



## Application for Works Approval

### Part V Division 3 of the *Environmental Protection Act 1986*

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<b>Works Approval Number</b>	W6402/2020/1
<b>Applicant</b>	Hazer Group Limited
<b>ACN</b>	144 044 600
<b>File Number</b>	DER2020/000194
<b>Premises</b>	Hydrogen Commercial Demonstration Plant 837 Cockburn Road Munster WA 6166  Legal description Part of Lot 09 on Deposited Plan 31097 As defined by the coordinates in Schedule 2 of the works approval
<b>Date of Report</b>	03/08/2020
<b>Decision</b>	Works approval granted

**Chris Malley**  
**A/Manager, Process Industries**

*An officer delegated by the CEO under section 20 of the Environmental Protection Act 1986*

# Table of Contents

<b>1. Decision summary</b>	<b>1</b>
<b>2. Scope of assessment</b>	<b>1</b>
2.1 Regulatory framework	1
2.2 Application summary and overview of Premises	1
2.2.1 The application	1
2.2.2 The manufacturing process	1
2.3 Emissions to air	2
<b>3. Risk assessment</b>	<b>3</b>
3.1 Source-pathways and receptors	3
3.1.1 Emissions and controls	3
3.1.2 Receptors	5
3.2 Risk ratings	6
<b>4. Consultation</b>	<b>8</b>
<b>5. Applicant’s comments</b>	<b>8</b>
<b>6. Conclusion</b>	<b>8</b>
<b>References</b>	<b>8</b>
<b>Appendix 1: Summary of Applicant’s comments on risk assessment and draft conditions</b>	<b>9</b>
<b>Appendix 2: Application validation summary</b>	<b>10</b>
Table 1: Emissions from pilot plant	3
Table 2: Risk events and proposed Applicant controls	4
Table 3: Sensitive human and environmental receptors and distance from the Premises	6
Table 4: Risk assessment of potential emissions and discharges from the Premises during construction, commissioning and operation	7
Table 5: Consultation	8
Figure 1: Process flowchart	2

## 1. Decision summary

This Decision Report documents the assessment of potential risks to the environment from emissions and discharges during the construction and operation of the Hydrogen Commercial Demonstration Plant to be located at 837 Cockburn Road in Munster WA (Premises). As a result of this assessment, Works Approval W6402/2020/1 has been granted.

## 2. Scope of assessment

### 2.1 Regulatory framework

In completing the assessment documented in this Decision Report, the Delegated Officer has considered and given due regard to the Department of Water and Environmental Regulation's (Department) Regulatory Framework and relevant policy documents which are available at <https://www.dwer.wa.gov.au>.

### 2.2 Application summary and overview of Premises

#### 2.2.1 The application

On 21 April 2020, Hazer Group Limited (the Applicant) applied for a works approval under section 54 of the *Environmental Protection Act 1986* (EP Act).

The application is to undertake construction works, commissioning and time limited operations relating to chemical manufacturing at the Premises. The Premises are approximately 8.5 km south of Fremantle between Jervoise Bay and Lake Coogee.

The Premises relate to category 31 and the assessed production capacity under Schedule 1 of the *Environmental Protection Regulations 1987* (EP Regulations) which are defined in Works Approval W6402/2020/1. The infrastructure and equipment relating to the Premises which the Delegated Officer has considered in line with *Guidance Statement: Risk Assessments* (DER 2017) are outlined in Works Approval W6402/2020/1.

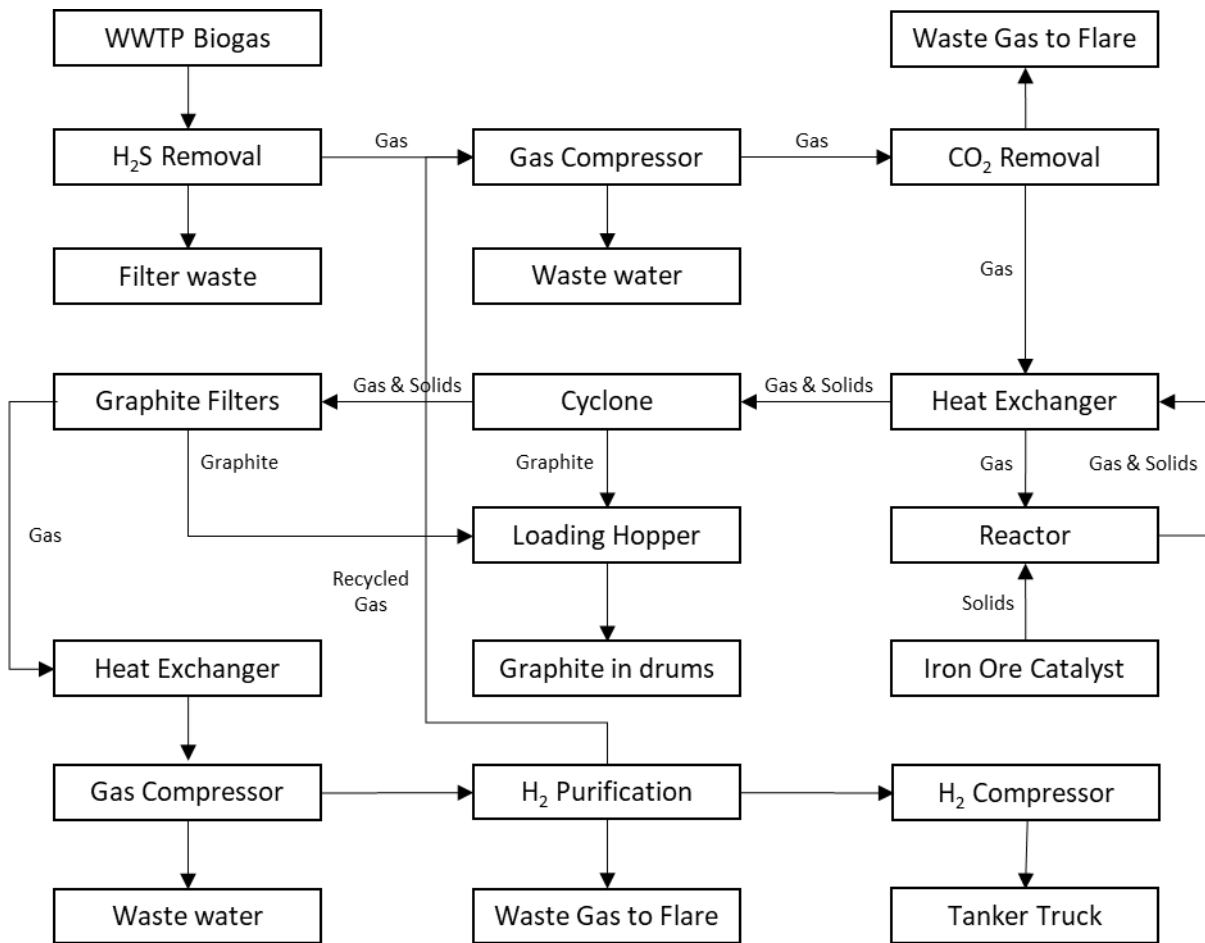
#### 2.2.2 The manufacturing process

The Premises will use biogas from the Water Corporation's adjacent Woodman Point Waste Water Treatment Plant (WWTP) as a feed gas for the production of fuel cell grade hydrogen, whilst capturing carbon as a graphite by-product. The biogas is mainly composed of Methane (CH<sub>4</sub>) and Carbon Dioxide (CO<sub>2</sub>) with traces of Hydrogen Sulphide (H<sub>2</sub>S), Nitrogen (N<sub>2</sub>), Oxygen (O<sub>2</sub>) and Carbon Monoxide (CO).

The Premises are anticipated to convert up to 90 % of the methane feed gas into hydrogen and graphite, with the H<sub>2</sub>S removed using a filtration process; the manufacturing process is illustrated as a flowchart in Figure 1. The biogas from the WWTP is currently being flared by Water Corporation at their premises. As such using the biogas as a feed to the hydrogen manufacturing process, which has very low emissions, will therefore have a net environmental benefit from an air emissions point of view.

The Premises' process emissions to air will be flared from a ground flare system with a vent stack 9m above the surface and 1.2m in diameter. The exhaust from the flare will result in approximately 170kg/hr CO<sub>2</sub> emissions with minor quantities of other constituents (CO, N<sub>2</sub>, H<sub>2</sub>O and particulate matter).

The removal of Hydrogen Sulphide (H<sub>2</sub>S) from the biogas using an activated carbon (or similar) filtration process, will generate solid waste in the form of used filter cartridges. The gas compression element of the process will generate wastewater, which will be captured in a wastewater pit and then transferred to the WWTP.



**Figure 1: Process flowchart**

## 2.3 Emissions to air

A smaller scale ‘pilot’ version of the same process to be used at the Premises is presently being operated at 2 Thorpe Way, Kwinana Beach. The operation of this pilot plant is described in works approval W6173/2018/1, available online at <https://www.der.wa.gov.au/our-work/licences-and-works-approvals>.

The predicted ground level concentrations (GLC) of CO and PM from the pilot plant’s flare stack are detailed in Table 1, together with the relevant standards from the National Environmental Protection (Ambient Air Quality) Measure (NEPM). Table 1 illustrates that the GLC are orders of magnitude less than the NEPM standards; hence, there is no reasonable expectation of emissions to air causing an adverse effect on receptors. Therefore, in accordance with *Guidance Statement: Risk Assessments* (DER 2017), a risk event does not exist.

**Table 1: Emissions from pilot plant**

Parameter	NEPM Standard ( $\mu\text{g}/\text{m}^3$ )	Time Average	Maximum GLC at nearest receptor (900m away) ( $\mu\text{g}/\text{m}^3$ )
CO	10310	8-hour	0.02
PM as TSP	90	24-hour	$1.74 \times 10^{-9}$
PM as PM <sub>10</sub>	50	24-hour	$8.70 \times 10^{-10}$
PM as PM <sub>2.5</sub>	25	24-hour	$2.18 \times 10^{-10}$

The pilot plant produces approximately 94 kg/day of graphite, whereas the Premise will produce 1100 kg/day, a factor of 11.7 times more. The nearest residential receptor to the Premises is at a similar distance to the receptors associated with the pilot plant. From an assessment of the GLC's presented in Table 1 and the increased production capacity at the Premises, it cannot be reasonably concluded that there is the potential for emissions to air to cause adverse effect on the receptors surrounding the Premises. Therefore, in accordance with *Guidance Statement: Risk Assessments* (DER 2017), a risk event does not exist; hence, no related emission limit conditions are required in the works approval.

### 3. Risk assessment

The Delegated Officer assesses the risk of emissions from prescribed premises and identifies the potential source, pathway and impact to receptors in accordance with the *Guidance Statement: Risk Assessments* (DER 2017).

To establish a Risk Event there must be an emission, a receptor which may be exposed to that emission through an identified actual or likely pathway, and a potential adverse effect to the receptor from exposure to that emission.

#### 3.1 Source-pathways and receptors

##### 3.1.1 Emissions and controls

The key emissions and associated actual or likely pathway during premises construction, commissioning and operation, which have been considered in this Decision Report are detailed in Table 2. Table 2 also details the control measures the Applicant has proposed to assist in controlling these emissions, where necessary.

**Table 2: Risk events and proposed Applicant controls**

Emission	Sources	Potential pathways	Proposed controls
<b>Construction</b>			
Dust	Fugitive dust emission may occur from vehicle and machinery movements, and from exposed ground surfaces	Air/windborne pathway	A complaints management system Dust suppression measures such as use of water carts, where dust emissions are visible beyond the Premises boundary
Noise	Vehicle, machinery, equipment and generator use	Air/windborne pathway	A complaints management system The Premises are located such that there is a landform barrier between the Premises and the nearest residential receptors
<b>Commissioning and operation</b>			
Dust	Loading of the catalyst into the reactor and unloading of graphite into drums via the hopper.	None	The systems are sealed to prevent dust generation.
Gaseous emissions	No potential for a risk event		Use of a vent stake 9m above surface level and 1.2m in diameter.  The flare system's pilot flame and stack flame are monitored via a system of thermocouples that will detect if they are alight or not.  In the event of a blowout, the flare's burner management system will alarm to alert the operator and the plant will be shutdown.  Stack emission monitoring: once during commissioning and then bi-annually during operation.
Noise	Three gas compressors	Air/windborne pathway	Complaints management system Each compressor will have a rated sound power level of 85 dB(A) at 1m, which is predicted to achieve noise levels at receptors are below those stipulated in the <i>Environmental Protection (Noise) Regulations 1997</i>

Emission	Sources	Potential pathways	Proposed controls
Wastewater	Oily water discharge from the wastewater pit, either via an overflow, or through leakage.	Seepage to soil and groundwater	Pit constructed from concrete Volumetric monitoring (and high level alarm) to ensure water level does not exceed 100% of the capacity of the pit Wastewater transferred to the WWTP Periodically emptying the pit using an oil skimmer to remove accumulated recovered oil and remove accumulated solids. All waste to be transported off-site and disposed of at an appropriately licensed facility
Process waste	PM discharge from the Hydrogen Sulfide impurities filters	Air/windborne pathway	Loading of filter automatically monitored. Alarm sounds when filter requires changing, and a stand-by filter is switched in to replace the fully loaded filter. Loaded filters will be disposed of at an appropriately licensed facility.

### 3.1.2 Receptors

In accordance with the *Guidance Statement: Risk Assessment* (DER 2017), the Delegated Officer has excluded employees, visitors and contractors of the Applicant from its assessment. Protection of these parties often involves different exposure risks and prevention strategies and is provided for under other state and or federal legislation.

Table 3 below provides a summary of potential human and environmental receptors that may be impacted because of activities upon or emission and discharges from the Premises (*Guidance Statement: Environmental Siting* (DER 2016)).

**Table 3: Sensitive human and environmental receptors and distance from the Premises**

Human receptors	Distance from the Premises
Closest residential receptor	Approximately 885m from eastern edge of the Premises boundary
Woodman Point Discovery Park (Caravan Park), Woodman Point Café and Woodman Point Sea Rescue.	Approximately 420m west of the Premises boundary
Water Corporation's Woodman Point Waste Water Treatment Works	Adjacent to the Premises boundary
Australian Maritime Complex	Approximately 730m SSW of the Premises boundary
Environmental receptors	Distance from the Premises
The WA TEC SCP30a <i>Callitris preissii</i> (or <i>Melaleuca lanceolata</i> ) forests and woodlands	Within the Premises boundary
Black Cockatoo foraging habitat and one potential breeding tree	Within the Premises boundary
Registered Aboriginal site ID 15840 Cockburn Road	Within the Premises boundary

### 3.2 Risk ratings

Risk is assessed in accordance with the *Guidance Statement: Risk Assessments* (DER 2017) for each identified emission source and takes into account potential source-pathway and receptor linkages as identified in Section 3.1. Where linkages are incomplete they have not been considered further in the risk assessment.

Where the Applicant has proposed mitigation measures/controls (as detailed in Section 3.1), these have been considered when determining the final risk rating. Where the Delegated Officer considers the Applicant's proposed controls to be critical to maintaining an acceptable level of risk, these will be incorporated into the works approval as regulatory controls.

Additional regulatory controls may be imposed where the Applicant's controls are not deemed sufficient. Where this is the case the need for additional controls will be documented and justified in Table 4.

Works approval W6402/2020/1 that accompanies this Decision Report authorises construction, commissioning and time-limited operations. The conditions in the issued works approval, as outlined in Table 4 have been determined in accordance with *Guidance Statement: Setting Conditions* (DER 2015).

A licence is required following the time-limited operational phase authorised under the works approval to authorise emissions associated with the operation of the Premises i.e. hydrogen and graphite production. A risk assessment for the operational phase has been included in this Decision Report, however licence conditions will not be finalised until the Department assesses the licence application.



**Table 4: Risk assessment of potential emissions and discharges from the Premises during construction, commissioning and operation**

Risk Event					Risk rating <sup>1</sup> C = consequence L = likelihood	Applicant controls sufficient?	Conditions <sup>2</sup> of works approval	Justification for additional regulatory controls
Source/Activities	Potential emission	Potential pathways and impact	Receptors	Applicant controls				
<b>Construction</b>								
Earthworks, vehicle movements and installation of equipment.	Dust	Air/windborne pathway causing impacts to health and amenity	Residences and commercial premises, see Table 3	Refer to Section 3.1.1	C = Slight L = Rare <b>Low Risk</b>	Y	N/A	N/A
	Noise				C = Slight L = Rare <b>Low Risk</b>	Y	N/A	N/A
<b>Commissioning and Operation</b> <i>(including time-limited-operations operations)</i>								
Operation of process plant and vehicle movements	Noise	Air/windborne pathway causing impacts to health and amenity	Residences and commercial premises, see Table 3	Refer to Section 3.1.1	C = Slight L = Rare <b>Low Risk</b>	Y	Condition 1	N/A
	Process waste				C = Minor L = Rare <b>Low Risk</b>	Y	Condition 1	N/A
	Wastewater	Seepage to soil and groundwater	Environmental receptors, see Table 3	Refer to Section 3.1.1	C = Minor L = Rare <b>Low Risk</b>	Y	Condition 1	N/A

Note 1: Consequence ratings, likelihood ratings and risk descriptions are detailed in the *Guidance Statement: Risk Assessments* (DER 2017).

Note 2: Proposed Applicant controls are depicted by standard text. **Bold and underline text** depicts additional regulatory controls imposed by the Department.

## 4. Consultation

Table 5 provides a summary of the consultation undertaken by the department.

**Table 5: Consultation**

Consultation method	Comments received	Department response
Application advertised on the department's website (01/06/2020)	None received	N/A
Local Government Authority advised of proposal (3 June 2020)	None received	N/A
Meeting with EPA and Applicant to discuss CO <sub>2</sub> emissions from the Premises	The operation of the Premises will reduce greenhouse gas emissions by diverting biogas from the WWTP, which would otherwise be flared off. Through the removal of carbon from the biogas, in the form of graphite, less CO <sub>2</sub> is emitted from the Premises' flare stack, than would have been emitted from the WWTP's flare.	No works approval conditions are required to limit emissions of CO <sub>2</sub> .

## 5. Applicant's comments

The applicant provided the Department, via email on 27 July 2020, with comments on the draft decision report and draft works approval, and waived the remainder of the 21 day consultation period. A summary of the applicant's comments and the Department's responses is provided in Appendix 1.

## 6. Conclusion

Based on the assessment in this Decision Report, the Delegated Officer has determined that a works approval will be granted, subject to conditions commensurate with the determined controls and necessary for administration and reporting requirements. As the Applicant's proposed commissioning of the Premises does not require special conditions the Delegated Officer has determined that this is not deemed environmental commissioning but deemed operation. The Delegated Officer has therefore included conditions for time limited operations which will cover the period of commissioning and operation of the Premises during which period the Applicant can apply for a licence for the Premises.

## References

1. Department of Environment Regulation (DER) 2016, *Guidance Statement: Environmental Siting*, Perth, Western Australia.
2. DER 2017, *Guidance Statement: Risk Assessments*, Perth, Western Australia.
3. DER 2015, *Guidance Statement: Setting Conditions*, Perth, Western Australia.

## Appendix 1: Summary of Applicant's comments on risk assessment and draft conditions

Condition	Summary of Applicant's comment	Department's response
1	That the requirement for the wastewater collection pit to incorporate a volumetric monitoring system, with a high level alarm set at 70% be amended to system that has a control level set point of 70% and high level alarm that is set to trigger when the water level exceeds 80%.	Accepted – This arrangement is sufficient to control the risk to the environment of the pit overflowing.
6	That the requirement for all continuous waste gases to only be discharged via the gas flare stack, be amended to allow for minor discharges from Pressure Safety Valves (PSVs) during fire emergencies and maintenance scenarios.	Accepted – Releases from PSVs will be small volumes of gas, such that they pose no risk to the identified receptors.

## Appendix 2: Application validation summary

SECTION 1: APPLICATION SUMMARY (as updated from validation checklist)				
<b>Application type</b>				
Works approval	<input checked="" type="checkbox"/>			
Licence	<input type="checkbox"/>	Relevant works approval number:		None <input type="checkbox"/>
		Has the works approval been complied with?	Yes <input type="checkbox"/> No <input type="checkbox"/>	
		Has time limited operations under the works approval demonstrated acceptable operations?	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/>	
		Environmental Compliance Report submitted?	Yes <input type="checkbox"/> No <input type="checkbox"/>	
		Date Report received:		
Renewal	<input type="checkbox"/>	Current licence number:		
Amendment to works approval	<input type="checkbox"/>	Current works approval number:		
Amendment to licence	<input type="checkbox"/>	Current licence number:		
		Relevant works approval number:	N/A	<input type="checkbox"/>
Registration	<input type="checkbox"/>	Current works approval number:	None	<input type="checkbox"/>
Date application received	21 April 2020			
<b>Applicant and Premises details</b>				
Applicant name/s (full legal name/s)	Hazer Group Limited			
Premises name	Hydrogen Commercial Demonstration Plant			
Premises location	Hydrogen Commercial Demonstration Plant 837 Cockburn Road Munster WA 6166			
Local Government Authority	City of Cockburn			
<b>Application documents</b>				
HPCM file reference number:	DER2020/000194			
Key application documents (additional to application form):	Hazer Hydrogen and Graphite CDP – Works Approval Application Supporting Documentation, Hazer Group, April 2020 Response to Request for Further Information, email dated 4 June 2020			

Scope of application/assessment		
Summary of proposed activities or changes to existing operations.	Construction and operation of a biogas to hydrogen and graphite commercial demonstration plant.	
Category number/s (activities that cause the premises to become prescribed premises)		
Table 1: Prescribed premises categories		
Prescribed premises category and description	Proposed production or design capacity	
Category 31 – Chemical Manufacturing	480 tonnes per annum	
Legislative context and other approvals		
Has the Applicant referred, or do they intend to refer, their proposal to the EPA under Part IV of the EP Act as a significant proposal?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Referral decision No: Managed under Part V <input type="checkbox"/> Assessed under Part IV <input type="checkbox"/>
Does the Applicant hold any existing Part IV Ministerial Statements relevant to the application?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Ministerial statement No: EPA Report No:
Has the proposal been referred and/or assessed under the EPBC Act?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Reference No:
Has the Applicant demonstrated occupancy (proof of occupier status)?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Certificate of title <input type="checkbox"/> General lease <input type="checkbox"/> Expiry: Mining lease / tenement <input type="checkbox"/> Expiry: Other evidence <input checked="" type="checkbox"/> Expiry: 30 June 2024
Has the Applicant obtained all relevant planning approvals?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A <input type="checkbox"/>	Approval: Expiry date: If N/A explain why?
Has the Applicant applied for, or have an existing EP Act clearing permit in relation to this proposal?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	CPS No: 8886/1
Has the Applicant applied for, or have an existing CAWS Act clearing licence in relation to this proposal?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Application reference No: N/A Licence/permit No: N/A
Has the Applicant applied for, or have an existing RIWI Act licence or permit in relation to this proposal?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Application reference No: Licence/permit No: Licence / permit not required.

<p>Does the proposal involve a discharge of waste into a designated area (as defined in section 57 of the EP Act)?</p>	<p>Yes <input checked="" type="checkbox"/> No <input type="checkbox"/></p>	<p>Name: N/A  Type:  Has Regulatory Services (Water) been consulted?  Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/>  Regional office:</p>
<p>Is the Premises situated in a Public Drinking Water Source Area (PDWSA)?</p>	<p>Yes <input type="checkbox"/> No <input checked="" type="checkbox"/></p>	<p>Name: N/A  Priority: N/A  Are the proposed activities/ landuse compatible with the PDWSA (refer to <a href="#">WQPN 25</a>)?  Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input checked="" type="checkbox"/></p>
<p>Is the Premises subject to any other Acts or subsidiary regulations (e.g. <i>Dangerous Goods Safety Act 2004, Environmental Protection (Controlled Waste) Regulations 2004, State Agreement Acts</i>)</p>	<p>Yes <input checked="" type="checkbox"/> No <input type="checkbox"/></p>	<p><i>The Aboriginal Heritage Act 1972</i></p>
<p>Is the Premises within an Environmental Protection Policy (EPP) Area?</p>	<p>Yes <input type="checkbox"/> No <input checked="" type="checkbox"/></p>	
<p>Is the Premises subject to any EPP requirements?</p>	<p>Yes <input type="checkbox"/> No <input checked="" type="checkbox"/></p>	
<p>Is the Premises a known or suspected contaminated site under the <i>Contaminated Sites Act 2003</i>?</p>	<p>Yes <input checked="" type="checkbox"/> No <input type="checkbox"/></p>	<p>Classification: Possibly contaminated - investigation required  Date of classification: 13/11/2013  Not expected to be an issue for the construction of this plant.</p>