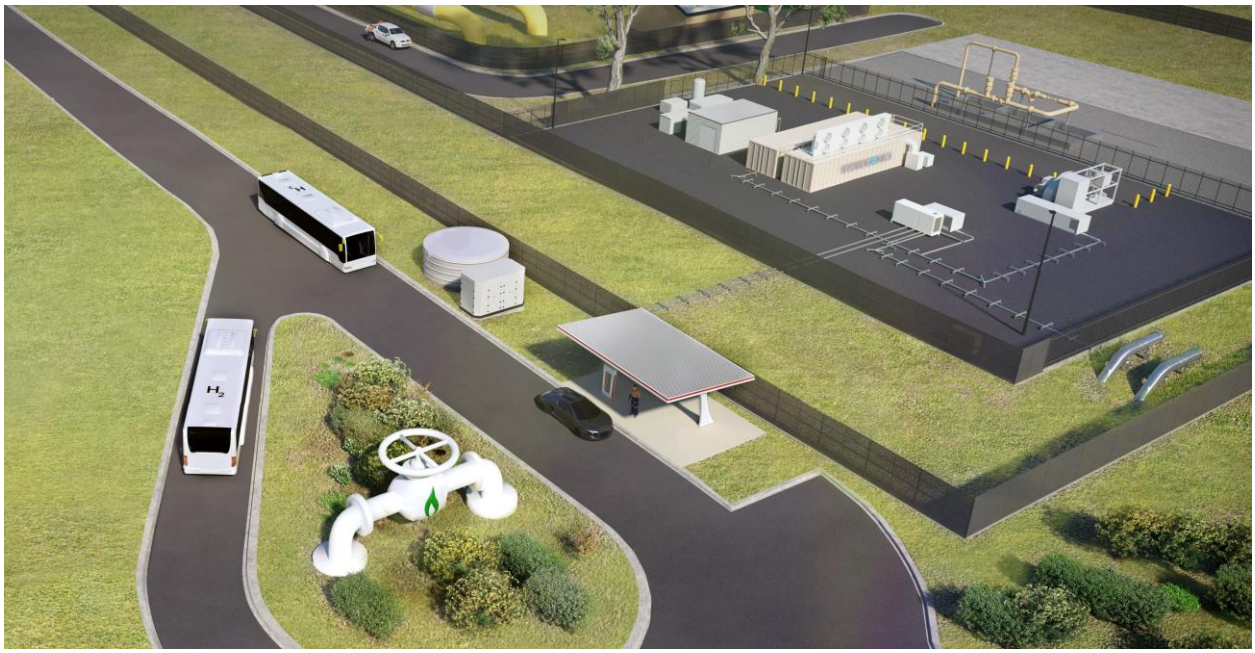
Western Sydney Green Gas Project

State Significant Development Assessment (SSD 10313)

August 2020



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Executive Summary

Jemena Gas Networks (NSW) Limited (Jemena) proposes to develop and operate the Western Sydney Green Gas Project (the Project) as a 5-year trial to demonstrate the feasibility of future commercialisation of Power-to-Gas (P2G) technology.

The Project would produce 52,600 kilograms/year (kg/year) of hydrogen and involve construction and operation of a P2G Facility and associated infrastructure to:

- convert water to hydrogen gas using electrolysis (P2G Facility);
- store hydrogen gas in a high-pressure storage and separate buffer storage pipeline on site for:
  - injection into the Sydney secondary natural gas distribution network at up to 2% by volume;
  - power generation back into the electricity grid; and/or
  - bus refuelling at a new hydrogen refuelling station (HRS).

The Project would be located at the existing Jemena high pressure gas facility in Horsley Park (Horsley Park Facility) within the Fairfield City local government area and Western Sydney Parklands.

The Project has a capital investment value of $18 million and is expected to create up to 30 full time construction jobs and 2 full time jobs during operation. It would generate enough hydrogen to supply the gas needs of approximately 250 homes.

The NSW *Net Zero Plan - Stage 1: 2020-2030* (NSW Government, 2020) sets an aspirational target of up to 10% of hydrogen within the NSW gas network by 2030 using renewable energy sources. The plan also commits to establish a Hydrogen Program to boost developing innovative new technologies that would support NSW businesses with goods, services and new market opportunities. This includes commercialisation of hydrogen production and applications, which could help to scale-up hydrogen as a low-emissions/renewable energy source. The project is consistent with these objectives.

The Department exhibited the development application and Environmental Impact Statement (EIS) from 15 January 2020 to 21 February 2020 and consulted with the key public authorities, including Fairfield City Council (Council) and Western Sydney Parklands Trust. The Department received a total of 14 submissions, including advice from 12 government authorities and 2 submissions from special interest groups. None of the public authorities or the special interest groups objected to the Project.

Assessment

The key assessment issues relate to potential off-site hazards and risks, and potential impacts on traffic safety and air quality.

The hazard analysis found that with the inclusion of suitable controls, including a firewall installed at the high-pressure hydrogen storage facility, the Project would meet acceptable off-site risk criteria associated with adjoining land uses. An assessment of the risks to downstream users and infrastructure from the injection of up to 2% hydrogen by volume showed that the blended gas would be compliant with gas quality standards and within the expected range of natural gas compositions allowed in the gas distribution network.

The Department considers the Project would not significantly increase the risk of hazards to people or the environment. Notwithstanding, the Department has included conditions requiring Jemena to carry out additional studies based on the final design of the Project and to prepare safety and emergency plans and studies for the Project.

During the construction of the Project, there would be up to 10 light vehicle and 8 heavy vehicle movements per day. During the operation of the Project, up to three buses would visit the Project site a day for refuelling. Based on this traffic volume the potential impact of the Project's construction and operation to the local traffic network is very minor.

Road safety concerns raised by Transport for NSW and Fairfield City Council related to a black-spot accident intersection at Wallgrove and Chandos roads was mitigated with Jemena proposing an alternative heavy vehicle access route during construction and operations. However, to address road safety concerns related to buses leaving the site following hydrogen refuelling, the Department has recommended a condition for a further swept path analysis of the exit and necessary upgrades be completed to the satisfaction of Council as part of the preparation and implementation of a Traffic Management Plan.

Given the small construction footprint and the types of emissions generated from the P2G Facility and from proposed power generation, the air, odour and greenhouse gas impacts associated with the project would be minimal. Dust generation during construction would be minimised by applying standard dust management practices and the access road would be sealed to ensure no dust generation during operations.

The Department has considered other potential impacts of the project to water and land resources, visual amenity, noise, Aboriginal heritage, historic heritage, traffic, waste, social and economic and biodiversity in its comprehensive assessment. The Department is satisfied that these impacts are minimal and could be suitably managed and mitigated.

Evaluation

The Department has carefully assessed the merits of the Project and the impacts during construction and operation. The Department is satisfied that the issues raised by the public authorities and special interest groups have been appropriately considered and responded to by Jemena and any residual issues could be appropriately mitigated or managed through the implementation of be the Department's recommended conditions of consent.

The Department considers the Project to be in the public interest and would be an important step towards a carbon neutral future for Australia and the growth of the hydrogen industry. Consequently, the Department considers that the benefits of the Project outweigh its impacts, and the Project should be approved, subject to the recommended conditions of consent.

Contents

1 Introduction

Jemena Gas Networks (NSW) Limited (Jemena) proposes to develop the Western Sydney Green Gas Project (the Project), which involves trialling Power-to-Gas (P2G) technology by transforming purchased green energy from the electricity mains network into hydrogen gas and injecting it into its secondary gas distribution network over a 5-year period. The Project would potentially facilitate ongoing development of commercially viable P2G systems in Jemena's NSW gas network.

The Project would be located at the existing Jemena high pressure gas facility in Horsley Park (Horsley Park Facility) within the Fairfield City local government area and Western Sydney Parklands. The Horsley Park Facility includes a number of facilities associated with Jemena's Eastern Gas Pipeline, Jemena Gas Networks Trunk Main, Sydney Primary Loop and secondary natural gas distribution network.

Jemena operates the Sydney Secondary Mains network which provides gas to over 900,000 domestic and industrial customers in the Sydney region (see **Figure 1**).

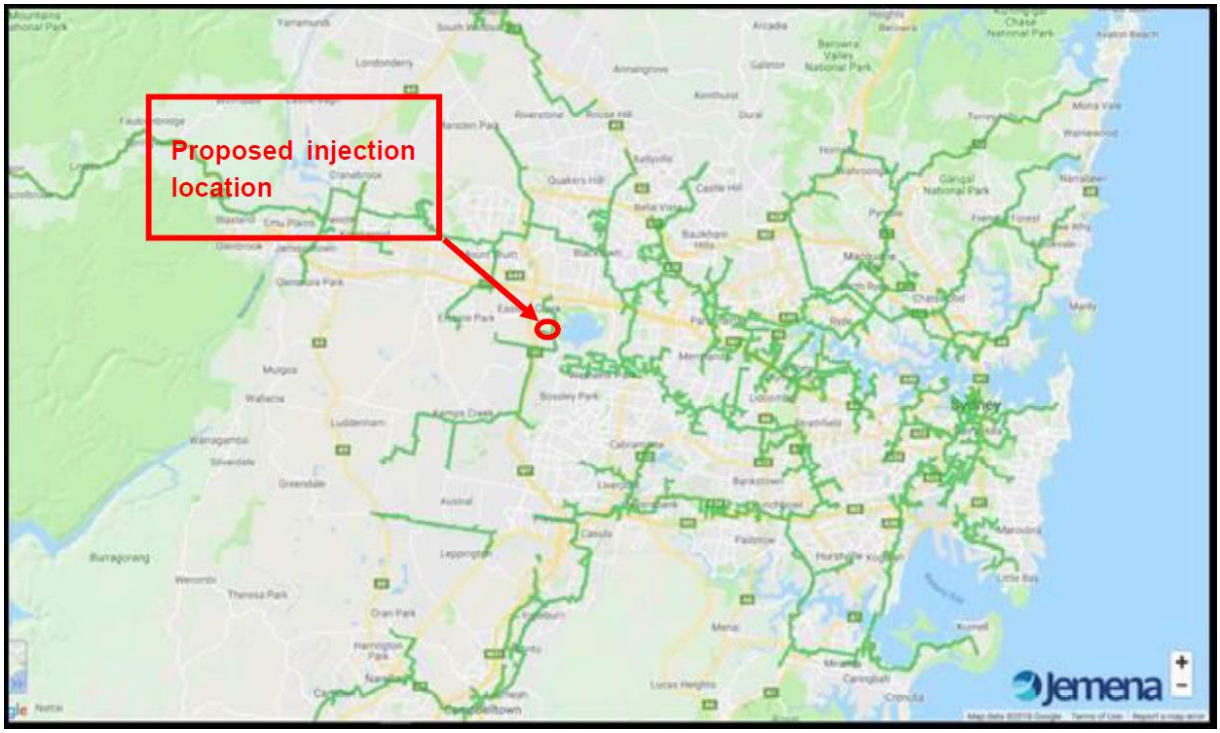

Figure 1 | Project location and the Secondary Mains network (Source: Jemena)

2 Project

2.1 Project Objectives

The objective of the Project is to test and demonstrate the ability of existing gas infrastructure to store excess renewable energy using P2G technology in the gas distribution network and facilitate the development of commercially viable systems for the Australian hydrogen industry. The specific objectives include:

- testing and developing the most viable mode of operation for P2G technology, and implication of blending up to 2% by volume of hydrogen into its natural gas stream;
- assisting development of relevant safety requirements regarding P2G technology;

- developing and trialling market opportunities for customers; and
- determining the demand for renewable gas (hydrogen) applications.

2.2 Project Components

The Project would produce 52,600 kilograms/year (kg/year) of hydrogen and involve construction and operation of a P2G facility and associated infrastructure (see **Figure 2**) to:

- convert water to hydrogen gas using electrolysis (P2G Facility);
- store hydrogen gas in a high-pressure storage and separate buffer storage pipeline on site for:
  - injection into the Sydney secondary natural gas distribution network;
  - power generation back into the electricity grid; and/or
  - bus refuelling at a new hydrogen refuelling station (HRS).

Figure 2 | Project site layout and components (Source: Jemena)

Table 1 summarises the major components of the Project. A full description of the Project is provided in the Environmental Impact Statement (EIS) (see **Appendix B**). **Figure 3** presents a flow diagram of the key components of the Project.

Table 1 | Main Components of the Project

Aspect	Description

Project summary	Five-year trial producing 52,600 kg/year of hydrogen including:
	• a 500kW P2G facility (Proton-Exchange Membrane (PEM) electrolyser) with hydrogen gas production capacity of 100 Nm^3/h; and
	• buried on-site carbon steel pipeline to store (capacity of 280 kg hydrogen) and manage the produced hydrogen prior to:
	  ○ injection into Jemena's secondary gas pipeline/distribution network up to 2% hydrogen by volume;
	  ○ generation of power through a microturbine to feed back into the grid; and/or
	  ○ use at the hydrogen refuelling station (HRS).

Ancillary Infrastructure	• Site control/equipment hut, gas injection and control panels, including controls for safely managing gas pressures and temperatures. • Water treatment, electrolyser stack, purification and cooling systems. • Gas fuelled microturbine to generate power on-site by converting natural gas to electricity with a transition from natural gas to hydrogen within 12 months. • On-site power supply infrastructure.
Site Access and Security	• The existing fencing and access route to Horsley Park Gas Facility would be used and upgraded. • A new turning circle would be constructed via the exiting access road to the Eastern Gas Pipeline facility (see **Figure 2**) to provide for the heavy vehicles using the HRS (e.g. hydrogen fuelled buses and wastewater tankers). • A maximum of three buses per day for 350 days per year
Water	• The Project would require up to 2,135 litres/day of Sydney Water supplied mains and would generate approximately 1,600 litres/day (0.58 megalitres (ML)/year) of purified water for the electrolyser and 535 litres/day of wastewater. • Water would be sourced from existing mains or potentially recycled water supplied by Sydney Water. • Wastewater would be stored in the wastewater disposal unit and removed by trucks to an off-site licenced disposal facility, reused for local irrigation (pending regulatory approval from Western Sydney Parklands Trust), and/or treated and reused within the Project site (e.g. on-site washing and septic systems).
Power	• Approximately 6 GWh electricity would be required and would be supplied by the existing main grid via a new power connection, with a two-way meter to allow for grid export and import metering (Proposed Electrical Supply, see **Figure 2**).
Construction	• Approximately 4 months during standard construction hours of 7 am to 6 pm Monday to Friday, 8 am to 1 pm on Saturday with no works on Sunday and public holidays.
Operation	• Remote continuous operation 24 hours a day by a control room. • Occasional on-site operation during working hours (7:00 am – 6:00 pm Monday to Friday).
Employment	30 construction and 2 operational full-time jobs.
Capital Investment Value	$18 million.

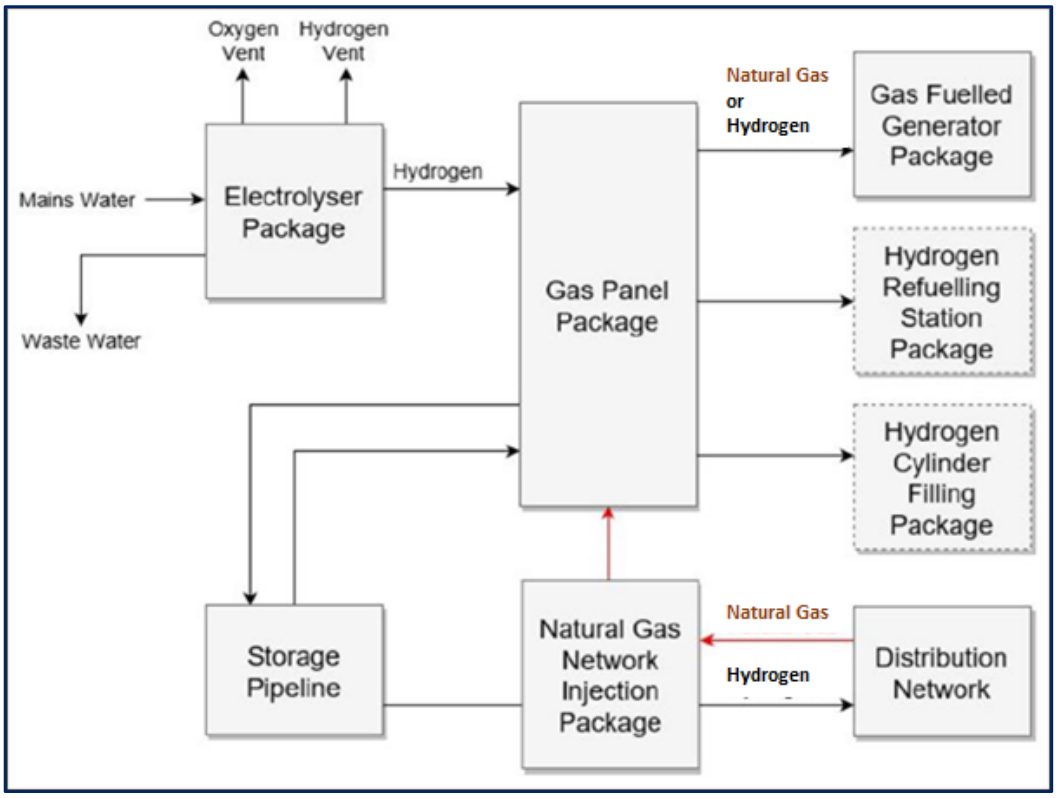

Figure 3 | Key Components (Source: Environmental Impact Statement – Western Sydney Green Gas Project).

The Project would result in generation of hydrogen and oxygen during electrolysis at the P2G facility. The generated oxygen would not be stored on-site and would be released into the atmosphere above the height of the electrolyser and at a safe distance from hydrogen vents.

The Project would generate enough hydrogen to supply gas to approximately 250 homes and provide electricity into the grid if required.

The size of the P2G facility would be approximately 20 m x 22 m, installed on reinforced concrete pads 100 mm above surrounding ground, with provisions for electrical connections from the transformer, natural gas lines, mains water inlet, wastewater outlet, hydrogen gas conduits and instrumentation and control conduits for the gas panel.

The existing internal road is unsealed with loose gravel, which would be covered with a base course and connected to the bus turning circle (see **Figure 2**). The bus turning circle would be designed to accommodate maximum of three buses, with the third bus being refuelled. The proposed design also allows for passage of additional two or more vehicles on unsealed space on both sides.

2.3 Future Scope

The proposal also outlines Jemena's future scope for the Project, including development and operation of a 550 kW – 1 MW solar farm on-site, as an alternative power supply for the Project, potential to extend the Project life at the end of the 5 years trial, and doubling the Project's hydrogen production capacity should Jemena proceed with retaining the HRS after the trial period.

The Department notes that any changes to the Project would be subject to additional development or modification applications under the relevant planning and/or regulatory requirements.

3 Strategic context

3.1 Strategic Policy Framework

The Project would contribute to the development and commercialisation of P2G technology using renewable energy sources. The Project has been developed in the context of the Commonwealth and NSW government's commitments to reduce carbon emissions under the Paris Agreement, NSW emissions reduction policies and targeted policy documents relating to the Australian hydrogen industry, as described in the sections below.

3.1.1 Australia's National Hydrogen Strategy

Australia's National Hydrogen Strategy (COAG Energy Council Hydrogen Working Group, 2019) provides a vision for a clean, innovative, safe and competitive Australian hydrogen industry.

The strategy notes that opportunities for the hydrogen industry are currently uncertain and identifies the need to carry out actions to scale-up activities and support to develop production, transport and storage technologies. The initial actions identified in the strategy include advancing pilots, trials and demonstrations as well as assessing supply chain infrastructure needs. The Project is therefore consistent with the actions identified in the strategy.

The strategy includes a series of state-based priorities based on existing and potential hydrogen capabilities. NSW is identified as having a large and expanding renewable energy sector, an established hydrogen-based industry, energy export capabilities and significant research and innovation capabilities.

The Project is specifically identified in the *Australia's National Hydrogen Strategy* and would contribute to identified priorities for NSW, which includes supporting research and development capabilities as well as considerations for updates to the regulatory frameworks to ensure safe operation of hydrogen related technologies.

3.1.2 Commonwealth Funding for Hydrogen Projects

The Australian Government has dedicated $70 million through Australian Renewable Energy Agency (ARENA) for projects that will demonstrate the production of hydrogen through electrolysis. ARENA was established by the Australian Government in 2012 under the *Australian Renewable Energy Agency Act 2011*, which supports projects that would facilitate the transition to using renewable energy technologies. The Project is partially supported by ARENA's Advancing Renewables Program and received up to $7.5 million of funding.

3.1.3 Hydrogen Strategy in NSW

The NSW *Net Zero Plan - Stage 1: 2020-2030* (NSW Government, 2020) sets an aspirational target of up to 10% of hydrogen within the NSW gas network by 2030 using renewable energy sources. The plan also commits to establish a Hydrogen Program to boost developing innovative new technologies that would support NSW businesses with goods, services and new market opportunities. This includes commercialisation of hydrogen production and applications, which could help to scale-up hydrogen as a low-emissions/renewable energy source.

Moreover, the HRS component of the Project has the potential to contribute to the development of hydrogen fuelled technologies consistent with Transport for NSW (TfNSW) action plans, as outlined in the *Future Transport 2056: NSW Electric and Hybrid Vehicle Plan* (2019), to transform transport technology and transition towards electric, hybrid and hydrogen fuelled vehicles.

The NSW and Commonwealth governments signed a memorandum of understanding (MOU) in energy and emissions reduction initiatives on 31 January 2020, which includes about $2 billion to support initiatives to reduce emissions in non-electricity sector, such as a Hydrogen Technology Program. The MOU support is in-line with the National Hydrogen Strategy recommendations and assists with commercialisation of hydrogen technologies in NSW.

3.1.4 Paris Agreement

The Paris Agreement is a framework enquiring all involved countries to reduce carbon emissions from 2020. Under the Paris Agreement in 2015, the Australian Government has a 2030 target to reduce economy-wide emissions by 26-28% below 2005 levels.

The reduction of emissions to reach the Paris Agreement targets will require the decarbonisation of the energy network, including the gas network. The research carried out as part of the Project would contribute to understanding the ability of hydrogen to reduce emissions in the gas and wider energy network.

3.2 Project Setting

The Project site is located within the boundary of Jemena's Horsley Park Facility, located at Chandos Road, Horsley Park. The Project infrastructure components cover an area of around 0.3 hectares within the existing 4 hectare site.

Land uses of the areas around the site consist of 'active open space area' to the east, which is primarily used for market gardening and has no permanent residents, rural land to the east, Austral Bricks Co Pty Ltd to the north, and Chandos Road to the south.

Population density of the surrounding area is less than 5 people per hectare. There are 10 residential properties within 500 m of the Project, with three properties located approximately 90 m to 160 m away south of the site boundary (**Figure 4**).

The proposed development of a walking track adjacent to the site identified in the *Horsley Park Urban Farming Masterplan 2019 (Western Sydney Parklands Trust, 2019)* would not change the definition of the land as an area of active open space as it is currently defined under *Hazardous Industry Planning Advisory Paper No 4: Risk Criteria for Land Use Planning (DP&E 2011)* (HIPAP 4). The outcome of the assessment summarised above would therefore remain consistent if the walking track is completed. It is noted that while the walking track is included in the masterplan, the track is still subject to development approval.

3.3 Relationship with other Approvals

In the vicinity of the Project, Jemena owns and operates the:

- Horsley Park Facility (as described in **Section 2.1**);
- Eastern Gas Pipeline; and
- Central Trunk Pipeline.

The Eastern Gas Pipeline is aligned north-south along the alignment of the western extent of the existing facility and enters from the north-western corner. The Central Trunk Pipeline passes under the south-west corner of the existing facility and connects to the facility underground.

The Project would not impact the operation of existing infrastructure and therefore would not require modifications to any other approvals.

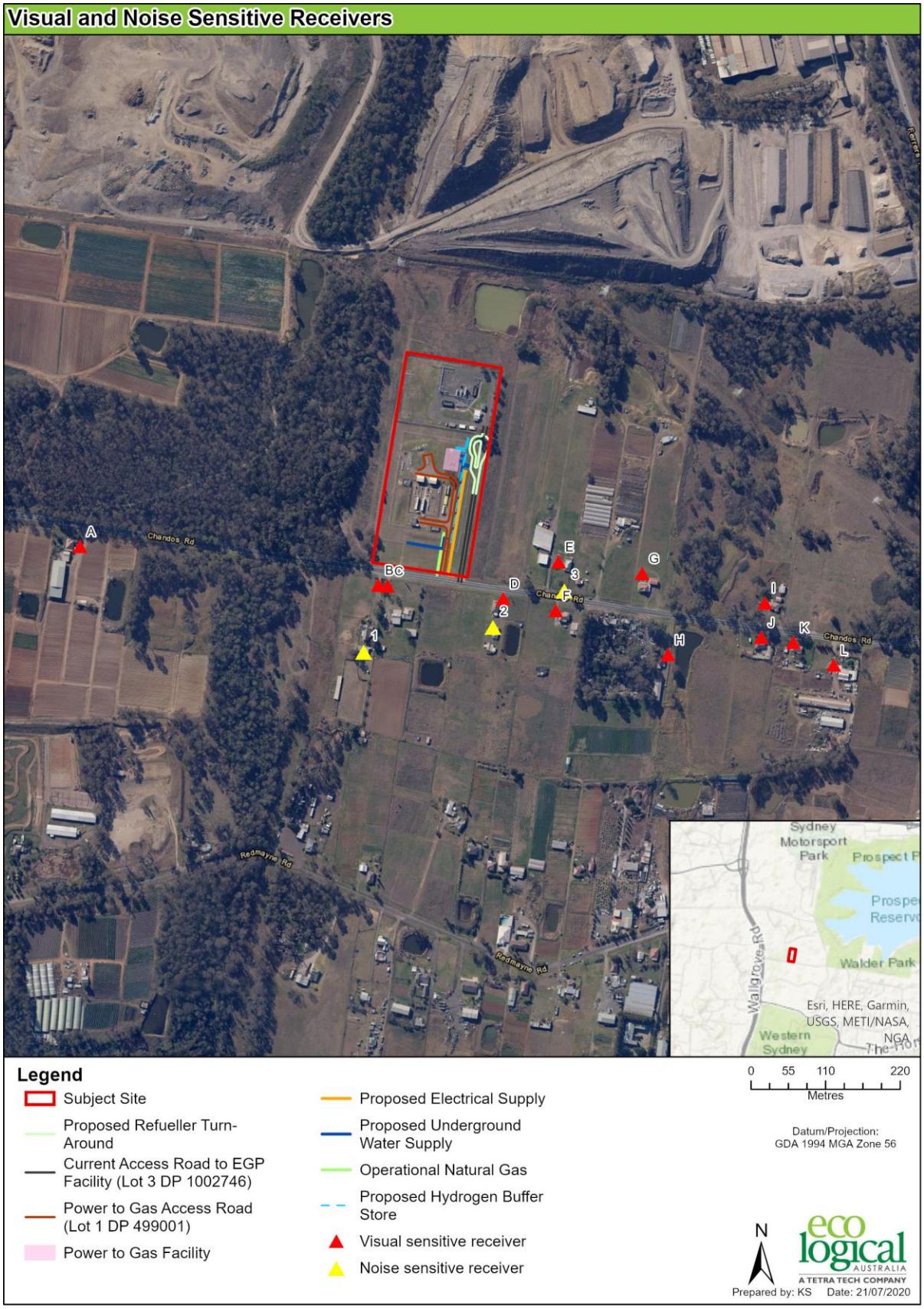

Figure 4 | Project setting (Source: Jemena)

4 Statutory Context

4.1 Approvals under the EP&A Act

4.1.1 Permissibility

The Project is located within the Fairfield City local government area. However, the *Fairfield Local Environment Plan 2013* (Fairfield LEP) and associated Development Control Plans do not apply to the Project as the site is located on unzoned land that is subject to *State Environmental Planning Policy (Western Sydney Parklands) 2009* (WSP SEPP). Under clause 11 of the WSP SEPP the Project is permissible with development consent.

The WSP SEPP includes a number of mandatory matters for the consent authority to consider prior to determination including the objects of the WSP SEPP. The Department has considered these matters in its assessment of the project with a summary provided in **Appendix G**.

4.1.2 State Significant Development

Under Schedule 2 Clause 5 of the *State Environmental Planning Policy (State and Regional Development) 2011* (SEPP SRD), the Project is classified as State significant development (SSD), as the development is located on land within the Western Sydney Parklands and has a capital investment value of more than $10 million.

Consequently, the Minister for Planning and Public Spaces (the Minister) is the consent authority for the proposed development. However, under the Minister's delegation of 9 March 2020, the Executive Director, Energy, Resources & Compliance, may determine the development application, as Council did not object, there were no submissions by way of objection from the general public, and Jemena has not made a political donations disclosure statement.

4.1.3 Environmental Planning Instruments

In addition to the SRD and WSP SEPPs, the Department has assessed the proposal against provisions of the following applicable Environmental Planning Instruments (EPIs):

- *State Environmental Planning Policy No 33—Hazardous and Offensive Development* (SEPP 33): requires consideration of a development's potential to be hazardous or offensive. The EIS included an assessment of potential risks and proposed mitigation measures for the Project against applicable risk criteria.
- *State Environmental Planning Policy No 55—Remediation of Land* (SEPP 55): makes provisions for a planning approach to the remediation of contaminated land in NSW. The EIS included an assessment of contamination land risks associated with the Project.
- *State Environmental Planning Policy (Infrastructure) 2007*: facilitates the delivery of infrastructure across NSW.

4.1.4 Application of *Biodiversity Conversation Act 2016*

Under Section 7.9(2) of the *Biodiversity Conservation Act 2016* (BC Act), an application for development consent under Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) for SSD "*is to be accompanied by a biodiversity development assessment report unless the Planning Agency Head and the Environment Agency Head determine that the proposed development is not likely to have any significant impact on biodiversity values*".

Jemena sought approval to waive the requirement for a biodiversity development assessment report (BDAR) for the Project (see the Biodiversity Development Assessment Report Waiver Approval section of Appendix B of the EIS) as the proposed site:

- is predominantly cleared of native vegetation;
- has no habitat available for threatened ecological communities; and
- is comprised of highly modified and disturbed vegetation, and soils with low natural resilience due to previous and current land management practices.

A BDAR waiver for the Project was granted on 11 September 2019 and therefore a BDAR was not required to be submitted with the development application.

4.1.5 Mandatory Matters for Consideration

Section 4.15 of the EP&A Act outlines the matters that a consent authority must take into consideration when determining development applications. These matters are summarised as the provisions of:

- the environmental, social and economic impacts of the development;
- EPIs, including draft instruments, development control plans, planning agreements, and the *Environmental Planning and Assessment Regulation 2000* (EP&A Regulations). The Department's consideration of all the relevant EPIs are detailed in **Appendix G**;
- the suitability of the site;
- any submissions; and
- the public interest, including objects of the EP&A Act which include encouraging ecologically sustainable development.

The Department has considered all of these matters in its assessment of the Project, as summarised in **Section 6** of this report and the recommended Instrument of Consent (see **Appendix H**).

In addition, the *State Environmental Planning Policy (Western Sydney Parklands) 2009* (WSP SEPP) includes a number of mandatory matters for the consent authority to consider prior to determination as outlined above.

4.2 Other Approvals

Under Section 4.41 of the EP&A Act, a number of other approvals are integrated into the State significant development approval process, and therefore are not required to be separately obtained for the proposal. No approvals identified under Section 4.41 were required for the Project.

Under Section 4.42 of the EP&A Act, a number of further approvals are required, but must be substantially consistent with any development consent for the proposal (e.g. approvals for any works under the *Roads Act 1993*, *Gas Supply Act 1996* and *Western Sydney Parklands Act 2006*).

Under the *Gas Supply (Safety and Network Management) Regulation 2013* (Gas Supply Regulation), injection of non-compliant natural gas such as hydrogen, or causing such gas to be injected, into a distribution pipeline is not allowed. It is noted that Jemena would be required to seek an exemption from conveying compliant natural gas for the hydrogen pipeline and permission to convey non-compliant natural gas at the Project's point of injection under clauses 31 and 24 of the Gas Supply Regulation.

The Department has consulted with the relevant government agencies responsible for the integrated and other approvals, considered their advice in its assessment of the project, and included suitable conditions in the recommended conditions of approval to address these matters (see **Appendix H**).

4.3 Commonwealth Approvals

Noting that a BDAR waiver was granted by the Department, no impacts on matters protected under the *Environmental Protection and Biodiversity Conservation Act 1999* have been identified. Consequently, a referral to the Commonwealth Minister for the Department of Agriculture, Water and the Environment was not made by Jemena.

5 Engagement

5.1 Department's Engagement

Consistent with clause 9 of Schedule 1 of the EP&A Act, the Department is required to publicly exhibit the EIS for a minimum of 28 days. However, the Department exhibited it for an extended period of 38 days, as the exhibition fell within the January holiday period. After accepting the development application and EIS for the Project, the Department:

- advertised the exhibition of the EIS in the Fairfield Advance and Fairfield City Champion;
- exhibited the EIS from Wednesday 15 January 2020 until Friday 21 February 2020 at the:
  - Fairfield City Council's office and Fairfield Library;
  - Nature Conservation Council's office; and
  - Department's website;
- notified the landowners surrounding the Project area, Deerubbin Local Aboriginal Land Council, relevant water and electricity supply and transmission authorities of the exhibition; and
- notified relevant State Government authorities and Council by email.

5.2 Summary of Submissions and Submissions Report

During the exhibition period, the Department received 14 submissions, including advice from 12 public authorities and two from special interest groups. The Department placed copies of all the submissions received on its website and requested that Jemena provide a response to the issues raised.

A full copy of the submissions is available in **Appendix C**. A breakdown of the submissions is provided in **Table 2**.

Table 2 | Summary of Submissions.

Submitter	Number	Position
Government Agencies	**10**	**Comment**
DPIE Energy Delivery & Coordination Environment, Energy and Sciences Group Water Group Regional NSW NSW Agriculture NSW Fisheries Environment Protection Authority Transport for NSW WaterNSW Western Sydney Parklands Trust Department of Premier and Cabinet Crown Lands		Comment
Local Councils	**2**	**1 Support, 1 Comment**
Blacktown City Council Fairfield City Council		Support Comment

Special Interest Groups	2	Comment
Brickworks Limited / Austral Bricks NSW Sydney Water		Comment
TOTAL	**14**	**13 Comment, 1 Support**

Jemena provided a Submissions Report, responding to all matters raised in submissions (see **Appendix D**). The Department referred the Submissions Report back to the key agencies and received additional comments from Fairfield City Council. Jemena's additional information to address matters raised by the Department and Fairfield City Council is available in **Appendix E**.

5.3 Key Issues - Government Agencies

None of the Government agencies or local councils objected to the Project. Key issues that were raised in their comments have been addressed through the provision of Jemena's Submissions Report, additional information, or through the recommended conditions of consent. A summary of the issues raised in the Government agency and council submissions is provided below.

The **Department of Planning, Industry and Environment – Energy Delivery and Coordination (DPIE Energy)** requested clarification on whether the facility would continue to operate after the five-year trail. DPIE Energy requested clarification on the elements of the Project that would need to be included in Jemena's existing Safety and Operating Plan (SAOP) and noted that if the hydrogen production increased in the future then further consultation between DPIE Energy and Jemena would be required. The Department's consideration of these matters is provided in **Sections 6.1** and **7.**

The **Environment Protection Authority (EPA)** stated that the proposal would not require an environment protection licence under the *Protection of the Environment Operations Act 1997* (POEO Act). However, the EPA has potentially a regulatory role in relation to the POEO Act. It recommended a condition of consent limiting the operating hours of the microturbine to between 7 am – 10 pm. The Department's consideration of noise and operating hours is provided in **Section 6.4**.

Fairfield City Council (Council) requested that Jemena carry out additional assessment for bushfire risks, Aboriginal heritage, flooding, stormwater, traffic routes, and outlined requirements for the Construction Traffic Management Plan, dilapidation surveys prior to construction. Council raised concerns regarding the construction and operational traffic route initially proposed in the EIS including safety concerns regarding the use of the Wallgrove Road and Chandos Road intersection and noted that Chandos Road is signposted with a five-tonne load limit.

Jemena carried out additional assessment and amended the proposed traffic route in the Submissions Report to address the issues raised by Council. Further consultation was undertaken with Council to resolve residual matters, including traffic safety issues associated with the new route as well as internal site traffic movements, flooding, noise and stormwater issues. These issues were either resolved during the consultation process or have been included as part of the Department's recommended conditions of consent.

Further details regarding consultation and the Department's consideration of these matters are provided in **Sections 6.2** and **6.4**.

The **Environment, Energy and Science (EES) Group** commented that the Project site is outside the limit of the Probable Maximum Flood (PMF) event, however the site is likely to be isolated as the culverts on Chandos Road are expected to be submerged under major storm events. EES recommended that Jemena develop an evacuation plan, in consultation with Council and the NSW State Emergency

Services. The Department's consideration of matters related to stormwater and flooding is provided in **Section 6.4**.

Transport for NSW (TfNSW) noted that the intersection of Wallgrove Road and Chandos Road has been identified as a blackspot site and had safety concerns with construction vehicles using this intersection. Jemena's Submissions Report provided a revised route for construction vehicles and TfNSW advised that it did not have further comments, noting that Jemena would be required to prepare and implement a construction traffic management plan and a swept path analysis in consultation with the relevant consent authorities. The Department's consideration of the traffic related matters is described in **Section 6.2**.

The **Department's Water Group** (DPIE Water) and **Natural Resources Access Regulator** (NRAR) did not have any concerns, noting that if groundwater was intercepted during construction, NRAR should be contacted for advice regarding any necessary approvals/licences. The Department notes that the Project is very unlikely to intercept groundwater from construction activities.

WaterNSW advised that the Project site is within approximately one kilometre of WaterNSW owned and managed lands, being the Warragamba Pipelines and Upper Canal controlled areas and Prospect Reservoir. WaterNSW suggested Jemena consider Prospect Reservoir as a sensitive receiver but considered the likelihood of the Project impacting WaterNSW critical water supply infrastructure as low. These matters have been further discussed in **Section 6.4**.

Western Sydney Parklands Trust (WSPT) stated that the *Western Sydney Parklands, Plan of Management 2030* & the *Horsley Park Urban Farming Masterplan 2019* were both relevant planning documents for the Project. WSPT has been in previous consultation with Jemena regarding the Project and measures to ensure the safe operation of the proposed facility and that the access road and turning facility on-site is an all-weather sealed surface to ensure that dust and erosion runoff does not impact the adjacent land. WSPT noted there is an opportunity to avoid off-site wastewater removal through water quality treatment. WSPT supported the purification of surplus water, and for this water to be considered for irrigation purposes for adjacent urban farming lots.

Blacktown City Council (BCC) provided overall support for the Project and identified interest in potentially using the HRS for its bus fleet. BCC noted that the noise assessment indicated the need for some noise mitigation for the microturbine and noise management during the construction phase. BCC also noted a discrepancy regarding the length of time that the microturbine is expected to emit nitrogen oxides while running on natural gas. This matter is discussed further in **Section 6.3** of this report.

Crown Lands, the **Department of Primary Industries – Agriculture** and the **Department of Primary Industries – Fisheries** did not raise any issues about the Project.

5.4 Key Issues - Special Interest Groups

Two submissions in the form of comments were made from the special interest groups (see **Table 2**).

The neighbouring Brickworks Limited / Austral Bricks NSW (Austral) raised concerns about potential downstream impacts of hydrogen blended fuel on the nearby brick manufacturing process, energy costs and air emissions. Jemena confirmed that the proposed injection of 2% by volume of hydrogen gas into the network would meet required specifications for gas quality and would be within the expected range of natural gas composition. The Department's assessment of the Project's risks and air quality are outlined in **Sections 6.1** and **6.3**.

Sydney Water commented that the existing water services to the site have sufficient capacity to provide water for the trial and that they had no objections to the wastewater services solution proposed by Jemena.

Sydney Water suggested that consideration should be given to increased volumetric water demands if the Project extends beyond the five-year trail, including considering recycled water, and measures to minimise or eliminate potential flooding, degradation of water quality and avoid adverse impacts on any heritage items and create pipeline easements where required.

The Department notes that these matters have been addressed in the Project's EIS and Submissions Report. Further consideration of these matters is provided in **Sections 6** and **7**.

6 Assessment

The Department has assessed the merits of the Project in accordance with the relevant requirements of the EP&A Act and applicable NSW Government policies and guidelines. The key documents that informed the Department's assessment are provided in **Appendices A** to **E**.

The key issues for the Department's assessment relate to potential off-site hazards and risks associated with loss of containment of hydrogen gas, and impacts on traffic safety and air quality.

The Department has also considered a range of other potential impacts associated with the proposal in **Section 6.4**, including impacts on land and water resources, amenity (noise and visual), heritage, biodiversity, as well as the cumulative, social and economic impacts and benefits of the Project.

6.1 Hazards and Risks

The Project includes new industrial elements within the existing Horsley Park Facility. Land uses around the Project site are a mix of industrial, agricultural and semi-rural residential. There are no schools, hospitals or other development referred to as sensitive development in *Hazardous Industry Planning Advisory Paper No 4: Risk Criteria for Land Use Planning (DP&E 2011)* (HIPAP 4) within the potential hazardous impact zone of the development.

The key hazard assessment issues for the Project are:

- the risk of a major incident affecting off-site land uses; and
- the risk of downstream impacts to the natural gas distribution network associated with the injection of hydrogen generated by the Project.

The EIS included a preliminary hazard analysis (PHA) carried out in accordance with the requirements of SEPP 33 and the Department's *Hazardous Industry Planning Advisory Paper No 6: Hazard Analysis (DP&E 2011)* (HIPAP 6). The PHA identified and modelled the probability and consequence of hazardous events occurring under a range of scenarios based on different environmental and operating conditions.

The hazardous materials identified in the PHA were hydrogen and oxygen, which would be generated during electrolysis at the P2G facility, and methane that would be used for a short period during the commissioning of the P2G facility and for use in the microturbine to produce electricity.

The PHA was based on a conservative but realistic approach, consistent with HIPAP No 6, and determined an overall risk to people and property in relation to defined risk criteria, as set out in HIPAP 4, and as summarised in **Tables 3** and **4**.

The PHA included Hazard Identification (HAZID) and Hazard and Operability (HAZOP) studies to identify the scenarios with the greatest potential for off-site consequences. and considered the potential for:

- fatality and injury risks to individuals (from heat radiation or explosion);
- propagation risks to and from other hazardous operations; and
- societal risks (fatality and injury risks to larger populations).

Table 3 | Acceptable level of risk for fatality, injury and propagation (HIPAP 4)

Acceptable level of risk (per annum)	Land use
Fatality	
0.5 in a million	Hospitals, schools, child-care facilities, old age housing
1 in a million	Residential, hotels, motels, tourist resorts
5 in a million	Commercial developments including retail centres, offices and entertainment centres
10 in a million	Sporting complexes and active open space
50 in a million	Industrial
Injury	
50 in a million	Sensitive land uses and industrial areas
Propagation	
50 in a million	Industrial operations

Table 4 | Acceptable level of risk of societal risks (HIPAP 4)

Consequence	Acceptable level of risk
One fatality	30 in a million
10 fatalities	1 in a million
100 fatalities	300 in a million
1000 fatalities	1 in one billion

The PHA included a detailed consequence analysis and identified that the most probable hazards for the Project include:

- flash fire, which occurs when a cloud of flammable gas mixed with air is ignited; and
- jet fire, which occurs when a flammable liquid or gas, under some degree of pressure, is ignited after release, resulting in the formation of a long, stable flame.

The key hazards relate to the risk of leaks from equipment from the high-pressure hydrogen storage facility and the HRS. Consequences for potential explosions would not extend beyond the site boundary due to the open-air nature of the facility and lack of congestion. The PHA identified potential offsite fatality and injury impacts are limited to the market gardens located directly to the east which is defined as an active open space area under HIPAP 4.

Fatality risk

The following worst-case scenarios with the potential to cause fatality consequences beyond the Project site were further assessed and modelled based on continuous release rates:

- scenario 5b – hydrogen high pressure storage equipment full bore leak (15 mm);
- scenario 6a – HRS equipment flange leak (10 mm); and
- scenario 6b – HRS – refuelling hose failure (15 mm).

The PHA found that to mitigate off-site fatality risk to an acceptable level a firewall on the east side of the high-pressure hydrogen storage facility would be required to eliminate the potential risk of off-site fatality associated with a flash fire incident at the high-pressure storage facility (scenario 5b).

The calculated frequency of potentially fatal individual risk associated with the HRS is 8.4 in a million ($8.4x10^{-6}$) which is below the tolerable risk for an active open space area of 10 in a million ($1x10^{-5}$). The modelled consequence contours in the PHA found that the residences 250 m away on the opposite side of Chandos Road would not be impacted by potential consequences from the Project. **Figure 5** shows the contour maps for the above 6a and 6b worst-case scenarios.

Although the individual fatality risk from the project complies with both industrial and open active space land uses, as shown in **Figure 5**, the risk contours extend beyond the project site boundary by about 35m for the worst-case scenario. This would only be an issue if the land use changed on the adjoining lot, for example to commercial or residential development. However, this area is identified as being within Precinct 9 of the *Western Sydney Parklands Plan of Management 2030* which is targeted by WSPT for urban market gardening opportunities, considered active open space for the purposes of the hazard assessment. That is, the risks are acceptable under current and proposed land use.

Injury and propagation risk

The risk of an off-site injury associated with a potential jet fire incident was determined in be 0.31 in a million which is within the acceptable risk criteria of 50 in a million. The assessment identified that no scenarios for the Project would result in damage and propagation impact at neighbouring properties.

Societal risk

The adjacent land is primarily used for market gardening, has no permanent residents and is classified as active open space area. The PHA assumed the open space is occupied with a population less than 5 people per hectare 10% of the time in a year and that no more than one fatality would occur as a result of an incident. It calculated the societal risk as 8.4 in a million per year and within the accepted limit of 30 in a million; which is considered a negligible risk under HIPAP 4.

The assessment also considered a potential scenario for future land use changes, such as if farm sheds or greenhouses are constructed at the market gardens, which may result in higher concentrations of people in the area. Based on the assumption that 10 people would be present 10% of the time, the relevant acceptable risk criteria is one in a million, which would still be considered a negligible risk.

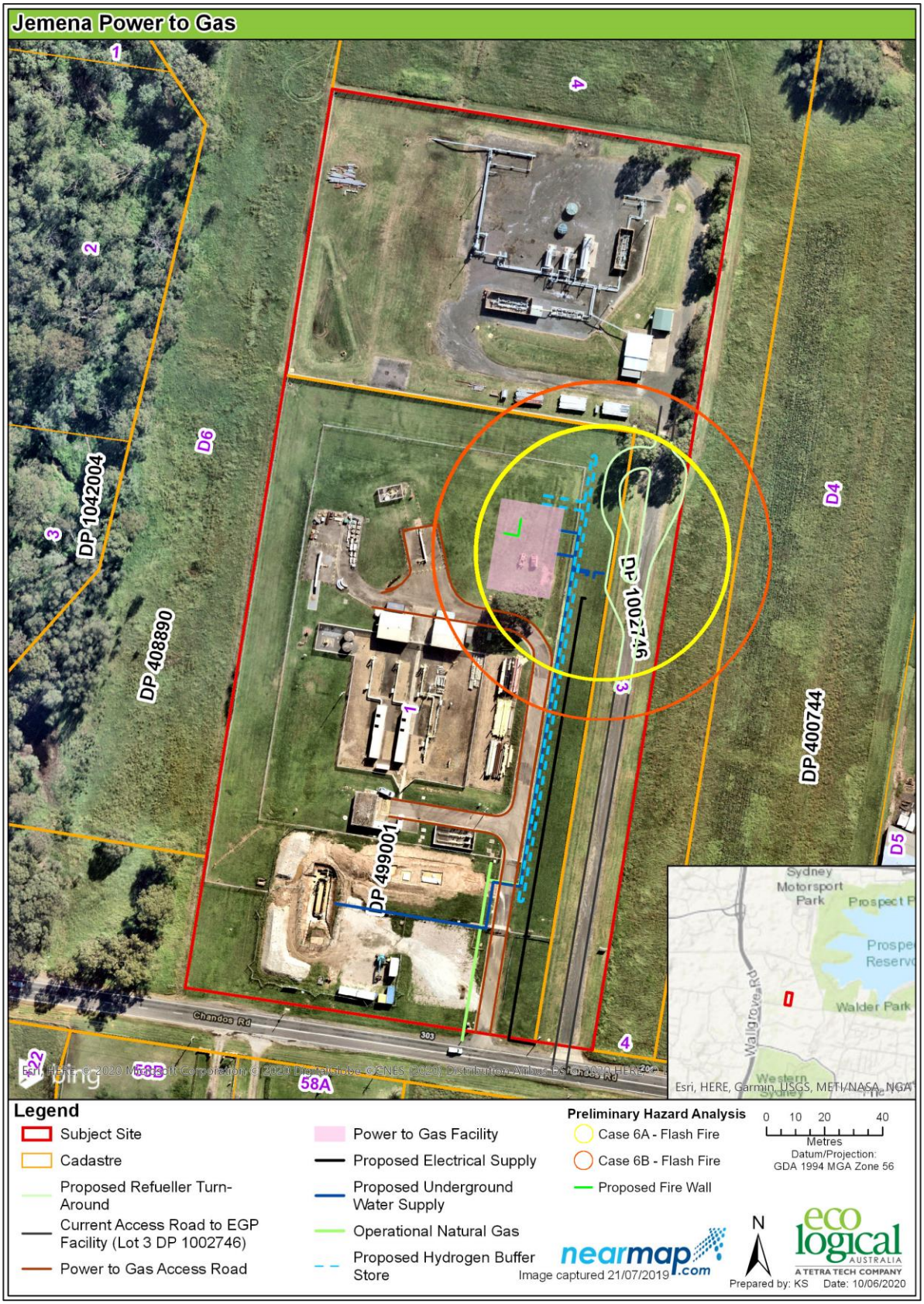

Figure 5 | Contour maps for HRS flash fire scenarios with the potential for off-site fatal consequences (Source: Jemena)

Bushfire risk

A Bushfire Protection Assessment was completed as part of the Submissions Report, which found that the Project would be compliant with the identified safety requirements. The assessment considered potential bushfire hazards and identified relevant bushfire protection measures.

It is noted that the Project is considered as a *potentially hazardous industry*, under SEPP 33. The recommended conditions include requirements for a Fire Safety Study prior to commencing construction, consistent with the Department's HIPAPs*, 'Fire Safety Study Guidelines'* and the NSW Government's Best Practice Guidelines and in consultation with Fire and Rescue NSW and NSW Rural Fire Service.

Downstream risk

The EIS included a Downstream Impact Assessment was prepared for the Project, assessing potential downstream impacts to medium and low-pressure gas mains and industrial and domestic users from the injection of hydrogen from the Project. Impacts were considered for the following:

- a scenario where the target blend of hydrogen (2% by volume) is injected into the network; and
- a scenario where the hydrogen injection control flow valve has failed, releasing levels of hydrogen above the target blend (up to 10% by volume, at which point the system would automatically shut down).

Consistent with the requirements of the *Gas Supply (Safety and Network) Regulation 2013*, the Downstream Impact Assessment found that injection of hydrogen concentrations of up to 2% by volume and the shutdown limit of 10% to the network would be compliant and safe for both transportation through the pipeline network and general-purpose use, in accordance with *Australian Standard - Specification for general purpose natural gas (AS 4564-2011)*. Additionally, Jemena would revise its SAOP prior to construction to include any subsequent changes to description of its assets.

Summary

The EIS included a comprehensive hazards assessment in accordance with the requirements of SEPP 33. The Department's hazard and risk section reviewed the PHA and Downstream Impact Assessment and determined the assessment was adequate following minor clarifications. The PHA would inform the Final Hazard Analysis, which would be required for the detailed design stage in accordance with HIPAP 4.

DPIE Energy recommended revision of Jemena's existing Safety and Operating Plan (SAOP) to address the potential downstream impacts on customer installations and appliances. The Department has recommended a condition requiring Jemena to revise the SAOP to the satisfaction of the Secretary administering the *Gas Supply Act 1996* in relation to all the assets and equipment located within the development footprint prior to construction.

The Department has included conditions requiring Jemena to carry out additional studies based on the final design of the Project and to prepare or revise a number of safety and emergency plans and studies for the Project including:

- a construction safety study, a hazard and operability study, a final hazard analysis, a fire safety study, and a revised SAOP prior to commencing construction; and
- an emergency plan, including updates of existing Bushfire Emergency and Evacuation Plan, and a safety management system, prior to commencing commissioning of the Project.

Consequently, the Department considers the identified safeguards as adequate and that with the implementation of the recommended conditions, the Project would not significantly increase the risk of hazards to people or the environment.

6.2 Traffic and Transport

The Project site is accessed from Chandos Road, a two-lane road with a carriageway of around eight metres. Chandos Road is a local road regulated by Council, which provides an east-west link between Wallgrove Road and Ferrers Road, State and local roads respectively. The M7 Motorway is located around 700 m to the west of the Project site. The nearest access to the M7 Motorway is via Horsley Road (a State road) around 1.3 kilometres south east of the Project site. Horsley Road generally runs parallel to Chandos Road and can be accessed from the Project site via either Wallgrove Road or Ferrers Road.

The EIS included a Traffic Impact Assessment, which assessed the Project against the *Fairfield City Wide Development Control Plan 2013*, and *Australian Standard AS2890 – Parking Facilities* and *Guide to Traffic Generating Developments* (Roads and Traffic Authority, 2002).

Local traffic network impacts

During the construction of the Project, there would be up to 10 light vehicle and 8 heavy vehicle movements per day. The construction of the Project is anticipated to take around two months. During the operation of the Project, up to three buses would visit the Project site a day for refuelling.

The operation of the Project does not require staff to be on-site and so other traffic movements would be intermittent and limited to staff accessing the site for maintenance or other purposes. Given the small number of vehicles, the EIS identified the potential impact of the Project's construction and operation to the local traffic network as minor.

Traffic safety impacts

Both TfNSW and Council raised concerns regarding the proposed construction traffic and operational bus routes proposed for the Project, which initially involved vehicles accessing the Project site from the M7 Motorway via Horsley Road / Wallgrove Road / Chandos Road. The concerns related to safety issues associated with the right turn from Wallgrove Road into Chandos Road and a five-tonne weight limit for Chandos Road, relating to the M7 Motorway overpass.

As part of the Submissions Report, Jemena completed a preliminary Traffic Management Plan and revised the route to utilise Ferrers Road rather than Wallgrove Road (see **Figure 6**). The plan also included a swept path analysis for the following movements:

- M7 Motorway right turn into Horsley Drive;
- Horsley Drive left turn into Ferrers Road;
- Ferrers Road left turn into Chandos Road; and
- Chandos Road right turn into the Project site.

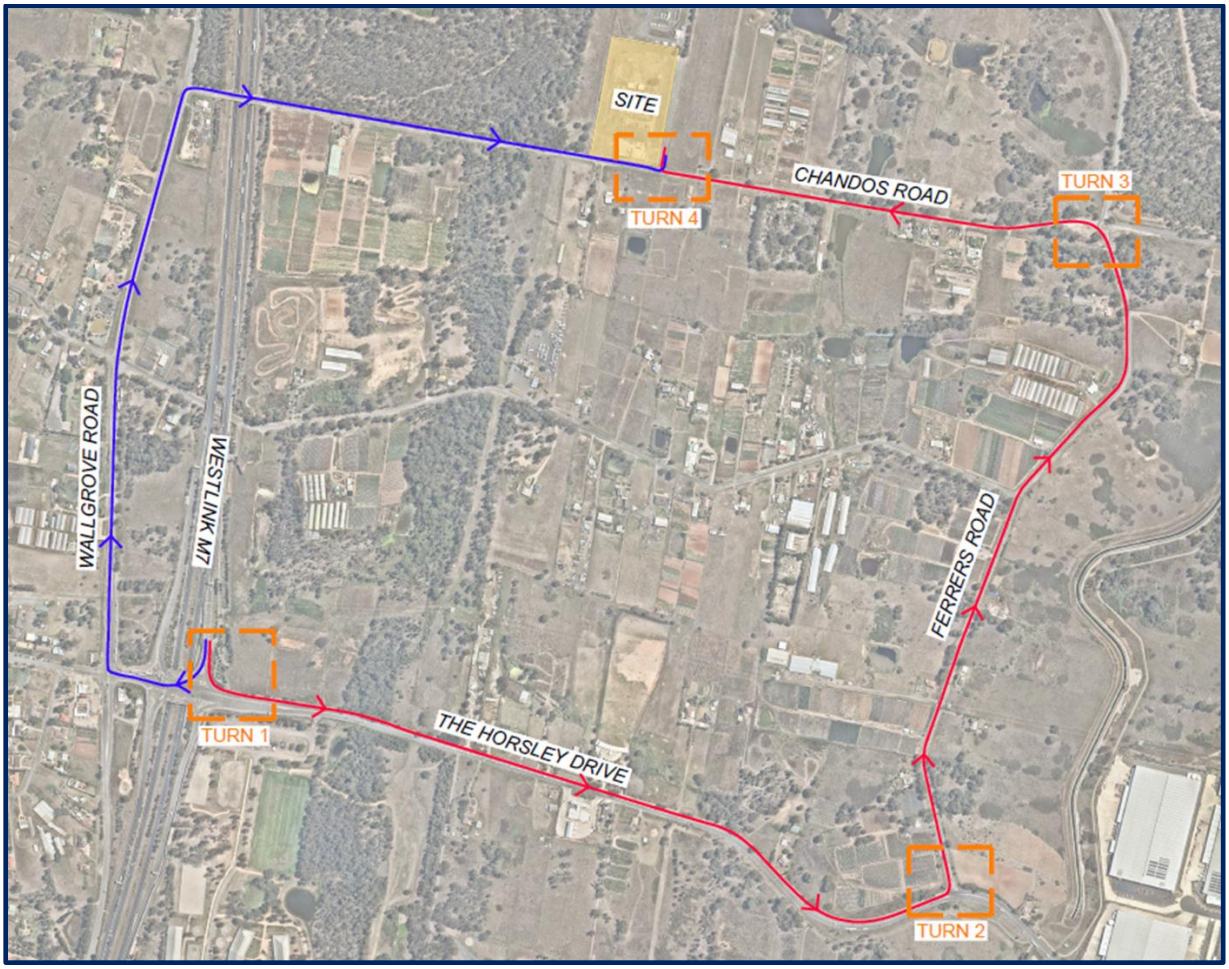

Figure 6 | Site access route. Blue line shows the originally proposed route in the EIS and the red line shows the revised route, as proposed in the Submissions Report (Source Submissions Report - Western Sydney Green Gas Project).

Fairfield Council was generally satisfied with the swept path analysis prepared for the Submissions Report but requested additional swept path analysis be prepared for the return journey. This swept path analysis was completed and provided to Council. Council identified a safety concern for the movement of heavy vehicles and buses turning left out of the Project site, as vehicles were required to cross over into the oncoming traffic lane over a continuous double line as part of the turning movement.

Council was satisfied that given the short construction schedule, heavy vehicles leaving the site could be appropriately managed through protocols developed as part of the Traffic Management Plan. However, Council remained concerned about buses exiting the site following refuelling

Following further consultation with TfNSW and Council, the Department has recommended a condition that a further swept path analysis be completed to the satisfaction of Council as part of a Traffic Management Plan. Jemena would refine the detailed design of the site access to provide for a safe left-turn movement, including extending the driveway into the Council road reserve to ensure buses could safely exit.

The Project has been designed for the safe movement of vehicles within the site. There would be enough space for three buses to be present within the site at once to avoid the potential for queuing on the road network or internal safety issues. Nevertheless, the Department has recommended conditions to ensure potential traffic safety risks are minimised for the Project.

Summary

The Department is satisfied that traffic network impacts from the Project would be minor and that potential traffic safety impacts can be appropriately managed through conditions of consent, requiring Jemena to prepare and implement a Traffic Management Plan in consultation with Council and TfNSW.

The plan would include:

- details on traffic routes;
- measures to minimise traffic safety issues;
- a swept path analysis of entry and exit to the site; and
- a protocol for undertaking dilapidation surveys.

6.3 Air Quality and Greenhouse Gas

The Project would generate direct and indirect air and greenhouse gas emissions during construction and operation. Sensitive receivers include residential properties to the south and south east on Chandos Road. The closest residential receiver is located around 180 metres to the south of the site.

An air quality impact assessment was completed for the Project in accordance with relevant guidelines including *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales (EPA 2016)*.

Air quality

Dust would be generated during construction activities, and dust associated with operations would be limited to vehicle movements on-site. It is noted that the existing access road would be sealed as part of the Project, resulting in negligible dust generation as a result of vehicle movements.

The produced oxygen and hydrogen during electrolysis are not considered to have a significant impact on local air quality. The hydrogen blend (2% by volume) that is injected into the gas supply would comply with relevant Australian Standards (refer to **Section 6.1** for further detail).

Sources of other air emissions during the operation of the Project are summarised in **Table 5**.

Table 5 | Sources of odour and gaseous emissions during operation.

Source	Emissions
Microturbine generator (using natural gas)	Nitrogen oxides, fugitive natural gas, odour
Microturbine generator (using hydrogen)	Fugitive hydrogen and water
Electrolysers	Oxygen, fugitive hydrogen
Buffer store blowdown vent	Fugitive hydrogen
Hydrogen refuelling and dispensing station	Fugitive hydrogen

The Project's microturbine power generator is proposed to initially be operated using natural gas and be converted to 100% hydrogen operation within one year of commissioning of the Project. Once the generator is converted to hydrogen, the potential emissions would be limited to fugitive hydrogen and water. Use of natural gas would generate nitrogen oxides, which were found to have minimal impacts to sensitive receivers.

Odour impacts from natural gas are anticipated to be negligible, as the Project would apply the same odour mitigation method that is used for the existing Jemena Horsley Park Facility to minimise potential impacts. Odour emissions from fugitive emissions were also found to be negligible.

Greenhouse gas emissions

The electricity would be sourced from a renewable energy provider and therefore there would be no Scope 2 emissions. Estimated greenhouse gas emissions for the Project are summarised in **Table 6**. The Project would at the most generate around 19 tonnes of greenhouse gas emissions annually based on using natural gas for energy generation in the microturbine in the first year of the trial, which is negligible compared to Australia's total annual greenhouse emissions.

Table 6 | Estimated total annual greenhouse gas emissions

Emission type	Annual GHG emissions (tonnes CO2-e)
Scope 1 (Direct emissions from the consumption of natural gas by microturbine generator)	15
Scope 2 (Indirect emissions from electricity consumption for electrolysis)	0
Scope 3 (Indirect emissions from the production of natural gas and electricity by others)	4
Total	**19**

Summary

The Department is satisfied that air quality and greenhouse gas impacts from the Project would be negligible and that the Project would contribute to the long-term development of green hydrogen production technology which has the potential to result in long term air quality benefits. The Department has recommended relevant conditions of consent to ensure that any residual impacts are managed or mitigated to minimise potential impacts to sensitive receivers. These requirements include:

- ensuring that no offensive odours are emitted from the development, as defined under the POEO Act; and
- minimising and/or preventing the dust emissions of the development, including wind-blown and traffic generated dust, greenhouse gas emissions and other air emissions.

6.4 Other Issues

The Department's consideration of other issues is provided in **Table 7**.

Table 7 | Department assessment of other issues

Issue	Findings	Recommendations
Noise	Construction of the Project would be limited to standard working hours. Potential noise impacts were assessed for three sensitive receiver locations to the south and south east of the Project site on Chandos Road. 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. The operation of the Project would be compliant with operational noise levels in the Noise Policy for Industry (NSW EPA, 2017), given the commitment to limit the operating hours of the microturbine to 7am to 10pm. Maximum noise level events are considered for gas venting (blowdown) which would occur less than once per	Construction activities to be carried out during standard construction hours (7 am to 6 pm Monday to Friday and 8 am to 1 pm on Saturdays). Project must comply with the noise levels within the *Noise Policy for Industry* (NSW EPA, 2017). • The operation of the microturbine would be limited to between 7 am and 10 pm.

Issue	Findings	Recommendations
	week. The maximum predicted noise level for the gas venting is 67 dB however given the frequency of the events potential impacts are considered to be minor overall. Given separation distances to residential receivers, potential construction vibration impacts would be negligible.	• The blowdown operation is limited to 7am to 6pm Monday to Friday, 8am to 1pm Saturday, and at no time on Sundays and NSW public holidays.
Visual	The key visual impact of the Project is the blowdown pipe which would be around 6.5 metres tall. The pipe would be viewed in the context of existing and proposed industrial infrastructure. A line of sight assessment was carried out which determined the Project would have a moderate visual impact to three sensitive receivers located to the south and south-east of Project site on Chandos Road. Landscaping is not proposed due to potential hazard and risks associated with perimeter vegetation, including bushfire risks. Operational lighting would be limited to simple lighting to enable night-time access to the facility in the event of an emergency and so lighting impacts would be negligible. The Department considers the visual impacts are acceptable.	Implement reasonable and feasible measures to minimise visual and off-site lighting impacts. Ensure visual appearance of visual infrastructure blends in as far as possible with surrounding landscape.
Aboriginal Heritage	An Aboriginal Heritage Due Diligence assessment for the Jemena Horsley Park facility was carried out in 2014 and the Project is wholly located within the area considered for that assessment. The assessment identified that the potential for intact archaeological deposits at the site is low due to previous disturbance. The nearest Aboriginal heritage site recorded in the Aboriginal Heritage Information Management System (AHIMS) database is located around 20 metres to the west of the site and consists of two silcrete items. The Project would not impact this item.	In the event of the discovery of an unexpected Aboriginal artefact cease works and engage an archaeologist to assess the find.
Water Resources	The construction of the Project has the potential to result in sediment and erosion. Jemena proposes to manage disturbed areas during construction in accordance with best practice sediment and erosion control principles. The Project would introduce a minor increase to impermeable surfaces at the Project site. Jemena has committed to managing stormwater in accordance with Water Sensitive Urban Design (WSUD) techniques consistent with the Western Sydney Parklands Design Manual. WSPT is satisfied with this approach, however Council requested that during detailed design that further information be provided about stormwater runoff management to ensure consistency with its Stormwater Management Policy, particularly in relation to changes in peak flow as a result in increases to hardstand areas. The Department has recommended conditions to ensure that WSUD principles are applied and that the recommended site Environment Management System (EMS) includes a stormwater management subplan to be developed in consultation with Council and WSPT. The Project site is unlikely to have groundwater impacts, as it is not located in a flood prone area and no excavations below 2 metres are proposed to be undertaken. It is	The Department is satisfied that the Project would not cause significant impacts to water quality or changes to stormwater runoff. The Department has recommended the following conditions to address any residual impacts: • soil erosion must be minimised in accordance with the relevant requirements in the Managing Urban Stormwater: Soils and Construction (Landcom, 2004); and • ensure that stormwater runoff from the development is managed using Waster Sensitive Urban Design (WSUD) techniques

Issue	Findings	Recommendations
	therefore unlikely that groundwater would be intercepted during the construction stage of the project and no licensing for the take of water is anticipated.	consistent with the Western Sydney Parklands Design Manual and considers the Fairfield City Council Stormwater Management Policy. • Preparation and implementation of an EMS incorporating a stormwater management subplan in consultation with Council and WSPT.
Flooding	The Project site is identified to be within a low flood risk precinct, as it is within the extent of the Probable Maximum Flood on the flood risk map but above the peak water level of the 1 in 100-year average recurrence interval design flood. The Project infrastructure would be elevated from the ground level and relative to Eastern Creek and the whole Project site would be unlikely to be inundated by significant flooding. The EIS found that only the north west area of the Project site would be prone to be inundated during a peak maximum flood.	The Department have recommended the following conditions to address any residual impacts: • the existing Evacuation and Emergency Management Plan for the existing Horsley Park Facility be updated in consultation with Council and the NSW State Emergency Service to include a flood evacuation plan.
Historic heritage	The Project would be carried out within the existing disturbed Jemena Horsley Park Facility. The Project would not impact known historic heritage items within the site.	In the event of the discovery of an unexpected historic artefact cease works and engage an archaeologist to assess the find.
Contamination	A Waste Classification Assessment was carried out to determine the classification of in-situ material at the existing Horsley Park Facility including soil sampling at seven locations and laboratory analysis of the samples for a range of contaminants. The assessment did not identify visible signs of contamination such as asbestos containing material, hydrocarbon odours or staining. Analysis of soil samples identified that existing site contaminant levels were below the General Solid Waste CT1 criteria as outlined in the NSW EPA *Waste Classification Guidelines* (2014) and that the risk of encountering contaminated soils is very low.	No specific conditions
Waste and resource use	Construction of the Project would generate waste primarily in the form of excess spoil and plant packaging. Appropriate mitigation measures are identified to manage potential impacts. The Project would require the consumption of around 0.58 megalitres per day of water which would be sourced from the mains supply. Following consultation with Sydney Water, the Project has been designed to include a delivery point for recycled water to trial the use of recycled water and reduce the amount of mains water required. The Project would also generate a saline wastewater product. Around 535 litres of wastewater would be generated per day with a salinity level of 500 parts per	The Department considers that waste generated from the site can be appropriately managed and has recommended operating conditions for Jemena to: • minimise waste generated by the Project; • classify all waste generated on site in accordance with the waste classification guidelines;

Issue	Findings	Recommendations
	million (ppm). Jemena proposes to store the liquid waste on site prior to off-site waste disposal to a licensed facility on an indicative fortnightly cycle, requiring storage of around 5 to 10,000 litres. Jemena would also look at options for reuse of the wastewater on-site or opportunities with adjoining properties, subject to required approvals, such as Resource Recovery Exemption Order under Clause 93 of the *Protection of the Environment Operations (Waste) Regulation 2014*. It is noted that the detailed design of the Project would consider further options related to water treatment and reuse in consultation with Sydney Water and WSPT.	• store and handle all waste generated on site in accordance with its classification; and • ensure all waste is disposed of off-site at appropriately licensed facilities.
Biodiversity	A Biodiversity Development Assessment Report (BDAR) waiver request was prepared by Jemena and accepted by the Department (see **Section 4.1.4**).	No specific conditions.
Infrastructure	The Department is satisfied that Jemena has demonstrated that the Project would not impact the operation of the existing infrastructure at the Jemena Horsley Park Facility. Existing infrastructure would remain operational during the construction of the Project.	No specific conditions.
Social and economic	Potential social impacts identified generally for the hydrogen industry and specifically for the Project include: • greenhouse gas emissions • safety and hazards • water consumption • operational noise These issues have been considered above and the Department is satisfied that impacts are minor and can be managed appropriately by Jemena. The cost of producing hydrogen is currently quite high compared to natural gas. However, improvements in technology are anticipated to reduce costs which would allow Australia to develop a competitive hydrogen export industry (COAG Energy Council 2019). The Project would contribute to research that has the potential to improve hydrogen production technology and reduce production costs.	No specific conditions.
Cumulative	There is the potential for cumulative impacts from the Project and the Austral Brick Plant Two upgrade proposal at the existing Austral Bricks facility located at 780 Wallgrove Road, Horsley Park, which is located around 850 metres to the north of the Project site. The potential for cumulative hazard and risk, air quality, noise and vibration and traffic impacts were considered in the EIS. The Department is satisfied that the potential for cumulative impacts would be minor given the distance between the two sites and nature of the two Projects.	No specific conditions.

7 Evaluation

The proposed application seeks approval for the construction and operation of a trial P2G facility and associated infrastructure in Horsley Park.

The Project proposes to trial the P2G technology that has the potential to contribute to the development of larger scale green hydrogen production and commercially viable facilities and enhance Australia's renewable energy capability. The Project would facilitate ensuring homes and businesses in Australia could be powered by clean, green renewable energy.

The project is consistent with key government strategic objectives for the State and the region, including the *National Hydrogen Strategy* (Council of Australian Governments Energy Council, 2019) and *Net Zero Plan Stage 1: 2020-2030* (NSW Government, 2020) (see **Section 3**).

Jemena has committed to implement a range of environmental management measures and studies. Based on its assessment, the Department has recommended further conditions of consent to minimise any potential impacts in consultation with the relevant agencies, including WSPT, Council, TfNSW and DPIE Energy.

The Project has a capital investment value of $18 million and is expected to create up to 30 full time construction jobs and 2 full time jobs during operation. It would generate enough hydrogen to supply the energy needs of approximately 250 homes and generate electricity for the grid if required.

The Department has carefully assessed the merits of the Project and the impacts during construction and operation. The Department did not receive any community submissions and is satisfied that the issues raised in by the public authorities have been appropriately considered and responded to by Jemena and any residual issues could be appropriately mitigated or managed through the implementation of be the Department's recommended conditions of consent.

The Department considers the Project to be in the public interest and would be an important step towards a carbon neutral future for Australia and the growth of the hydrogen industry.

Consequently, the Department considers that the benefits of the Project outweigh its impacts, and the Project should be approved, subject to the strict set of recommended conditions of consent.

8 Recommendation

It is recommended that the Executive Director - Energy, Resources & Compliance, as delegate of the Minister for Planning and Public Spaces:

- **considers** the findings and recommendations of this report;
- **accepts and adopts** all of the findings and recommendations in this report as the reasons for making the decision to grant consent to the application;
- **agrees** with the key reasons for approval listed in the notice of decision;
- **grants consent** for the application in respect of the Western Sydney Green Gas Project (SSD-10313); and
- **signs** the attached development consent and recommended conditions of consent (see **Appendix H**).

Recommended by:

10/8/2020

Jack Turner
Senior Environmental Assessment Officer
Resource Assessments

Recommended by:

10/8/2020

Mandana Mazaheri
A/ Team Leader
Resource Assessments

Recommended by:

10/8/20

Stephen O'Donoghue
Director
Resource Assessments

9 Determination

The recommendation is **Adopted / ~~Not adopted~~** by:

10/8/20

Mike Young
Executive Director
Energy, Resources & Compliance

Appendices

Appendix A – List of Referenced Documents

- Australian Government (2020). *Clean Energy Finance Corporation Investment Mandate Direction 2020*.
- Minister for Energy and Emissions Reduction – Media Release (15 April 2020) *Fast tracking renewable hydrogen projects*.
- COAG Energy Council Hydrogen Working Group (2019). *Australia's National Hydrogen Strategy* (Designed by: Department of Industry, Innovation and Science, Australian Government).
- Department of Climate Change and Energy Efficiency (2019). *Australian National Greenhouse Accounts, Quarterly Update of Australia's National Greenhouse Gas Inventory*, March Quarter 2019.
- NSW Government (2020). *Net Zero Plan Stage 1: 2020-2030*.
- Transport for NSW (2019). *Future Transport 2056: NSW Electric and Hybrid Vehicle Plan*.
- United Nations (2015). *United Nations Framework Convention on Climate Change*.
- Western Sydney Parklands Trust (2018). *Western Sydney Parklands Plan of Management 2030*.
- Western Sydney Parklands Trust (2019). *Horsley Park Urban Farming Masterplan 2019*.

Appendix B – Environmental Impact Statement

Appendix C – Submissions

Appendix D – Submissions Report

Appendix E – Additional Information

Appendix F – Community Views for Draft Notice of Decision

See the Department's website at: https://www.planningportal.nsw.gov.au/major-projects/project/11681

Appendix G – Statutory Considerations

Considerations under Section 4.15 of the EP&A Act

Section 4.15 of the EP&A Act requires that the consent authority, when a determining development application, must take into consideration the matters contained in **Table G1**. In summary, the Department is satisfied the proposed power station is consistent with the requirements of Section 4.15 of the EP&A Act.

Table G1 | Matters for consideration under Section 4.15

Matter	Consideration
(a) the provisions of— (i) any environmental planning instrument, and (ii) any proposed instrument that is or has been the subject of public consultation under this Act and that has been notified to the consent authority (unless the Planning Secretary has notified the consent authority that the making of the proposed instrument has been deferred indefinitely or has not been approved), and (iii) any development control plan, and (iiia) any planning agreement that has been entered into under Section 7.4, or any draft planning agreement that a developer has offered to enter into under Section 7.4, and (iv) the regulations (to the extent that they prescribe matters for the purposes of this paragraph),	• A detailed consideration of the provisions of all environmental planning instruments (including draft instruments subject to public consultation under the EP&A Act) that apply to the proposed development is provided below. • Jemena has not entered into any planning agreement under Section 7.4 of the EP&A Act. • The Department has undertaken its assessment to the proposed development in accordance with all relevant matters as prescribed by the *Environmental Planning and Assessment Regulation 2000* (EP&A Regulation), the findings of which are contained within this report.
(b) the likely impacts of that development, including environmental impacts on both the natural and built environments, and social and economic impacts in the locality,	• The Department has considered the likely impacts of the development in detail in **Section 6** of this report. The Department concludes that all environmental impacts can be appropriately managed and mitigated through the recommended conditions of approval.
(c) the suitability of the site for the development,	• The proposed development involves the construction and operation of a green gas facility with associated infrastructure. The project is to be constructed within the boundaries of an already existing gas facility.
(d) any submissions made in accordance with this Act or the regulations,	• All matters raised in the submissions have been summarised in **Section 5** of this report and given due consideration as part of the assessment of the proposed development in **Section 6** of this report.
(e) the public interest.	• The Development would generate up to 30 FTE jobs during construction and approximately 2 FTE jobs during operation. • The project will generate enough hydrogen to supply about 250 homes during its 5-year trial and provide a carbon-neutral option. • The environmental impacts of the development would be appropriately managed via the recommended conditions. On balance, the Department considers the development is in the public interest.

Environmental Planning Instruments (EPIs)

The EPIs that have been taken into consideration in the Department's environmental assessment are:

- *State Environmental Planning Policy (State & Regional Development) 2011* (SEPP SRD)
- *State Environmental Planning Policy (Infrastructure) 2007* (Infrastructure SEPP)
- *State Environmental Planning Policy No. 33 – Hazardous and Offensive Development* (SEPP 33)
- *State Environmental Planning Policy No 55—Remediation of Land (SEPP 55)*
- *State Environmental Planning Policy (Western Sydney Parklands) 2009* (SEPP WSP)
- *Western Sydney Parklands Plan of Management 2030*
- *Fairfield Local Environmental Plan (LEP) 2013*

Consideration of Environmental Planning Instruments

State Environmental Planning Policy (State & Regional Development) 2011 (SEPP SRD)

Table G2 | SEPP SRD Compliance Table

Relevant Sections	Consideration and Comments	Complies
3 Aims of Policy The aims of this Policy are as follows: (a) to identify development that is State significant development	The proposed development is identified as SSD.	Yes
8 Declaration of State significant development: Section 4.36 (1) Development is declared to be State significant development for the purposes of the Act if— (a) the development on the land concerned is, by the operation of an environmental planning instrument, not permissible without development consent under Part 4 of the Act, and (b) the development is specified in Schedule 1 or 2. (2) If a single proposed development the subject of one development application comprises development that is only partly State significant development declared under subclause (1), the remainder of the development is also declared to be State significant development, except for— (a) so much of the remainder of the development as the Director-General determines is not sufficiently related to the State significant development, and (b) coal seam gas development on or under land within a coal seam gas exclusion zone or land within a buffer zone (within the meaning of clause 9A of State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007), and (c) development specified in Schedule 1 to State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007. (3) This clause does not apply to development that was the subject of a certificate in force under clause 6C of State Environmental Planning Policy (Major Development) 2005 immediately before the commencement of this Policy	As the proposal will have a capital investment value of more than $10 million and is on land subject to the WSP SEPP, the proposed development is considered SSD. As such, the proposal is subject to assessment and determination under Part 4, Division 4.7 of the EP&A Act and, in accordance with Section 4.38 of the EP&A Act, approval from the Minister of Planning and Public Spaces or delegate is required.	Yes

***State Environmental Planning Policy (Infrastructure) 2007* (Infrastructure SEPP)**

The Infrastructure SEPP aims to facilitate the effective delivery of infrastructure across the State by improving regulatory certainty and efficiency, through a consistent planning assessment and approvals regime for public infrastructure and service. identifying matters to be considered in the assessment of development adjacent to particular types of infrastructure development and providing for consultation with relevant public authorities about certain development during the assessment process. Clause 66A (1) of the Infrastructure SEPP states:

Development for the purpose of a pipeline may be carried out by any person without consent on any land if the pipeline is subject to a licence under the Pipelines Act or a licence or authorisation under the GS Act.

The proposal is seen to be consistent with the Infrastructure SEPP, given the above clause. The Department has included suitable conditions in the recommended conditions of approval (**Appendix H**).

***State Environmental Planning Policy No. 33 – Hazardous and Offensive Development* (SEPP 33)**

The Hazardous and Offensive Development SEPP aims to provide a systematic approach to planning and assessing developments that are potentially hazardous or offensive. The proposal is likely to meet the definition of 'potentially hazardous industry', which is defined In Clause 3 of the SEPP as:

A development for the purposes of any industry which, if the development were to operate without employing any measures (including, for example, isolation from existing or likely future development on other land) to reduce or minimise its impact in the locality or on the existing or likely future development on other land, would pose a significant risk in relation to the locality:

a. to human health, life or property, or

b. to the biophysical environment, and includes a hazardous industry and a hazardous storage establishment.

If a development is classified as 'potentially hazardous industry', a PHA must be undertaken to determine the risk to the community, property and the environment. A PHA has been undertaken by GPA Engineering, which addressed the matters of considerations as outlined in Clause 12 of the SEPP (Section 7.3 of Jemena's EIS), which concluded that the calculated frequency of potentially fatal off-site individual risk for the project is estimated to be approximately 8.4×10^{-6} per year. This value is below the tolerable risk target of 1×10^{-5} per year for 'active open space areas'.

State Environmental Planning Policy No 55—Remediation of Land (SEPP 55)

The Department has considered the provisions of SEPP 55. The EIS included an assessment of contamination land risks and found no contaminated land within the project site, and the Department is satisfied the site is suitable for the development.

***State Environmental Planning Policy (Western Sydney Parklands) 2009* (WSP SEPP)**

In accordance with the WSP SEPP, the land in which the proposal site is situated is un-zoned. Clause 11 (1-3) of the WSP SEPP allows for the proposal to be carried out in the WSP only with consent.

The proposal is not within land mapped as an Environmental Conservation Area, as defined within the WSP SEPP.

Clause 12 of the WSP SEPP requires the consent authority to consider a range of matters that may be relevant to a development. A number of other clauses apply to the project and were considered by the Department. **Table G3** below summarises the Department's consideration of these matters.

Table G3 | WSP SEPP Matters for consideration

Relevant Matter	Consideration and Comments
The aim of this Policy	The aims of the policy include allowing for infrastructure consistent with the Metropolitan Strategy, which identifies the need for increased renewable energy generation. The Project is consistent with this aim.
The impact on drinking water catchments and associated infrastructure	The Prospect Reservoir is located around 1.3 kilometres from the Project site. Given this distance and the nature of the Project potential impacts to the reservoir are unlikely. The Project would manage stormwater in accordance with Western Sydney Parklands Design Manual
The impact on utility services and easements,	The design of the Project has considered existing services and easements.
The impact of carrying out the development on environmental conservation areas and the natural environment, including endangered ecological communities,	The proposal is not within land mapped as an Environmental Conservation Area, as defined within the WSP SEPP. The Project site is predominantly cleared of native vegetation, has no habitat available for threatened ecological communities and is comprised of highly modified and disturbed vegetation.
The impact on the continuity of the Western Parklands as a corridor linking core habitat such as the endangered Cumberland Plain Woodland,	The Project site is predominantly cleared of native vegetation and has no habitat available for threatened ecological communities. The Project would therefore not impact the continuity of core habitat corridors.
The impact on the Western Parkland's linked north-south circulation and access network and whether the development will enable access to all parts of the Western Parklands that are available for recreational use	The Project is within an existing industrial site and would not impact access to or within the Western Parklands.
The impact on the physical and visual continuity of the Western Parklands as a scenic break in the urban fabric of western Sydney,	The Project is within an existing industrial site and would not change the existing physical and visual continuity of the Western Parklands.
The impact on public access to the Western Parklands,	The Project would not change public access to the Western Parklands.

Relevant Matter	Consideration and Comments
Consistency with: (i) any plan of management for the parklands, that includes the Western Parklands, prepared and adopted under Part 4 of the Western Sydney Parklands Act 2006, or (ii) any precinct plan for a precinct of the parklands, that includes the Western Parklands, prepared and adopted under that Part	The Project site is located within the Horsley Park Precinct in the Western Sydney Parklands Plan of Management 2030. The Project is consistent with the desired future character of the precinct to be an extension of the Smithfield/Wetherill Park industrial area
(j) the impact on surrounding residential amenity,	Potential noise, air quality and visual impacts from the Project have been considered as part of the Department's assessment. The Department has recommended conditions of consent to manage these impacts.
(k) the impact on significant views,	The Project would add new industrial elements to an existing industrial site which is not considered to be a significant view.
(l) the effect on drainage patterns, ground water, flood patterns and wetland viability,	The Project would manage stormwater in accordance with Western Sydney Parklands Design Manual. The Project site is unlikely to have groundwater impacts and is not located in a flood prone area.
(m) the impact on heritage items,	The Project would be carried out within the existing disturbed Jemena Horsley Park facility. The Project would not impact known Aboriginal or historic heritage items within the site.
(n) the impact on traffic and parking.	Potential traffic and parking impacts were considered as part of the Department's assessment. The Department has recommended conditions of approval to manage potential safety impacts.
Clause 13: Bulk water supply infrastructure not to be impacted	The Project would not impact bulk water supply infrastructure.
Clause 14: Development in areas near nature reserves or environmental conservation areas	The Project is not located within or adjacent to land mapped as an Environmental Conservation Area, as defined within the WSP SEPP.
Clause 14A - Flood planning	The Project site is identified to be within a low flood risk precinct, as it is within the extent of the Probable Maximum Flood above the peak water level of the 1 in 100-year average recurrence interval design flood. The Project infrastructure would be elevated from the ground level and relative to Eastern Creek and the whole Project site would be unlikely to be inundated by significant flooding.
Clause 15 Heritage conservation	The Project would be carried out within the existing disturbed Jemena Horsley Park facility. The Project would not impact known Aboriginal or historic heritage items within the site.

Relevant Matter	Consideration and Comments
Clause 16 Signage	The Department has recommended a condition of consent restricting signage permitted at the site.
Clause 17 Essential services	The Project is located within an existing industrial site with adequate essential services.

Western Sydney Parklands Plan of Management 2030

The Proposal location is within Precinct 9 (Horsley Park) as identified within the Western Sydney Parklands Plan of Management 2030. The desired future character of this precinct is to be a key WSPT Business Hub site as an extension of the Smithfield/Wetherill Park industrial area, surrounded by a sustainable urban farming precinct. The urban farming precinct will feature market gardening, community and research gardens, agri-tourism and education programs. This precinct identifies utilities infrastructure as a future land use opportunity.

Fairfield Local Environmental Plan (LEP) 2013

The proposal is located within the Fairfield LGA, and as such a review of zoning maps within the Fairfield LEP was undertaken. The Fairfield LEP indicates that the location of the proposal is within an area covered by the WSP SEPP, and therefore the land is not zoned within the Fairfield LEP. In accordance with clause 6 of the WSP SEPP, the Fairfield LEP does not apply to the location of the proposal, however ongoing consultation has been undertaken with Fairfield Council.

Appendix H – Recommended Instrument of Consent

See the Department's website at: https://www.planningportal.nsw.gov.au/major-projects/project/11681