Landscape Management Plan

MEG-HP1 Hydrogen Production Facility

Northam, Western Australia

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1. Introduction

Infinite Green Energy's (IGE) objective is to create a new kind of energy future in the region and internationally, by leveraging our domain expertise in developing renewable hydrogen projects that will facilitate the transitioning of the Australian economy towards decarbonisation and net zero emissions.
Our ethos engrained in our culture is to leverage our natural resources including water, solar and wind energy through alliances proven technology partners, to deliver commercial scale projects that deliver renewable hydrogen to the evolving domestic and international markets and create a model of lower-carbon energy production that can be replicated worldwide.

Our vision is to establish IGE as a leader in the green hydrogen sector and to elevate Australia onto the global stage by demonstrating the country has the technology, skills and entrepreneurial mindset to be ahead of the pack in the development of green hydrogen projects.
We are excited to be facilitating and being at the forefront of this transformation towards the net zero emissions economy and establishing Australia on the world stage in demonstrating this capability.

1.1. Background

MEG-HP1 Early Production System is a small-scale project designed to produce IGE's first hydrogen for the domestic transport market. The project, located in Northam, has been envisioned to kick start the development of an end-user market for hydrogen through a fast-tracked hydrogen production schedule. The project will be powered by renewable energy sources and will have up to 10MW of electrolyser capacity with a nameplate production capacity of four (4) tonnes of hydrogen per day. The new 10MW system will utilise surplus renewable power from the existing 11MW Northam Solar Farm and an additional 8MW array to be constructed. The facility will also be connected to the power grid to allow for 24/7 output.

The plant will utilise 2x 5MW capacity Polymer Electrolyte Membrane (PEM) system to produce green hydrogen. Hydrogen will be compressed in gaseous form and transferred to trailer mounted Multi Element Gas Containers (MEGC) for transportation by road to Hydrogen Refueling Stations (HRS).

1.2. Purpose

This report describes the proposed landscaping management and visual amenity analysis within the project site.

1.3. Scope

The Northam Hydrogen Plant (MEG-HP1) by Infinite Green Energy's (IGE's) subsidiary MEG-HP1 Pty Ltd for producing green hydrogen by electrolysis. The hydrogen plant will be located adjacent to the existing 11MW Northam Solar Farm (NSF).

The project will provide a total of 10MW of electrolysers. Hydrogen will be compressed in gaseous form and transferred to trailer mounted MEGC for transportation by road to customers. The hydrogen will be dispensed by one or more Hydrogen Refuelling Stations (HRS) to end users within the heavy vehicle transportation sector.

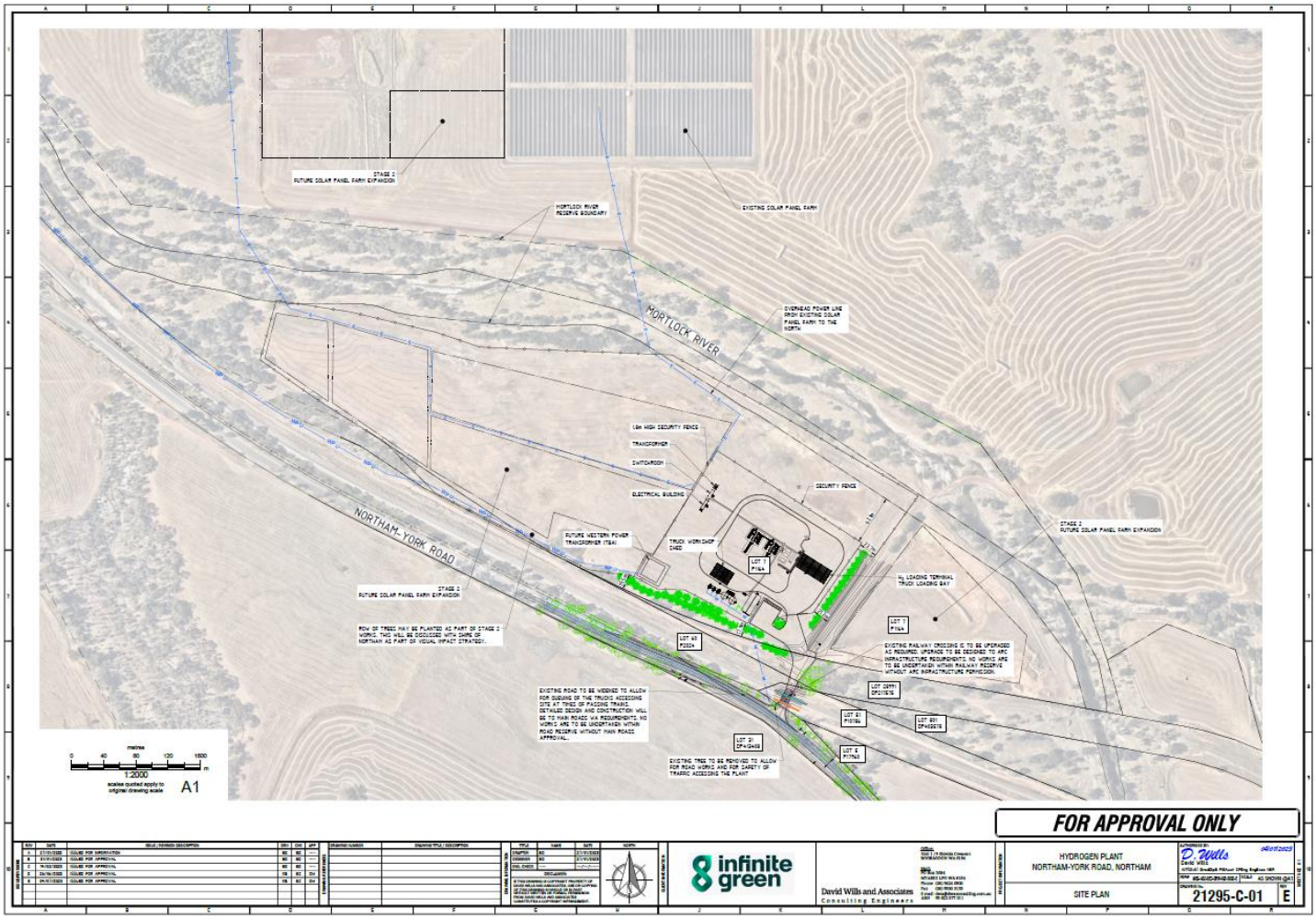
The site layout design shall allow for expansion of electrolyser capacity from 10MW to 20MW as part of a future expansion project.

On review of previous studies and considering Hydrogen is classed as 'Dangerous Goods' the proposed upgrade of the project site access road will involve installing boom gates adjacent to the ARC train line crossing and the construction of a deceleration lane approaching the project site access.(See figure1).

1.4. Solar Expansion

The development involves the addition of 8MW of additional solar panels located West of the hydrogen plant for 5.8MW and 2.2MW added to the existing plant.

Figure 1 Site Plan Covering Solar Expansion To The West Of The Project Site



1.5. Northam Map

Infinite Green Energy's proposed Northam Hydrogen plant (MEG-HP1) is situated next to the existing Northam Solar Farm located approximately one kilometre east of the Northam townsite, on the northeast side of the Northam – York Road, and adjacent to the East Perth – Kalgoorlie railway line, as shown above in Figure 2 below.

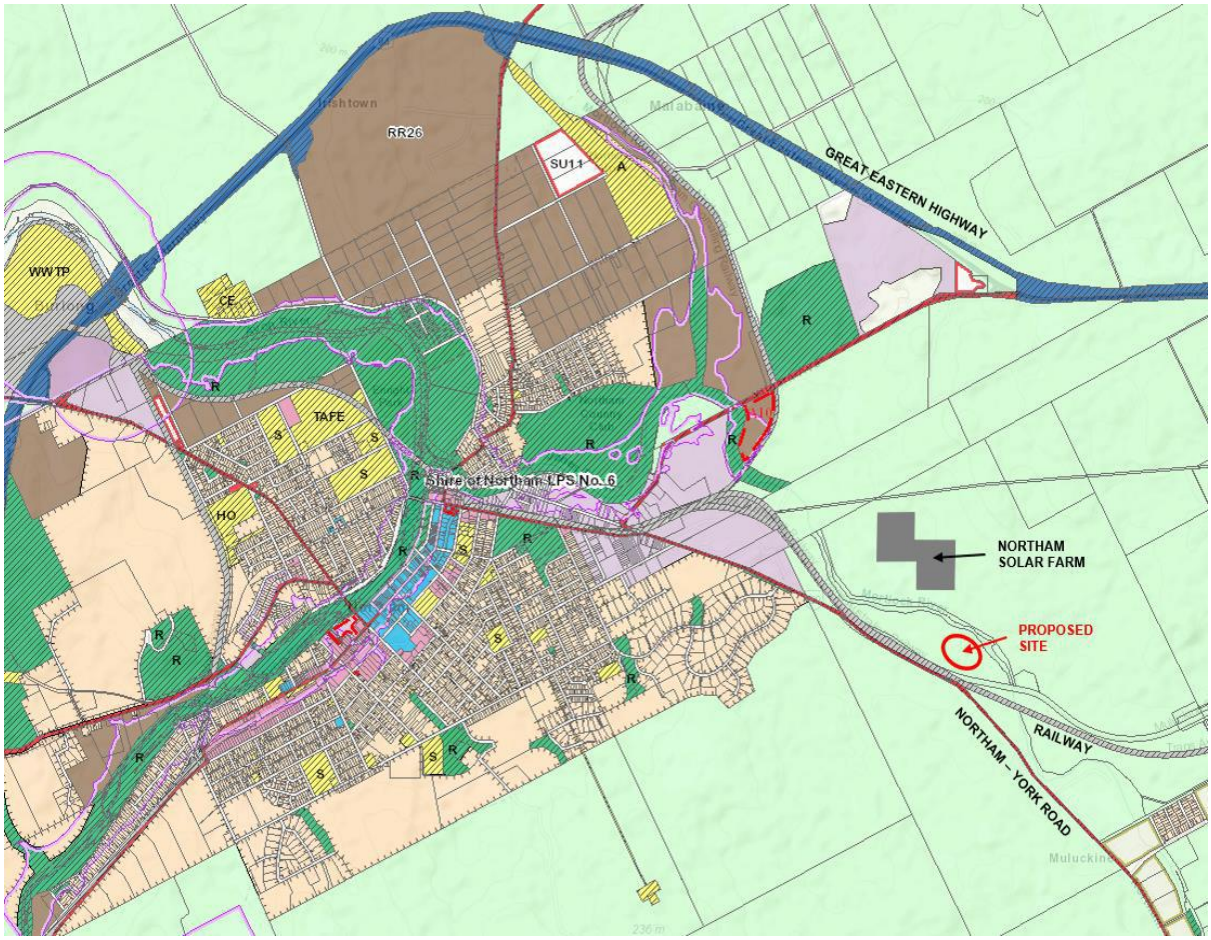


Figure 2 Site Location

Access to the project site is via the existing private access road (unsealed) and then crossing the private railway level crossing, that provides access to the Northam Solar Farm from the Northam–York Road.

1.6. Desktop Study and Site Inspection

To provide an assessment of potential environmental visual/landscape impacts, IGE examined GIS data from Western Australia's Department of Parks and Wildlife for threatened and protected flora, fauna, communities, reserves, and environmentally sensitive areas. In addition, a search was conducted for the area on the Department of Energy and Environment's (DEE) Protected Matter Search Engine.

1.7. Heritage

The AHIS database was queried to identify if any sites of Aboriginal Heritage are located on or near the site. In addition, the Aboriginal Heritage Places Dataset was downloaded from the Department of Aboriginal Affairs (DAA) website. Information on European cultural heritage was obtained using the Australian Places Inventory. (http://www.environment.gov.au/heritage/places/wa/index.html).

Other information such as wind erosion, weeds, managed lands, bush fire prone areas and world heritage etc. was obtained using spatial information available from data.wa.gov.au.

1.8. Site Survey Results

Mattiske Consulting Pty Ltd were commissioned by IGE in the spring months of 2022 to complete an assessment of flora, vegetation, and fauna values. The area consists of localised remnant vegetation located adjacent to the Mortlock River on a historical operating sheep and grain farm near the township of Northam in the Western Australian wheatbelt. The proposed project area was surveyed to provide information concerning the location, composition and conservation value of native species, the extent of degradation and other disturbances. Habitats were inspected to identify the vegetation types, topography and amenity values.

The remnant area of vegetation is restricted to the fringes of the Mortlock River and as such is dominated by introduced grasses and a few patches of trees that are predominantly in decline.

1.9. Landscape Strategy Introduction

A ‘landscape’ is a socio-ecological system that consists of a mosaic of natural and/or human-modified ecosystems, with a characteristic configuration of topography, vegetation, land use, and settlements that is influenced by the ecological, historical, economic, and cultural processes and activities of the area. The mix of land cover and use types (landscape composition) usually includes agricultural lands, native vegetation, and human dwellings, villages and/or urban areas. The spatial arrangement of different land uses, and cover types (landscape structure) and the norms and modalities of its governance contribute to the character of a landscape.

The composition and spatial arrangement of landscape features – such as the location of native vegetation species within a surrounding production landscape matrix – influence the flow of goods and services, maintaining pollination or reducing downstream impacts of nutrient runoff into waterways. Heterogeneous landscapes harbor a variety of habitats and genetic resources that can reduce risks of losses to production and livelihood (Landscape Management for Policy Makers 2014).

1.10. Sensitive Visual Receptors

Perceived visual impacts are relatively subjective and are predominantly related to the sensitivity of the view point and the perspective of the viewer.

The potential sensitive locations include:

- Residential dwellings (Northam townsite);
- Identified locations of public and private importance (pastoral dwellings, residential);
- Tourist destinations and heritage sites;
- Major and secondary roads, and
- Other Residential dwellings (these dwellings are only considered as sensitive visual receptors to the extent that they would be occupied during construction and operation of the Project).

Figure 3 Aerial View Showing Site Layout Looking North

2. Site Characteristics

2.1. Location and climate

The site is located within the Shire of Northam situated east of Northam township. The site is located between the existing state road connecting Northam with York within the Mortlock River reserve.

The climate is Mediterranean type with hot dry summers and cool wet winters. Mean maximum temperature is approximately 25.4°C and mean minimum temperature is approximately 11°C.

Mean annual rainfall is approximately 427.2mm with the majority of the rainfall occurring during the months between May and August.

2.2. Site topography

The existing site topography has been obtained from a site survey and data provided by the Water Corporation from ESINET. The existing site generally falls to the northwest, with the majority of stormwater flowing into the Mortlock River. The site also has sections of low-lying areas that currently pool in storm conditions. An extract of the ESINET contours is provided below.

2.3. Earthworks Site Grading

The proposed plant area will be graded towards the proposed nutrient stripping basins located near the northern boundary of the site. The western basin is proposed to be the lowest laying to mimic current site conditions and to allow for controlled discharge of stormwater runoff from major storm events The grading plan will be undertaken as part of the detailed design for the site. The site grading has been indicated with arrows on DWA 21295-C-06 Stormwater Discharge Plan included as part of the Services Plan. The overall site development area impacted will be (18Ha) and the plant construction area extent (3.3 ha).

Figure 4: Site Contours (ESINET, 2023)

2.4. Geotechnical

A detailed geotechnical report was undertaken by Brown Geotechnical on September 30, 2022. A summary of the report is provided below:

- A thin 0.1m layer of silty sand is present across the entire site, PRI (Phosphorus Retention Index) values ranged from 8 to 25. A 0.5m layer of dense silty sands was encountered at Test Holes 1 and 9;
- Stiff, fine-grained, sandy clay then extends to at least 1.5m depth. The material has a high plastic fines content, exhibiting intermediate to high plasticity and moderate expansive properties. PRI values ranged from 7 to 30. Permeability of the stiff clayey soil would be <1x10-8 m/sec or very poor. Because of this, stormwater is required to discharge off-site rather than purely infiltrate;
- This graded into extremely weathered bedrock, recovered as clayey sand with gravel below approx. 1.6m. Refusal of the 3-tonne excavator occurred at approx. 1.6m in most test holes;
- No Groundwater levels were encountered during testing;
- Acid Sulphate Soils were not encountered during geotechnical testing and are a low probability of occurrence based on soil mapping from Geoscience Australia. An extract is provided below in Figure 4;
- 21295- Infinite Green Energy– Drainage Management Plan Page 5 of 10, and
- The site is underlain by a clayey subgrade close to or at the surface. It has been determined that the appropriate site classification for footing design is Class 'M' (Moderately reactive clay or silt sites, which can experience moderate ground movement from moisture changes (ys 20-40mm)) in accordance with AS2870-2011. The land is therefore suitable for development, (DWA 2023).

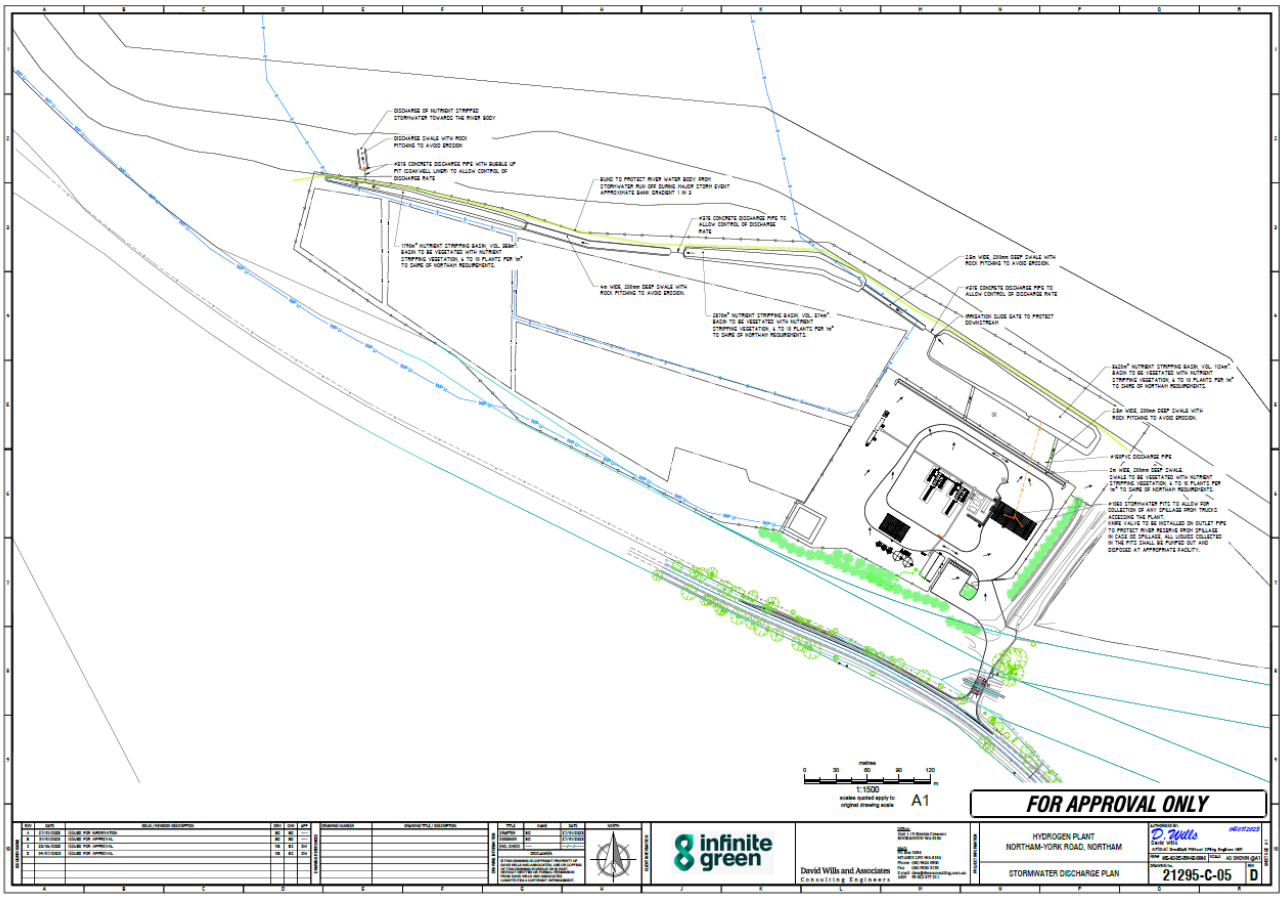


Figure 5: Stormwater Drainage With Catchment Area

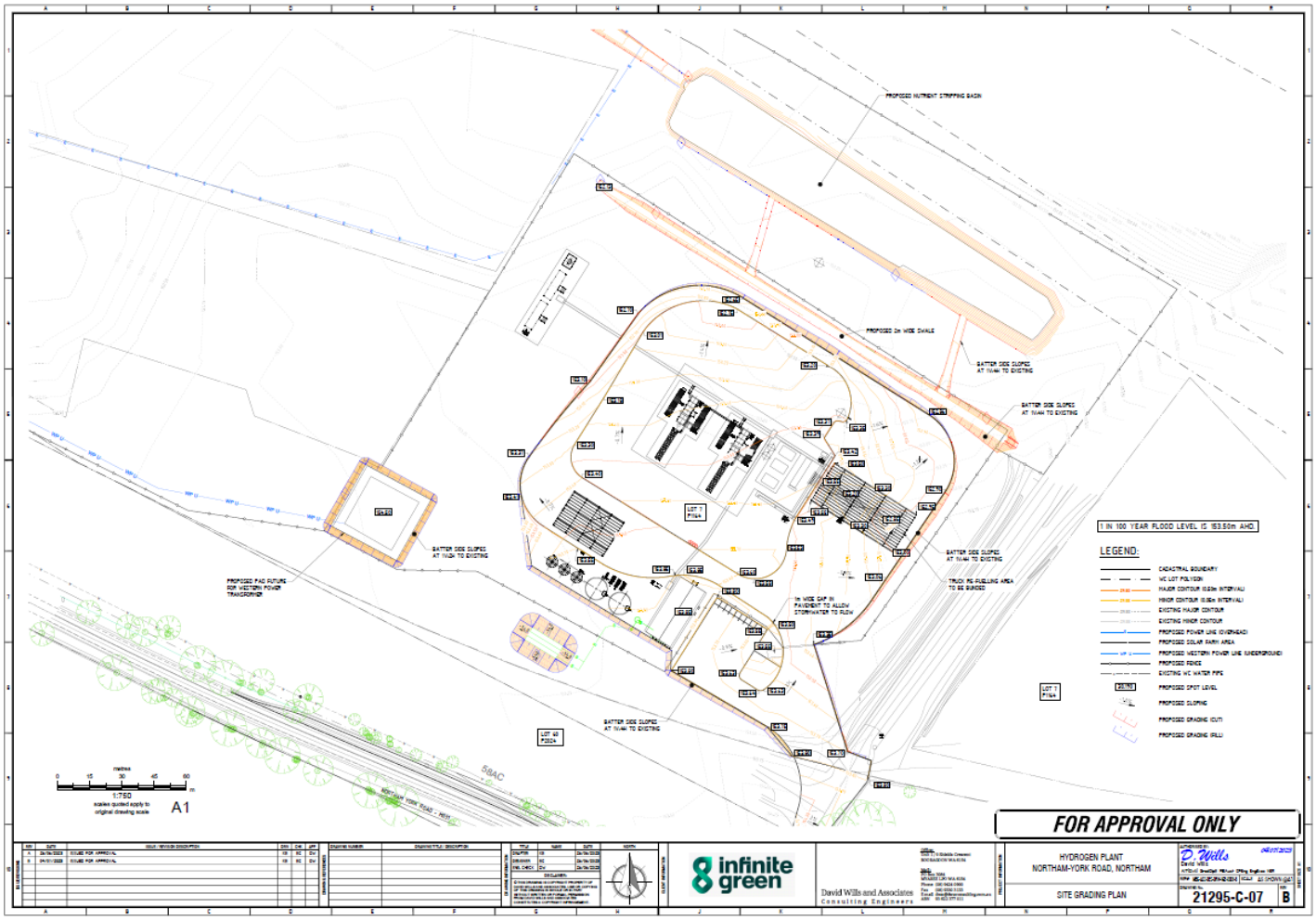


Figure 6 Site Grading

2.5. Existing Vegetation

The range of flora on the site is extremely limited due to the previous clearing activities associated with sand mining, grazing and cropping activities. There are existing solar panels situated east of the creek line that are operating on previously cleared, grazed, and cropped paddocks. The proposed energy facilities will be established on the southern side of the creek line in the cleared and grazed paddock. The current and proposed facilities occur on completely degraded paddocks and the only proposed disturbance of the degraded remnant vegetation along the fringes of the Mortlock River is an overhead power facility to link the established solar panel with the proposed hydrogen plant. The understorey on the fringes of the creek line is dominated by mainly introduced grasses (e.g., *Avena fatua, *Bromus diandrus, *Lolium rigidum and *Eragrostis curvula). This dominance of introduced grasses is reflected in the regional terrain that consists of a high covering of introduced grasses across the intended project site, (Mattiske 2023).

Three woodland types were recorded within the survey area in 2022 (see Table 1). The variance in tree types relates to the subtle variations in the dominance of certain tree species within the area and their proximity to the Mortlock riverbed. The surrounding riverbank and the flood plain location tends to produce a moist, 'high clay content' soil type.

Table 1: Summary of Vegetation unit for the Survey Area

Name	Description	Area (Ha) % Total Mapped	Vegetation Condition
1	Open Woodland to Woodland of Casuarina obesa, Eucalyptus rudis over introduced grasses and herbs of *Bromus diandrus, *Avena fatua, * Loliumrigidum and *Cotula coronopifolia on fringes of watercourses and wider flats.	0.981 _	Degraded
2	Open Woodland of Eucalyptus rudis, Melaleuca rhaphiophylla, Casuarina obesa with stands of remnant Eucalyptus loxophleba on fringing slopes over shrubs of Hakea preissii over introduced grasses and herbs of *Bromus diandrus, *Avena fatua, *Lolium rigidum and *Cotula coronopifolia on watercourses and adjacent slopes	2.904	Degraded
3	Open Woodland of Eucalyptus loxophleba, Melaleuca rhaphiophylla, Eucalyptus rudis, Casuarina obesa over occasional shrub of Hakea preissii over introduced grasses and herbs of *Bromus diandrus, *Avena fatua, * Lolium rigidum and Cotula coronopifolia on undulating slopes	6.415	Degraded
CL	Cleared	59.075	Completely Degraded

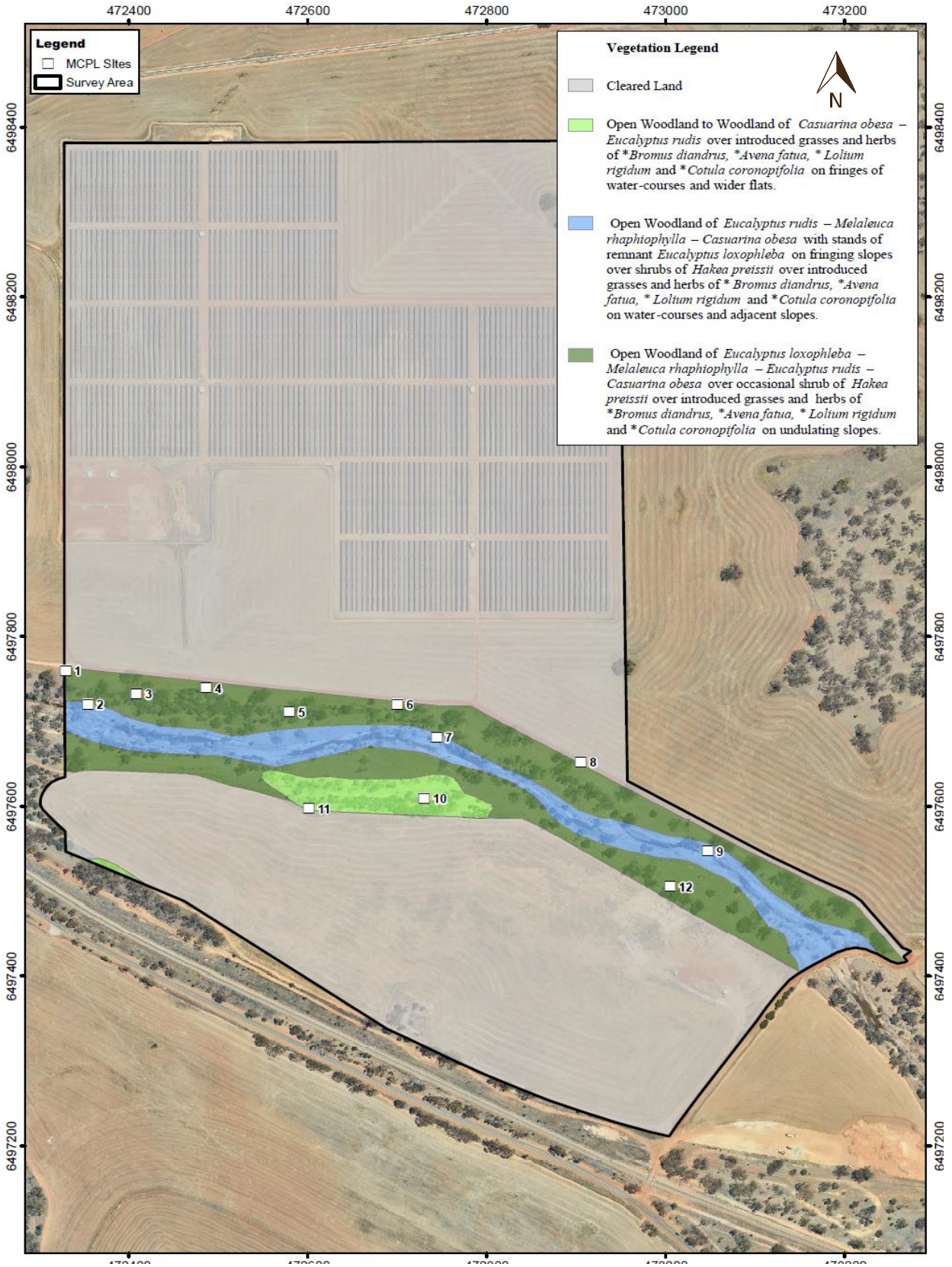


Figure 7: Aerial view showing Hydrogen Plant Vegetation Dec 2022

2.6. Surrounding Riverbanks and Remnant Woodland

The Mortlock River South lies approximately 15-30 metres north of the proposed hydrogen site footprint. The area between the riverbank and arable paddock was formed of woodland (circa 30% cover) with sparse understorey and ground cover dominated by agricultural weeds.

The woodland was dominated by flooded gum (Eucalyptus rudis), salmon gum (Eucalyptus salmonophloia), swamp she-oak (Casuarina obesa) and one other eucalypt that are possibly hybrids between E. camaldulensis and E. rudis as described by French (2012).

The understorey is formed of swamp paperbark (Melaleuca rhaphiophylla), infrequent needle bush (Hakea preisii) and occasional Acacia spp. Occasional plants of the dominant species listed above were also present. The ground cover was dominated wholly by wild oats. (Dr Barry Shepherd of Matters of Environment Pty Ltd (MoE) 2017).

2.7. Flora and Vegetation

A Threatened Ecological Community (TEC) has been reported immediately northwest of the development envelope.

The DPAW data show that several stands of “Eucalypt Woodland of the Western Australian Wheatbelt” are situated Immediately north of the site. This is classed as a critically endangered, threatened ecological community (TEC) under the Commonwealth Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) and therefore a matter of National Environmental Significance (MNES). It has been designated Priority Level 3 in Western Australia.

A dieback survey has been deemed unnecessary due to the historical agricultural land use and the lack of intact native vegetation (MoE 2017).

2.8. Project Site Vegetation Types

A field assessment was undertaken by Mattiske Consulting who have over 40 years of experience in undertaking biological surveys in Western Australia in the spring months of 2022.

A total of 23 flora taxa from 13 families and 22 genera were recorded. The range of flora on the site is very limited due to the previous historical activities. In general, only an occasional tree persists over introduced grasses and herbs. No threatened or priority flora species were recorded in the survey area. Of the 23 flora taxa recorded 15 of these were introduced species. Two of the introduced species (*Opuntia stricta was recorded at site 6 and *Echium plantagineum was recorded at sites 1 and 2) are listed as Weeds of National Significance (DCCEEW 2022a); although only present in limited numbers. The latter reflects the degree of disturbance of the vegetation in the survey area.

3. Landforms

No significant landforms were identified in the Carnegie Clean Energy Northam PV Array Environmental Site Assessment Report (MoE 2017) for the area adjacent to the proposed hydrogen project site.

3.1. Landform and Soils

Table 2: Summary of Land Systems for the Survey Area

Systems	Name	Description	Area (Ha) % Total Mapped	Total Mapped (Ha)
256Jc	Jelcobine System	Isolated steep low hills with undulating low granite hills and isolated lateritic remnants in the Zone of Rejuvenated Drainage. Gravels, and grey shallow to deep sandy duplexes. Wandoo, york gum, Jam and Casuarina woodland predominate.	198.31 0.09%	212529.54
256Af	Avon Flats System	Alluvial flats, in the northern Zone of Rejuvenated Drainage, with brown loamy earth, grey non-cracking clay and brown deep sand. York gum-salmon gum-flooded gum-sheoak woodland.	109.02 0.54%	20122.59

Both systems within the survey area are less than 1.00% of the total extents of the respective land systems.

Figure 8: Northam-York Road Looking West

4. Landscape Clearing Impacts

IGE are proposing to clear 0.45 hectares of MRWA land/road verge, if approved, IGE intend to utilise Clearing Permit CPS 818/15 that was initially was granted to Main Roads Western Australia (Main Roads) on 11 November 2005 by the then Department of Environment.

Purpose of clearing: Clearing for project activities/new road.

The Northam–York Road is a State Road controlled by Main Roads WA and is classified as a Primary Distributor Road in the Main Roads WA functional road hierarchy.

The access road from the Northam – York Road to the IGE project site is an unsealed, private road.

After extensive consultation, IGE propose construction of a left turn lane (deceleration lane) on the Northam–York Road on approach to the level crossing. This new lane will provide deceleration clear of the through traffic lane, for inbound vehicles that are required to wait for trains to clear the level crossing.

4.1. Alternatives to Clearing

Alternatives to clearing to accommodate the turning lane were limited due to the existing alignment of the Northam-York Road approach road. Subsequently the proposed verge clearing will be undertaken to minimise the clearing extent, obeying the ten clearing principles.

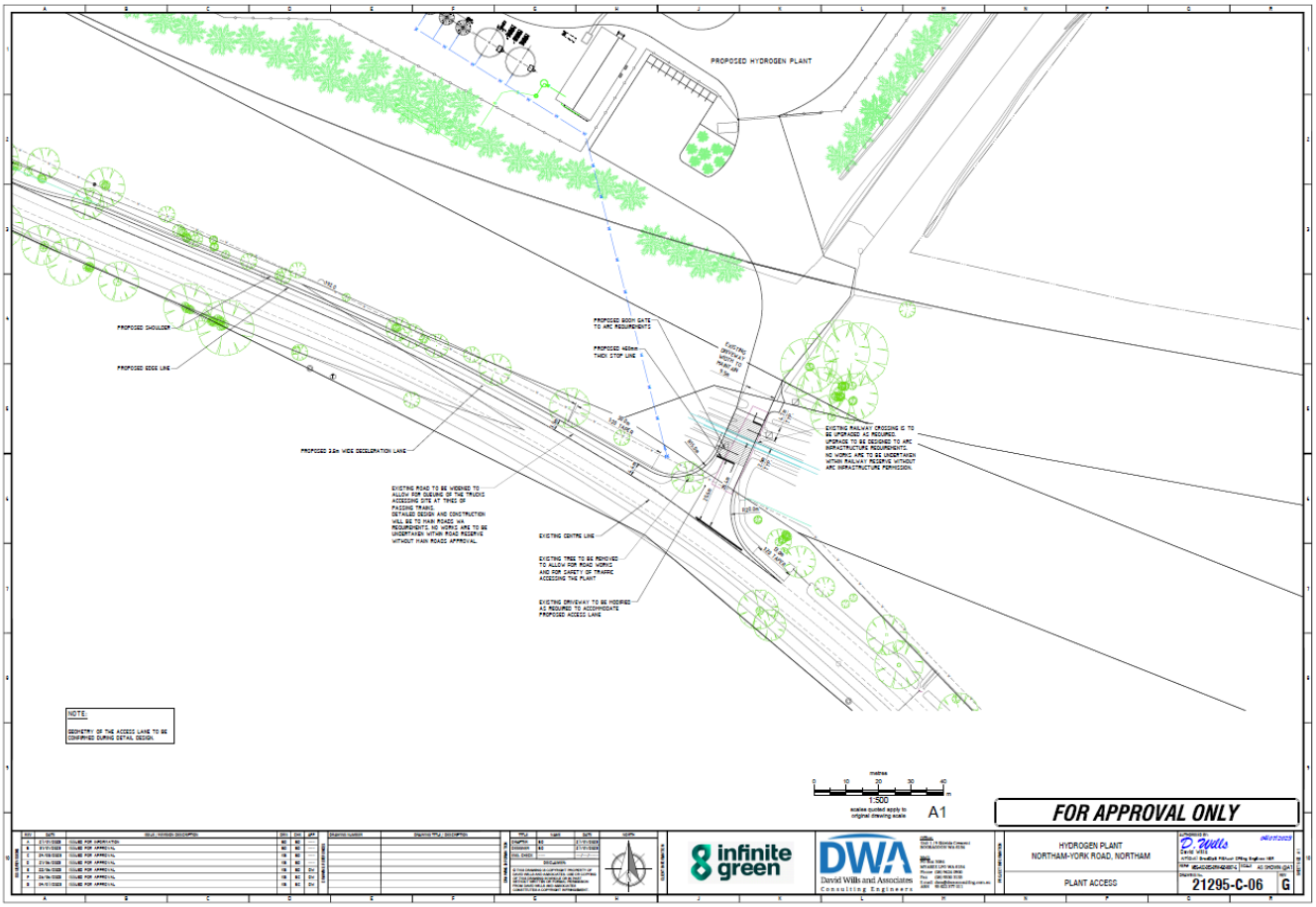


Figure 9: Plant Access

4.2. Location of proposed clearing (MRWA Gazette land)

The clearing of native vegetation in Western Australia is regulated under the Environmental Protection Act 1986, and the Environmental Protection (Clearing of Native Vegetation) Regulations 2004 (Clearing Regulations).

Figure 10: Northam –York Road Proposed Road Verge Clearing, (Green tint)

5. Landscaping

A visual buffer is intended to be planted between the hydrogen project and Northam-York Road. The species of tree will be determined by the Shire of Northam. A shortlist of tree species from the Shire of Northam's preferred tree species list has been provided to assist IGE.

5.1. Landscape Screening

Planting will be as required by the Shire of Northam in the form of vegetation/tree buffers on the southern and eastern edge of the project.

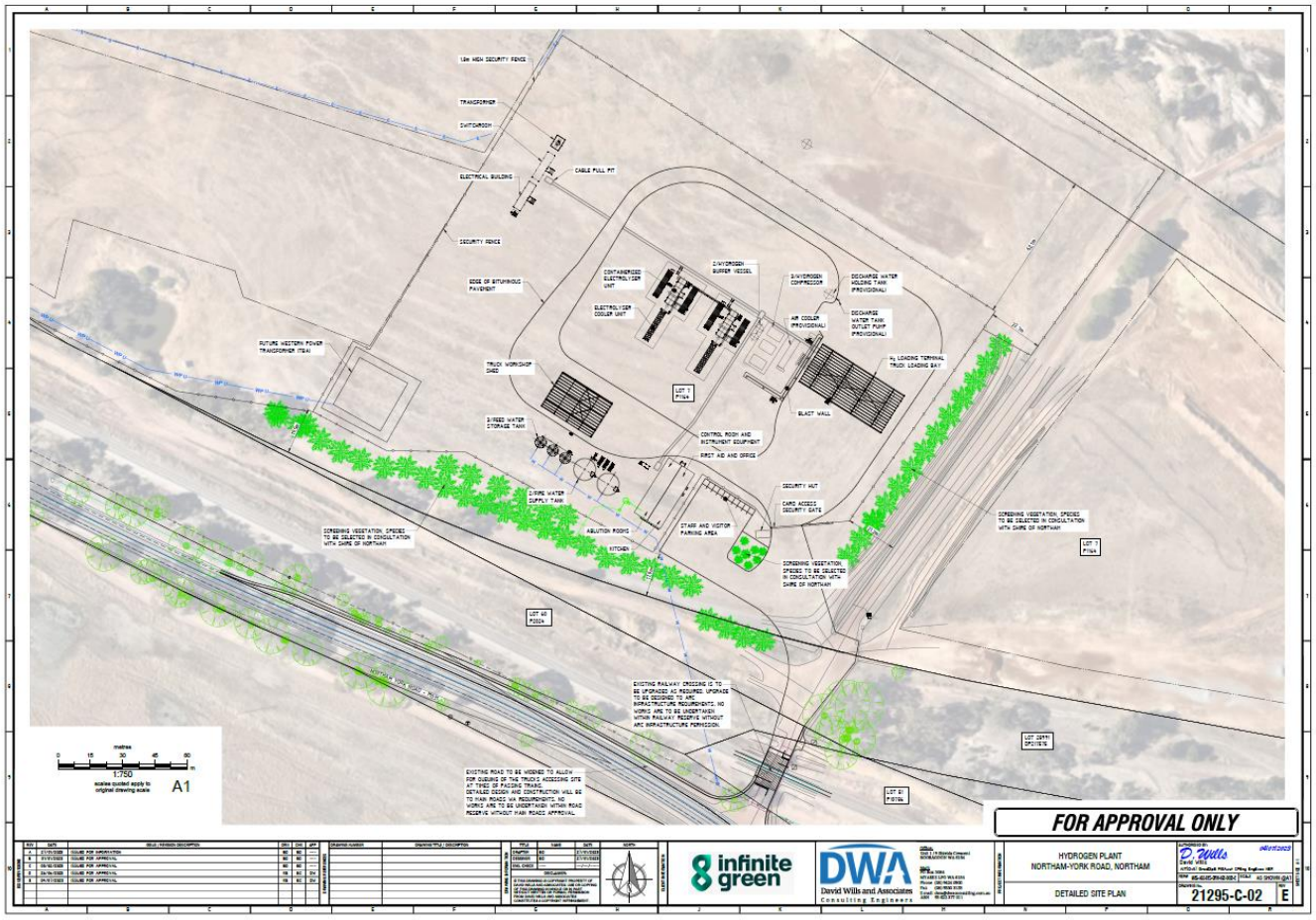


Figure 11: Detailed Site Plan - Lot boundaries, North Point and vegetation screening

Figure 12: *Hydrogen Plan, Looking West towards Northam townsite with screening trees*

6. Environmental Offsets

Environmental offsets will provide environmental benefits that will counterbalance the residual environmental impacts or project risks, regulated under the Environmental Protection Act 1986 on biodiversity.

IGE will establish new vegetation areas within the project site to offset the proposed road verge clearing (See Figure 13 above). Offsets will comprise planting and revegetation, including native tree establishment, similar to existing vegetation communities. Replanting will incorporate visual amenity management and landscaping design elements to meet both our environmental governance commitments and the benefits of ecological restoration.

IGE understand it is preferable that the intention of an offset leads to a net gain in size, density and diversity of native vegetation within the area, and an overall improvement in the condition of the natural environment. During offset design, we will emphasise specific environmental values required for offsetting while considering ecosystem function, rarity, connectivity, vegetation condition, habitat quality and consider the type of ecological community cleared, when offsetting our clearing.

7. Visual Amenity and Landscaping

There are no established, measurable technical thresholds for significance of change for landscape and visual impacts. For the purposes of this plan, the significance of impact types have been determined by considering the sensitivity of the landscape or visual receptors, and the magnitude of change expected as a result of the project.

Landscape and visual receptor sensitivity are the primary factors in determining which areas of the project development area were targeted for site assessment, with sensitive landscapes, visual amenity and noise receptors being the focus.

Descriptions of the anticipated project visual amenity impacts from a range of vantage points were assessed by drone aerial assessment capture, including the visual amenity data relating to surrounding residents and pastoral stakeholders.

In order to minimise adverse visual amenity impacts associated with project construction, the following management and mitigation measures will be adopted:

- Establish of vegetation screens to shield the plant and infrastructure from views from the closest resident 0.9km to the west of the project adjacent to the Northam townsite;
- The new solar array placement will be situated west of the plant site to utilise the natural vegetation screening in this area;
- Establish and maintain a site ‘southern boundary’ visual screen to reflect native species present within the vegetation community types of the Northam shire district;
- Associated modelling visuals indicate the approximate locations proposed during vegetation establishment, with species selected based on identification during field surveys as outlined above, and
- Monitor areas undergoing vegetation establishment/rehabilitation annually and implement corrective management actions if required.

8. Criteria and Objectives

The primary construction activities that impact landscape and visual amenity values are the construction of plant facilities and associated infrastructure (e.g., temporary office facilities, electrolysers, compressors, power lines etc.).

Table 3: Criteria and Objectives

Criteria	Objective	Mitigation
Environmental Impact	Conduct an environmental survey The type, location and significance of flora and fauna, particularly rare endangered or threatened	Site flora and fauna Survey/Report
	Describe and Map: Remnant native vegetation and sensitive areas can be avoided.	Zero sensitive vegetation areas within project area
Visual and Landscape Impacts	Construct plant facilities adjacent to power grid to minimise clearing of vegetation for grid connection	Project Site Layout Plans Site optimisation
	Site Earthworks: Adequate drainage design Solar arrays, stormwater impacts and drainage flows	Consult Stormwater Management Plan
	Pre-cleared pastoral land offers a practical solution to minimise environmental impacts	Stormwater Management plan
	Manage landscape impact assessment addresses: Adequate	Infrastructure Servicing Report/Actions/Optimisation
	Suitable earthworks design including rehabilitation areas, drainage, public amenity, and community values.	Environment al Management Plan Project Drone Footage
	Potential impact on public views including the visibility of the plant.	Plant vegetation Screening and this plan
	Amenity Impacts: View shed analysis and simulations of views from significant viewing locations including residential areas	Site 3d Modelling analysis Site Drawings/Plans
	Design plant layout to reduce landscape impacts, including density, height, scale, spacing, colour, surface reflectivity and design of components.	Drone footage analysis and design Optimisation Sustainable Construction/Procurement
	Introduce solutions to mitigate unwanted, unacceptable or adverse visual impacts. Include, ancillary buildings, signage, access roads, and incidental facilities	Tree Planting/Screening Infrastructure Servicing Report
Community Impacts	Ensure minimum recommended distances/ regulated noise levels Noise- sensitive receptors monitoring	See Noise assessment report

Criteria	Objective	Mitigation
Emissions Impact	Ensure the EMP identifies standards and procedures for site construction, including the management of operational emissions	See project EMP and associated sub-plans
Construction Impacts	Introduce management actions to prohibit public access to plant and infrastructure	Traffic Management Plan Infrastructure Servicing Report
Public/Community Safety	Manage Impacts to ethnographic/archaeological heritage.	Heritage desk-top study/No heritage sites identified
Cultural Heritage	Early consultation with the community and stakeholders by proponent	Community Consultation EMP
Community Consultation	Ensure development proposals are compatible with existing land uses within the surrounds	Landscape plan
	The Northam shire should be consulted with respect to the community consultation program.	Shire of Northam Development Assessment Panel - (DAP)

8.1. Landscape Management Measures

IGE's sustainability management approach will focus on early identification of sensitive locations and key receptors during project construction and operations.

8.2. Planning and Design

The following project site, design management controls will be implemented for each phase of the project to minimise potential impacts to the surrounding landscape character and visual amenity:

- Shrouded, downcast lighting will be utilised to minimise spill and mitigate light impacts;
- External lighting shall automatically "switch off" to prevent light pollution, reduce energy consumption and to mitigate impacts to local fauna;
- Design lighting in accordance with AS 4282-1997, Control of the Obtrusive Effects of Outdoor Lighting (Standards Australia, 1997);
- Co-locate facilities where practicable and design plant layout to minimise footprint (taking into consideration the elements that contribute to landscape character) to reduce visibility of the plant;
- Avoid visually sensitive locations (i.e. adjacent to residential areas) and landscapes when locating plant infrastructure, where practicable;
- Seek backdrops when siting facilities to protect the skyline in distant views;
- Avoid siting facilities within view of sensitive viewpoints, including but not limited to schools and private residences;
- When designing plant layout facilities, maintain an appropriate distance from, and minimise visual disturbance to visual receptors;
- Hide or screen the facility using natural landscape features or plant native vegetation barriers, where suitable to the landscape sensitivity;
- Avoid the removal of trees and other vegetation features that conceal views towards facilities;
- Establish screening barriers using endemic species in advance of construction of the facilities;
- Integrate facilities into the landscape setting considering building and structure colour, texture and lines, where screening is not practical;
- Use matt and low glare finishes two shades darker than the prevalent shading of the site, having regard to sun angles throughout the day and year, and to the harvesting of crops, where possible;
- Consider neutral paints/finishes in overly sensitive landscapes;
- Consult with potentially impacted visual receptors (landowners and neighbours) during site planning;
- Seek to reduce the form and shape of facilities visible to landowners and residents;
- Minimise the disturbance footprint and vegetation clearing;
- Conduct planned maintenance/works during daylight hours to minimise light spill where practicable, and
- Where it is not practicable to screen or integrate a facility into the landscape, consider designing the facility to blend with surrounding landscape, understanding the form, texture and arrangement of buildings structures.

8.3. Construction

This section provides a summary of the landscape and visual amenity values within and surrounding the project development area and an assessment of the potential for these values to be affected by direct and indirect impacts associated with the construction, operation phases of the project

During construction, mitigation measures that will be implemented will include:

- Plan the movement of equipment and materials during periods of minimal visual impact (i.e., workday start and end) where practicable;
- Target dry weather periods when undertaking construction in sensitive landscape areas (e.g., Waterway crossings), where feasible, to minimise visual impacts due to sedimentation or erosion;
- Clear areas progressively and implement rehabilitation ‘as soon as practicable’ following construction and decommissioning activities;
- Locate topsoil and spoil mounds in visually unobtrusive locations, where practicable;
- Incorporate excess spoil from site excavations into bunding at the base of a planted vegetation;
- Screening barriers to increase the overall height of the barrier;
- Use existing roads and tracks, where practicable;
- Utilise landscape features and contours, where practicable, to integrate linear infrastructure (Access tracks, gathering lines) into the landscape;
- Minimise the length and width of roads and tracks;
- Minimise construction time near sensitive visual receptors;
- Maintain the integrity of private roads and tracks and minimise dust generation, where appropriate, in consultation with relevant landowners and council, and
- Develop and implement waste management procedures in accordance with the Environmental Protection (Waste Management) Policy 2000.

8.4. Operation

Hydrogen plant operations management and mitigation measures to be implemented will include:

- Develop a Stormwater Control Plan (See Environment Management Plan and Subplans) and install and maintain appropriate site-specific controls;
- Maintain visual amenity controls utilised to reduce landscape and visual impacts.
- Replace cleared trees/shrubs to manage screening barriers to ensure they establish and maintain an effective barrier;
- Monitor plant emissions;
- Implement dust emissions mitigation controls/community nuisance, and
- Implement emissions monitoring. Noise/water /airborne emissions.

8.5. Drone Modelling

Drone Modelling Aspects: Digital spatial model is created by using aerial drone photography

Height datum: 75m above Sea Level with dynamic mapping analysis

Hover Speed: 25km/h

Project Design: Multiple aspect mapping for accurate terrain modeling for future site development. Aerial photography capture combine imagery for a full overview of the project site.

Drone modelling visuals have been prepared for the project, primarily as a tool for stakeholder consultation and to aid in presenting the cumulative landscape impacts. 3D visualisation is also beneficial in validating the potential impacts identified through photographic representation and visibility analysis (limited to the constraints of the model).

Utilising drone viewshed analysis techniques, IGE determined locations visible to an observer in all given directions. This type of analysis shows visible and non-visible outlooks in the vicinity of the project site. As an alternative to using a straight line as an input, viewshed analysis technology uses a single point location within the terrain surroundings.

Accordingly, graphics generated from the drone data analysis used in the visual impact assessment are provided below.

8.6. Site Modelling

A visual impact assessment of the Project- site providing an assessment of the potential impact on the existing viewshed from a number of key locations.

Figure 13 3D modelling perspective viewpoint North to South Render

Figure 14 Northam Hydrogen North East to South West Render

Figure 15 3D Drone Viewpoint From South Showing Site Access

9. Conclusions

The undulating landscape of the project site area illustrates a panorama of a predominately rural landscape with a medium degree of visual amenity. The site is dominated by interspersed pastoral landscapes that includes rural dwellings and an unobtrusive residential development along the Northam townsite.

By utilising landscape management mitigation measures and assessing the visual surrounds, the visual impacts identified are likely to be negligible. Additionally, no impacts upon features of cultural heritage or social values have been identified within the Heritage assessment report.

In conclusion the proposed construction and operation of the hydrogen plant will have minimal impact or risk to matters of environmental significance or visual amenity.

10. References

Commonwealth of Australia (2016) Eucalypt Woodlands of the Western Australian Wheatbelt: a nationally protected ecological community.

Department of Agriculture (Accessed 9 February 2017) (https://www.agric.wa.gov.au/fire/winderosion management)

Department of Environment and Conservation (2011) Plants Used by Carnaby's Black Cockatoo.

Department of Environment and Energy (Accessed 18 February 2017) (http://www.environment.gov.au/cgibin/sprat/public/publicspecies.pl?taxon_id=59523

Department of Fire and Emergency Services (2016) Map of Bush Fire Prone Areas 2016

French, M. (2012) Eucalypts of Western Australia's Wheatbelt. Malcolm French.

Defining Integrated Landscape Management for Policy Makers (2013) https://www.un.org

(Landscape Management for Policy Ma kers 2014).

Mattiske Consulting 2023 Assessment of flora, vegetation and fauna on the infinite green energy area near Northam

Spaven Consulting (2011) Solar Photovoltaic Energy Facilities: Assessment of Potential for Impact on Aviation.

Wheatbelt NRM (2013) Avon River Strategy Review

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NORTHAM HYDROGEN GENERATION PROJECT

PERSPECTIVE VIEW

NORTH TO SOUTH RENDER

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NORTHAM HYDROGEN GENERATION PROJECT

PERSPECTIVE VIEW

SOUTH EAST TO NORTH WEST RENDER

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NORTHAM HYDROGEN GENERATION PROJECT

PERSPECTIVE VIEW

NORTH EAST TO SOUTH WEST RENDER

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NORTHAM HYDROGEN GENERATION PROJECT

PERSPECTIVE VIEW

SOUTH WEST TO NORTH EAST RENDER

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