off that may contaminate surface waters	Construction Manager/Supervisor	At all times
24.	Visually monitor dust levels surrounding construction sites to determine effectiveness of dust suppression measures.	Construction Manager/Supervisor	At all times

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25.	Throughout construction, areas should be progressively rehabilitated to assist in the mitigation of dust generation. Temporary measures should also be taken in areas which cannot be fully rehabilitated in conjunction with 2018-ENV-PLN-002	Construction Manager/Supervisor	At all times
Plant and Equipment			
26.	Vehicles, plant and equipment shall be regularly maintained, and pre-start checks conducted.	All	Ongoing
27.	All vehicles and plant in operation shall be fitted with emission control devices and not left idling un-necessarily.	Plant Co-ordinator	Prior to mobilisation
28.	Vehicles and equipment shall be regularly inspected for faults and excessive emissions.	All Personnel	Ongoing
29.	All plant and equipment not functioning normally (with respect to emissions – e.g. excessive smoke) shall be taken out of service immediately and/or repaired.	All Personnel	Ongoing
30.	All machinery shall be maintained as per the manufacturer's guidelines. Particular care shall be taken to ensure that all filters/emission control devices are replaced within the specified time.	Plant Co-ordinator	Ongoing
31.	Vehicle journeys shall be optimised to reduce fuel consumption and emissions where possible or practicable.	All Personnel	Ongoing
32.	A register of vehicles and equipment and a log of fuel used for all vehicles and equipment for the duration of the contract shall be maintained for GHG reporting purposes.	HSE Advisor	Ongoing
Movement of Materials offsite			
33.	Trucks shall be kept clean to ensure that loose material being dislodged during road transport is minimised. If necessary, a "cattle grid" may be installed prior to the truck exiting a work or construction site to assist the removal of loose material.	Construction Manager/Supervisor	Ongoing
34.	Loads shall be covered wherever possible to ensure that materials do not generate dust whilst being transported.	Construction Manager/Supervisor	Ongoing

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Monitoring Records			
35.	The site shall be continually visually monitored for excessive dust generation	Construction Manager/Supervisor	Ongoing
36.	Following any nuisance dust complaint, a visual inspection of the area shall be undertaken and investigated.	Construction Manager/HSE Advisor	As required
37.	Any air quality issues shall be recorded on the Environmental Inspection Checklist.	Construction Manager/HSE Advisor	Daily/Weekly
38.	As required, air quality monitoring may be undertaken to investigate any ongoing complaints relating to environmental nuisance caused by construction dust and/or particulate matter. Monitoring may be carried out at a place(s) relevant to the potentially affected dust sensitive receptor.	Construction Manager/HSE Advisor	As required
Reporting			
39.	All complaints / incidents regarding dust shall be reported and investigated in accordance with the Incident Management Procedure.	All	As required
40.	All complaints shall be recorded in [2018-HSS-REG-011_A_Complaints Register]	Construction Manager/HSE Advisor	As required
41.	All concerns/complaints shall be resolved in a timely manner, by considering all practicable means to mitigate air quality impacts.	Construction Manager/HSE Advisor	As required

6.2 SITE INDUCTIONS

All Wasco employees and sub-contractors engaged to work, as part of the project, will attend the project specific safety induction before commencing on site work. This induction will be reviewed and updated to suit the changing project conditions.



All personnel shall be required to sign and acknowledge that they have been inducted into the site and understand the requirements of the project.

All licenses and certificates of competency held must be sighted.

The induction process will include an assessment indicating that the inducted employee has gained a suitable understanding of their responsibilities, project hazards and control measures.

Points of the Wasco project induction will include but not be limited to:

- Objectives of the project.
- Emergency Response Procedures/Muster points
- Pre-start & Toolbox meetings.

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- Project safety rules
- 12 Non-Compromising Rules
- Smoking policy
- Policies
- Safe Work Method Statements
- Personal Protective Equipment requirements
- Environmental concerns and activities
- Hazard and Incident Reporting
- Identification & management of hazardous substances
- Specific Working Procedures
- Basic HSE rules
- The requirement to minimize GHGs where possible
 - Turn off vehicles and plant machines when not required
 - Maintain plant and machinery to minimize GHGs

7. MONITORING AND REPORTING

7.1 MONITORING

Visual monitoring shall be undertaken daily by the project team to ensure aforementioned control measures are adhered to. Aspects of onsite inductions will also ensure personnel working within the site are trained to take notice of potential gaps in control measure continuity.

7.2 COMMUNICATION

External communication to surrounding stakeholders will be undertaken prior to the commencement of construction works, this will include a notification of planned works and construction timelines.



In addition, activities may be undertaken outside of the hours notified in Development Consent conditions Table 1 without the approval of the Secretary in accordance with the Schedule 3 Condition 9 and only where negotiated agreement has been reached with affected receivers, this shall be communicated appropriately.

All relevant project communication will be made available to everyone on the community website <https://haveyoursay.jemena.com.au/western-sydney-green-gas-project>

7.3 COMPLAINT MANAGEMENT

Wasco will notify the Jemena Project Team immediately of any issues or complaints raised by any relevant stakeholder, so that the most consistent and up to date information is provided and a suitable resolution is reached. All complaints will be recorded by Wasco, and the complaint record must include the following details:

- Date and time of the complaint;
- The method by which the complaint was made;
- Any personal details of the complainant which were provided by the complainant or, if no such details were provided, a note to that effect;

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- The nature of the complaint;
- The action taken in relation to the complaint, including any follow-up contact with the complainant; and
- If no action was taken, the reasons why no action was taken.

The Wasco complaint investigation process shall be completed within 24 hours of the occurrence by the project team. A response/resolution to the complaint will be communicated to the Jemena Project Team and from there Jemena will follow up the complaint as required.

7.4 INSPECTIONS

Inspections shall be conducted weekly as part of a weekly HSE site inspection in accordance with 2018-HSS-PLN-001. Standalone inspections shall also be undertaken as required if concern is raised to Wasco Project Team.

No.	Inspection Type	Responsibility	Timing
1	Weekly HSE Site Inspection	HSE Advisor	Weekly
2	HAZOB/Incident Related Inspection	Project Team	As Required

7.5 INCIDENT NOTIFICATION

All incidents, as defined in the Development Consent, will be reported to the, Council and any other relevant government agencies immediately after it becomes aware of an incident.



In the event of any incident, unless a significant hazard continues to exist, the scene will remain undisturbed until authorisation has been received from the Project Manager in consultation with Jemena and any designated Government Authority (in the case of a fatality, the police).

As soon as practicable verbally, but within 24 hours, the Project Manager will provide a report to Jemena outlining fully all material facts and circumstances concerning the incident that the Wasco Project Management Team is aware of or is able, by reasonable search and inquiry, to find out.

Jemena shall then pass on to the relevant parties as per condition of Development Consent outlined below.

A non-compliance includes contravention of a condition of Schedules 2, 3 or 4 of the DPI&E Development Consent. Within seven days of becoming aware of a non-compliance, Jemena must notify DPI&E. The notification must identify the development (including the development application number, location and name), nature of incident, set out the condition of this consent that the development is non-compliant with, why it does not comply and the reasons for the non-compliance (if known) and what actions have been, or will be, undertaken to address the non-compliance.

Note: A non-compliance which has been notified as an incident does not need to also be notified as a non-compliance.

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7.6 REPORTING

Wasco will report to Jemena and other agencies as required on air quality issues related to the Project. Reporting will include:


- Notification of works commencement (including prior to construction commencement and completion)
- Monitoring records;
- Non-compliances; and
- Project website updates and inclusion of any revision of this plan.

8. DEFINITIONS

Term	Definition
Atmospheric Emissions	Any emissions to air, for any period of time, for solid, liquid or gaseous matter e.g. dust, greenhouse gases, primary air pollutants.
Dust	Generic term used to describe fine particles that are suspended in the atmosphere. This term is non-specific with respect to the size, shape and chemical make-up of the particles.
Greenhouse gases (GHG)	Components of the atmosphere that contribute to the greenhouse effect. These include Carbon Dioxide (CO ₂), Methane (CH ₄) Sulfur hexafluoride (SF ₆) and Nitrous Oxide (N ₂ O).
NGERS	National Greenhouse and Energy Reporting scheme
Primary air pollutants	Gaseous emissions containing toxic gases, often produced by burning fossil fuels (e.g. diesel). Examples include Oxides of Nitrogen (NO _x), Oxides of sulfur (SO _x), Hydrogen Sulfide (H ₂ S), Volatile Organic Compounds (e.g. Hydrocarbons) and Carbon Monoxide.

Appendix F – Erosion and Sediment Control Plan

Document Cover Sheet

 Wasco (Australia) Pty Ltd 60 Commercial Drive, Shailer Park QLD 4128, Australia	Supplier PO/Contract No:	4600009152
	Supplier Item Description:	Western Sydney Green Gas Project Construction Works
	Equipment/Tag No:	N/A

Project Name:	WSGG Project		
Supplier Document Title:	Erosion and Sediment Control Plan		
Supplier Document No:	2018-PRM-PLN-002	Supplier Rev No:	2
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Jemena Aconex Document No:	P2G-2099-PA-EV-002	Total No of Pages (incl cover page)	25

Document Revision History:

Rev	Issue Date	Key Reason for Issue (as above table)	Approved By/ Signature	Company Name	Notes (if not applicable N/A)
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B	18.09.20	Issued for Review	MPW	Wasco	
C	23.09.20	Issued for Review	MPW	Wasco	
0	25.09.20	Issued for Use	MPW	Wasco	
1	16.10.20	Issued for Use	MPW	Wasco	
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Key Reason for Issue:


IFR- Issued for Review	IFI- Issued for Information	IFU- Issued for Use
IFP- Issued for Purchase	IFC- Issued for Construction	AB- As Built



WESTERN SYDNEY GREEN GAS PROJECT

EROSION AND SEDIMENT CONTROL PLAN

Document Number			2018-ENV-PLN-002		
Revision	Issue	Date	By	Check	Approve
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1. INTRODUCTION

1.1 PROJECT DESCRIPTION

The Western Sydney Green Gas (WSGG) Project involves the construction of a power to gas (P2G) hydrogen facility at the existing Jemena Horsley Park Trunk Receiving Station, located in Western Sydney. The facility will use renewable electricity to generate hydrogen, which can be injected into the natural gas network or used to generate electricity back to the grid by means of a hydrogen-powered micro-turbine or similar technology.

The Jemena Horsley Park Facility is located at 194 – 202 Chandos Road, Horsley Park (Lot 1 DP 499001 and Lot 3 DP 1002746)

1.2 PROGRAM

The current construction project timeline is presented below, the construction works are anticipated to commence in October 2020, pending approval of the required management plans. The timing presented below are indicative only and subject to change.

	Aug 20	Sep 20	Oct 20	Nov 20	Dec 20	Jan 20	Feb 20	Mar 20	Apr 20	May 21	Jun 21	Jul 21
Pre-Construction												
Construction [#]												
Commissioning [#]												
Operation and Maintenance [*]												→

Notes

[#] the phases that this management plan addresses

^{*} 5 year operation in accordance with Condition A8 of the Development Consent SSD 10313

Grey – Float

1.3 CONSTRUCTION ACTIVITIES

The construction activities to be undertaken as part of the works are summarised below:

- Completion of pre-construction documentation, inductions and establishment of site amenities and delineation of construction;
- Coordination and management of site delivery, off-loading and installation of major equipment packages (inclusive of all electrical packages);
- Completion of construction, installation, testing and commissioning of carbon steel pipelines including buffer store;
- Completion of civil, structural, piping as well as mechanical, process and electrical of the P2G Facility, including the spray sealed coating of the turning circle; and

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- Completion of pre-commissioning and commissioning works.

The works noted above will be completed works in a manner consistent with relevant laws, policies and guidelines.

The construction works will commence following approval of all relevant pre-construction deliverables in accordance with the Project Approvals. Figure 1 below shows a proposed construction layout.

1.4 PROJECT APPROVALS

The delivery of the Project is facilitated by the Development Consent SSD 10313 approved by the Minister for Planning and Public Spaces, under Part 4, Division 4.7 of the *Environmental Planning and Assessment Act 1979* and, in accordance with Section 4.38 (Approval).

1.5 PURPOSE

The purpose of this Construction Erosion and Sediment Control Plan (ESCP) is to describe the stormwater management control mechanisms to be implemented during the construction of Jemena Gas Networks (NSW) Limited's (JGN) Western Sydney Green Gas Project (the Project).

Note: This Erosion and Sediment Control Plan does not address the operational and decommissioning phase of the project.

This plan should be read in conjunction with the Construction Environmental Management Plan (CEMP).

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Figure 1 WSGGP P2G Site 194 to 202 Chandos Road, Horsley Park.



1.6 OBJECTIVES

Wasco is committed to environmental protection through ^{Site Access} erosion and sediment control. All of Wasco's activities are conducted in accordance with State and Federal Legislation coupled with the Wasco Workplace Health & Safety Policy and the Wasco Environmental Policy.

The key overarching objective of this plan is to demonstrate how to minimise erosion and sedimentation arising from construction activities and retain sediment on the site by concentrating efforts to prevent erosion. With respect to the process of erosion and sediment control management, objectives are to:

- Prevent the loss of the soil resources from the site.

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- Promotion of sustainable use of the resource.
- Control of sediment into creeks, rivers, and lakes.
- That the biodiversity values of the locality be maintained and enhanced.
- Identify construction activities with the potential to cause erosion and generate sediment.
- Define the best practice Erosion and Sediment Control (ESC) principles which will guide all ESC activities on site.
- Outline monitoring, inspection, and maintenance requirements.
- Plan ahead for current activities and wet weather events;
- To maintain the land use capabilities of disturbed areas with respect to land's soil, water, and vegetation attributes

2. STATUTORY AND PLANNING FRAMEWORK

2.1 LEGISLATION, STANDARDS AND GUIDELINES

Commonwealth and State legislation, as well as state planning instruments relevant to the project are outlined within Jemena's *Western Sydney Green Gas Project - Environment Management Strategy* (Sep 2020).

Legislation, Standards and Guidelines relevant to this plan include:

- Protection of the Environment Operations Act 1997
- Protection of the Environment Operations (General) Regulation 2009
- National Environment Protection (Ambient Air Quality) Measure
- Managing Urban Stormwater: Soils and Construction (Landcom, 2004)
- NSW Office of Environment & Heritage, Erosion and sediment control on unsealed tracks
- DECC, 2008, Managing Urban Stormwater, Soils and construction, Volume 2A Installation of services, Department of Environment and Climate Change (NSW).

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2.2 CONDITIONS OF APPROVAL

The Approval conditions relevant to the this plan are presented in the table below. This ESCP responds to the specific relevant requirements of the approval Development Consent, as follows:

Condition	Requirement	Addressed
Schedule 2 – Part A – Administrative Conditions		
DEMOLITION AND REHABILITATION		
A11	<p>The Applicant must:</p> <p>(a) rehabilitate the site progressively, as soon as reasonably practicable following disturbance;</p> <p>(b) minimise the disturbance area at any time;</p> <p>(c) employ interim rehabilitation strategies to minimise dust generation, soil erosion and weed incursion on parts of the site that cannot yet be permanently rehabilitated; and</p> <p>.....</p>	Section 8.2
Schedule 3 – Part B - Environmental Conditions – General		
SOIL AND WATER		
Operating Conditions		
B15	<p>The Applicant must:</p> <p>(a) ensure that the development does not cause any water pollution, as defined under section 120 of the POEO Act;</p> <p>.....</p> <p>(c) minimise any soil erosion associated with the construction of the development in accordance with the relevant requirements in the Managing Urban Stormwater: Soils and Construction (Landcom, 2004) manual, or its latest version.</p>	This Document
Part B Environmental Conditions – General		
ENVIRONMENTAL MANAGEMENT		
Environmental Management Strategy		
C1(f)	- stormwater management including erosion and sediment controls during construction; and	This document
COMPLIANCE		
Incident Notification		
C3	<p>The Applicant must immediately notify the Department, Council and any other relevant agencies immediately after it becomes aware of an incident. The notification must identify the development (including the development application number and name) and set out the location and nature of the incident.</p>	Section 11.3

3. SITE DESCRIPTION

3.1 CLIMATE

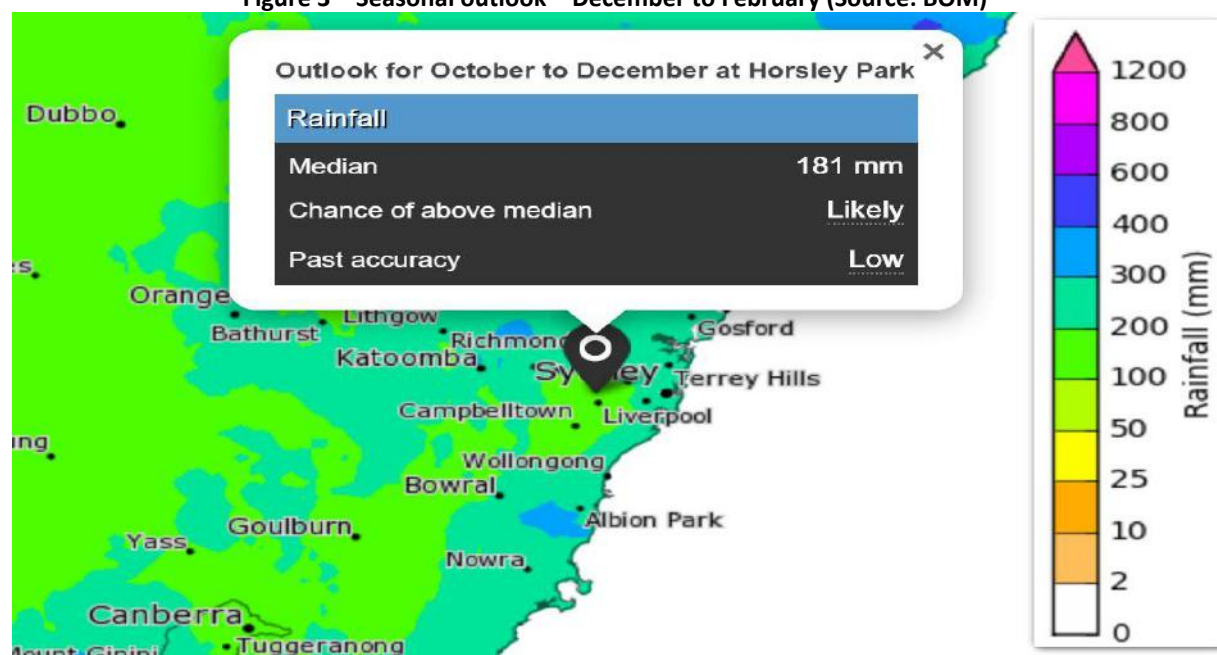
Historically, the project area receives the majority of annual rainfall between November and March, with the majority of falls in February. The historical rainfall from 1997 to 2019 for the region is presented below in Figure 2.

Figure 2 – Historic mean rainfall (source: Benbow Environmental 2019)

Month	Mean Maximum Temperature (°C)	Mean Minimum Temperature (°C)	Daily Wind Run (km)	Mean Rainfall (mm)	Mean Number of Days of Rain ≥ 1 mm
January	30.1	17.9	212	75.6	7.6
February	28.9	17.8	204	103.6	7.1
March	26.9	16.2	177	83.3	8.0
April	23.9	13.0	174	70.3	6.8
May	20.6	9.0	157	41.9	5.0
June	17.6	7.2	174	74.7	6.3
July	17.4	5.8	177	35.2	5.0
August	19.0	6.4	198	36.8	4.0
September	22.4	9.3	211	35.1	4.9
October	24.7	11.8	202	58.8	5.8
November	26.4	14.4	215	78.6	7.0
December	28.4	16.3	211	66.4	7.1
Annual	23.9	12.1	193	757.3	74.6

The seasonal outlook for October to December (refer Figure 3) indicates the median rainfall for the region is 181mm with the forecast indicating rainfall between 100mm and 200mm as illustrated in Figure 3.

Figure 3 – Seasonal outlook – December to February (Source: BOM)



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3.2 TOPOGRPAHY

The project has been divided into a single catchment and the topography assessed for each section of the project. The topography varies from 62 to 66m being relatively flat with a grade of 3 to 4%. The slope assessment has been utilised in the erosion risk assessment, as detailed in **Section 4**.

Figure 4 WSGGP Topography Map



3.3 DRAINAGE AND FLOODING

Flood mapping sourced from Fairfield City Council and the Rural Area Flood Study (BMT WBM, 2013), identify all waterway locations which may intersect the WSGGP site. The site (in red) is just east, and outside of the designated Low Flood Risk Precinct as determined in the Fairfield Flood Planning Map. Overland flow will be managed as required and referenced by the below stormwater flow survey which indicates the flow travels east of then behind site into the creek easement.

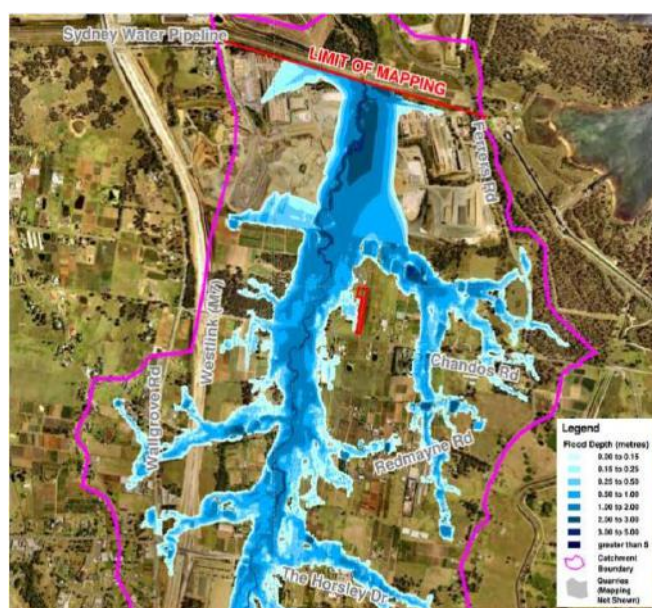


Fig 5A – Eastern Creek, Peak Maximum Flood Extent

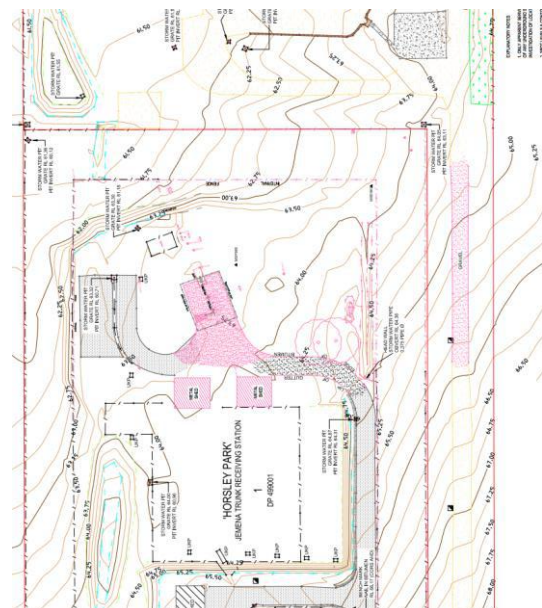


Fig. 5B Detail & Contours 'Horsley Park' Excerpt

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3.4 SOILS

3.4.1 FIELD SURVEY

Wasco has based initial implementation strategies off the Alliance Geotechnical Report October 2018. Where soils or project areas are not consistent with the report, soil testing may be undertaken in accordance with International Erosion Control Association IECA (2015).

Geotechnical investigations completed by Alliance Geotechnical (Oct 2018) in an assessment of the Jemena Gas Networks Trunk Receiving Station Facility identified a thin layer of topsoil with underlying clay, with a medium to high plasticity at 0.7-1.6m depth, overlying extremely low to very low strength shale.

3.4.2 SOIL MANAGEMENT

All soils will be stripped and stockpiled separately. The topsoil should consist approximately of the first 100mm of soil, with the exact depth determined on site, according to depth conditions.

Soil management for reinstatement is further discussed in Section 9.

Given the nature and properties of subsoils in the region, a focus should be on minimising the duration and extent of subsoil exposure during construction activities (i.e. minimising rainfall and overland flows contacting exposed portions of the cleared Right of Way (RoW) for pipeline area). Management of construction sequencing to achieve the above will result in a far superior outcome (both environmentally and financially) coupled with installing downslope sediment control measures in an attempt to retain a portion of mobilised sediment whilst areas are exposed. Just as critical will be reinstating surface cover and vegetation as soon as possible following construction activities.

4. EROSION RISK ASSESSMENT

An erosion risk assessment has been conducted using the Revised Universal Soil Loss Equation (RUSLE) to estimate soil loss rates along the project. Based on estimated soil loss rates, erosion risk can be assigned, and the level of sediment and erosion control management applied relevant to the varying risk.

$$A = K \times R \times LS \times P \times C$$

Where:

- A is the predicted soil loss per hectare per year
- K is the soil erodibility factor
- R is the rainfall erosivity factor
- LS is the slope length/gradient factor
- P is the erosion control practice factor
- C is the ground cover and management factor

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4.1.1 K-FACTOR – SOILS

Considering the description provided, a conservative K factor value of 0.038 has been adopted above that typically provided for sandy-clay Table 19 of *App C Managing Urban Stormwater: Soils and Construction Volume 1, 4th Edition, March 2004*.

Table 19 Penrith Soil Landscapes

Soil landscape	Common constraints	Slope range	Soil hydrologic group	Acid sulfate risk	USCS class	K- factor	Sediment type	Sediment basin wall construction (earth)
Agnes Banks (ab)	high wind and soil erosion hazards; non cohesive soils with low fertility, high permeability and seasonally high watertables	0-5	Group A	no A-S data available for this sheet	na	na	Type C	I
Bakers Lagoon (ba) (bi)	high watertables plastic soils	0-5	not applicable		OL CL	0.051 0.043	Type D Type D	J D
Berkshire Park (bp) (bp)	impermeable waterlogged subsoils, low fertility	0-5	Group C		CL	0.048	Type F	A
Blackdown (bt)	soils poorly drained with low fertility, localised high plasticity and expansive subsoils	0-5	Group C		ML/CL CL CL	na 0.038 na	Type F Type D Type D	B G G
Burralow Swamp (bs)	high flooding hazard, seasonally high watertable, soils with high permeability and low fertility	0-10	Group B		SP SC	0.023 0.011	Type C Type C	J J
Faulconbridge (fb) (fb)	shallow, highly permeable soils with low fertility; rock outcrop	0-5	Group D		SM CL	ft 0.035	Type C Type D	J A
Freemans Reach (fr)	high flooding and streambank erosion hazards; soils with high permeability and low fertility	0-5	Group B/C		ML CL-ML CL	0.046 0.038 0.025	Type F Type F Type D	A B A
Gymea (gy)	shallow highly permeable soils with very low fertility; rock outcrop; localised steep slopes with high soil erosion hazard	10-25	Group C/D		SM SC CL	0.022 0.034 0.032	Type C Type F Type D	B&I C A
Hawkesbury (ha)	high soil erosion and mass movement hazard; steep slope, rock outcrop, shallow stony highly permeable soils with low fertility	>25	Group D		SC SC	na 0.033	Type C Type F	C C
Hazelwood (hw)	high mass movement and sheet erosion hazards; soil with high permeability, high erodibility and low fertility	>60	Group B		SM CL	0.035 0.034	Type C Type F	J A
Kurrajong (kg)	localised mass movement hazard; localised waterlogging; localised steep slopes; some soils shallow and expansive	>10	Group C		CL	0.033	Type D	B
Lucas Heights (lh)	stony soil, low soil fertility, low available water capacity	0-10	Group C/D		SM SC CL	0.053 0.042 0.024	Type C Type D Type F	B&I B A
Luddenham (lu)	moderately expansive, low wet strength, localised impermeable and highly plastic subsoils	5-20	Group C		CL CL CL	0.038 na na	Type D Type F Type D	B A A
Picton (pn)	high mass movement hazard; low permeability; low fertility; localised high expansion	>20	Group C		CL CL	na 0.034	Type D Type D	D B
Richmond (ri)	high soil erosion hazard (particularly at terrace edges) and localised flooding hazards; localised salinity	0-1	Group C		CL	0.059	Type F	A
South Creek (sc)	high flooding hazard; localised permanently high watertables; low fertility; localised salinity	0-5	Group C/D		CL	0.05	Type F	A
Upper Castlereagh (up)	very high soil erosion hazard; dispersible, impermeable soil layers	0-5	Group C/D		SC CL	na 0.032	Type D Type F	D D
Volcanic (vo)	moderately expansive soils with low wet strength, high soil erosion and mass movement hazards on steep slopes	5-60	Group C/D		CL	0.029	Type F	B
Warragamba (wb)	very high mass movement and soil erosion hazards; steep slopes, highly permeable soils with low fertility	>35	Group C		SM SC	0.036 0.032	Type C Type D	J B
Woodlands (wl)	soils with low fertility and low water holding capacity	0-10	Group B/D		CL CL	0.029 na	Type F Type F	C B

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4.1.2 R- FACTOR – RAINFALL

An annual erosivity factor of 2500 has been adopted for site, extrapolated from MUSSC App B Map 10.

4.1.3 LS - SLOPE-LENGTH

Slopes vary between flat and 4% throughout the project. To minimise the potential soil loss, cross drainage will need to be installed at specified intervals to minimise the potential for rill erosion. The Ls factors adopted for the project has been determined based on installation of this cross-drainage. If cross-drainage is not installed, the sediment control or erosion control requirements for the site will increase from that provided in this report.

4.1.4 EROSION CONTROL PRACTICE (P) FACTORS

Default factors of .9 has been adopted for across the site, in accordance with App A, Table A2 MUSSC. The construction activities will involve the movement of heavy machinery across the site up and down the slope.

4.1.5 ESTIMATED SOIL LOSS

The resulting soil loss calculated using RUSLE is 26t/ha/yr. with cross drainage installed indicating a very low to low erosion risk.

5. SEDIMENT CONTROL

Sediment control on pipeline and facility projects is largely focused on the following:

- Retention or treatment of 'dirty' water runoff generated within the RoW/cleared area
- Managing vehicle exit points from the pipeline RoW/cleared area
- Integration of sediment control attributes into the drainage/erosion control practices installed at drainage lines.

5.1.1 NOMINATED SEDIMENT CONTROLS

An assessment of the disturbance area, erosion risk rating and spatial constraints has been undertaken in identifying suitable sediment controls. Control type and locations are presented on the ESC standard arrangement drawings in Appendix A.

Noting the low grade and short slope lengths, sediment fencing aligning with the disturbed area with rock sediment basins at each discharge point are nominated as the primary sediment controls.

The attached ESCP drawing in Appendix A notes key location points of the sediment fencing and discharge points. During ground truthing adjustments may be required which shall be noted on the drawing during construction.

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6. DRAINAGE CONTROL

Drainage control considers three main principles; diverting external flow before it enters site, directing site runoff to an appropriate sediment control, and ensuring runoff is conveyed in a non-erosive manner.

Typically, the above principles are achieved by forming diversion bunds (vegetation/topsoil) along the upslope portion of the RoW and diversion bunds (trench/pad spoil) along the downslope edge of disturbance. Depending on construction constraints the bunding may consist of vegetation, topsoil or subsoil on either side of the RoW. External flows should be conveyed across the RoW at existing drainage points which should be appropriately managed.

6.1 DRAINAGE CONTROL REQUIREMENTS

Reference to Table P22 of International Erosion Control Association guidelines IECA (2015) indicates the following drainage control standard for the disturbance area:

- Vegetation/Topsoil windrows as Flow Diversion Banks
- For low risk - drainage controls are designed for a 4-EY (four exceedances per year) storm event
- For moderate risk - drainage controls (excluding those across the RoW such as contour berms) are designed for at least a 1-year ARI storm.

6.1.1 LONGITUDINAL DRAINAGE

Achieved by windrows or bunds along the upslope and downslope edge of disturbance.

Within 50 m of waterways, and 25m of drainage lines or where slopes exceed 2 % longitudinally, the windrows should be lined with jute/geotextile along the flow path to limit mobilisation of sediment. The 2% limit has been determined based on a 1-year ARI drainage design standard and a maximum drainage catchment of 0.5 ha (200m of RoW length) in lowly erodible soils. Where soils are highly erodible or where drainage catchments exceed 0.5 ha and 2%, lining will be required.

6.1.2 STORMWATER ASSETS

The site has a stormwater asset which directly links to the Eastern Creek. Due to the high risk of sediment entering a waterway through this drain extra precautions need to take place.

The stormwater ingress point lies on the edge of the pipeline trench entering the facility and thus the distance of drain to disturbed soil will necessarily be minimal.

Due to this high risk, ground truthing will be required to assess the area and ensure that adequate controls are implemented. As per the ESCP drawing the drain will need to have a rock basin surrounding it with a sediment fence surrounding the rock basin.

Where practicable all sediment controls along the pipeline RoW will need to be angled such that all run off is directed away from the drain ingress point.

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6.1.3 CROSS DRAINAGE

As required existing drainage lines and/or temporary concentrated flow paths conveying runoff across the RoW will be managed by lining the RoW with sediment fencing. Due to the facilities pad being upstream of the drainage slope the downstream edge of the facilities pad will be edged with sediment fencing terminating in a rock basin. This is deemed sufficient due to the low grade and short slope length.

7. EROSION CONTROL

In pipeline construction, erosion control practices are typically restricted to the effective management of clearing/disturbance works and site rehabilitation activities (IECA, 2015). Given the narrow width of the pipeline RoW it is usually impractical to employ general erosion control practices during the construction phase, unless warranted by erosion risk.

The key to effective 'erosion control' is to:

- minimise the extent and duration of soil disturbance during periods when significant rainfall is possible, and
- promptly cover exposed soils once the construction phase has been completed.

Topsoil stripping and reinstatement requirements are presented in Section 8.

7.1 EROSION CONTROL REQUIREMENTS

7.1.1 BEST PRACTICE REQUIREMENTS

Reference to Table P23 of IECA (2015) indicates no specific erosion controls required other than normal best practice. Based on a low erosion risk during the nominated construction period. Normal best practice erosion control requirements would include:

- Appropriate management of work programming and the scheduling of forward works with the aim of minimising the erosion risk
- Control of soil erosion at drainage lines caused by run-on water passing through (across) the RoW (associated with 'drainage control' measures)
- Control of soil erosion at vehicle crossings of drainage lines
- Minimising the extent of vegetation and soil disturbance at drainage lines
- Erosion control practices during site reinstatement.

7.2 NOMINATED EROSION CONTROLS

The primary erosion control measure for the facilities construction pad is management of construction activities to minimise the cross flow of surface water. The erection of downstream sediment fencing terminating in a rock basin is deemed sufficient.

The primary erosion control measure for the RoW is management and scheduling of construction activities to minimise the extent and duration of clearing prior to pipe installation and commencement of reinstatement. Given the nominated timing for the project and generally low erosion risks the extent of physical erosion controls measures (i.e. not management or scheduling) is limited to:

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- Stabilisation of vehicle crossings at drainage lines.
- Installation of erosion controls around the facilities pad during construction activities.
- Appropriate erosion control techniques for reinstatement of drainage lines.

7.2.1 LAND CLEARING

- The timing of soil disturbances along the pipeline RoW, laydown pad and facilities pad is critical. Establish exclusion zones to prevent over-disturbance and restrict stripping to approved areas only.
- Land clearing should proceed just ahead of the pipe installation, laydown pad and facilities pad construction so as to minimise the duration of soil exposure to rainfall.

8. REINSTATEMENT PLAN

8.1 REQUIREMENTS

The re-establishment of surface cover on disturbed soils is a fundamental component of reducing the risk of erosion and offsite sediment and turbid water release. Table 9 summarises the best practice timing, per IECA (2015) for execution of rehabilitation works based on erosion risk parameters and proximity to sensitive receiving environments. The timeframes within Table 9 should not be considered mandatory.

Best practice timeframes for reinstatement and rehabilitation works

PARAMETER	MAXIMUM DELAY BEFORE START OF SITE STABILISATION ¹	MAXIMUM DAYS TO ACHIEVE SOIL COVERAGE ^{2,3}
General works - Low Risk	10	50
General works - Moderate Risk	10	30
Identified Good Quality Agricultural Land (GQAL)	10	30
Works within 50 m of an ephemeral watercourse. Works less than 200 m upstream of a cultural heritage site, regional ecosystem, or organic farm.	10	10
Works within the banks of a watercourse that is likely to experience flow within the stabilisation period. Works within 100 m of a watercourse.	5	5

¹ Maximum ~~days~~ following completion of pipe laying and trenching or construction works before ~~stabilisation~~ and rehabilitation works commence.

² Maximum days following completion of pipe laying and ~~trenching~~ or construction works before the ~~stabilised~~ area achieves the specified soil cover.

³ Soil cover may consist of organic or rock mulch, synthetic blankets, vegetation or combination thereof, as appropriate for the area.

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8.2 REINSTATEMENT WORKS

Throughout construction, areas should be progressively reinstated to assist in the mitigation of dust generation, soil erosion and weed incursion. Temporary measures should also be taken in areas which cannot be fully rehabilitated.

Reinstatement works should address the specific conditions onsite which may impact the long term stability of soils and vegetation. A key criteria of reinstatement planning is to assess whole of life cost for incorporating temporary measures to protect soil surfaces and assist in establishment of suitable ground cover quickly following construction. It is intended that the reinstatement measures outlined will achieve the reinstatement requirements and objectives at the lowest overall cost, considering preparation, establishment and maintenance.

8.3 HAZARDS AND CONTROLS

Hazards	Control Methods	Construction Phase
<ul style="list-style-type: none"> • Soil erosion and sediment release to land and water. • Potential modification to surface water flows (drainage lines and streams). 	<ul style="list-style-type: none"> • Environmental risk management methods shall be implemented from the environmental management plan (2018-ENV-PLN-001_Construction Environmental Management Plan). • Pre-construction environmental assessments including photographs and GPS references shall be undertaken as required - for use as pre-construction baseline information, (Dilapidation Survey). • Adequate plant and equipment should be maintained to ensure rehabilitation is completed adequately 	During Planning/Pre-works
<ul style="list-style-type: none"> • Potential for site run-off into drainage lines and watercourses. • Potential for contamination of land / water. • Generation of hazardous (liquid /water) waste. • Temporary disruption to landowners (water logging). • Potential impacts to visual and aesthetic amenity 	<ul style="list-style-type: none"> • Environmental risk management methods shall be implemented from the environmental management plan (2018-ENV-PLN-001_Construction Environmental Management Plan). • Compaction relief shall be undertaken, as required, by ripping or scarifying soils along the contours. • The pipeline corridor should be re-profiled to original or stable contours, re-establishing surface drainage lines and other land features. • Where topsoil has been removed, it should be re-spread. If clean topsoil needs to be imported where there are insufficient stockpiles, biosecurity measures shall be applied to imported topsoil as per Jemena's instruction. • Erosion and sediment control measures shall be installed as per this Erosion and Sediment Control Plan to manage the disturbed area whilst revegetation occurs. • Onsite stockpiling of excavated material will be minimised (EIS Table 33 - SES04) • Area of disturbance will be limited to strictly necessary to minimise potential erosion (EIS Table 33 - SES01) 	During Earthworks

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Hazards	Control Methods	Construction Phase
	<ul style="list-style-type: none"> • All stockpiles of loose and erodible materials will be provided with suitable controls, for example sediment fencing or filter socks, to prevent erosion (EIS Table 33 - SES05) • If groundwater seepage is encountered during excavation or piling, sump and pump methods for management of groundwater will be required. Alternatively, tremie concrete placement method may be adopted for concrete placement if required (EIS Table 33 - SES10) • If groundwater is encountered during construction, the Jemena PM should be notified before proceeding • All efforts will be taken to schedule works outside of predicted heavy rain periods (EIS Table 33 - SES07) • Weather forecasts will be checked daily to ensure that works are not carried out before or during high rainfall (EIS Table 33 - WQ025) • Ongoing review of control measures • Pre/post rainfall monitoring and audits • Incident reporting • Monitoring will be undertaken as per Section 11 and damaged controls will be fixed immediately 	
	<ul style="list-style-type: none"> • Environmental risk management methods shall be implemented from the environmental management plan (2018-ENV-PLN-001_Construction Environmental Management Plan). • Third party, stock and wildlife access to newly reinstated areas should be excluded where possible, to allow for establishment of seed and plant stock sufficient for area stabilisation. • Third party, stock and wildlife access to above-ground infrastructure, such as valves or scraper stations, shall be controlled by installing barriers (e.g. fencing). • Flagging used to identify sensitive environmental features (e.g. natural and cultural heritage), shall be removed and disposed of at the completion of construction in order to avoid drawing attention to sites. • Ongoing review of control measures • Pre/post rainfall monitoring and audits • Incident reporting 	During Reinstatement

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9. ROLES AND RESPONSIBILITIES

Please refer to below summary and Project Execution Plan 1902_PRN_PLN_001

Element	Project Manager	Construction Manager	HSE Advisor	Site Project Engineer	Earthworks Supervisor	All personnel (WAPL)
ESC Procedure is implemented, and confirming understanding by construction personnel of Procedure	X		X			
ESC Plan, including drawings, to be present and approved before disturbance			X	X		
Access points to be assigned and rumble strips installed as required		X				
Design of any Sediment Basins to be in accordance with IECA requirements		X	X	X		
Stage works to reduce erosion potential		X			X	
ESC measures to be installed prior to clearing or within 24 hrs of start		X	X		X	
ESC controls to be in place prior to disturbance if rain predicted		X			X	
Appropriate controls to be used in diversion channels (sandbags, matting, etc)			X	X	X	
Stormwater to be directed to catchments using swales, berms, contours, etc				X	X	
Vehicle movement restricted to approved areas and tracks				X	X	
Controls regularly inspected and repaired when 60% capacity breached			X	X	X	
Minimise length of flow paths and low gradients.			X	X	X	
Inlet and outlet energy dissipators to be used (filter rolls, sandbags, rock)			X	X	X	
Direct runoff around areas where contaminants are stored			X	X	X	
Drains cut to promote water to existing drainage lines				X	X	
Contour banks on slopes prone to erosion				X	X	
Keep topsoil stockpiles to 2m and away from drainage lines, watercourses		X	X	X	X	
Washdown of plant on purpose-built facilities for sediment capture		X	X			
Remove sediment from external roads as soon as possible		X	X			
Watering roads for dust suppression to be done to minimise runoff				X	X	
Stockpiles > 1 month to be covered, roughened or compacted			X	X	X	
Sediment controls to be downslope from stockpiles			X	X	X	
Use stabilisation products as required		X		X	X	
Communicate to construction (during the site walk through) areas of problematic soils on site		X	X			
Develop (in consultation with construction) the ESC Site Environmental Plans for each construction phase			X	X		
Release of collected runoff to be in accordance with DA conditions			X			
For floccing, use gypsum to remove excess sediment			X	X	X	
Silt curtains should be considered for works close to permanent waterways		X	X			
If potential disturbance to waterways, works:		X				

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Element	Project Manager	Construction Manager	HSE Advisor	Site Project Engineer	Earthworks Supervisor	All personnel (WAPL)
<ul style="list-style-type: none"> Must only be undertaken where necessary for the authorised petroleum activities Must be no greater than the minimum area necessary for the purpose of the significant disturbance Must be designed and undertaken by a qualified & experienced person 						
Upon cessation of works, commence rehab as soon as is practicable		X	X			
Responsible to uphold the General Environmental Duty and undertake works in accordance with all contractual and legislative requirements.			X			X

10. EMPLOYEE SELECTION, TRAINING AND QUALIFICATIONS

Project Employee Selection, Induction and Training are defined in the Health Safety Management Plan 2018-HSS-PLN-001.

The Wasco Project Management Team has the responsibility for ensuring all employees have the necessary skills and knowledge to fulfil the requirements of their positions including any environmental responsibilities. A training register of personnel qualifications including inductions and operators permits or licences will be maintained.

Personnel involved in the development of ESCP and installation or maintenance of ESC must be suitably competent in understanding:

- Requirements of and how to interpret an ESCP.
- IECA specifications.
- Managing Urban Stormwater Soils and Construction
- Correct installation, maintenance and operation and ESC measures.
- Spill Response and Management

11. MONITORING AND REPORTING

11.1 MONITORING

ESCPs are considered live documents that in some instances require review and updating as site conditions change, or if the adopted measures fail to achieve the required treatment standard.

When a site inspection detects a notable failure in the adopted ESC measures, the source of this failure must be reported, investigated using the normal incident reporting process' and appropriate amendments made to the site and if required the ESCP, in the form of 'redline' mark-ups.

The following should be read in conjunction with the Project (CEMP)

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Best practice site management requires all ESC measures to be inspected at the following frequencies and include the following checks as a minimum, any damaged controls will be fixed immediately:

Daily site inspections (during rainfall)

- All drainage, erosion and sediment control measures
- Occurrences of excessive sediment deposition (whether on-site or off-site)
- All site discharge points (including dewatering activities as appropriate)

Weekly site inspections (even if work is not occurring on-site)

- All drainage, erosion and sediment control measures
- Occurrences of excessive sediment deposition (whether on-site or off-site)
- Occurrences of construction materials, litter or sediment placed, deposited, washed or blown from the site, including deposition by vehicular movements
- Litter and waste receptors
- Oil, fuel and chemical storage facilities

Prior to anticipated runoff producing rainfall (within 24 hours of expected rainfall)

- All drainage, erosion and sediment control measures
- All temporary flow diversion and drainage works

Following runoff producing rainfall (within 18 hours of rainfall event)

- All drainage, erosion and sediment control measures
- Occurrences of excessive sediment deposition (whether on-site or off-site)
- Occurrences of construction materials, litter or sediment placed, deposited, washed or blown from the site, including deposition by vehicular movements

11.2 INSPECTIONS

Weekly Environmental Site Inspection checklist (2018-ENV-CHK-001) will be completed by the Construction Manager or delegate. This form will be kept onsite and recorded in the HSE register folder.

The Project performance data will be incorporated into the Monthly Progress reports submitted to the Wasco Project Manager and Jemena, summarising:

- Erosion and sediment control activities including inspections;
- Erosion and sediment control documents (check list, procedures etc) developed or reviewed;
- Summary of environmental incidents or non-compliances;
- Fauna data;
- Weed management strategies and wash-downs;
- Extent of trench open and inspected; and
- Areas of concern.

The Project HSE advisor will have overall responsibility for the timely submission of complete and accurate reports.

11.3 INCIDENT NOTIFICATION

Jemena, as the proponent for the Project, is required to report certain events to the EPA and DPI&E as soon as possible after an event occurs. In the event of a reportable incident, the Project Manager

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will report the required information to Jemena's Representative. Incidents shall be reported within 24 hours, in accordance with Jemena's requirements. Jemena will then communicate the incident to the EPA and DPI&E. A copy of all documented incidents will be retained at the site project office and within project archives for a minimum period of 5 years.

11.4 REPORTING

Wasco will report to Jemena and other agencies as required on issues related to the Project, all reporting required to be completed in accordance with the Development Conditions will be reported in accordance with the CEMP requirements these include:

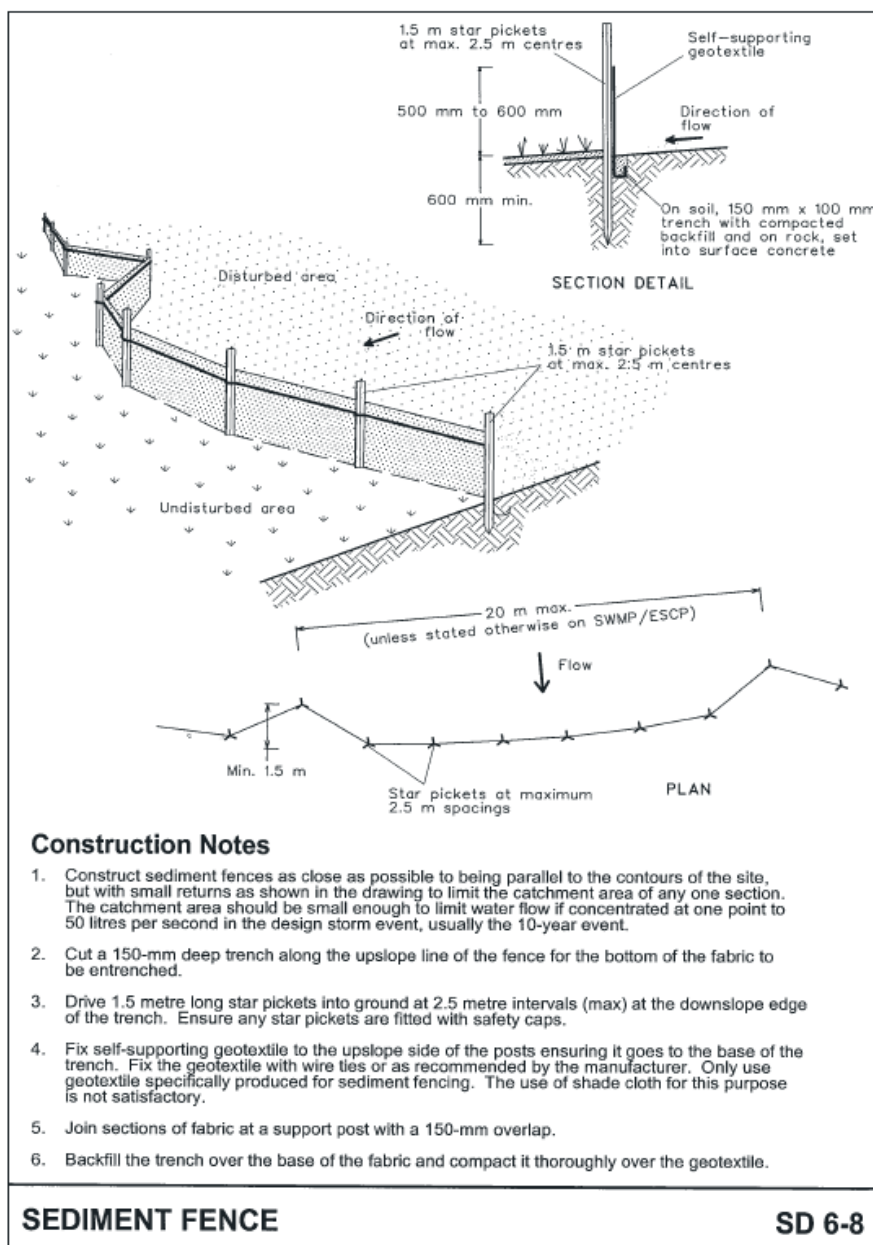
- Incidents
- Non-compliance

Reporting provided to Jemena relating to the ECSP will include the following:

- Weekly checklists (2018-HSS-FRM-001_Environmental checklist); and
- Any revision of this plan.

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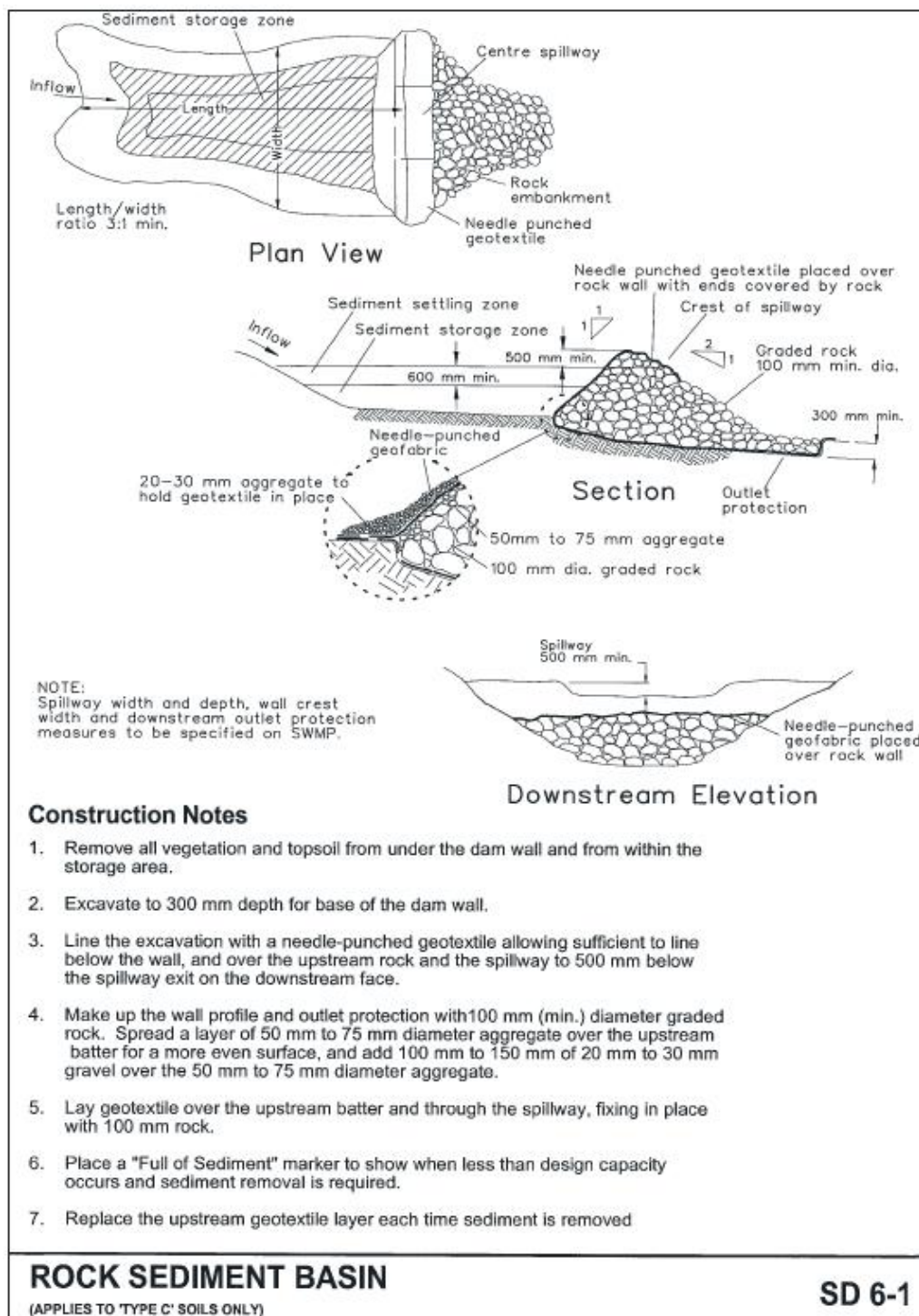
Appendix 1 - Sediment Fence



Managing Urban Stormwater: Soils and Construction Vol 1 (2004)

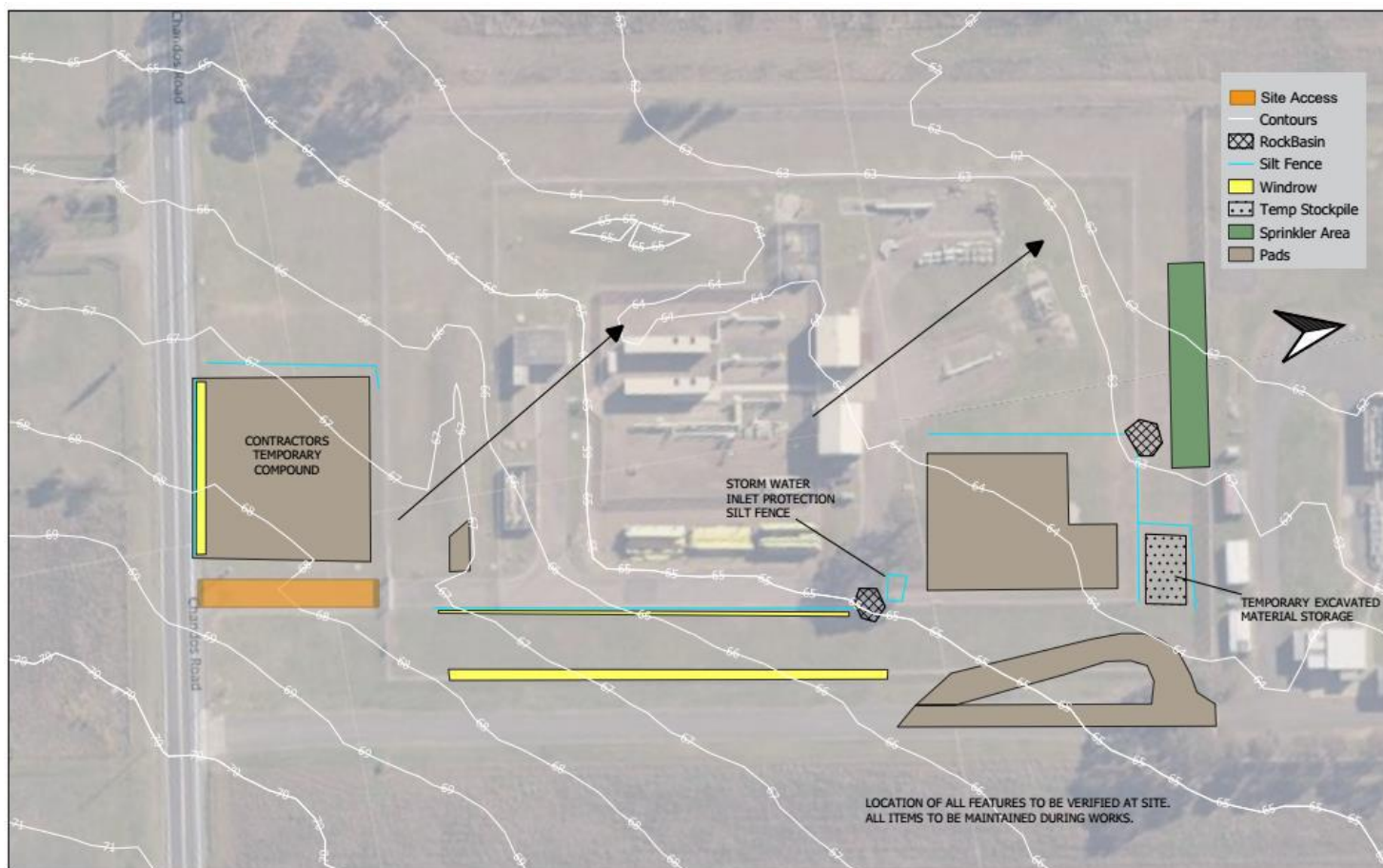
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Appendix 2 - Standard Drawing Rock Sediment Basin




Managing Urban Stormwater: Soils and Construction Vol 1 (2004)

Appendix 3 - ESC Feature Layout



Appendix G – Cultural Heritage Management Plan

Document Cover Sheet

 Wasco (Australia) Pty Ltd 60 Commercial Drive, Shailer Park QLD 4128, Australia	Supplier PO/Contract No:	4600009152
	Supplier Item Description:	Western Sydney Green Gas Project Construction Works
	Equipment/Tag No:	N/A

Project Name:	WSGG Project		
Supplier Document Title:	Cultural Heritage Management Plan		
Supplier Document No:	2018-PRM-PLN-005	Supplier Rev No:	0
Jemena ECMS Document No:	<i>This Section To Be Completed By Jemena</i>	Jemena Rev No:	<i>This Section To Be Completed By Jemena</i>
Jemena Aconex Document No:	P2G-2099-PA-EV-008	Total No of Pages (incl cover page)	15

Document Revision History:

Rev	Issue Date	Key Reason for Issue (as above table)	Approved By/ Signature	Company Name	Notes (if not applicable N/A)
A	16.09.20	Issued for Review	MPW	Wasco	
B	20.09.20	Issued for Review	MPW	Wasco	
C	23.09.20	Issued for Review	MPW	Wasco	
0	16.10.20	Issued for Use	MPW	Wasco	

Key Reason for Issue:

IFR- Issued for Review	IFI- Issued for Information	IFU- Issued for Use
IFP- Issued for Purchase	IFC- Issued for Construction	AB- As Built





WESTERN SYDNEY GREEN GAS PROJECT



CULTURAL HERITAGE MANAGEMENT PLAN

Document Number: 2018-HSS-PLN-005

Revision	Issue	Date	By	Check	Approve
0	Issued for Use	15.10.20	DP	AMH	MPW
C	For Client Review	23.09.20	DP	AMH	MPW
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1. INTRODUCTION

1.1 PROJECT DESCRIPTION

The Western Sydney Green Gas (WSGG) Project involves the construction of a power to gas (P2G) hydrogen facility at the existing Jemena Horsley Park Trunk Receiving Station, located in Western Sydney. The facility will use renewable electricity to generate hydrogen, which can be injected into the natural gas network or used to generate electricity back to the grid by means of a hydrogen-powered micro-turbine or similar technology.

The Jemena Horsley Park Facility is located at 194 – 202 Chandos Road, Horsley Park (Lot 1 DP 499001 and Lot 3 DP 1002746)

1.2 PROGRAM

The current construction project timeline is presented below, the construction works are anticipated to commence in October 2020, pending approval of the required management plans. The timing presented below are indicative only and subject to change.

	Aug 20	Sep 20	Oct 20	Nov 20	Dec 20	Jan 20	Feb 20	Mar 20	Apr 20	May 21	Jun 21	Jul 21
Pre-Construction												
Construction [#]												
Commissioning [#]												
Operation and Maintenance [*]												→

Notes

[#] the phases that this management plan addresses



^{*} 5 year operation in accordance with Condition A8 of the Development Consent SSD 10313

Grey – Float

1.3 CONSTRUCTION ACTIVITIES

The construction activities to be undertaken as part of the works are summarised below:

- Completion of pre-construction documentation, inductions and establishment of site amenities and delineation of construction;
- Coordination and management of site delivery, off-loading and installation of major equipment packages (inclusive of all electrical packages);
- Completion of construction, installation, testing and commissioning of carbon steel pipelines including buffer store;
- Completion of civil, structural, piping as well as mechanical, process and electrical of the P2G Facility, including the spray sealed coating of the turning circle; and
- Completion of pre-commissioning and commissioning works.

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The works noted above will be completed works in a manner consistent with relevant laws, policies and guidelines.

1.4 PROJECT APPROVALS

The delivery of the Project is facilitated by the Development Consent SSD 10313 approved by the Minister for Planning and Public Spaces, under Part 4, Division 4.7 of the *Environmental Planning and Assessment Act 1979* and, in accordance with Section 4.38 (Approval).

1.5 PURPOSE

The purpose of this Plan is to adopt best practice in the management of both Aboriginal and Non-Aboriginal Heritage, ensuring any item, site or relic of heritage significance is protected and recorded. Compliance with all relevant legislation and mitigation measures is outlined in Section 6.

Note: This Cultural Heritage Management Plan does not address the operational and decommissioning phase of the project.

This plan should be read in conjunction with the Construction Environmental Management Plan (CEMP) SCOPE and Objectives

1.6 OBJECTIVES

This Plan applies to all work associated with the construction phase of the project. There is potential for Aboriginal and Non-Aboriginal heritage sites to be discovered during construction works (both Identified and unidentified sites). Any cultural values or heritage material encountered during ground disturbance works shall be managed in accordance with this Plan.

The objectives of this Plan are to:



- Avoid and/or minimise impacts on Aboriginal and Non-Aboriginal Heritage sites
- Ensure best management procedures are followed
- Manage impacts on known and previously unrecorded sites where impacts are unavoidable
- Obtain all necessary approvals and adhere to permit conditions, where disturbance is unavoidable
- Protect, educate, and promote environmental awareness
- Leave a positive environmental legacy post-construction

2. STATUTORY FRAMEWORK

2.1 LEGISLATION, STANDARDS AND GUIDELINES

Commonwealth and State legislation, as well as state planning instruments relevant to the project are outlined within Jemena's *Western Sydney Green Gas Project - Environment Management Strategy* (Sep 2020).

Heritage items are protected by NSW State and Federal legislation. It is an offence to damage Aboriginal places or objects except where a permit or approval has been granted. Penalties apply for breaches and all staff and contractors can be personally liable. Where heritage items are known to

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occur, all reasonable steps must be taken to avoid impacts. Any permit, approval or environmental assessment must be incorporated into the project risk assessment.

Legislation relevant to cultural heritage include:

- National Parks and Wildlife Act 1974 NSW
- Heritage Act 1977 NSW



In addition the Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales applies for the works.

2.2 CONDITIONS OF APPROVAL

The Cultural Heritage Management Plan is a sub-plan that forms part of the overarching Construction Environmental Management Plan (CEMP) 2018-ENV-PLN-001.

This cultural heritage management plan responds to the specific relevant requirements of the Approval Development Consent, as follows:

Condition	Requirement	Addressed
Schedule 2 – Part A – Administrative Conditions		
OPERATION OF PLANT AND EQUIPMENT		
A11	The Applicant must: ... (b) minimise the disturbance area at any time;	Section 6.1 (3,4)
Schedule 3 – Part B – Environmental Conditions – General		
HERITAGE		
Protection of Heritage Items		
B11	The Applicant must ensure the development does not cause any direct or indirect impacts on heritage items located outside the approved development footprint.	Section 6.1
B12	If historical and/or Aboriginal archaeological heritage items are unexpectedly discovered during construction of the development, all works must cease, and a suitably qualified and experienced archaeologist be brought in to assess the find. Depending on the nature of the discovery, additional assessment, recording and management measures may be required prior to the recommencement of works in the affected area. Heritage NSW and/or members of the relevant Local Aboriginal Land Council must be notified of this discovery in writing.	Section 6.1 (5-13) Section 6.2
Part B Environmental Conditions – General		

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Condition	Requirement	Addressed
COMPLIANCE		
Incident Notification		
C3	The Applicant must immediately notify the Department, Council and any other relevant agencies immediately after it becomes aware of an incident. The notification must identify the development (including the development application number and name) and set out the location and nature of the incident.	Section 7.5

3. RESPONSIBILITIES



The roles, responsibilities, of all key personnel involved in the management of cultural heritage during construction works on the Project are summarised below.

Role	Responsibility
General Manager Systems & Facilities	Provide WASCO with advice in relation to heritage management and support the Project in complying with NSW State regulations.
HSE Advisor	Provide training in this Plan, monitoring and reporting on the day-to-day operation of this Plan, regular auditing and updating the Plan.
Construction Manager / Site Supervisors	<ul style="list-style-type: none"> Ensure all measures are implemented as per requirements detailed in this Plan and included in the project risk register, plans and induction. Where there is an unexpected find of a heritage item ensure that the Plan is followed including any notification.
Construction Manager/ Site Supervisors	Coordinate implementation of this Plan on site.
All Employees and Contractors	Ensure awareness of any sites adjacent to the works, minimise risk and report issues to their immediate supervisor.

4. CULTURAL HERITAGE IMPACTS

Disturbance can lead to a loss of cultural heritage, loss of visual amenity, community outrage and fines from regulators.

Aboriginal heritage items may include stone artefact scatters, rock shelters, scarred trees, rock engravings, carvings and rubbing grooves as found on rocks. They may also include material deposited on land such as middens and ancestral remains of Aboriginal people.

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Non-Aboriginal heritage items may include ruins, historic settlement areas, road markers, bridges or buildings that have aesthetic, archaeological, architectural, cultural, historical, scientific, or social significance.

While the development of an area may destroy the scientific values of the cultural heritage values of an area, the historic and social significance may remain as those values may relate to place rather than just the objects that are there. Indirect impacts and the context of cultural heritage values within a landscape must also be considered.

5. EXISTING CONDITIONS

The below information is an extract from *'Eco Logical Australia 2019. Western Sydney Green Gas Project - Environmental Impact Statement. Prepared for Jemena Gas Networks (NSW) Limited'* which was supplied to Wasco as part of the project documentation.

5.1 ABORIGINAL HERITAGE – EXISTING ENVIRONMENT

The AHIMS is a database maintained by DPIE and regulated under Section 90Q of the NPW Act. AHIMS holds information and records regarding the registered Aboriginal archaeological sites (Aboriginal objects, as defined under the Act) and declared Aboriginal places that exist in NSW.



An extensive search of the AHIMS database was conducted on 9 September 2019 to identify if any registered Aboriginal sites were present within, or adjacent to, the study area.

The AHIMS database search was conducted within the following lot/coordinates:

- Lat, Long From: -33.8484, 150.8364
- Lat, Long To: -33.8124, 150.8936
- Buffer: 200m

The AHIMS search identified 61 Aboriginal sites recorded in or near the proposal site and no Aboriginal places.

An Aboriginal Due Diligence was undertaken by Biosis Pty Ltd in 2014 in accordance with the requirements of the Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales (DECCW 2010) for the same study area, although for different proposed works. As the previous report covered impacts to the entire lot, the conclusions and recommendations presented within it are relevant to the current study. The report stated that the study area was generally located within an area of high archaeological potential for Aboriginal sites, as it is within 100 m of Eastern Creek. The level of potential for intact archaeological deposits was downgraded to low due to the high-level ground disturbance from the installation of the existing gas meter station and associated infrastructure.

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5.2 HISTORIC HERITAGE – EXISTING ENVIRONMENT

Searches were made of the following heritage databases on 9 September 2019 in order to determine if any places of historical significance are located within or in proximity to the study area. Databases searched included:

- World Heritage List
- National Heritage List
- Commonwealth Heritage List
- NSW State Heritage Register
- NSW State Heritage Inventory
- Section 170 Registers
- Fairfield Local Environmental Plan (2013)

The results of the searches indicated that there are no known items of historical heritage significance located within or in proximity to the study area (Figure 22 of the EIS). There is no archaeological potential for relics within the proposed study area as soils within the area have been heavily disturbed by subsequent agricultural and construction activities.



6. CONTROL MEASURES

This section presents the strategy that will be applied to minimise cultural heritage impacts by the project. All workers will be made aware of the project specific controls and best practice measures for minimising air quality impacts through a site induction process.



6.1 CULTURAL HERITAGE PROTECTION MEASURES

Controls that are to be implemented to manage cultural heritage are listed below and aim to reduce risk.

No.	Control measure	Responsibility	Timing
Planning			
1.	All employees and subcontractors must undertake a Heritage Induction (part of the Project Induction) prior to the commencement of works. The project induction must detail the contingency measures for the discovery of Aboriginal and non-Aboriginal heritage sites as described in the CHA	All	Prior to work commencing on site
2.	Work crew induction, prestart and toolbox on these to raise awareness of sensitivities and requirements to avoid impact. All contractors undertaking earthworks will be briefed on the protection of Aboriginal heritage objects under the National Parks and Wildlife Act 1974 and the penalties for damage to these items	Construction Manager/HSE Advisor	Prior to work commencing on site
3.	Ensure clearing of soil and vegetation is kept to a minimum where possible.	Construction Manager/HSE Advisor	During construction

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4.	Ensure that all vehicle and equipment movement is kept within approved designated land disturbance areas.	Construction Manager/HSE Advisor	During construction
Protocol to be followed in the event that previously unrecorded or unanticipated Aboriginal or non-Aboriginal archaeological material (objects, artefacts, deposits or relics) are encountered			
5.	All ground surface disturbance in the area should cease immediately if the finds are uncovered. a) The discoverer of the find(s) will notify machinery operators in the immediate vicinity of the find(s) so that work can be halted; and b) Fence off area with suitable markers (star pickets, flagging or barrier mesh) c) Inform site supervisor and Jemena Project Manager and Environment Representative.	All Personnel	At all times
6.	If there is substantial doubt regarding a human or Aboriginal or historical European origin for the finds, then An archaeologist will be engaged to determine the significance of the find and if required, the notification, consultation and approval requirements. Heritage NSW and/or members of the relevant Local Aboriginal Land Council must be notified of this discovery in writing	Construction Manager/HSE Advisor	At all times
7.	Facilitate, in co-operation with the appropriate authorities and stakeholders.	Construction Manager/HSE Advisor	As required
8.	Where the find(s) are determined to have cultural heritage value according to the criteria specified in the Heritage Act 1977, any re-commencement of construction related ground surface disturbance may only resume in the area of the find(s) following compliance with any consequential legal requirements and gaining written approval from Jemena and the NSW Heritage Council.	Construction Manager/HSE Advisor	As required
Protocol to be followed in the event that suspected human remains are encountered			
9.	All ground surface disturbance in the area of the finds should cease immediately the finds are uncovered. a) The discoverer of the find(s) will notify machinery operators in the immediate vicinity of the find(s) so that work can be temporarily halted; and b) Fence off area with suitable markers (star pickets, flagging or barrier mesh) c) Inform site supervisor and Jemena Project Manager and Environment Representative.	All	At all times

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10.	If there is substantial doubt regarding a human or Aboriginal or historical European origin for the finds, then An archaeologist will be engaged to determine the significance of the find and if required, the notification, consultation and approval requirements. Heritage NSW and/or members of the relevant Local Aboriginal Land Council must be notified of this discovery in writing	Construction Manager/HSE Advisor	As required
11.	Immediately notify the following people of the discovery: a) The local Police (this is required by law) b) The Jemena Site Representative; Note: If human remains are suspected to be Aboriginal it shall be the responsibility of Jemena to contact the BCD to assist with determining appropriate management.	Construction Manager/HSE Advisor	As required
12.	Facilitate the evaluation of the find(s) by the statutory authorities and comply with any stated requirements. Depending on the evaluation of the find(s), the management of the find(s) and their location may become a matter for the Police and/or Coroner.	Construction Manager/HSE Advisor	As required
13.	Construction related works in the area of the find(s) may not resume until the development proponent (Jemena) receives written approval from the relevant statutory authority: from the Police or Coroner in the event of an investigation; and from the NSW Heritage Council in the case of human remains outside of the jurisdiction of the Police or Coroner.	Construction Manager/HSE Advisor	As required

6.2 SITE INDUCTIONS

All Wasco employees and sub-contractors engaged to work, as part of the project, will attend the project specific safety induction before commencing on site work. This induction will be reviewed and updated to suit the changing project conditions. All personnel shall be required to sign and acknowledge that they have been inducted into the site and understand the requirements of the project. The induction process will include an assessment indicating that the inducted employee has gained a suitable understanding of their responsibilities, project hazards and control measures.

Points of the Wasco project induction will include but not be limited to:

- Objectives of the project.
- Emergency Response Procedures/Muster points
- Pre-start & Toolbox meetings.
- Project safety rules
- 12 Non-Compromising Rules
- Smoking policy
- Policies
- Safe Work Method Statements
- Personal Protective Equipment requirements
- Environmental concerns and activities

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- Cultural heritage awareness
 - Protocol if item is located
 - Awareness if disturbing ground
 - Requirements to avoid impact
 - NPW Act and the penalties for damage to Aboriginal items
- Basic HSE rules

7. MONITORING AND REPORTING

7.1 MONITORING

Visual monitoring shall be undertaken daily by the project team to ensure aforementioned control measures are adhered to. Aspects of onsite inductions will also ensure personnel working within the site are trained to take notice of potential gaps in control measure continuity.

7.2 COMMUNICATION

External communication to surrounding stakeholders will be undertaken prior to the commencement of construction works, this will include a notification of planned works and construction timelines.

All relevant project communication will be made available to everyone on the community website <https://haveyoursay.jemena.com.au/western-sydney-green-gas-project>

7.3 INSPECTIONS

Inspections shall be conducted weekly as part of a weekly HSE site inspection in accordance with 2018-HSS-PLN-001. Standalone inspections shall also be undertaken as required if concern is raised to Wasco Project Team.



No.	Inspection Type	Responsibility	Timing
1	Weekly HSE Site Inspection	HSE Advisor	Weekly
2	HAZOB/Incident Related Inspection	Project Team	As Required

7.4 COMPLIANCE AND REVISION

Regular monitoring and reporting of air quality compliance will be conducted in conjunction with regular Project reporting.

7.5 INCIDENT NOTIFICATION

In the event of a cultural artefact being unearthed the scene will remain undisturbed until authorisation has been received from the Project Manager in consultation with Jemena and any designated CH Authority.

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As soon as practicable verbally, but within 24 hours, the Project Manager will provide a report to Jemena outlining fully all material facts and circumstances concerning the incident that the Wasco Project Management Team is aware of or is able, by reasonable search and inquiry, to find out.

Jemena shall then pass on to the relevant parties as per legislative requirements.

Depending on the nature of the discovery, additional assessment, recording and management measures may be required prior to the recommencement of works in the affected area. Heritage NSW and/or members of the relevant Local Aboriginal Land Council must be notified of this discovery in writing.

The notification must identify the development (including the development application number and name) and set out the location and nature of the incident.



7.6 REPORTING

Wasco will report to Jemena and other agencies as required on issues related to the Project. Reporting will include:

- Notification of works commencement (including prior to construction commencement and completion)
- Monitoring records;
- Non-compliances; and
- Project website updates and inclusion of any revision of this plan.

8. DEFINITIONS

Term	Definition
Artefact Scatters	Means material remains of past Aboriginal people's activities and usually contain stone artefacts used for tasks such as cutting, charcoal, animal bone, shell or ochre.
CHA	Cultural Heritage Assessment
Cultural Heritage	Means a way of understanding and living in the world. Cultural Heritage encompasses the environment, objects and places that we inherit from the past and pass on to future generations to use, learn from and be inspired by.
CEMP	Construction Environmental Construction Plan
Aboriginal	Means for the purpose of this Plan, the term to encompass all Aboriginal and Torres Strait Islander people, communities and items.
Middens	Means a mound or deposit of shells, animal bones or other refuse that indicates the site of an Aboriginal settlement, often including

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Term	Definition
	shellfish remains, bones of fish, birds and land and sea mammals used for food, charcoal from campfires and tools made from stone, shell and bone.
Non-Aboriginal	Means for the purpose of this Plan, to encompass all people and communities and items that are not Aboriginal or Torres Strait Islander in origin.
Relic	Means any artefact, object or material evidence which relates to the settlement of the area, not being Aboriginal settlement, and which is of State or Local heritage significance.
Rock Engraving	Means Rock Art or Rock Paintings.
Rock Shelter	Means a shallow cave-like opening at the base of a bluff or cliff.
Scarred Trees	Means trees which have had bark removed by Aboriginal people for the creation of canoes, shelters, shields, or containers.

Appendix H – HSE External Incident Notification

WORK INSTRUCTION

HSE EXTERNAL INCIDENT NOTIFICATION

JEM PR 0151 WI 02

Revision Number: 5

Revision Date: 4/03/2020

AUTHORISATION

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DOCUMENT HISTORY

Revision	Date	Author	Description of Changes
1	01/12/10	Belinda Kearins	New Document
1.1	08/02/12	Michael Moroney	Amendment to Section 4.1 to reflect changes in the NSW POEO Act with regards to immediate reporting of environmental incidents to relevant authority and fix up discrepancies in environmental reporting requirements for other states.
1.2	03/02/15	Anthony Sarabi	Formerly JEM GU 0110 External HSE Incident Notification. Update due to Harmonisation and Consolidation Project in line with legislation and Jemena Way.
1.3	25/02/15	Lina Trad	Final document review with changes to document structure and flow of information before consultation.
1.4	01/04/15	Lina Trad	Document review following comment phase.
1.5	13/04/15	Lina Trad	Updated to final version for publishing following consultations and incorporation of stakeholder comments & final editorial review.
1.6	21/05/15	Lina Trad	Minor editorial changes made.
1.7	27/05/15	Michael Moroney	Inclusion of additional Environmental Reporting requirements.
2	02/06/15	Tyrone Singleton	Review & approval.
3	18/01/2016	Michael Moroney	Changes to NSW requirements, department name changes, editorial amendments
4	21/01/2019	Marc Rullo	Additional requirements for NT incorporated as part of the NGP.
5	04/03/20	Julie Dunn	Updated Regulator contact detail and document referenced.

OWNING FUNCTIONAL GROUP & DEPARTMENT / TEAM

HR & HSEQ : HSEQ : HSE

REVIEW DETAILS

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1 INTRODUCTION

There are a range of particularly serious incidents / serious harm occurrences which are required to be reported to regulatory bodies within specified timeframes by legislation.

Not all incidents are required to be reported. This work instruction defines notifiable incidents for each State or Territory in which Jemena operates.

Requirements under WHS and OHS legislation differ. Environmental reporting obligations also differ depending on the severity of harm to the environment and in which state or territory the incident occurred. Definitions of incidents considered notifiable, reporting requirements and the responsibility for reporting in each jurisdiction are provided in the following pages.

1.1 PURPOSE

The purpose of this Work Instruction is to define the roles, responsibilities, and processes by which Jemena will manage its legislative obligations as they relate to HSE incident notifications within assets and workplaces under its control.

The objectives of this work instruction are to:

- Provide clear definition for Notifiable Events to be managed under this guidance;
- Define the roles, responsibilities and actions related to the notification of recognised incidents to the relevant authorities; and
- Ensure that HSE incidents which must be reported to regulatory are reported as per regulatory requirements;

1.2 SCOPE

This procedure applies to:

- A person conducting a business or undertaking (PCBU) i.e. Jemena or principle contractor; and
- All Jemena employees and contractors (under the direction of Jemena where Jemena is recognized as the PCBU).

1.2.1 OUT OF SCOPE

For incident management refer to JEM HSE 0151 Jemena HSE Incident and Investigation Management.

For internal hazard and incident reporting refer to Jemena Incident Management System - ASPIRE.

Emergency and crisis events as defined in the Asset Emergency Management Plans.

1.3 RESPONSIBILITIES

Responsible Persons	Responsibilities
Team Leaders/Managers	Ensure all employees adhere to the requirements as outlined in this work instruction.
Contractor Managers	Ensure all contractors adhere to the requirements outlined in this work instruction.
Employees/Contractors	Adhere to the requirements as outlined in this work instruction. Attend required training/awareness sessions.
HSE/ HSE Advisor	Provide subject matter expertise on procedure as required. Report notifiable incident to Regulator.
Project Managers/Asset Managers/Designers	Adhere to the requirements of this document.

Table 1 – Responsibilities

2 HSE INCIDENT EXTERNAL NOTIFICATION PROCESS

2.1 WHEN, HOW AND WHO TO NOTIFY?

A Regulator must be notified of a notifiable incident immediately after Jemena becomes aware of the incident. A notifiable incident is defined as:

- the death of a person;
- a serious injury or illness;
- a dangerous incident; or
- material harm to the environment or discharge of a substance where an environmental hazard may be caused (Vic).

Refer to Section 3 for the definition of the above terms.

For Safety incidents, immediate notification of a notifiable incident to the Regulator must occur after becoming aware of it and written notification, including required information, within 48 hours of the request being made, if the Regulator asks.

The notice must be given by the fastest possible means which could be by telephone or in writing, for example by facsimile, email or other electronic means.

For environmental incidents, notification timeframes are detailed in Tables 6 to 10. For Projects there may also be specific pollution reporting obligations connected with an Environmental Licence or Authority, which are documented in the area specific Environmental Management Plan/s.

Table 2 below (Section 2.2) provides contact details for applicable Regulatory bodies for the States and Territories in which Jemena operates. Table 3 (Section 2.2) provides guidance for the information to be collected and reported.

Table 2 – Occupational and Work Health and Safety Contacts

Section 2.2 below also provides guidance and examples to assist with the determination of when to report an incident to external regulatory agencies.

2.1.1 WHO MAKES THE NOTIFICATION?

Notifiable incidents may relate to any person conducting work for Jemena, whether an employee or contractor, and includes visitors and members of the public.

In some cases multiple reporting requirements may be triggered by a single event such as notification to the:

- Work Health & Safety Regulator;
- Workers Compensation Insurer;
- Energy Regulator; and/or
- Environmental Regulator.

Unless otherwise specified, for example as in Asset Emergency Management Plans, the notification of regulatory authorities is the responsibility of the local **HSE Advisor** and for Environmental Incidents the **Environmental Advisor** will notify the relevant regulatory authority only after agreement is provided by their Manager.

2.1.2 INCIDENT INVOLVING CONTRACTORS OR OTHERS

In these circumstances all duty holders must, so far as is reasonably practicable, consult, cooperate and coordinate to put appropriate reporting and notification arrangements in place.

The Contract shall describe the process for HSE incident notifications. For example, contractors at a construction workplace may agree that the principal contractor for the workplace will notify all 'notifiable incidents' that occur at the workplace.

2.1.3 FAILURE TO NOTIFY

As per WHS, OHS and Environmental legislation, the regulatory authority may issue an infringement notice for failure to report a notifiable incident. Failure to notify is a breach of the primary duties detailed under the WHS Act.

For example, in NSW that can attract Penalties apply for not notifying incidents. The maximum penalty for failing to notify is \$50,000 for a body corporate and \$10,000 for an individual

2.1.4 INFORMATION THAT WILL BE REQUESTED

A clear description of the incident with as much detail as possible will help the Regulator assess whether the incident is notifiable and the need for a follow-up investigation by the Regulator.

Where insufficient details are provided in a telephone notification, the Regulator may contact the notifier if further information is required.

The following information (see table 3 below) should be collected as a minimum at the point of incident notification.

2.2 CONTACT DETAILS & REQUIRED INFORMATION

Jurisdiction	Regulator	Telephone	Website / Further Information
Health and Safety			
New South Wales	SafeWork NSW	13 10 50	https://www.safework.nsw.gov.au/notify-safework/incident-notification
Victoria	WorkSafe Victoria Energy Safe Victoria (ESV)	1800 136 089 1800 671337	www.worksafe.vic.gov.au http://www.esv.vic.gov.au/
Queensland	Workplace Health and Safety Qld	1300 362 128	www.worksafe.qld.gov.au
	Petroleum and Gas Inspectorate - Department of Natural Resources, Mines and Energy	CSG and LNG hotline: 13 25 23	www.dnrm.qld.gov.au/our-department/contact-us gassafe@dnrm.qld.gov.au
Australian Capital Territory	WorkSafe ACT	02 6207 3000	www.worksafety.act.gov.au
Northern Territory	WorkSafe NT Department of Primary Industry and Resources (DPIR)	1800 019 115 08 8999 7348	ntworksafe@nt.gov.au DPIRPetroleumOperations@nt.gov.au
Commonwealth	Comcare	1300 366 979	www.comcare.gov.au

Jurisdiction	Regulator	Telephone	Website / Further Information
Environment			
New South Wales	Appropriate Regulatory Authority (if this is not the EPA)		www.epa.nsw.gov.au All) Authorities must be notified immediately unless the EPA / Appropriate Regulatory Authority advise this is not required. Appropriate Regulatory Authority means another NSW Authority that may issue a consent or licence i.e. Department of Industry, Independent Pricing and Regulatory Tribunal etc. There are different Public Health Units for NSW depending on the Region. Refer here for more details.
	Environment Protection Authority (EPA)	131 555	
	The relevant Local Council (if the Regulatory Authority is the EPA)		
	Ministry of Health (Public Health Unit)	1300 066 055	
	SafeWork NSW	13 10 50	
	Fire and Rescue NSW	000	

Jurisdiction	Regulator	Telephone	Website / Further Information
Victoria	EPA (Vic)	1300 372 842	www.epa.vic.gov.au Note: The obligation to report pollution is from vehicles and ships. There is no obligation to report if water, land, air etc. is polluted from other sources. The obligation of not polluting, that could cause harm to humans, flora, fauna, etc. or a beneficial use detriment, remains. Consultation with HSE Advisors/Environmental Advisors is required. They will consult internally within Jemena as to whether environmental incidents should be reported to the Regulator.
Queensland	Department of Environment and Science (DES)	1300 130 372	There are specific reporting obligations contained within Qld Asset Operational Environmental Management Plans (OEMPs) which are a summary of Environment Authority (EA) conditions. This must also be consulted for reporting obligations. The Qld government Material Harm Reporting Form (EM468) can also be used as a guide.
	Registered owners of land where the incident occurred		
Australian Capital Territory	EPA (ACT)	13 22 81	

Jurisdiction	Regulator	Telephone	Website / Further Information
Northern Territory	NT EPA	1800 064 567	<p>A report must be made if there has been a spill of a contaminant or waste (such as hydrocarbons, paint, pesticides, or other toxic chemicals), and the spill:</p> <ul style="list-style-type: none"> - has entered a waterway (including a drain) - spread more than 3 metres, or - left your premises.
Commonwealth	Department of Environment and Energy	1800 110 395	<p>This is only applicable for matters that come under the EPBC Act and where this is a breach of an approval condition or environmental harm has been caused to a Matter of National Environmental Significance where a permit has not been obtained. Consult with an Environmental Advisor for further information.</p>

Table 2 - Contact details – Regulatory Authorities

What happened: An overview	<ul style="list-style-type: none"> • Provide an overview of what happened. • Nominate the type of notifiable incident—was it death, serious injury or illness, or 'dangerous incident' as described in the table below.
When did it happen	<ul style="list-style-type: none"> • Date and time. • When (date/time) Jemena became aware of the incident.
Where did it happen	<ul style="list-style-type: none"> • Incident address; • Details that describe the specific location of the notifiable incident e.g. section of the warehouse; or • The particular piece of equipment that the incident involved, to assist instructions about site disturbance.
What happened: detailed description	<ul style="list-style-type: none"> • Detailed description of the notifiable incident (based on facts as they are known).
Who did it happen to	<ul style="list-style-type: none"> • Injured person's name, salutation, date of birth, address and contact number. • Injured person's occupation. • Relationship of the injured person to the entity notifying.

How and where are they being treated (if applicable)	<ul style="list-style-type: none"> • Description of serious injury or illness. i.e. nature of injury. • Initial treatment of serious injury or illness. • Where the patient has been taken for treatment.
Who is the person conducting the business or undertaking (there may be more than one)	<ul style="list-style-type: none"> • Legal and trading name. • Business address (if different from incident address). • ABN/ACN and contact details including phone number and email.
What specific environmental information should be collected	<ul style="list-style-type: none"> • The nature, the estimated quantity or volume and the concentration of any pollutants involved, if known; • Suspected cause of the release. • Effects of the release (environmental harm caused). • Any sampling conducted or proposed.
What has/is being done	<ul style="list-style-type: none"> • Action taken or intended to be taken to prevent recurrence (if any).
Who is notifying	<ul style="list-style-type: none"> • Notifier's name, salutation, contact phone number and position at workplace. • Name, phone number and position of person to contact for further information (if different from above).

Table 3 – Guideline for Information collection

2.3 TRIGGERS AND EXAMPLES

The following table (Table 4) shows working examples of incidents and whether they fall into being reportable or are exceptions based on the definitions within legislation.

Trigger	Example
Immediate treatment as an in-patient in a hospital	<ul style="list-style-type: none"> Admission into a hospital as an in-patient for any duration, even if the stay is not overnight or longer. <p><u>It does not include:</u></p> <p>Out-patient treatment provided by the emergency section of a hospital (i.e. not requiring admission as an in-patient) and immediate discharge.</p> <p>Subsequent corrective surgery such as that required to fix a fractured nose.</p>
Immediate treatment for the amputation of any part of the body	<ul style="list-style-type: none"> Amputation of a limb such as arm or leg, body part such as hand, foot or the tip of a finger, toe, nose or ear. <p><u>It does not include:</u></p> <p>Bruising or minor abrasion or laceration to the skin.</p>
Immediate treatment for a serious head injury	<ul style="list-style-type: none"> Fractured skull, loss of consciousness, blood clot or bleeding in the brain, damage to the skull to the extent that it is likely to affect organ/face function. Head injuries resulting in temporary or permanent amnesia.
Immediate treatment for a serious eye injury	<ul style="list-style-type: none"> Injury that results in or is likely to result in the loss of the eye or total or partial loss of vision. Injury that involves an object penetrating the eye (for example metal fragment, wood chip). Exposure of the eye to a substance which poses a risk of serious eye damage. <p><u>It does not include:</u></p> <p>Eye exposure to a substance that merely causes irritation.</p>
Immediate treatment for a serious burn	<ul style="list-style-type: none"> A burn requiring intensive care or critical care which could require compression garment or a skin graft. <p><u>It does not include:</u></p> <p>A burn that merely requires washing the wound and applying a dressing.</p>

Trigger	Example
Immediate treatment for the separation of skin from an underlying tissue (such as degloving or scalping)	<ul style="list-style-type: none"> Separation of skin from an underlying tissue such that tendon, bone or muscles are exposed (de-gloving or scalping).
Immediate treatment for a spinal injury	<ul style="list-style-type: none"> Injury to the cervical, thoracic, lumbar or sacral vertebrae including the discs and spinal cord.
Immediate treatment for the loss of a bodily function	<ul style="list-style-type: none"> Loss of consciousness, loss of movement of a limb or loss of the sense of smell, taste, sight or hearing, or loss of function of an internal organ. <p><u>It does not include:</u></p> <p>Mere fainting, or</p> <p>A sprain, strain or fracture.</p>
Immediate treatment for serious lacerations	<ul style="list-style-type: none"> Serious lacerations that cause muscle, tendon, nerve or blood vessel damage or permanent impairment. Deep or extensive cuts. Tears of wounds to the flesh or tissues—this may include stitching to prevent loss of blood and/or other treatment to prevent loss of bodily function and/or infection.
Immediate substance loss to the surroundings	<ul style="list-style-type: none"> Loss of containment of substance to ground, air or waterway. Potential environmental incident. Material travelling beyond a site boundary.
Unexpected find of hazardous substance	<ul style="list-style-type: none"> Contaminated soil. Asbestos. Chemical substances.
Environmental incident below harm trigger levels	<ul style="list-style-type: none"> Environmental harm caused or likely to be caused which is below designated trigger levels (refer to Section 3 Definitions) can be managed inhouse by Jemena and not reported.

Table 4 – Triggers and Examples

3 TERMS & DEFINITIONS

Terms	Definition
Health and Safety	

<p>Dangerous Incident</p>	<p>A 'dangerous incident' as outlined in S37 of the WHS Act requires notification i of any incident in relation to a workplace that exposes a worker or any other person to a serious risk to a person's health or safety emanating from an immediate or imminent exposure to:</p> <ul style="list-style-type: none"> • an uncontrolled escape, spillage or leakage of a substance • an uncontrolled implosion, explosion or fire • an uncontrolled escape of gas or steam • an uncontrolled escape of a pressurised substance • electric shock: <ul style="list-style-type: none"> ○ examples of electrical shock that are not notifiable <ul style="list-style-type: none"> ▪ shock due to static electricity ▪ 'extra low voltage' shock (i.e. arising from electrical equipment less than or equal to 50V AC and less than or equal to 120V DC) ▪ defibrillators are used deliberately to shock a person for first aid or medical reasons ○ examples of electrical shocks that are notifiable <ul style="list-style-type: none"> ▪ minor shock resulting from direct contact with exposed live electrical parts (other than 'extra low voltage') including shock from capacitive discharge • the fall or release from a height of any plant, substance or thing • the collapse, overturning, failure or malfunction of, or damage to, any plant that is required to be designed or item registered under the Work Health and Safety Regulations • the collapse or partial collapse of a structure • the collapse or failure of an excavation or of any shoring supporting an excavation • the inrush of water, mud or gas in workings, in an underground excavation or tunnel, or • the interruption of the main system of ventilation in an underground excavation or tunnel. <p>Any of these occurrences are reportable as a 'dangerous incident' (or 'near miss') if a person is exposed to a serious risk from immediate or imminent exposure to a hazard.</p> <p>For most hazards such as plant or a structure collapsing a person will need to be in the immediate vicinity to be exposed to a serious risk to their health or safety.</p> <p>However some hazards such as an uncontrolled leak of a hazardous gas or a fire can travel towards a person and expose them to a serious risk to health and safety away from the original source.</p> <p>A dangerous incident includes both immediate serious risks to health or safety, and also a risk from an immediate exposure to a substance which is likely to create a serious risk to health or safety in the future, for example asbestos or chemicals.</p> <p>Only occurrences involving a 'serious risk' are notifiable taking into account the likelihood of a serious illness or injury occurring from the incident. This would include any situation which seriously endangers or threatens the health or safety of a person.</p>
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Terms	Definition
Notifiable Incident (OHS-Vic)	<p>Incident at a workplace resulting in:</p> <ul style="list-style-type: none"> • death; or • serious injury. <p>Serious injury is used in this context to describe those incidents that result in the consequences described in section 37(1) of the Act. They include, but are not limited to, incidents that result in a person requiring:</p> <ul style="list-style-type: none"> • medical treatment within 48 hours of exposure to a substance • immediate treatment as an in-patient in a hospital • immediate medical treatment for: <ul style="list-style-type: none"> – amputation – serious head injury – serious eye injury – separation of skin from underlying tissue (for example de-gloving or scalping) – electric shock – spinal injury – loss of bodily function – serious lacerations <p>https://www.worksafe.vic.gov.au/resources/guide-incident-notification</p>

Terms	Definition
Notifiable Incident (WHS)	<p>A 'notifiable incident' as outlined in S35 of the WHS Act is:</p> <ul style="list-style-type: none"> • the death of a person • a 'serious injury or illness', or • a 'dangerous incident' <p>arising out of the conduct of a business or undertaking at a workplace. 'Notifiable incidents' may relate to any person - whether an employee, contractor or member of the public.</p> <p>Only the most serious safety incidents are intended to be notifiable, and they trigger requirements to preserve the incident site pending further direction from the regulator.</p> <p>https://www.safeworkaustralia.gov.au/doc/incident-notification-fact-sheet</p>
Regulatory Authority	<p>Refers to the relevant State or Territory government agency responsible for regulating and enforcing workplace safety legislation e.g. SafeWork, WorkSafe, etc.</p> <p>Queensland Petroleum and Gas Inspectorate Chief Inspector</p>
Treatment	<p>'Treatment' means the kind of treatment that would be required for a serious injury or illness and includes 'medical treatment' (i.e. by a registered medical practitioner), treatment by a paramedic or treatment by a registered nurse practitioner.</p>

Terms	Definition
Environmental	
Beneficial Use (Vic)	A use of the environment or any element or segment of the environment which— (a) is conducive to public benefit, welfare, safety, health or aesthetic enjoyment and which requires protection from the effects of waste discharges, emissions or deposits or of the emission of noise; or (b) is declared in State environment protection policy to be a beneficial use.
Environmental Hazard (Vic)	A state of danger to human beings or the environment whether imminent or otherwise resulting from the location, storage or handling of any substance having toxic, corrosive, flammable, explosive, infectious or otherwise dangerous characteristics.
Material Environmental Harm (ACT)	Means environmental harm— (a) That is significant, including environmental harm that becomes significant— (i) Over time; or (ii) Due to its frequent recurrence; or (iii) Due to its cumulative effect with other relevant events; or (b) That is to an area of high conservation value, other than harm that is trivial or negligible; or (c) That results in loss or damage to property to the value of more than \$5,000; or (d) That results in necessary remedial action costing more than \$5,000.
Material Harm (NSW)	(a) Harm to the environment is material if: (i) It involves actual or potential harm to the health or safety of human beings or to ecosystems that is not trivial, or (ii) It results in actual or potential loss or property damage of an amount, or amounts in aggregate, exceeding \$10,000 (or such other amount as is prescribed by the regulations), and (b) Loss includes the reasonable costs and expenses that would be incurred in taking all reasonable and practicable measures to prevent, mitigate or make good harm to the environment
Material Environmental Harm (QLD)	Is environmental harm that: (a) Is not trivial or negligible in nature, extent or context; or (b) Causes actual or potential loss or damage to property of total amount more than the threshold amount (\$5,000) but less than the maximum amount (\$50,000); or (c) Results in costs of more than the threshold amount (\$5,000) but less than the maximum amount (\$50,000) being incurred in taking appropriate action to prevent or minimise the harm, or rehabilitate or restore the environment to its condition before the harm

Terms	Definition
Pollution Incident	<p>Means an incident or set of circumstances during or as a consequence of which:</p> <ul style="list-style-type: none"> (a) There is or is likely to be a leak, spill or other escape or deposit of a substance, (b) As a result of which pollution has occurred (c) Is occurring or is likely to occur. <p>It includes an incident or set of circumstances in which a substance has been placed or disposed of on premises, but it does not include an incident or set of circumstances involving only the emission of any noise.</p>
Serious Environmental Harm (ACT)	<p>Means environmental harm—</p> <ul style="list-style-type: none"> (a) That is very significant, including environmental harm that becomes very significant— <ul style="list-style-type: none"> (i) Over time; or (ii) Due to its frequent recurrence; or (iii) Due to its cumulative effect with other relevant events; or (b) That is to an area of high conservation value and is significant, including environmental harm that becomes significant— <ul style="list-style-type: none"> (i) Over time; or (ii) Due to its frequent recurrence; or (iii) Due to its cumulative effect with other relevant events; or (c) That results in loss or damage to property to the value of more than \$50,000; or <p>That results in necessary remedial action costing more than \$50,000</p>
Serious Environmental Harm (QLD)	<p>Is environmental harm that:</p> <ul style="list-style-type: none"> (a) Causes actual or potential harm to environmental values that is irreversible, of high impact or widespread; or (b) Causes actual or potential harm to environmental values of an area of high conservation value or special significance (c) Causes actual or potential loss or damage to property of an amount totalling more than the threshold amount (\$50,000); or (d) Results in costs of more than the threshold amount being incurred in taking appropriate action to prevent or minimise the harm or rehabilitate or restore the environment to its condition before the harm.

Table 5 – Definitions

4 REFERENCES

4.1 INTERNAL

Document Number	Document Title
JEM HSE 0151	Jemena HSE Incident and Investigation Management.

4.2 EXTERNAL

Type	Document
Acts	Occupational Health and Safety Act 2004 (VIC)
	Energy Pipelines Act 2015 (NT)
	Work Health And Safety (National Uniform Legislation) Act 2016
	Work Health and Safety Act 2011 (NSW)
	Work Health and Safety Act 2011 (QLD)
	Environment Protection and Biodiversity Conservation Act 1999
	Protection of the Environment Operations Act 1997 (NSW)
	Environment Protection Act 1970 (Vic)
	Environment Protection Act 1994 (QLD)

	Environment Protection Act (ACT)
Regulations	Occupational Health and Safety Regulation 2017 (VIC)
	Work Health and Safety Regulation 2011 (Amdt. March 2018) (NSW)
	Work Health and Safety Regulation 2011 (QLD)
	Petroleum and Gas (Production and Safety) Regulation 2004
	Energy Pipelines Regulation 2015 (NT)
Incident Notification	WorkSafe Australia Incident-notification-fact-sheet

5 APPENDICES

The following tables outline the notifiable incident reporting details for each state.

5.1 NOTIFICATION REQUIREMENTS WITHIN VICTORIAN JURISDICTIONS

Incident	Contact	Notification		Responsible
		Verbal	Written	
Fatality (Electric Related)	WorkSafe ESV	Immediate Immediate	48 hours 48 hours	HSE Advisor Field Practices
Fatality (Non Electric)	WorkSafe	Immediate	48 hours	HSE Advisor
Fatality (Gas Related)	WorkSafe ESV	Immediate N/A	48 hours As soon as practicable but no later than two (2) hours	HSE Advisor Field Practices
Exposure to a substance requiring medical treatment within 48 hours	WorkSafe	Immediate	48 hours	HSE Advisor
An injury requiring immediate treatment as an in-patient in a hospital	WorkSafe	Immediate	48 hours	HSE Advisor
An injury requiring immediate medical treatment for: <ul style="list-style-type: none"> • amputation, • serious laceration, • serious head or eye injury, • loss of a bodily function, • spinal injury, • separation of skin from underlying tissue (de-gloving or scalping), • electric shock 	WorkSafe	Immediate	48 hours	HSE Advisor
Collapse, overturning, failure or malfunction or damage to items of plant listed in schedule 2* below.	WorkSafe	Immediate	48 hours	HSE Advisor
Collapse or failure of an excavation or shoring supporting an excavation	WorkSafe	Immediate	48 hours	HSE Advisor
Collapse or partial collapse of any part of a structure or building	WorkSafe	Immediate	48 hours	HSE Advisor
Implosion, explosion or fire	WorkSafe	Immediate	48 hours	HSE Advisor
Explosion involving gas	ESV	N/A	As soon as practicable but no later	HSE Advisor

Incident	Contact	Notification		Responsible
		Verbal	Written	
			than two (2) hours	
Escape, spillage or leakage of any substance including dangerous goods	WorkSafe	Immediate	48 hours	HSE Advisor
Fall or release from height of any substance, plant or object	WorkSafe	Immediate	48 hours	HSE Advisor
In a mine, the overturning or collapse of any plant, the inrush of water, mud or gas or the interruption to the main system of ventilation	WorkSafe	Immediate	48 hours	HSE Advisor
Receives an electric shock from or makes contact with live high voltage power lines or equipment used for the generation, transmission, distribution or supply of electricity	Work Safe	Immediate	48 hours	HSE Advisor
	ESV	Immediate	48 hours	Field Practices
Serious property damage or a serious reduction in public safety has occurred or is likely to occur	ESV	N/A	As soon as practicable but no later than two (2) hours	Field Practices
Injury to a person as a result of an incident with gas systems	ESV	N/A	As soon as practicable but no later than two (2) hours	Field Practices
Significant damage to property as a result of an incident involving gas	ESV	N/A	As soon as practicable but no later than two (2) hours	Field Practices
Off-site environmental contamination	EPA	As soon as reasonably practical	As directed by EPA	Environmental Advisor
Motor vehicle incident involving injury	Police (nearest station)	Within 24 hours	N/A	Employee

Table 6 – Victoria

***Schedule 2** – Incidents involving plant that are reportable.

Any incident involving the collapse, overturning, failure, malfunction or damage to any item of plant listed below is notifiable to the authorities.

- (a) Boilers categories as hazard A, B or C according to the criteria identified in AS 3920-Part 1, Pressure Equipment Manufacture-Assurance of Product Quality;
- (b) Pressure vessels categories as hazard A, B or C according to the criteria identified in AS 3920-Part 1, Pressure Equipment Manufacture-Assurance of Product Quality, other than:
 - (i) gas cylinders to which AS 2030-Gas Cylinders applies; and
 - (ii) Liquefied petroleum gas fuel vessels for automotive use to which AS 3509-LP Gas Fuel Vessels for Automotive Use applies; and
 - (iii) serially produced vessels to which AS 2891-Serially Produced Pressure Vessels applies;
- (c) Tower cranes;
- (d) Lifts;
- (e) Building maintenance units;
- (f) Amusement structures to which AS 3533-Amusement Rides and Devices applies, other than amusement structures referred to in the standard as class 1 structures;
- (g) Concrete placing units (truck-mounted with boom);

Mobile cranes with a safe working load greater than 10 tonnes.

ESV Written Reporting Requirements

Two (2) hour reporting requirement must include the following information

- (i) the date, time and location of the incident;
- (ii) a description of the incident;
- (iii) any known or suspected cause of the incident;
- (iv) whether any emergency service attended the incident and, if so, the name and contact details of the emergency controller.

A licensee must, as soon as practicable but not later than 7 days (or a longer period as agreed by the Minister or Energy Safe Victoria) after the occurrence of a reportable environmental incident or a reportable safety incident, submit a written report to the Minister and Energy Safe Victoria that includes the following information—

- (a) the date, time and location of the incident;
- (b) a description of the incident;
- (c) details of any known or suspected causes of the incident;
- (d) details of any corrective action that has been taken, or is proposed to be taken, to prevent a similar incident;
- (e) in the case of an escape or ignition of anything in the pipeline, a description of—
 - (i) the nature and approximate quantity of the thing that escaped, or escaped and ignited; and
 - (ii) any damage resulting from the escape or ignition; and
 - (iii) the methods adopted to carry out repairs.

5.2 NOTIFICATION REQUIREMENTS WITHIN THE NEW SOUTH WALES JURISDICTIONS

Incident	Contact	Notification		Responsible
		Verbal	Written if requested by Regulator	
<ul style="list-style-type: none"> Fatality Serious Incident or Illness (see below and Table 2) A Dangerous Incident (see Section 4) 	SafeWork NSW Insurer	Immediate	48 hours	HSE Advisor
Immediate treatment as an in-patient in a hospital	SafeWork NSW Insurer	Immediate	48 hours	HSE Advisor
Immediate treatment for the amputation of any part of the body	SafeWork NSW Insurer	Immediate	48 hours	HSE Advisor
Immediate treatment for a serious head injury	SafeWork NSW Insurer	Immediate	48 hours	HSE Advisor
Immediate treatment for a serious eye injury	SafeWork NSW	Immediate	48 hours	HSE Advisor
Immediate treatment for a serious burn	SafeWork NSW	Immediate	48 hours	HSE Advisor
Immediate treatment for the separation of skin from an underlying tissue (such as degloving or scalping)	SafeWork NSW	Immediate	48 hours	HSE Advisor
Immediate treatment for a spinal injury	SafeWork NSW	Immediate	48 hours	HSE Advisor
Immediate treatment for the loss of a bodily function	SafeWork NSW	Immediate	48 hours	HSE Advisor
Immediate treatment for serious lacerations	SafeWork NSW	Immediate	48 hours	HSE Advisor
Medical treatment within 48 hours of exposure to a substance.	SafeWork NSW	Immediate	48 hours	HSE Advisor

Incident	Contact	Notification		Responsible
		Verbal	Written if requested by Regulator	
Any infection to which the carrying out of work is a significant contributing factor, including any infection that is reliably attributable to carrying out work: (i) with micro-organisms (ii) that involves providing treatment or care to a person (iii) that involves contact with human blood or body substances (iv) that involves handling or contact with animals, animal hides, skins, wool or hair, animal carcasses or animal waste products.	SafeWork NSW	Immediate	48 hours	HSE Advisor
The following occupational zoonoses contracted in the course of work involving handling or contact with animals, animal hides, skins, wool or hair, animal carcasses or animal waste products: (i) Q fever (ii) Anthrax (iii) Leptospirosis (iv) Brucellosis (v) Hendra Virus (vi) Avian Influenza (vii) Psittacosis.	SafeWork NSW	Immediate	48 hours	HSE Advisor
An injury or illness to a person that results in the person being unfit for a continuous period of 7 days from work or from carrying out normal duties	SafeWork NSW Insurer	Immediate 48 hours	48 hours	Rehabilitation Coordinator
Pollution incidents causing or threatening serious or material harm to the environment	EPA*	Immediate	7 days	Environmental Advisor

Table 7 – New South Wales

* Other authorities which may be required to be notified depending on the nature of the incident include: the appropriate Regulatory Authority (if this is not the EPA), if the EPA is the appropriate authority the Local Council; Ministry of Health (Public Health Unit); SafeWork NSW; Fire and Rescue NSW.

5.3 NOTIFICATION REQUIREMENTS WITHIN THE QUEENSLAND JURISDICTIONS

Incident	Contact	Notification		Responsible
		Verbal	Written if requested by Regulator	
Fatality (Electrical)	Workplace Health and Safety Or Electrical Safety Office	Immediate	24 hours	HSE Advisor
<ul style="list-style-type: none"> Fatality Serious Incident or Illness (see below and Table 2) A Dangerous Incident (see Section 3) 	Workplace Health and Safety *PGI-DNRME	Immediate	48 Hours	HSE Advisor
		Immediate	As soon as practicable	
Immediate treatment as an in-patient in a hospital	Workplace Health and Safety Chief Inspector	Immediate	48 Hours	HSE Advisor
		Immediate	As soon as practicable	
Immediate treatment for the amputation of any part of the body	Workplace Health and Safety	Immediate	48 Hours	HSE Advisor
Immediate treatment for a serious head injury	Workplace Health and Safety	Immediate	48 Hours	HSE Advisor
Immediate treatment for a serious eye injury	Workplace Health and Safety	Immediate	48 Hours	HSE Advisor
Immediate treatment for a serious burn	Workplace Health and Safety	Immediate	48 Hours	HSE Advisor
Immediate treatment for the separation of skin from an underlying tissue (such as degloving or scalping)	Workplace Health and Safety	Immediate	48 Hours	HSE Advisor
Immediate treatment for a spinal injury	Workplace Health and Safety	Immediate	48 Hours	HSE Advisor
Immediate treatment for the loss of a bodily function	Workplace Health and Safety	Immediate	48 Hours	HSE Advisor
Immediate treatment for serious lacerations	Workplace Health and Safety	Immediate	48 Hours	HSE Advisor
Medical treatment within 48 hours of exposure to a substance.	Workplace Health and Safety	Immediate	48 Hours	HSE Advisor

Incident	Contact	Notification		Responsible
		Verbal	Written if requested by Regulator	
<p>Any infection to which the carrying out of work is a significant contributing factor, including any infection that is reliably attributable to carrying out work:</p> <p>(i) with micro-organisms</p> <p>(ii) that involves providing treatment or care to a person</p> <p>(iii) that involves contact with human blood or body substances</p> <p>(iv) that involves handling or contact with animals, animal hides, skins, wool or hair, animal carcasses or animal waste products.</p>	Workplace Health and Safety	Immediate	48 Hours	HSE Advisor
An injury or illness to a person that results in the person being unfit for a continuous period of 7 days from work or from carrying out normal duties	Workplace Health and Safety	Immediate	48 Hours	HSE Advisor
<p>The following occupational zoonoses contracted in the course of work involving handling or contact with animals, animal hides, skins, wool or hair, animal carcasses or animal waste products:</p> <p>(i) Q fever</p> <p>(ii) Anthrax</p> <p>(iii) Leptospirosis</p> <p>(iv) Brucellosis</p> <p>(v) Hendra Virus</p> <p>(vi) Avian Influenza</p> <p>(vii) Psittacosis.</p>	Workplace Health and Safety	N/A	Within 24 hrs of awareness of incident	HSE Advisor
An incident where a person is not, or would not have been electrically safe because of circumstances involving high voltage electrical equipment	Workplace Health and Safety	N/A	Within 24 hrs of awareness of incident.	HSE Advisor

Incident	Contact	Notification		Responsible
		Verbal	Written if requested by Regulator	
An incident involving electrical equipment in which significant property damage is caused directly by or originates from electricity	Workplace Health and Safety	N/A	Within 24 hrs of awareness of incident.	HSE Advisor
The performance of electrical work by a person not authorised under an electrical work licence to perform the work	Workplace Health and Safety	N/A	Within 24 hrs of awareness of incident.	HSE Advisor
The performance of electrical work by a person, if as a result of the performance of the work, a person or property is not electrically safe	Workplace Health and Safety	N/A	Within 24 hrs of awareness of incident.	HSE Advisor
The discovery by a licensed electrical worker of electrical equipment that has not been marked as required under the Electrical Safety Act, 2002	Workplace Health and Safety	N/A	Within 24 hrs of awareness of incident.	HSE Advisor
An emergency, including an emergency alarm activation other than as part of a routine test, at an operating plant that is a major hazard facility under the Work Health and Safety Regulation 2011.	*PGI-DNRME	Immediate	As soon as practicable.	HSE Advisor
A fire at an operating plant.	*PGI-DNRME	Immediate	As soon as practicable.	HSE Advisor
An unplanned or uncontrolled release of petroleum, fuel gas or prescribed storage gas, attended by emergency Services.	*PGI-DNRME	Immediate	As soon as practicable.	HSE Advisor
An unplanned or uncontrolled release of a gas that is petroleum or prescribed storage gas or fuel gas from an operating plant, at a concentration of more than the lower flammable alarm level for the gas stated in the safety management plan for the plant, not attended by Emergency services.	*PGI-DNRME	N/A	As soon as practicable	HSE Advisor
An incident with the potential to cause a general shortage of fuel gas in Queensland or an area of Queensland.	*PGI-DNRME	Immediate	As soon as practicable.	HSE Advisor
An incident involving damage to property that substantially increases the risk of damage to plant or equipment or injury to persons.	*PGI-DNRME	Immediate	As soon as practicable.	HSE Advisor

Incident	Contact	Notification		Responsible
		Verbal	Written if requested by Regulator	
An incident at an operating plant to which the Work Health and Safety Act 2011 does not apply, if the incident is not otherwise mentioned in this schedule.	*PGI-DNRME	N/A	As soon as practicable but no later than 5 business days after the incident occurs.	HSE Advisor
An incident that had the potential to, but did not, cause the death of, or injury to, a person or damage to plant or equipment.	*PGI-DNRME	Immediate	As soon as practicable but no later than 5 business days after the incident occurs.	HSE Advisor
A work related illness of a person at an operating plant to which the Work Health and Safety Act 2011 does not apply.	*PGI-DNRME	N/A	As soon as practicable but no later than 5 business days after the operator of the operating plant becomes aware or, ought reasonably to have been aware, of the illness.	HSE Advisor
Activities undertaken cause or threaten to cause serious or material environmental harm.	Department of Environment and Science.	N/A	Within 24 hours.	Environmental Advisor
Motor vehicle incident involving injury or greater than \$2,500 damage	Police (nearest station)	Within 24 hours	N/A	Employee

Table 8 – Queensland

According to Petroleum and Gas (Production and Safety) Regulation 2004, the Chief Inspector Petroleum and Gas Inspectorate needs to be contacted according to Schedule 2 for prescribed incidents. These have been added to the table above.

*PGI-DNRM - Petroleum and Gas Inspectorate - Department of Natural Resources, Mines and Energy

5.4 NOTIFICATION REQUIREMENTS WITHIN AUSTRALIAN CAPITAL TERRITORY JURISDICTIONS

Incident	Contact	Notification		Responsible
		Verbal	Written if requested by Regulator	
<ul style="list-style-type: none"> Fatality Serious Incident or Illness (see below and Table 2) A Dangerous Incident (see Section 3) 	ACT WorkSafe	Immediate	48 hours	HSE Advisor
Immediate treatment as an in-patient in a hospital	ACT WorkSafe	Immediate	48 hours	HSE Advisor
Immediate treatment for the amputation of any part of the body	ACT WorkSafe	Immediate	48 hours	HSE Advisor
Immediate treatment for a serious head injury	ACT WorkSafe	Immediate	48 hours	HSE Advisor
Immediate treatment for a serious eye injury	ACT WorkSafe	Immediate	48 hours	HSE Advisor
Immediate treatment for a serious burn	ACT WorkSafe	Immediate	48 hours	HSE Advisor
Immediate treatment for the separation of skin from an underlying tissue (such as degloving or scalping)	ACT WorkSafe	Immediate	48 hours	HSE Advisor
Immediate treatment for a spinal injury	ACT WorkSafe	Immediate	48 hours	HSE Advisor
Immediate treatment for the loss of a bodily function	ACT WorkSafe	Immediate	48 hours	HSE Advisor
Immediate treatment for serious lacerations	ACT WorkSafe	Immediate	48 hours	HSE Advisor
Medical treatment within 48 hours of exposure to a substance.	ACT WorkSafe	Immediate	48 hours	HSE Advisor
Any infection to which the carrying out of work is a significant contributing factor, including any infection that is reliably attributable to carrying out work: (i) with micro-organisms (ii) that involves providing treatment or care to a person	ACT WorkSafe	Immediate	48 hours	HSE Advisor

Incident	Contact	Notification		Responsible
		Verbal	Written if requested by Regulator	
(iii) that involves contact with human blood or body substances (iv) that involves handling or contact with animals, animal hides, skins, wool or hair, animal carcasses or animal waste products.				
The following occupational zoonoses contracted in the course of work involving handling or contact with animals, animal hides, skins, wool or hair, animal carcasses or animal waste products: (i) Q fever (ii) Anthrax (iii) Leptospirosis (iv) Brucellosis (v) Hendra Virus (vi) Avian Influenza (vii) Psittacosis.	ACT WorkSafe	Immediate	48 hours	HSE Advisor
An incident which causes or threatens to cause material or serious environmental harm	Environmental Protection Authority	As soon as possible	N/A	Environment Advisor

Table 9 – Australian Capital Territory

5.5 NOTIFICATION REQUIREMENTS WITHIN NORTHERN TERRITORY JURISDICTIONS

Incident	Contact	Notification		Responsible
		Verbal	Written if requested by Regulator	
Death	Police Department of Primary Industry and Resources - Energy Directorate - Pipeline Operations Worksafe NT	Immediate	48 hours	HSE Advisor
Immediate treatment as an in-patient in a hospital	Worksafe NT	Immediate	48 hours	HSE Advisor
Immediate treatment for the amputation of any part of his or her body	Worksafe NT	Immediate	48 hours	HSE Advisor
Immediate treatment for a serious head injury	Worksafe NT	Immediate	48 hours	HSE Advisor
Immediate treatment for a serious eye injury	Worksafe NT	Immediate	48 hours	HSE Advisor
Immediate treatment for a serious burn	Worksafe NT	Immediate	48 hours	HSE Advisor
Immediate treatment for the separation of his or her skin from an underlying tissue (such as degloving or scalping)	Worksafe NT	Immediate	48 hours	HSE Advisor
Immediate treatment for a spinal injury	Worksafe NT	Immediate	48 hours	HSE Advisor
Immediate treatment for the loss of a bodily function	Worksafe NT	Immediate	48 hours	HSE Advisor
Immediate treatment for serious lacerations	Worksafe NT	Immediate	48 hours	HSE Advisor
medical treatment within 48 hours of exposure to a substance	Worksafe NT	Immediate	48 hours	HSE Advisor
Uncontrolled escape, spillage or leakage of a substance	Worksafe NT	Immediate	48 hours	HSE Advisor
Uncontrolled escape of gas or steam	Worksafe NT	Immediate	48 hours	HSE Advisor
Uncontrolled escape of a pressurised substance	Worksafe NT	Immediate	48 hours	HSE Advisor
Uncontrolled implosion, explosion or fire	Worksafe NT	Immediate	48 hours	HSE Advisor

Incident	Contact	Notification		Responsible
		Verbal	Written if requested by Regulator	
Electric shock	Worksafe NT	Immediate	48 hours	HSE Advisor
Fall or release from a height of any plant, substance or thing	Worksafe NT	Immediate	48 hours	HSE Advisor
Collapse, overturning, failure or malfunction of, or damage to, any plant that is required to be design or Item registered under the Work Health and Safety (National Uniform) Regulations	Worksafe NT	Immediate	48 hours	HSE Advisor
Collapse or partial collapse of a structure	Worksafe NT	Immediate	48 hours	HSE Advisor
Collapse or failure of an excavation or of any shoring supporting an excavation	Worksafe NT	Immediate	48 hours	HSE Advisor
Inrush of water, mud or gas in workings, in an underground excavation or tunnel	Worksafe NT	Immediate	48 hours	HSE Advisor
Interruption of the main system of ventilation in an underground excavation or tunnel	Worksafe NT	Immediate	48 hours	HSE Advisor
Significant damage to a pipeline or any incident which is likely to cause death or serious injury or illness or needs immediate investigation	Department of Primary Industry and Resources - Energy Directorate - Pipeline Operations	As soon as possible	As soon as practicable or As directed by the Minister	HSE Advisor
Non – compliance with Waste Discharge Licences, Environment Protection Licences and/or Environment Protection Approvals	NT EPA	Within 24 hours	As soon as practicable or As directed by EPA	Environment Advisor

Table 10 – Northern Territory

5.6 ADDITIONAL GUIDANCE FOR HARMONISED JURISDICTIONS

The following guidance is for the harmonized Work Health and Safety jurisdictions of the Commonwealth, Australian Capital Territory, New South Wales, Queensland, Northern Territory, South Australia, and Tasmania.

5.6.1 ONLY SAFETY WORK-RELATED INCIDENTS ARE NOTIFIABLE

Sometimes incidents occur at a workplace (or in the vicinity of a workplace) that do not arise out of work, or the way work is carried out or the workplace itself. These kinds of incidents that are unrelated to work or a workplace are not notifiable. For example:

- a worker or another person suffers a heart attack while at work which is unrelated to work or the workplace
- an amateur athlete is injured while playing on the local soccer team and requires immediate medical treatment (this is not work)
- a person driving to work is injured in a car accident (where driving is not part of their work)
- a person with a known medical condition becomes ill at work.

5.6.2 WORK-RELATED SAFETY INCIDENTS THAT OCCUR OUTSIDE A WORKPLACE

Work-related incidents may occur outside the workplace and these may still be notifiable if they involve a death, serious illness or injury or a dangerous incident. For example:

- an object like a hand tool is dropped off a multi-storey building under construction hitting a person below;
- scaffold collapse that causes serious injury to persons below; or
- cladding is dislodged off a multi-storey building that is a workplace, hitting a person passing by at street level.

Appendix I – Stormwater Management Report

12 November 2020

Our Reference: 361-20

194-214 Chandos Road, Horsley Park
Jemena Site

Stormwater Management Report

Jemena Gas Networks (NSW) Ltd



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DOCUMENT CONTROL				
Revision	Date	Details	Author	Reviewed
A	9/11/2020	For Submission	MG	DD
B	12/11/2020	For Submission	MG	DD



1 Background

Craig & Rhodes has been engaged by Jemena Gas Networks (NSW) Ltd to prepare documentation for a stormwater management plan, considering stormwater detention and water sensitive urban design (WSUD) treatment for the proposed power to gas development at 194-214 Chandos Road, Horsley Park.

A set of engineering drawings prepared by Craig & Rhodes accompanies this report in Appendix A.

This report aims to investigate and avoid any adverse impacts on the downstream drainage systems, and to ensure flows throughout the site are adequately managed in accordance with the development consent granted on the 10th August 2020 (SSD 2013).

2 Site Description

The two sites 194-214 Chandos Road are operational gas facilities with associated commercial buildings and related structures.

- 194 Chandos Road (lot 1) is 1.8 hectares in area. The land falls to the north-west to an existing low point.
- 214 Chandos Road (lot 3) is 1.8 hectares in area. The hardstand components of the area drain to a 250m² OSD basin. The pervious areas flow overland to three separate low points. Both sites drain to Eastern Creek.

2.1 Proposed Works

The proposed development consists of two components. The first proposed work includes a sealed turning bay totalling 1300m² located on both lot 1 and 3. This area will drain to the existing OSD basin via a bioretention system. The second is the construction of a sealed hardstand area totalling 1000m² at the plant area. This area will drain as sheet flow into a grass swale to an existing outlet.

3 Reference Policies and Guidelines

The following documents were referenced in developing the stormwater drainage and water sensitive urban design strategy for the proposed development:

- Fairfield City Council, September 2017, Stormwater Management Policy
- Western Sydney Parklands Design Manual
- Engineers Australia, 2019, Australian Rainfall & Runoff
- NSW Government, 2015, NSW MUSIC Modelling Guidelines



4 **Stormwater Management Strategy**

The Western Sydney Parklands SEPP drives the stormwater management objective for the proposed development. The SEPP requires the ensure that stormwater is managed employing Water Sensitive Urban Design techniques.

The water quantity and water quality management strategy are provided in the subsequent sections.

5 **Water Quality Management**

The site is located within the Western Sydney Parklands, and there are no specific water quality target requirements. In the absence of the specification, we have considered water quality target in line the current industry practice. It is noted that as per the development consent condition that the Fairfield City Council Stormwater Management Policy is considered. Craig and Rhodes have, therefore utilised a WSUD performance target of greater than that within section 6.2 Performance Criteria within the management policy.

The following Table is a summary of water quality targets.:

Pollutant	Stormwater quality Management Objective
Total Suspended Solids	85% reduction
Total Phosphorus	65% reduction
Total Nitrogen	45% reduction
Gross Pollutants >5mm	90% reduction

Table 1 - Stormwater Quality Performance Targets (Council Standard for Development)

WSUD strategy proposed will be modelled and compared against industry-standard pollutant targets for comparative purposes. This is consistent with The Fairfield City Council stormwater management policy.

5.1 **Methodology**

The stormwater quality management modelling has been prepared using MUSIC (Model for Urban Stormwater Improvement Conceptualisation) Version 6.3.

5.1.1 **Data Inputs**

Climate Data

The meteorological data adopted for the proposed development incorporates 6-minute rainfall (pluviography) and monthly evaporation data from the Parramatta North Meteorologic station 067035 between 1984 and 2010 providing an average annual rainfall of 960mm and average evapotranspiration of 1261mm. This period provides a mix of wet, dry and average rainfall years.



Source Nodes

The following Table summarises the source node inputs used within the MUSIC model.

Landuse Category		Total Suspended Solids (mg/L Log ₁₀)		Total Phosphorus (mg/L Log ₁₀)		Total Nitrogen (mg/L Log ₁₀)	
		Storm Flow	Base Flow	Storm Flow	Base Flow	Storm Flow	Base Flow
Road Areas	Mean Std Dev	2.43 0.32	n/a	-0.30 0.25	n/a	0.34 0.19	n/a
Other Impervious Areas	Mean Std Dev	2.15 0.32	n/a	-0.60 0.25	n/a	0.30 0.19	n/a
Pervious Areas	Mean Std Dev	2.15 0.32	1.20 0.17	-0.60 0.25	-0.85 0.19	0.30 0.19	0.11 0.12

Table 2 - Stormwater Quality Parameters Source Nodes

Treatment Train

The existing treatment includes grass buffers, swale and basins and does not provide sufficient treatment for the runoff from the proposed 1300m² sealed surface of the turning bay.

The model has considered 200m² bio-retention basin, which has 32m² of filter area. An extended detention depth of 200mm was chosen. The filter media layer depth is 400mm, 100mm sandy transition layer and a 200mm gravel drainage layer as detailed in the drawing set presented in Appendix A.

A treatment train to treat flow from 1000m² hardstand area. This includes grass buffer (existing) and vegetated swale (proposed). The vegetated swale will lead to an existing outlet. The design drawing is provided in Appendix 1.

The overall MUSIC model layout is shown in Figure 1.

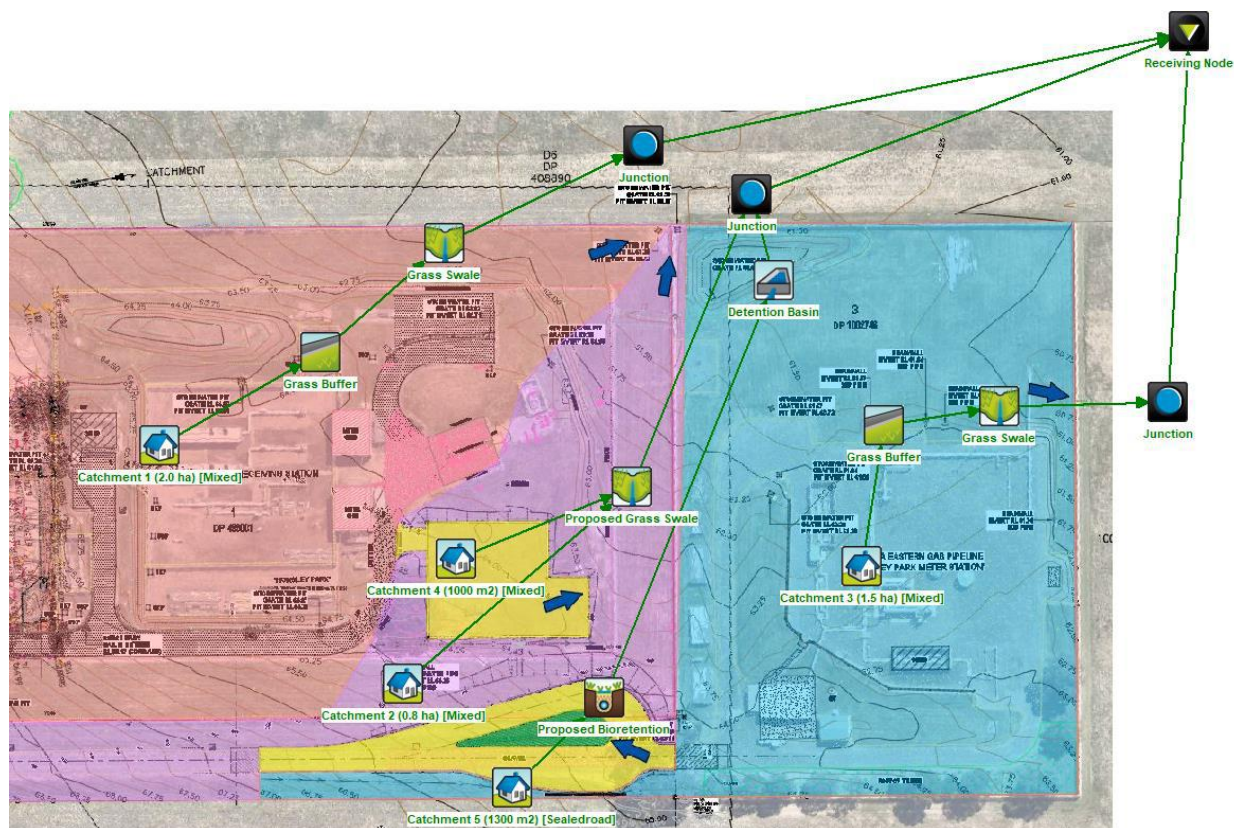


Figure 1 - MUSIC Model Layout

5.2 Results

The results from the MUSIC model indicates that the proposed treatment train provided water quality treatment exceeded the target level indicated in Table 1.

The following Table outlines the overall performance of the treatment train.

Pollutant	Post-Development without Treatment	Post-Development with Treatment	Overall Reduction (%)	Stormwater Management Objective (%)
Flow (ML/yr)	11.5	7.52	34.8	-
Total Suspended Solids (kg/yr)	2280	7.52	89.9	85
Total Phosphorus (kg/yr)	4.69	1.19	74.5	65
Total Nitrogen (kg/yr)	32	14.9	53.4	45



Gross Pollutants (kg/yr)	243	0	100	90
--------------------------	-----	---	-----	----

Table 3 - MUSIC Summary Table

Additional MUSIC results are shown in Appendix B.

5.3 Stormwater Quantity Management

The stormwater management objective for the proposed development is driven by the Western Sydney Parklands SEPP. There are no specific requirements in this study to manage stormwater quantity management, attenuation of peak flow in particular.

However, with the provision of WSUD design elements in water quality study, it is noted that there is a 35% reduction in flow volume, even though there is an increase in impervious area.

5.4 Management of Overland Flow

The proposed turning bay and the hardstand area not in overall flows paths. There are no issues required to be considered in the design.

6 Conclusion

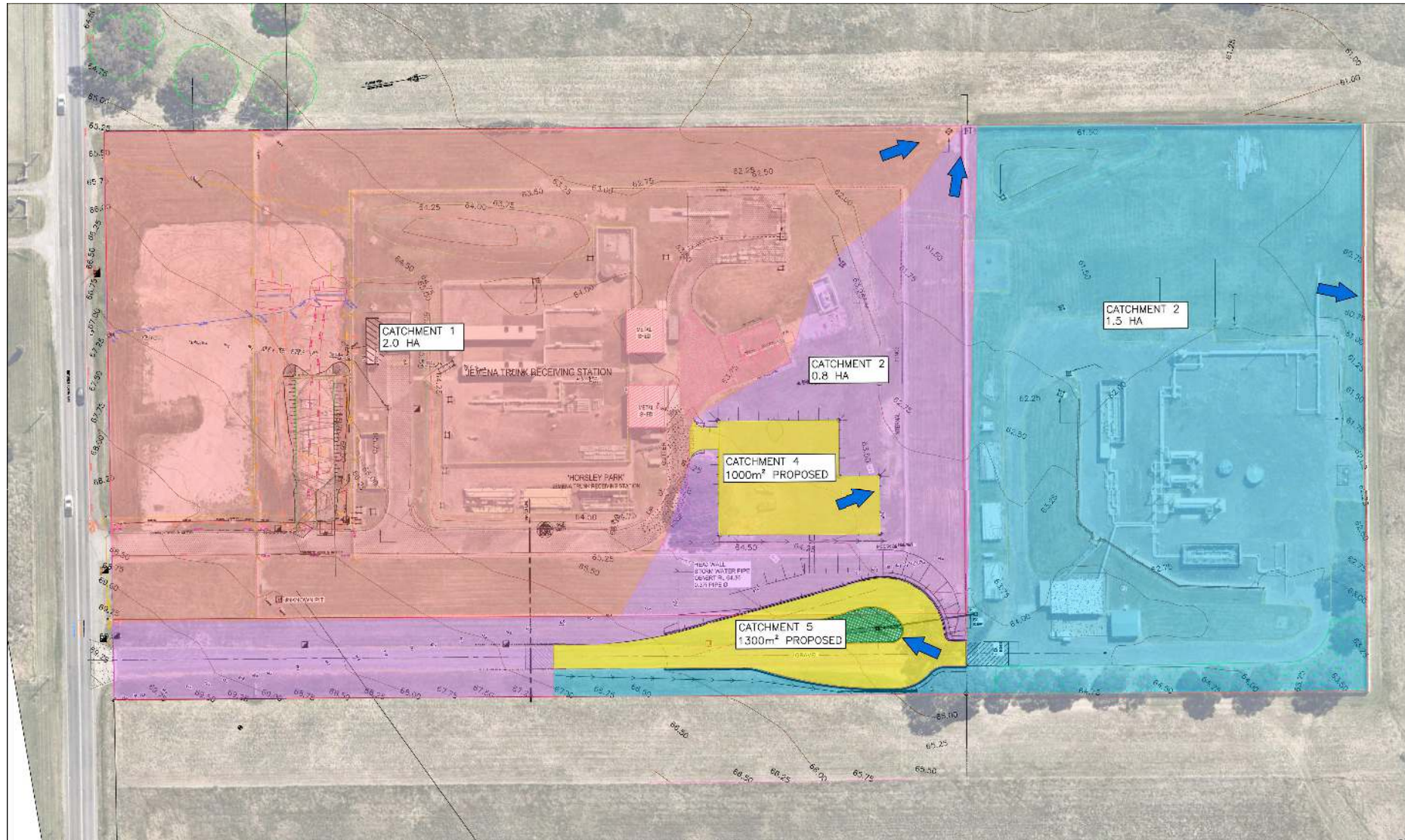
The utilisation of treatment trains in line with WSUD principles provides sufficient water quality treatment. Therefore, it is concluded that the proposed stormwater strategy for the proposed development is fit for purpose and meets the objectives adopted in addition to the performance objectives for stormwater quality improvement targets noted in the Fairfield City Council Stormwater Management Policy.

7 Recommendation

It is recommended that the design is incorporated into the client's Civil Works design within the works package.



Appendix A – WSUD Drawing Set



CATCHMENT PLAN
SCALE 1:500 ON A1

Rev.	Revision	Description	Designed	Date	Original sheet size	A1
			Designed: MG		Authorised: RK	
			Checked: RK		Approved: ---	

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MELBOURNE UNIT 7, 84 CHURCH ST, RICHMOND VIC 3121 P 03 9208 0111
 CAD FILE: 361.20-CD-P01.dwg

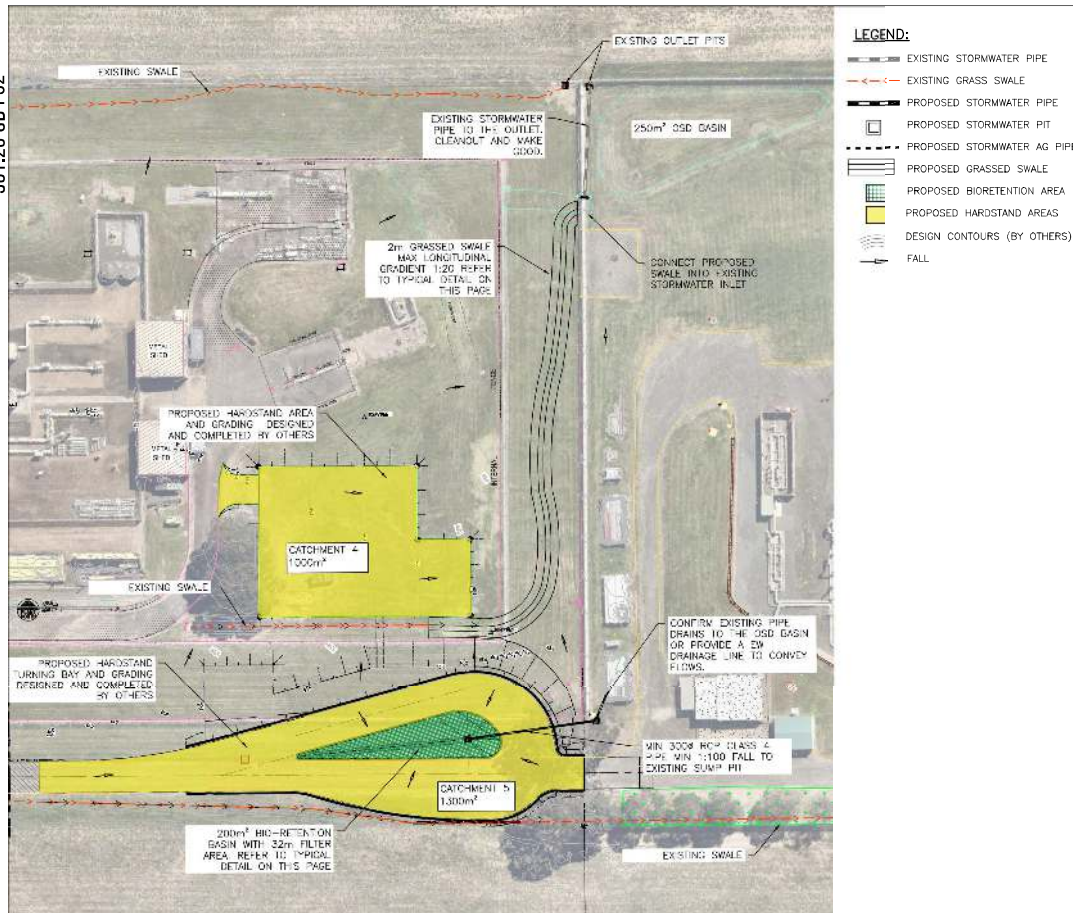
CLIENT: JEMENA PTY LTD
 LEVEL 11, 99 WALKER STREET
 NORTH SYDNEY, NSW 2060
CONTACT: TOM BREADON
 P 02 9867 7599

STORMWATER MANAGEMENT PLAN

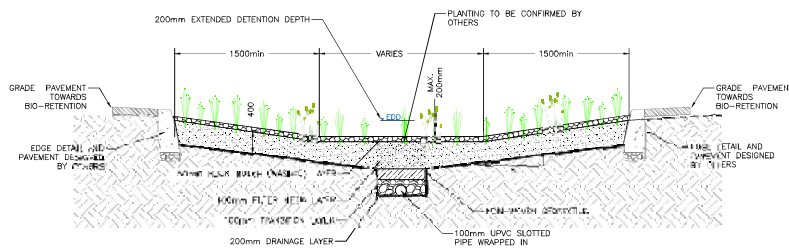
PRELIMINARY DESIGN
 194-214 CHANDOS ROAD, HORSLEY PARK

CATCHMENT PLAN

Date 05.11.2020 Drawing No. 361.20-CD-P01 Sheet 1 of 02



LAUYOUT PLAN
SCALE 1:500 ON A1



BIO-RETENTION TYPICAL DETAIL
NOT TO SCALE

BIO-RETENTION MATERIAL SPECIFICATION

MULCH LAYER

THE TOP LAYER OF THE FILTER SHOULD BE COVERED WITH LAYER OF SCREENED NO FINES STONE AGGREGATE MULCH. 100% OF THE PARTICLES SHOULD BE IN THE SIZE RANGE 10-20MM. MULCH SHALL BE RAKED EVEN AND KEPT CLEAR OF PLANT STEMS TO AVOID COLLAR ROT. THE FINISHED LEVEL IS CRITICAL FOR EXTENDED DETENTION STORAGE VOLUME. A SAMPLE IS TO BE PROVIDED TO THE SUPERINTENDENT FOR APPROVAL PRIOR TO INSTALLATION AND SHALL NOT BE SEDIMENTARY IN ORIGIN.

FILTER LAYER

THE FILTER MATERIAL SHALL PREFERABLY BE A 'WASHED SAND' OF SILICEOUS OR CALCAREOUS ORIGIN, ONE THAT HAS BEEN MINED AND PROCESSED. NATURAL SOILS OR TOPSOILS ARE NOT USUALLY SUITABLE. USE BURDETTE'S TURF 200 OR SIMILAR AND AMEND TO SUIT THE FOLLOWING PROPERTIES:

- SATURATED HYDRAULIC CONDUCTIVITY (HC) - FILTER MEDIA SHALL HAVE A HC IN THE RANGE OF 150 - 250MM/H. THIS CRITICAL ELEMENT IS TO BE DEMONSTRATED THROUGH LAB TESTING USING ASTM F1815-06.
- PARTICLE SIZE DISTRIBUTION (PSD) - COMPOSITION (W/W) REQUIREMENTS:

DESCRIPTION	PROPORTION	GRADING
CLAY & SILT	<2%	<0.05 MM
VERY FINE SAND	5-30%	0.05-0.15 MM
FINE SAND	10-30%	0.15-0.25 MM
MEDIUM TO COARSE SAND	40-60%	0.25-1.0 MM
COARSE SAND	7-10%	1.0-2.0 MM
FINE GRAVEL	<3%	2.0-3.4 MM
- TOTAL NITROGEN (TN) CONTENT - < 1000MG/KG
- ORTHOPHOSPHATE CONTENT - < 10MG/KG
- ORGANIC MATTER - AT LEAST 3% (W/W)
- PH - FILTER MEDIA IS TO HAVE A PH 5.5 - 7.5 BEFORE DELIVERY TO SITE, ADD DOLOMITE AS REQUIRED.
- ELECTRICAL CONDUCTIVITY (EC) - FILTER MEDIA EC TO BE <1.2 DS/M

UPPER FILTER MEDIA

UPPER 100MM OF FILTER MEDIA LAYER TO BE MIXED WITH FOLLOWING TO SUPPORT PLANT GROWTH:

- GRANULATED POULTRY MANURE FINES 50KG/100M² FILTER AREA
- SUPERPHOSPHATE AT 2KG/100M² FILTER AREA
- MAGNESIUM SULPHATE AT 3KG/100M² FILTER AREA
- POTASSIUM SULPHATE AT 2KG/100M² FILTER AREA
- TRACE ELEMENT MIX (MICROMAX OR EQUIVALENT APPROVED) 1KG/100M² FILTER AREA
- FERTILIZER NPK (16.4.14) AT 4KG/100M² FILTER AREA
- LIME AT 20KG/100M² FILTER AREA

TESTING REQUIREMENTS

THE FOLLOWING TESTS ARE TO BE UNDERTAKEN ON ALL FILTER MEDIA PRIOR TO ITS DELIVERY:

- SATURATED HYDRAULIC CONDUCTIVITY (HC) IN ACCORDANCE WITH ASTM F1815-06.
- PARTICLE SIZE DISTRIBUTION (PSD) IN ACCORDANCE WITH AS1141.11
- CONCENTRATIONS OF TOTAL NITROGEN, ORTHOPHOSPHATE, ORGANIC MATTER, pH AND ELECTRICAL CONDUCTIVITY PRIOR TO AMELIORATION.

TRANSITION LAYER

TO PREVENT THE FILTER MEDIA FROM WASHING THROUGH A TRANSITION LAYER IS REQUIRED WHEN THE DRAINAGE LAYER IS FINE GRAVEL. THE TRANSITION LAYER SHOULD BE A CLEAN, WELL GRADED SAND/COARSE SAND MATERIAL CONTAINING <2% FINES, GENERALLY APPLIED IN A 100MM LAYER. A SUITABLE PRODUCT IS WASHED A3 FILTER SAND (VIC ROADS) WITH 90% PARTICLES RETAINED ABOVE 0.25MM.

TO AVOID MIGRATION OF THE FILTER MEDIA INTO THE TRANSITION LAYER, THE PARTICLE SIZE DISTRIBUTION OF THE SAND SHOULD BE ASSESSED TO ENSURE IT MEETS THE FOLLOWING CRITERIA:

D15 (TRANSITION LAYER) ≤ 5 X D85 (FILTER MEDIA)

WHERE D15 (TRANSITION LAYER) IS THE 15TH PERCENTILE PARTICLE SIZE IN THE TRANSITION LAYER MATERIAL AND D85 (FILTER MEDIA) IS THE 85TH PERCENTILE PARTICLE SIZE IN THE FILTER MEDIA

THE SUPERINTENDENT MAY REQUIRE THE TRANSITION LAYER TO BE TESTED TO DETERMINE ITS HYDRAULIC CONDUCTIVITY AND PARTICLE SIZE DISTRIBUTION.

DRAINAGE LAYER

THE DRAINAGE LAYER IS NORMALLY BETWEEN 100 - 150MM THICK. SUITABLE MATERIALS INCLUDE A WASHED COARSE SAND (COARSER THAN TRANSITION LAYER) OR WASHED FINE GRAVEL IN THE RANGE 4MM - 7MM. SCORIA IS NOT AN ACCEPTABLE MATERIAL FOR THIS APPLICATION.

ACCEPTABLE PARTICLE SIZE DISTRIBUTION:

PARTICLE SIZE (MM)	% RETAINED
GREATER THAN 7.0	0
4.0 - 7.0	GREATER THAN 70
2.0 - 4.0	LESS THAN 20
LESS THAN 2.0	0

TO AVOID MIGRATION OF THE TRANSITION LAYER INTO THE DRAINAGE LAYER, THE PARTICLE SIZE DISTRIBUTION OF THE SAND SHOULD BE ASSESSED TO ENSURE IT MEETS THE FOLLOWING CRITERIA:

D15 (DRAINAGE LAYER) ≤ 5 X D85 (TRANSITION LAYER)

WHERE D15 (DRAINAGE LAYER) IS THE 15TH PERCENTILE PARTICLE SIZE IN THE DRAINAGE LAYER MATERIAL AND D85 (TRANSITION LAYER) IS THE 85TH PERCENTILE PARTICLE SIZE IN THE TRANSITION LAYER

NOTE: THE PERFORATIONS IN THE UNDERDRAIN PIPES SHOULD BE SMALL ENOUGH TO PREVENT THE DRAINAGE LAYER FROM FALLING THROUGH THE PIPES. A USEFUL GUIDE IS TO CHECK THAT D85 (DRAINAGE LAYER) IS GREATER THAN THE PIPE PERFORATION WIDTH. UNLESS SPECIFIED OTHERWISE, STORM RECOMMEND SLOTTING OF THE PIPES AT 3, 6 AND 9 O'CLOCK.

THE SUPERINTENDENT MAY REQUIRE THE DRAINAGE LAYER TO BE TESTED TO DETERMINE ITS HYDRAULIC CONDUCTIVITY AND PARTICLE SIZE DISTRIBUTION.

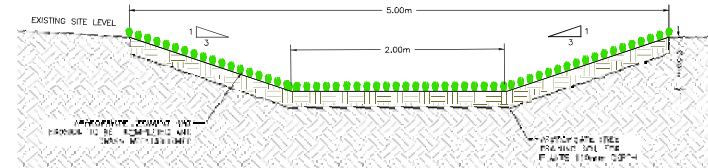
GEOTEXTILE WRAP

UNLESS SPECIFIED OTHERWISE, STORM REQUIRES AN A24 BIDM OR EQUIVALENT FOR THE SIDES OF THE RAINGARDEN ONLY. THE BASE OF THE RAINGARDEN IS NOT BE LINED UNLESS SPECIFIED, HOWEVER A SMALL 100mm LAP AT THE CORNER IS ACCEPTABLE.

CONSTRUCTION HOLD POINTS

THE CONTRACTOR IS TO SEEK APPROVAL OF THE SUPERINTENDENT BEFORE PROCEEDING WITH THE CONSTRUCTION AT THE FOLLOWING STAGES OF IMPLEMENTATION:

- PROVISION OF SAMPLES AND SPECIFIED TEST RESULTS FOR ALL MATERIALS (MULCH, FILTER, TRANSITION AND DRAINAGE MEDIA) PRIOR TO DELIVERY TO SITE AND INSTALLATION
- CONNECTION TO STORMWATER SYSTEM AND PLACEMENT OF DRAINAGE LAYER
- INSTALLATION OF FILTER MEDIA BEFORE PLACEMENT OF MULCH
- COMPLETION OF RAINGARDEN INCLUDING PLANTS AND MULCHING



GRASS SWALE TYPICAL DETAIL
NOT TO SCALE

Rev.	Revision	Description	Designed	Date	Original sheet size A1
1			MG		
2			RK		
3					
4					
5					
6					
7					
8					
9					
10					

FOR APPROVAL

Designed:	MG	Authorised:	RK
Checked:	RK	Approved:	---
10	5	10	20
1:500			
North			



SYDNEY SUITE 7.01 LEVEL 7, 3 RIDER BLVD, RHODES NSW 2138 P 02 9869 1855
MELBOURNE UNIT 7, 84 CHURCH ST, RICHMOND VIC 3121 P 03 9208 0111

CAD FILE: 361.20-CD-0P.dwg

CLIENT: JEMENA PTY LTD
LEVEL 11, 99 WALKER STREET
NORTH SYDNEY, NSW 2060
CONTACT: TOM BREADON
P 02 9867 7599

STORMWATER MANAGEMENT PLAN

PRELIMINARY DESIGN
194-214 CHANDOS ROAD, HORSLEY PARK

GENERAL ARRANGEMENT, TYPICAL DETAIL, NOTES

Date 05.11.2020 Drawing No. 361.20-CD-PD2 Sheet 2 of 02



Appendix B – MUSIC Model Results Summary

Source nodes

Location,Catchment 1 (2.0 ha),Catchment 2 (0.8 ha),Catchment 3 (1.5 ha),Catchment 4 (1000 m2),Catchment 5 (1300 m2)

ID,5,6,7,8,9

Node

Type,UrbanSourceNode,UrbanSourceNode,UrbanSourceNode,UrbanSourceNode,UrbanSourceNode

Zoning Surface Type,Mixed,Mixed,Mixed,Mixed,Sealedroad

Total Area (ha),2,0.8,1.5,0.1,0.13

Area Impervious

(ha),0.291492537313433,0.0412238805970149,0.218619402985075,0.0145746268656716,0.13

Area Pervious

(ha),1.70850746268657,0.758776119402985,1.28138059701493,0.0854253731343284,0

Field Capacity (mm),99,80,99,99,99

Pervious Area Infiltration Capacity coefficient - a,180,180,180,180,180

Pervious Area Infiltration Capacity exponent - b,3,3,3,3,3

Impervious Area Rainfall Threshold (mm/day),1,1,1,1,1

Pervious Area Soil Storage Capacity (mm),119,119,119,119,119

Pervious Area Soil Initial Storage (% of Capacity),25,25,25,25,25

Groundwater Initial Depth (mm),10,10,10,10,10

Groundwater Daily Recharge Rate (%),25,25,25,25,25

Groundwater Daily Baseflow Rate (%),25,25,25,25,25

Groundwater Daily Deep Seepage Rate (%),0,0,0,0,0

Stormflow Total Suspended Solids Mean (log mg/L),2.2,2.2,2.2,2.2,2.43

Stormflow Total Suspended Solids Standard Deviation (log mg/L),0.32,0.32,0.32,0.32,0.32

Stormflow Total Suspended Solids Estimation

Method,Stochastic,Stochastic,Stochastic,Stochastic,Stochastic

Stormflow Total Suspended Solids Serial Correlation,0,0,0,0,0

Stormflow Total Phosphorus Mean (log mg/L),-0.45,-0.45,-0.45,-0.45,-0.3

Stormflow Total Phosphorus Standard Deviation (log mg/L),0.25,0.25,0.25,0.25,0.25

Stormflow Total Phosphorus Estimation

Method,Stochastic,Stochastic,Stochastic,Stochastic,Stochastic

Stormflow Total Phosphorus Serial Correlation,0,0,0,0,0

Stormflow Total Nitrogen Mean (log mg/L),0.42,0.42,0.42,0.42,0.34

Stormflow Total Nitrogen Standard Deviation (log mg/L),0.19,0.19,0.19,0.19,0.19

Stormflow Total Nitrogen Estimation

Method,Stochastic,Stochastic,Stochastic,Stochastic,Stochastic

Stormflow Total Nitrogen Serial Correlation,0,0,0,0,0

Baseflow Total Suspended Solids Mean (log mg/L),1.1,1.1,1.1,1.1,1.2

Baseflow Total Suspended Solids Standard Deviation (log mg/L),0.17,0.17,0.17,0.17,0.17

Baseflow Total Suspended Solids Estimation

Method,Stochastic,Stochastic,Stochastic,Stochastic,Stochastic

Baseflow Total Suspended Solids Serial Correlation,0,0,0,0,0

Baseflow Total Phosphorus Mean (log mg/L),-0.82,-0.82,-0.82,-0.82,-0.85

Baseflow Total Phosphorus Standard Deviation (log mg/L),0.19,0.19,0.19,0.19,0.19

Baseflow Total Phosphorus Estimation

Method,Stochastic,Stochastic,Stochastic,Stochastic,Stochastic

Baseflow Total Phosphorus Serial Correlation,0,0,0,0,0

Baseflow Total Nitrogen Mean (log mg/L),0.32,0.32,0.32,0.32,0.11

Baseflow Total Nitrogen Standard Deviation (log mg/L),0.12,0.12,0.12,0.12,0.12

Baseflow Total Nitrogen Estimation

Method,Stochastic,Stochastic,Stochastic,Stochastic,Stochastic

Baseflow Total Nitrogen Serial Correlation,0,0,0,0,0

Flow based constituent generation - enabled,Off,Off,Off,Off,Off

Flow based constituent generation - flow file, , , , ,

Flow based constituent generation - base flow column, , , , ,

Flow based constituent generation - pervious flow column, , , , ,

Flow based constituent generation - impervious flow column, , , , ,

Flow based constituent generation - unit, , , , ,

OUT - Mean Annual Flow (ML/yr),4.93,1.66,3.70,0.247,0.991

OUT - TSS Mean Annual Load (kg/yr),929,239,712,46.0,349

OUT - TP Mean Annual Load (kg/yr),1.97,0.561,1.49,96.9E-3,0.578

OUT - TN Mean Annual Load (kg/yr),13.9,4.44,10.6,0.701,2.40

OUT - Gross Pollutant Mean Annual Load (kg/yr),114,12.0,85.5,5.70,26.4

Rain In (ML/yr),17.1072,6.84279,12.8303,0.855349,1.11196

ET Loss (ML/yr),12.224,5.20093,9.16811,0.611192,0.120736

Deep Seepage Loss (ML/yr),0,0,0,0,0

Baseflow Out (ML/yr),0.413915,0.510473,0.310437,0.0206958,0

Imp. Stormflow Out (ML/yr),2.28744,0.304992,1.71558,0.114372,0.991225

Perv. Stormflow Out (ML/yr),2.23264,0.845394,1.67448,0.111632,0

Total Stormflow Out (ML/yr),4.52008,1.15039,3.39006,0.226004,0.991225

Total Outflow (ML/yr),4.93399,1.66086,3.7005,0.2467,0.991225

Change in Soil Storage (ML/yr),-0.0508558,-0.0189345,-0.0381419,-0.00254278,0

TSS Baseflow Out (kg/yr),5.6294,6.94379,4.20903,0.28157,0

TSS Total Stormflow Out (kg/yr),923.644,232.278,708.087,45.7401,349.084

TSS Total Outflow (kg/yr),929.273,239.222,712.296,46.0217,349.084

TP Baseflow Out (kg/yr),0.0689196,0.0848788,0.0517895,0.00343961,0

TP Total Stormflow Out (kg/yr),1.89947,0.475926,1.43337,0.0934419,0.578142

TP Total Outflow (kg/yr),1.96839,0.560804,1.48516,0.0968815,0.578142

TN Baseflow Out (kg/yr),0.898312,1.10872,0.673412,0.04496,0

TN Total Stormflow Out (kg/yr),12.9537,3.33484,9.90763,0.655978,2.39676

TN Total Outflow (kg/yr),13.852,4.44356,10.581,0.700938,2.39676

GP Total Outflow (kg/yr),115.465,12.7492,86.599,5.77327,26.4097

No Imported Data Source nodes

USTM treatment nodes

Location,Grass Buffer,Grass Buffer,Grass Swale,Detention Basin,Proposed Grass

Swale,Proposed Bioretention,Grass Swale

ID,10,11,12,13,14,15,16

Node

Type,BufferNode,BufferNode,SwaleNode,DetentionBasinNode,SwaleNode,BioRetentionNode,SwaleNode

Lo-flow bypass rate (cum/sec), , ,0,0,0,0,0

Hi-flow bypass rate (cum/sec), , , ,100, ,100,

Inlet pond volume, , , ,0, , ,

Area (sqm),1457.46268656716,1093.09701492537, ,250, ,250,

Initial Volume (m^3), , , , , , ,

Extended detention depth (m), , ,0.3,0.6,0.3,0.2,0.3

Number of Rainwater tanks, , , , , , ,

Permanent Pool Volume (cubic metres), , , ,2, , ,

Proportion vegetated, , , ,0, , ,

Equivalent Pipe Diameter (mm), , , ,1, , ,

Overflow weir width (m), , , ,0.3, ,2,

Notional Detention Time (hrs), , , ,23.1E3, , ,
 Orifice Discharge Coefficient, , , ,0.6, , ,
 Weir Coefficient, , , ,1.7, ,1.7,
 Number of CSTR Cells, , ,10,1,10,3,10
 Total Suspended Solids - k (m/yr), , , ,8000,8000,8000,8000,8000
 Total Suspended Solids - C* (mg/L), , ,20,20,20,20,20
 Total Suspended Solids - C** (mg/L), , ,14,20,14, ,14
 Total Phosphorus - k (m/yr), , , ,6000,6000,6000,6000,6000
 Total Phosphorus - C* (mg/L), , ,0.13,0.13,0.13,0.13,0.13
 Total Phosphorus - C** (mg/L), , ,0.13,0.13,0.13, ,0.13
 Total Nitrogen - k (m/yr), , , ,500,500,500,500,500
 Total Nitrogen - C* (mg/L), , ,1.4,1.4,1.4,1.4,1.4
 Total Nitrogen - C** (mg/L), , ,1.4,1.4,1.4, ,1.4
 Threshold Hydraulic Loading for C** (m/yr), , , ,3500,3500,3500, ,3500
 Horizontal Flow Coefficient, , , , ,3,
 Reuse Enabled,Off,Off,Off,Off,Off,Off,Off
 Max drawdown height (m), , , , , ,
 Annual Demand Enabled,Off,Off,Off,Off,Off,Off,Off
 Annual Demand Value (ML/year), , , , , ,
 Annual Demand Distribution, , , , , ,
 Annual Demand Monthly Distribution: Jan, , , , , ,
 Annual Demand Monthly Distribution: Feb, , , , , ,
 Annual Demand Monthly Distribution: Mar, , , , , ,
 Annual Demand Monthly Distribution: Apr, , , , , ,
 Annual Demand Monthly Distribution: May, , , , , ,
 Annual Demand Monthly Distribution: Jun, , , , , ,
 Annual Demand Monthly Distribution: Jul, , , , , ,
 Annual Demand Monthly Distribution: Aug, , , , , ,
 Annual Demand Monthly Distribution: Sep, , , , , ,
 Annual Demand Monthly Distribution: Oct, , , , , ,
 Annual Demand Monthly Distribution: Nov, , , , , ,
 Annual Demand Monthly Distribution: Dec, , , , , ,
 Daily Demand Enabled,Off,Off,Off,Off,Off,Off,Off
 Daily Demand Value (ML/day), , , , , ,
 Custom Demand Enabled,Off,Off,Off,Off,Off,Off,Off
 Custom Demand Time Series File, , , , , ,
 Custom Demand Time Series Units, , , , , ,
 Filter area (sqm), , , , ,32,
 Filter perimeter (m), , , , ,32,
 Filter depth (m), , , , ,0.5,
 Filter Median Particle Diameter (mm), , , , , ,
 Saturated Hydraulic Conductivity (mm/hr), , , , ,100,
 Infiltration Media Porosity, , , , ,0.35,
 Length (m), , ,100, ,100, ,100
 Bed slope, , ,0.025, ,0.025, ,0.025
 Base Width (m), , ,1, ,1, ,1
 Top width (m), , ,4, ,4, ,4
 Vegetation height (m), , ,0.1, ,0.1, ,0.1
 Vegetation Type, , , , ,Vegetated with Effective Nutrient Removal Plants,
 Total Nitrogen Content in Filter (mg/kg), , , , ,800,
 Orthophosphate Content in Filter (mg/kg), , , , ,55,
 Is Base Lined?, , , , ,No,
 Is Underdrain Present?, , , , ,Yes,
 Is Submerged Zone Present?, , , , ,No,

Submerged Zone Depth (m), , , , , ,
 B for Media Soil Texture, -9999, -9999, -9999, -9999, -9999, 13, -9999
 Proportion of upstream impervious area treated, 1, 1, , , , ,
 Exfiltration Rate (mm/hr), 3.6, 3.6, 3.6, 1, 3.6, 3.6, 3.6
 Evaporative Loss as % of PET, , , , 100, , 100,
 Depth in metres below the drain pipe, , , , , , ,
 TSS A Coefficient, , , , , , ,
 TSS B Coefficient, , , , , , ,
 TP A Coefficient, , , , , , ,
 TP B Coefficient, , , , , , ,
 TN A Coefficient, , , , , , ,
 TN B Coefficient, , , , , , ,
 Sfc, , , , , , 0.61,
 S*, , , , , , 0.37,
 Sw, , , , , , 0.11,
 Sh, , , , , , 0.05,
 Emax (m/day), , , , , , 0.008,
 Ew (m/day), , , , , , 0.001,
 IN - Mean Annual Flow (ML/yr), 4.93, 3.70, 3.58, 0.689, 1.91, 0.991, 2.69
 IN - TSS Mean Annual Load (kg/yr), 929, 712, 225, 3.18, 285, 349, 178
 IN - TP Mean Annual Load (kg/yr), 1.97, 1.49, 0.845, 89.0E-3, 0.658, 0.578, 0.640
 IN - TN Mean Annual Load (kg/yr), 13.9, 10.6, 7.54, 0.516, 5.14, 2.40, 5.80
 IN - Gross Pollutant Mean Annual Load (kg/yr), 114, 85.5, 71.7, 0.00, 17.7, 26.4, 53.8
 OUT - Mean Annual Flow (ML/yr), 3.58, 2.69, 3.42, 59.2E-3, 1.50, 0.689, 2.54
 OUT - TSS Mean Annual Load (kg/yr), 225, 178, 98.9, 1.24, 50.0, 3.18, 75.2
 OUT - TP Mean Annual Load (kg/yr), 0.845, 0.640, 0.541, 7.83E-3, 0.250, 89.0E-3, 0.395
 OUT - TN Mean Annual Load (kg/yr), 7.54, 5.80, 6.57, 84.5E-3, 3.29, 0.516, 4.94
 OUT - Gross Pollutant Mean Annual Load
 (kg/yr), 71.7, 53.8, 0.00, 0.00, 0.00, 0.00, 0.00
 Flow In (ML/yr), 4.933, 3.69927, 3.58153, 0.689227, 1.9055, 0.991555, 2.6861
 ET Loss (ML/yr), 0, 0, 0, 0.0756487, 0, 0.0668685, 0
 Infiltration Loss
 (ML/yr), 1.3519, 1.01404, 0.157463, 0.551067, 0.410407, 0.235285, 0.146236
 Low Flow Bypass Out (ML/yr), 0, 0, 0, 0, 0, 0, 0
 High Flow Bypass Out (ML/yr), 0, 0, 0, 0, 0, 0, 0
 Orifice / Filter Out
 (ML/yr), 3.58153, 2.6861, 3.41163, 0.00498891, 1.49682, 0.644263, 2.53927
 Weir Out (ML/yr), 0, 0, 0.011945, 0.0541965, 0, 0.0449649, 0.000294109
 Transfer Function Out (ML/yr), 0, 0, 0, 0, 0, 0, 0
 Reuse Supplied (ML/yr), 0, 0, 0, 0, 0, 0, 0
 Reuse Requested (ML/yr), 0, 0, 0, 0, 0, 0, 0
 % Reuse Demand Met, 0, 0, 0, 0, 0, 0, 0
 % Load Reduction, 27.3965, 27.3883, 4.41034, 91.4128, 21.4474, 30.4902, 5.45548
 TSS Flow In (kg/yr), 929.279, 712.3, 225.49, 3.17679, 285.246, 349.082, 178.487
 TSS ET Loss (kg/yr), 0, 0, 0, 0, 0, 0, 0
 TSS Infiltration Loss (kg/yr), 0, 0, 2.43644, 11.15, 6.04494, 3.05314, 2.23148
 TSS Low Flow Bypass Out (kg/yr), 0, 0, 0, 0, 0, 0, 0
 TSS High Flow Bypass Out (kg/yr), 0, 0, 0, 0, 0, 0, 0
 TSS Orifice / Filter Out
 (kg/yr), 225.49, 178.487, 96.946, 0.0997255, 49.9823, 1.70732, 75.1729
 TSS Weir Out (kg/yr), 0, 0, 1.98439, 1.13608, 0, 1.46944, 0.0407045
 TSS Transfer Function Out (kg/yr), 0, 0, 0, 0, 0, 0, 0
 TSS Reuse Supplied (kg/yr), 0, 0, 0, 0, 0, 0, 0
 TSS Reuse Requested (kg/yr), 0, 0, 0, 0, 0, 0, 0

TSS % Reuse Demand Met,0,0,0,0,0,0
 TSS % Load Reduction,75.7349,74.9421,56.1266,61.0988,82.4775,99.09,57.8605
 TP Flow In (kg/yr),1.9684,1.48516,0.844782,0.0890487,0.657686,0.578143,0.640373
 TP ET Loss (kg/yr),0,0,0,0,0,0
 TP Infiltration Loss
 (kg/yr),0,0,0.0211733,0.0725122,0.0540785,0.0295566,0.0195784
 TP Low Flow Bypass Out (kg/yr),0,0,0,0,0,0
 TP High Flow Bypass Out (kg/yr),0,0,0,0,0,0
 TP Orifice / Filter Out
 (kg/yr),0.844782,0.640373,0.539165,0.000648713,0.250033,0.0821306,0.395312
 TP Weir Out (kg/yr),0,0,0.00174659,0.007181,0,0.00691673,6.12653E-5
 TP Transfer Function Out (kg/yr),0,0,0,0,0,0
 TP Reuse Supplied (kg/yr),0,0,0,0,0,0
 TP Reuse Requested (kg/yr),0,0,0,0,0,0
 TP % Reuse Demand Met,0,0,0,0,0,0
 TP % Load Reduction,57.0827,56.8819,35.9702,91.2074,61.9829,84.5977,38.2589
 TN Flow In (kg/yr),13.852,10.5811,7.54014,0.515621,5.14445,2.39675,5.80258
 TN ET Loss (kg/yr),0,0,0,0,0,0
 TN Infiltration Loss (kg/yr),0,0,0.250822,0.77562,0.620647,0.267093,0.231117
 TN Low Flow Bypass Out (kg/yr),0,0,0,0,0,0
 TN High Flow Bypass Out (kg/yr),0,0,0,0,0,0
 TN Orifice / Filter Out
 (kg/yr),7.54014,5.80258,6.53986,0.00692589,3.28811,0.427512,4.94094
 TN Weir Out (kg/yr),0,0,0.0252283,0.0775297,0,0.0881088,0.000846481
 TN Transfer Function Out (kg/yr),0,0,0,0,0,0
 TN Reuse Supplied (kg/yr),0,0,0,0,0,0
 TN Reuse Requested (kg/yr),0,0,0,0,0,0
 TN % Reuse Demand Met,0,0,0,0,0,0
 TN % Load Reduction,45.5665,45.1608,12.9315,83.6206,36.0843,78.4866,14.8347
 GP Flow In (kg/yr),113.96,85.4703,71.7408,0,17.6597,26.4096,53.8057
 GP ET Loss (kg/yr),0,0,0,0,0,0
 GP Infiltration Loss (kg/yr),0,0,0,0,0,0
 GP Low Flow Bypass Out (kg/yr),0,0,0,0,0,0
 GP High Flow Bypass Out (kg/yr),0,0,0,0,0,0
 GP Orifice / Filter Out (kg/yr),0,0,0,0,0,0
 GP Weir Out (kg/yr),0,0,0,0,0,0
 GP Transfer Function Out (kg/yr),0,0,0,0,0,0
 GP Reuse Supplied (kg/yr),0,0,0,0,0,0
 GP Reuse Requested (kg/yr),0,0,0,0,0,0
 GP % Reuse Demand Met,0,0,0,0,0,0
 GP % Load Reduction,100,100,100,100,100,100,100
 PET Scaling Factor, , , , ,2.1,

No Generic treatment nodes

Other nodes

Location,Junction,Junction,Junction,Receiving Node
 ID,1,2,3,4

Node Type,JunctionNode,JunctionNode,JunctionNode,ReceivingNode

IN - Mean Annual Flow (ML/yr),3.42,1.56,2.54,7.52

IN - TSS Mean Annual Load (kg/yr),98.9,51.2,75.2,225

IN - TP Mean Annual Load (kg/yr),0.541,0.258,0.395,1.19

IN - TN Mean Annual Load (kg/yr),6.57,3.37,4.94,14.9

IN - Gross Pollutant Mean Annual Load (kg/yr),0.00,0.00,0.00,0.00

OUT - Mean Annual Flow (ML/yr),3.42,1.56,2.54,7.52
 OUT - TSS Mean Annual Load (kg/yr),98.9,51.2,75.2,225
 OUT - TP Mean Annual Load (kg/yr),0.541,0.258,0.395,1.19
 OUT - TN Mean Annual Load (kg/yr),6.57,3.37,4.94,14.9
 OUT - Gross Pollutant Mean Annual Load (kg/yr),0.00,0.00,0.00,0.00
 % Load Reduction,30.6,46.3,31.4,34.8
 TSS % Load Reduction,89.4,91.9,89.4,90.1
 TN % Load Reduction,52.6,55.3,53.3,53.5
 TP % Load Reduction,72.5,79.1,73.4,74.5
 GP % Load Reduction,100,100,100,100

Links

Location,Drainage Link,Drainage Link,Drainage Link,Drainage Link,Drainage
 Link,Drainage Link,Drainage Link,Drainage Link,Drainage Link,Drainage
 Link,Drainage Link,Drainage Link,Drainage Link,Drainage Link,Drainage Link
 Source node ID,1,2,3,5,10,12,13,7,8,6,14,9,15,11,16
 Target node ID,4,4,4,10,12,1,2,11,14,14,2,15,13,16,3
 Muskingum-Cunge Routing,Not Routed,Not Routed,Not Routed,Not Routed,Not
 Routed,Not Routed,Not Routed,Not Routed,Not Routed,Not Routed,Not Routed,Not
 Routed,Not Routed,Not Routed,Not Routed
 Muskingum K, , , , , , , , , , , , , , ,
 Muskingum theta, , , , , , , , , , , , , , ,
 IN - Mean Annual Flow
 (ML/yr),3.42,1.56,2.54,4.93,3.58,3.42,59.2E-3,3.70,0.247,1.66,1.50,0.991,0.689,2
 .69,2.54
 IN - TSS Mean Annual Load
 (kg/yr),98.9,51.2,75.2,929,225,98.9,1.24,712,46.0,239,50.0,349,3.18,178,75.2
 IN - TP Mean Annual Load
 (kg/yr),0.541,0.258,0.395,1.97,0.845,0.541,7.83E-3,1.49,96.9E-3,0.561,0.250,0.57
 8,89.0E-3,0.640,0.395
 IN - TN Mean Annual Load
 (kg/yr),6.57,3.37,4.94,13.9,7.54,6.57,84.5E-3,10.6,0.701,4.44,3.29,2.40,0.516,5.
 80,4.94
 IN - Gross Pollutant Mean Annual Load
 (kg/yr),0.00,0.00,0.00,114,71.7,0.00,0.00,85.5,5.70,12.0,0.00,26.4,0.00,53.8,0.0
 0
 OUT - Mean Annual Flow
 (ML/yr),3.42,1.56,2.54,4.93,3.58,3.42,59.2E-3,3.70,0.247,1.66,1.50,0.991,0.689,2
 .69,2.54
 OUT - TSS Mean Annual Load
 (kg/yr),98.9,51.2,75.2,929,225,98.9,1.24,712,46.0,239,50.0,349,3.18,178,75.2
 OUT - TP Mean Annual Load
 (kg/yr),0.541,0.258,0.395,1.97,0.845,0.541,7.83E-3,1.49,96.9E-3,0.561,0.250,0.57
 8,89.0E-3,0.640,0.395
 OUT - TN Mean Annual Load
 (kg/yr),6.57,3.37,4.94,13.9,7.54,6.57,84.5E-3,10.6,0.701,4.44,3.29,2.40,0.516,5.
 80,4.94
 OUT - Gross Pollutant Mean Annual Load
 (kg/yr),0.00,0.00,0.00,114,71.7,0.00,0.00,85.5,5.70,12.0,0.00,26.4,0.00,53.8,0.0
 0

Catchment Details

Catchment Name,OSD JEMENA 6min_V3
 Timestep,6 Minutes

Start Date,25/12/1984
End Date,31/05/2010 11:54:00 PM
Rainfall Station, 66124 PARRAMATTA
ET Station,User-defined monthly PET
Mean Annual Rainfall (mm), 856
Mean Annual ET (mm), 1201