



Application for Works Approval

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

Works Approval Number W6845/2023/1

Applicant BP Refinery (Kwinana) Pty Ltd

ACN 008 689 763

File number DWER2023/000634

Premises BP Kwinana Energy Hub
1 Mason Road,
KWINANA BEACH WA 6167

Legal description
Lot 18 on Plan 17311

As defined by the premises maps attached to the issued works approval

Date of report 15 November 2024

Decision Works approval granted

MANAGER, PROCESS INDUSTRIES

an officer delegated under section 20 of the *Environmental Protection Act 1986* (WA)

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1. Decision summary

This decision report documents the assessment of potential risks to the environment and public health from emissions and discharges during the construction and operation of the premises. As a result of this assessment, works approval W6845/2023/1 has been granted.

2. Scope of assessment

2.1 Regulatory framework

In completing the assessment documented in this decision report, the Department of Water and Environmental Regulation (the department; DWER) has considered and given due regard to its regulatory framework and relevant policy documents which are available at <https://dwer.wa.gov.au/regulatory-documents>.

2.2 Application summary and overview of premises

On 25 September 2023, bp Refinery (Kwinana) Pty Ltd (bp, the applicant) submitted an application for a works approval to the department under section 54 of the *Environmental Protection Act 1986* (EP Act).

The application is to undertake construction works relating to the Kwinana Renewable Fuels (KRF) facility at the premises. The premises relates to the category 31, chemical manufacturing, and assessed production capacity of 584,000 tonnes under Schedule 1 of the *Environmental Protection Regulations 1987* (EP Regulations) which are defined in works approval W6845/2023/1.

Background

The bp Kwinana Refinery is located approximately 35 km southwest of the Perth CBD in the Kwinana industrial area. The facility was an oil refinery from 1955 to February 2021 before production ceased and the facility converted to a fuel import terminal. The site is currently licenced to operate under an existing Part V licence for the prescribed premises (L5938/1967/12).

Proposed construction and operational activities associated with the works approval application will occur in a Development Envelope that is within the existing approved prescribed premises boundary. The applicant has advised that the plan for the proposed KRF biorefinery is to repurpose some existing oil refinery infrastructure to accommodate the new project and build new infrastructure. bp are currently decommissioning and demolishing redundant units that were used as part of the existing oil refinery. These works are being conducted separately, with activities under the control of a demolition contractor working within an Environmental Management Plan.

Existing operational areas include a tank farm, two steam generators, jetties, and the existing wastewater treatment plant (WWTP).

The KRF facility will utilise 584,000 tonnes per annum of raw and waste fatty oils and greases, such as tallow, used cooking oil, palm oil mill effluent and other biowaste to produce hydrotreated vegetable oil (HVO), synthetic paraffinic kerosene (SPK) and bio naphtha. These products can be blended with mineral oil to produce renewable diesel and sustainable aviation fuel. Feedstocks will be segregated and stored in existing storage tanks on site.

Construction of new infrastructure

New proposed infrastructure includes:

- a pretreatment unit with dust filtration aid silos and odour abatement unit;;
- hydrogen generation unit with continuous emissions monitoring system (CEMS) on the stack and a bunded area draining to the oily water sewer and WWTP;
- product fractionation unit including PFU combustion stack and a bunded area draining to the oily water sewer and WWTP;
- closed loop cooling water system with a bunded area draining to the oily water sewer and WWTP
- minor new supporting infrastructure (heat exchangers, pumps and pipelines associated with the import terminal)

Existing infrastructure requiring modification.

Existing infrastructure located on the premises that will be modified during the construction includes:

- Hydrofiner unit 2 - reused to process pretreatment stock including new surge drum and new reactor increase capability of gas compressor, vacuum drying system and pipe modifications;
- Hydrofiner unit 3 - reused to provide isomerization and hydrocracking activity including new reactor, increased capability of gas compressor, pipe modifications, increased product stripper capability;
- LPG storage vessels;
- Flare system; and
- 3 hydrogen storage vessels.

Changes to proposal

The original application included a biodigestion unit (anaerobic digester); however, applicant laboratory studies have since shown this is not feasible for the solid and liquid wastes generated by the project. The applicant has withdrawn this part of the proposal and will develop a byproduct recovery unit (BRU). The BRU will have water treatment facilities such as fat and grease removal, biological treatment and denitrification.

The full proposal for a BRU will be submitted as a separate works approval or amendment.

Commissioning

Startup and commissioning is where process fluids such as hydrocarbons are introduced for the first time and the equipment is started up.

The controls and mitigation for commissioning will be similar or the same as operational controls with the difference of the startup sequence. Emissions are likely to be higher during commissioning until the operation is optimised.

Stack testing will be carried out to validate the predicted emissions from the design and also validate the CEMS.

Process

A process flow diagram is depicted in Figure 1. Figure 1 also indicates which parts of the infrastructure are to be built new and which parts are re-used from the existing infrastructure.

Existing infrastructure excluded from the works approval assessment includes tanks, jetty infrastructure, wastewater treatment plant and existing natural gas, air, nitrogen and water supply.

Kwinana Renewable Fuels Project

Block Flow Diagram

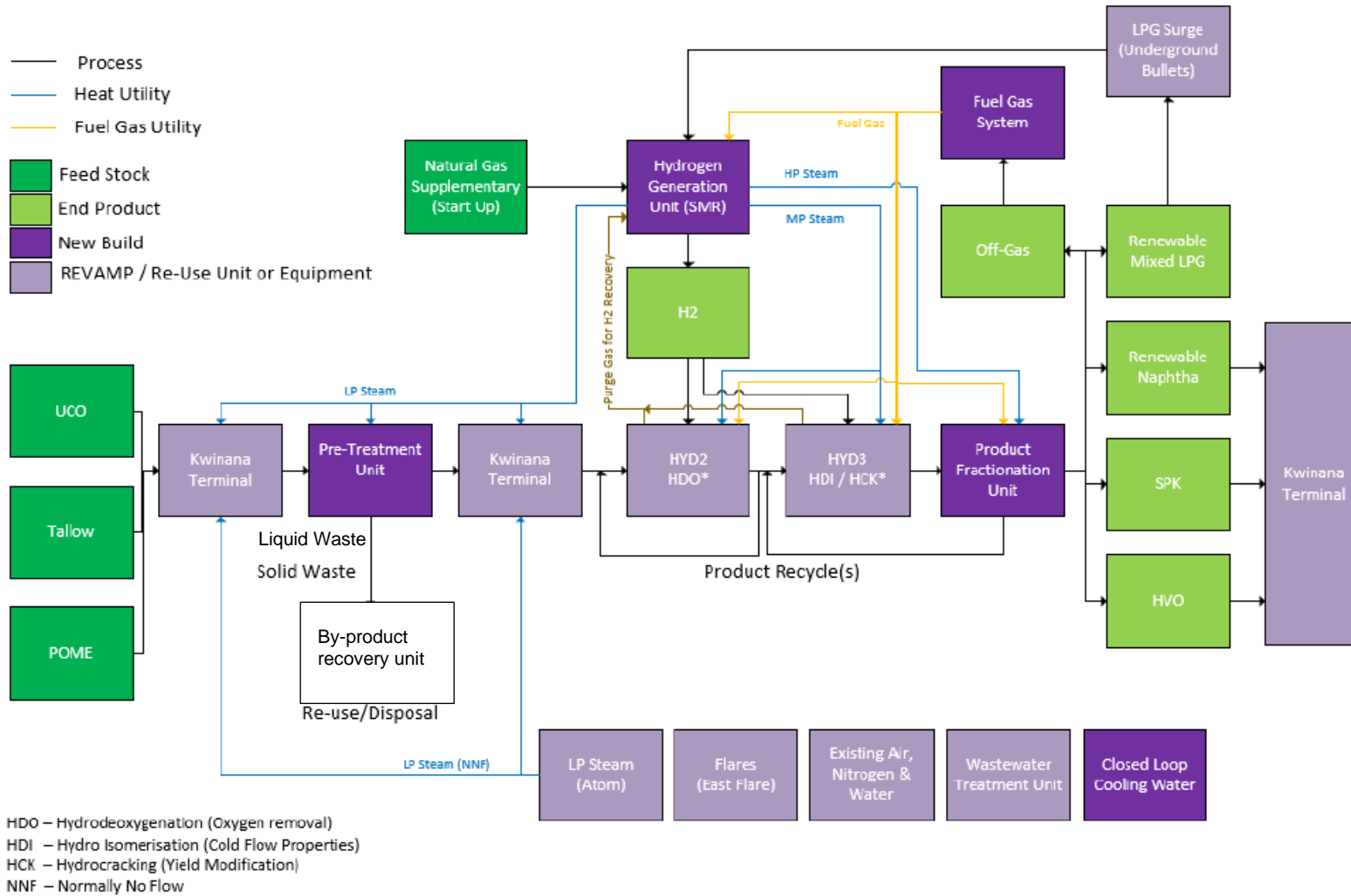


Figure 1: Process flow diagram for Kwinana Renewable Fuels Project

Emissions from the facility are expected to be from:

- Pre-treatment unit (solid waste, liquid waste, odour, wastewater and dust);
- Hydrofiners 2 and 3 (air emissions, wastewater);
- Hydrogen generation unit (air emissions, wastewater);
- Production fractionation unit (air emissions, wastewater);
- Solid waste handling facility (odour, solid waste);
- Main flare (air emissions);

Process water will be treated in an existing wastewater treatment plant and discharged to the Sepia Depression Ocean Outlet Landline (SDOOL). Discharges to the SDOOL are managed under Ministerial Statement 665 issued to the Water Corporation and the existing licence.

Significant atmospheric emissions to the environment include SO_x, NO_x, CO₂, CO, particulates, VOCs and odour.

The pre-treatment unit has two exhausts, one from the odour scrubber unit and the other from the hot well exhaust. The pre-treatment unit is also a possible source of fugitive dust. There are two bleaching earth trains which have two emission points each, being the filter aid exhaust and the earth exhaust fan. Pneumatic conveying systems for these materials have dust filtration systems on the receiving silos to remove dust from the conveying air prior to discharge.

The hydrogen generation unit reformer stack is the largest emitter of CO₂, SO_x and NO_x and will be equipped with CEMS to monitor emissions.

CEMS will also be installed for the product fractionation unit reboiler.

2.3 Contaminated Sites

The refinery is a known contaminated site managed under the *Contaminated Sites Act 2003*. The premises is currently classified as contaminated – remediation required. Contaminated sites issues are currently being managed by DWER Contaminated Sites Branch.

As part of construction activities, dewatering will be required as its expected that there will be several excavations into depths below 2.8m (approx. water table level). Any intrusive works into the soil or groundwater must follow the site's existing procedure for "Management of soil and groundwater", developed to ensure works are carried out in a manner consistent with the *Contaminated Sites Act 2003*. The steps to follow for works affecting soil and groundwater are:

- Determine the extent of excavation and if soil and/or groundwater is affected.
- Carry out a contamination assessment of the proposed area to understand and prevent the distribution of any potential contaminants.
- Consult with bp remediation team and develop a work management plan that includes where and how to dispose of soil and/or groundwater.

In addition, the contractor will develop a construction environmental management plan for the task that will reference the soil and groundwater management plan and cover all other environmental impacts.

Contaminated soils can be treated at the refinery's waste management area and contaminated soils in general are managed under the *Management of Soil and Groundwater procedure* ensuring compliance with the *Contaminated Sites Act 2003*.

2.4 Noise modelling

The applicant submitted noise modelling by Acoustic Engineering Solutions modelling the noise

impacts at sensitive receptors and comparing them to the levels assigned by the *Environmental Protection (Noise) Regulations 1997*.

Two worst case scenarios were modelled, scenario 1 with all equipment including the Kwinana Renewable Fuels proposal and scenario 2 which is scenario 1 plus the existing east flare operating at the normal flow rate.

The predicted nighttime noise levels at sensitive receptors are shown in Table 1 for both the worst case scenarios the predicted noise levels are 7 dB below the assigned noise levels L_{A10} for night time.

Table 1: Predicted worst case noise levels.

Receivers	Nighttime assigned noise levels L_{A10} in dB(A)	Predicted noise levels in dB(A)	
		Scenario 1	Scenario 2
Calista	36	26.5	27.5
Hillman	45	20.8	22.0
Hope Valley	42	30.7	33.4
Leda	35	22.5	23.5
Medina	39	30.5	31.4
North Rockingham	40	30.0	30.7
Wattleup	45	21.4	24.1

The worst case 65 dB(A) contour was shown to be inside the applicant's premises meaning they are likely to be compliant within the assigned levels at neighbouring industrial premises.

Noise contour maps are shown in Figure 2 and Figure 3 showing the main noise impacts are inside the boundary of the premises and in adjoining industrial premises.

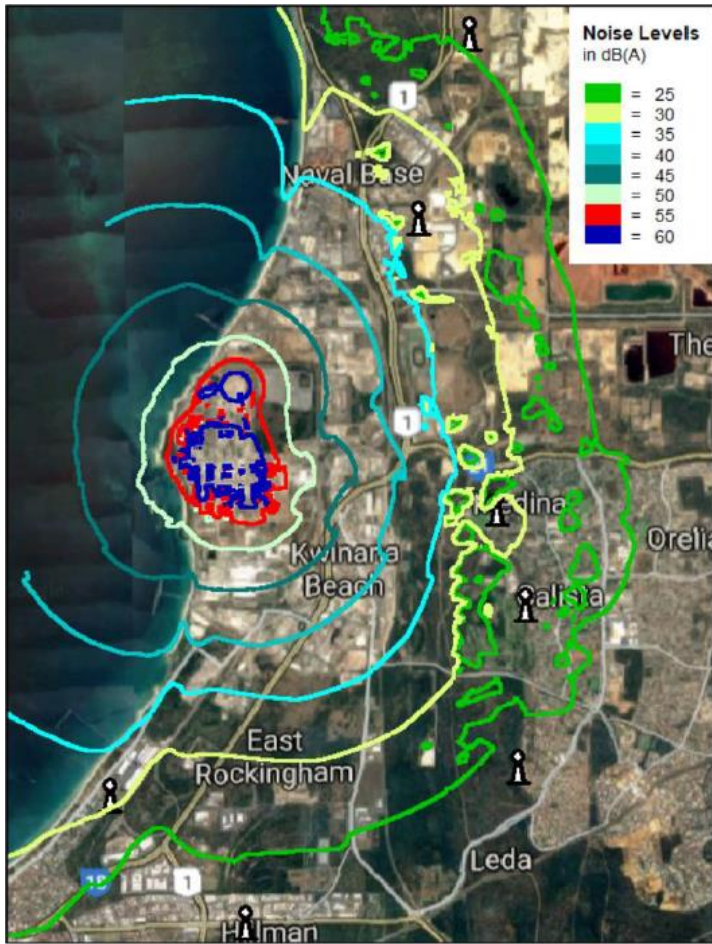


Figure 2: Worst case night time noise contours for scenario 2

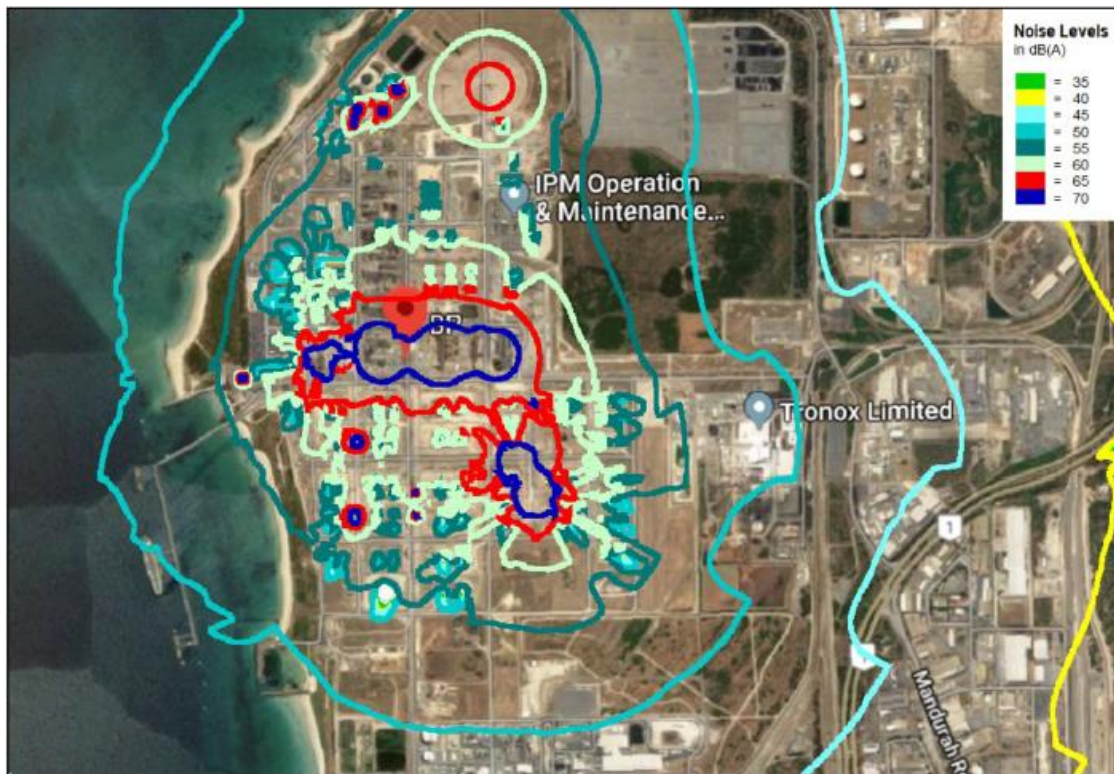


Figure 3: Zoomed night time noise contours for Scenario 2

2.4.1 DWER Technical Review

A technical review of the noise impact assessment was conducted by the department and determined that:

- The noise modelling and conclusions seem reliable and acceptable; and
- The modelled operational scenarios seem reasonable.

The technical review noted however that the proposal as assessed and considered in the noise impact assessment was in the early design stage and that actual noise emissions will likely need to be monitored under operational stages to confirm the noise modelling conducted.

2.5 Air quality modelling

The application also includes *BP Kwinana – Renewable Fuels Project Air Quality Impact Assessment* by Ramboll Australia Pty Ltd.

The compounds modelled for a number of scenarios were carbon monoxide (CO), oxides of nitrogen (NO_x), oxides of sulphur (SO_x) and particulate matter.

Table 2 shows the maximum predicted ground level concentrations as a percentage of the guideline values for Scenario 1.

Table 2: Summary of maximum Ground Level Concentrations for normal operations

Receptor	Pollutant	Guideline µg/m ³		Max GLC % of Guideline	
				Predicted Isolation	Predicted in cumulative
Maximum Offsite	CO	1 hour	30,000	<1%	2%
		8 hour	23,580	<1%	2%
	NO ₂	1 hour	151	73%	97%
		Annual	28	12%	53%
	PM _{2.5}	24 hour	25	<1%	35%
		Annual	8	<1%	95%
	SO ₂	1 hour	262	23%	27%
		24 hour	52	55%	71%
		Annual	52	5%	15%
Nearest Residence	CO	1 hour	30,000	<1%	2%
		8 hour	23,580	<1%	1%
	NO ₂	1 hour	151	13%	48%
		Annual	28	<1%	41%
	PM _{2.5}	24 hour	25	<1%	35%
		Annual	8	<1%	95%
	SO ₂	1 hour	262	4%	13%
		24 hour	52	3%	22%
		Annual	52	<1%	10%

Offsite concentrations of CO are predicted to be 2% of guideline values with the direct contribution of the Renewable Fuels Facility negligible.

For NO₂ the 1-hour average maximum offsite cumulative ground level concentration is 97%. Predicted cumulative ground level concentrations for all nominated sensitive receptors were well below the guideline. The maximum annual average GLC was predicted to be 53% of the annual guideline value.

Cumulative maximum offsite predicted 24 hour and annual concentrations for PM_{2.5} were 35% and 95% respectively. Although the cumulative annual average PM_{2.5} GLC was predicted to approach the guideline, the contribution of emissions from this proposal are predicted to be negligible.

Maximum offsite SO₂ concentrations predicted for normal operations were 27% of guideline values for 1 hour average, 71% for 24-hour average and 15% for an annual average. Modelling at sensitive receptors all remain well below the guideline values for SO₂.

Besides normal operations, modelling was also conducted for startup, plant trip/upset and shutdown/turndown. Predicted ground level concentrations were all below guideline values for these scenarios both at the maximum offsite and nominated sensitive receptors.

The premises has a SO₂ allocation under the Environmental Protection (Kwinana) (Atmospheric Wastes) Policy (EPP). The proposed emissions are well within the allocation. The allocation obliges the licence holder to report emissions and to participate in an ambient monitoring programme.

2.5.1 DWER technical review

The department conducted a technical review of the applicants modelling and determined that met the requirements of DWER's Air Quality Modelling Guidance Notes. The review also considered that the potential risk of emissions from the proposal to cause exceedances of air quality criteria is low. It was noted during this review however that the proposed activities include novel industrial operations and as a result, emissions for emission sources were generally not able to be confirmed. Ongoing emissions monitoring will be required to confirm the emissions estimates and modelling for this proposal.

2.6 Odour risk assessment

BP Kwinana Refinery Works Approval Application for Renewable Fuels Project Odour risk assessment was prepared by OPAM Consulting for Ramboll (Australia) Pty Ltd and submitted by the applicant for the activities associated with this proposal.

The odour analysis considered odour emissions from the following existing emission sources:

- The wastewater treatment plant
- The waste management area
- Tank respiration at the tank farm
- Jetty Operations
- Demolition and hydro blasting

The following proposed new odour sources were also considered:

- Pre-treatment unit;

Odour analysis was supplemented with field odour assessment of current activities on site.

The odour footprint of the renewable fuels facility will be smaller than the crude oil refinery that operated before 2021 based on scale. There were 3 offsite complaints in the last 5 years two of which related to the waste management area and 1 which may have been related to the waste management area or the Jetty unloading facility.

Based on the field odour assessment and historical complaints the main odour source for the

site is the waste management area, part of the currently licensed activities. Biosludge from the WWTP, centrifuge cake from the WWTP and tank sludges are treated in the open air with fertilizer and tilled.

The assessment determined that the current odour footprint is close to the boundary of the site and that it will be similar when the renewable fuels facility is built. The odour assessment concluded that the emissions from the entire premises (including the new infrastructure proposed to be constructed and operated as part of the renewable fuels project) should be considered low risk in terms of odour.

2.6.1 DWER technical review

The Odour Assessment Report follows the detailed analysis procedure documented in DWER's Guideline: *Odour emissions* 2019.

The technical review noted that the odour field assessment was conducted during the daytime in January with clear skies (i.e. unstable meteorological conditions), which is not ideal for undertaking odour field assessment. The odour footprint may have been underestimated from some sources.

The technical review found no reason to believe that odour impacts resulting from the proposed premises will be unreasonable. The existing Waste Management Area is likely to remain the largest source of odour. However, the lack of information regarding the future planned operation's emissions and controls means that these emissions will remain poorly understood and conclusions regarding impacts will remain somewhat speculative.

2.7 Part IV of the EP Act

The proposal was assessed by the EPA and Report 1754 was issued. The EPA's assessment was primarily about greenhouse gas emissions (GHG). The report recommended that the proposal be implemented subject to recommended conditions. On 8 April 2024, Ministerial Statement 1218 was issued for the proposal.

3. Risk assessment

The department assesses the risks of emissions from prescribed premises and identifies the potential source, pathway and impact to receptors in accordance with the *Guideline: Risk Assessments* (DWER 2020).

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 and operation which have been considered in this decision report are detailed in Table 3 below. Table 3 also details the control measures the applicant has proposed to assist in controlling these emissions, where necessary.

Table 3: Proposed applicant controls

Emission	Sources	Potential pathways	Proposed controls
Construction			
Dust	Construction activities. Heavy vehicle movement and assembly of infrastructure	Air / windborne pathway	Dust suppression (water cart) during construction activities; Speed limits for vehicles will be implemented (as per current site requirements); Construction materials that can potentially emit dust would be carted using tarped haul trucks to prevent dust emissions; Monitor wind and put controls in place if required to reduce dust emissions; Construction works to be limited during working business hours; and Visual dust monitoring daily.
Noise		Air / windborne pathway	Construction work will occur during daytime hours where possible.
Dewatering effluent	Site preparation and construction activities	Direct discharge to ground	Soil and groundwater management plan and procedure. Contractor Construction Environmental Management Plan. Testing of soil and groundwater prior to construction commencing. bp waste permitting system tracking waste.
Operation			
Air Emissions		Air / windborne pathway	Pretreatment unit has filters for receipt of bleaching earth; Pretreatment unit has scrubber with 40 metre stack; Use of low NOx burners (other than that on hydrofiner 2 which will only be used during startup and upset conditions); and CEMS on hydrogen generation unit stack
Odour	Raw feedstock, Processing, hydrofining, fractionation, storage of final product.	Air / windborne pathway	Caustic scrubber on pre-treatment unit including pH checks; and Odour monitoring program will be conducted during time limited operations.

Emission	Sources	Potential pathways	Proposed controls
Noise	Heavy machinery operation Pumps and fans Flares	Air / windborne pathway	Noise monitoring of the biorefinery will be conducted during time limited operations
Process wastewater	Pretreatment unit Hydrogen generation unit Hydrofiners Product fractionation unit.	Direct discharge	All process wastewater excluding that generated by the Pretreatment unit will be directed to the WWTP. Any stormwater or runoff that could contain renewable feedstock will be directed to the byproduct recovery unit.
Leaks and spills	Delivery and storage of raw materials. Processing of raw materials Storage and dispatch of product	Direct discharge	Pre-Treatment unit banded and separated from oily water sewer; Hydrogen generation unit on hardstand designed so all runoff drains to oily water sewer and WWTP; Product fraction unit on hardstand that has been designed so that all runoff drains to oily water sewer and WWTP; Cooling water blow down to be processed at WWTP; Hydrofiners 2 and 3 on hardstand that has been designed so that all runoff drains to oily water sewer and WWTP All new hydrocarbon and chemical tanks effective secondary containment volume equal to or greater than 110% of largest tank; All tanks fitted with high level switch; Tanks are to be inspected daily; A suitable pump on standby for managing accumulation of rainwater and spilt materials inside banded area; and Groundwater is currently monitored across the prescribed premises which will capture any contamination issues from the prescribed activities.

3.1.2 Receptors

In accordance with the *Guideline: Risk Assessment* (DWER 2020), the Delegated Officer has excluded the applicant's employees, visitors, and contractors from its assessment. Protection of these parties often involves different exposure risks and prevention strategies, and is provided for under other state legislation.

Table 4 below provides a summary of potential human and environmental receptors that may be impacted as a result of activities upon or emission and discharges from the prescribed premises (*Guideline: Environmental Siting* (DWER 2020)).

Table 4: Sensitive human and environmental receptors and distance from prescribed activity

Human receptors	Distance from prescribed activity
Residents in Kwinana	~2 km from the Premises
Industrial premises	Adjacent to the Premises
Environmental receptors	Distance from prescribed activity
Cockburn Sound	Adjacent to the Premises
Depth to groundwater (non-potable)	~2.8 metres

3.2 Risk ratings

Risk ratings have been assessed in accordance with the *Guideline: Risk Assessments* (DWER 2020) for each identified emission source and takes into account potential source-pathway and receptor linkages as identified in Section 3.1. Where linkages are in-complete 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 5.

Works approval W6845/2023/1 that accompanies this decision report authorises construction and time-limited operations. The conditions in the issued works approval, as outlined in Table 5 have been determined in accordance with *Guidance Statement: Setting Conditions* (DER 2015).

A licence amendment is required following the time-limited operational phase authorised under the works approval to authorise emissions associated with the ongoing operation of the premises. 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 5: Risk assessment of potential emissions and discharges from the premises during construction, commissioning and operation

Risk events					Risk rating ¹	Applicant controls sufficient?	Conditions ² of works approval	Reasoning
Sources / activities	Potential emission	Potential pathways and impact	Receptors	Applicant controls	C = consequence L = likelihood			
Construction								
Earthworks and new infrastructure	Dust	Air / windborne pathway causing impacts to health and amenity	Residences 2 km from premises and adjacent industrial sites	Refer to Section 3.1	C = Minor L = Rare Low Risk	Y	Condition 2	The Delegated Officer considers that given the controls proposed by the applicant, the short duration of the construction works, construction activities limited to daytime hours where possible and the large distance to sensitive receptors, there is a low risk of noise and dust emissions generated during construction impacting sensitive receptors. The Delegated Officer has conditioned applicant proposed dust controls, and notes that noise emissions from premises construction are required to comply with the Environmental Protection (Noise) Regulations 1997.
	Noise			Refer to Section 3.1	C = Minor L = Rare Low Risk	Y	N/A	
	Dewatering	Contamination of land from contaminated groundwater	Land within the refinery	Refer to Section 2.3	C = Minor L = Rare Low Risk	Y	N/A	The Delegated Officer considers that the ongoing requirements under the Contaminated Sites Act 2003, including controls developed (such as through the applicants Soil and Groundwater Management Plan) are suitable for the management of dewatering activities on the premises.
Commissioning and Operation (including time-limited-operations operations)								
Raw feedstock receipt and handling Commissioning and operation of biofuels plant and equipment.	Emissions to air including NO _x CO SO ₂ and PM _{2.5} .	Air / windborne pathway causing impacts to health and amenity	Residences 2 km from premises and adjacent industrial sites	Refer to Section 3.1	C = Moderate L = Unlikely Medium Risk	Y	Condition 1, 3, 6, 7, 8, 9	In determining the risk of air emissions from the renewable fuels facility causing amenity of health impacts the Delegated Officer considered the applicants air quality impact assessment outcomes (Section 2.4) and proposed controls. The assessment concluded that Guideline values are predicted to be met at all sensitive receptors within the model domain. Based on the above, the Delegated Officer considers there to be a medium risk of air emissions causing health or amenity impacts as it is unlikely that Air Guideline Values will be exceeded at receptors. The applicant's infrastructure and operational conditions relevant to the mitigation of air emissions include a scrubber on the pre-treatment unit and CEMS

Risk events					Risk rating ¹ C = consequence L = likelihood	Applicant controls sufficient?	Conditions ² of works approval	Reasoning
Sources / activities	Potential emission	Potential pathways and impact	Receptors	Applicant controls				
								monitoring of emissions from the hydrogen generation unit. These controls have been included in the works approval (for infrastructure, commissioning and time limited operations as required). Due to the novel technology involved with the proposal and to confirm air emissions modelling, the Delegated Officer has also included requirements for stack testing to be conducted during time limited operations. Ongoing emission monitoring (CEMS and annual stack testing) will be considered and conditioned as required during relevant future amendments to the premises licence.
	Odour				C = Moderate L = Unlikely Medium Risk	Y	Condition 1, 14, 15	In determining the risk of odour emissions from the renewable fuels facility causing amenity impacts, the Delegated Officer considered the applicant's odour assessment outcomes together with the complaint history relating to the previous oil refinery The assessment found that the current odour footprint is close to the boundary of the site and that it will be similar when the renewable fuels facility is built. To ensure that odour emissions are understood once commissioning and time limited operations commences, the Delegated Officer has conditioned odour monitoring to be undertaken during time limited operations.
	Noise				C = Moderate L = Unlikely Medium Risk	Y	Condition 1, 10, 11,12, 13	Based on the outcome of the noise modelling discussed in section 2.3, the Delegated Officer considered that operation of the plant will likely comply with the <i>Environmental Protection (Noise) Regulations 1997</i> . Notwithstanding this, noise verification monitoring has been conditioned within the works approval to ensure that noise emissions are assessed and managed where necessary during commissioning and time limited operations.
	Emissions to water	Wastewater and wastewater treatment plant.	Direct discharge to Cockburn Sound adjacent		C = Minor L = Unlikely Medium Risk	Y	Condition 1	The Delegated Officer notes that raw feedstock will be stored in existing tank infrastructure on the premises which is banded to contain spillage or leaks. The wastewater treatment plant operates under

Risk events					Risk rating ¹ C = consequence L = likelihood	Applicant controls sufficient?	Conditions ² of works approval	Reasoning
Sources / activities	Potential emission	Potential pathways and impact	Receptors	Applicant controls				
								limits set in the current licence and has not been reassessed for this works approval. The Delegated officer considers that the current limits and management conditions will be sufficient for the renewable fuels facility and the risk will be lower than when the premises operated as an oil refinery due to the lower volumes involved.
	Stormwater contamination from leaks and spills	Direct discharge or overland flow	Direct discharge to Cockburn Sound adjacent		C = Moderate L = Unlikely Medium Risk	Y	Condition 1	The Delegated Officer considers stormwater will be adequately managed on the premises to prevent adverse impacts to surrounding land and surface water ecosystems by the bunding controls proposed by the applicant for hydrocarbon storage, together with the existing premises drainage and stormwater treatment system. The applicant's bunding controls have been included as conditions of the works approval.

Note 1: Consequence ratings, likelihood ratings and risk descriptions are detailed in the *Guideline: Risk Assessments* (DWER 2020).

Note 2: Proposed applicant controls are depicted by standard text. **Bold and underline text** depicts additional regulatory controls imposed by department.

4. Consultation

Table 6 provides a summary of the consultation undertaken by the department.

Table 6: Consultation

Consultation method	Comments received	Department response
Application advertised on the department's website on 24 October 2023	None received	N/A
Local Government Authority advised of proposal on 24 October 2023	The City of Kwinana replied 16 November 2023 noting that development approval has not yet been applied for and that a Construction Management Plan must be submitted to the City before the commencement of work.	Applicant has advised that a development application was submitted to City of Kwinana in February 2024 and a It is expected to be considered by the Development Application Panel (DAP) in October 2024. The applicant provided a copy of the Development Approval on 30 October 2024.
Department of Energy, Mines, Industry Regulation and Safety (DEMIRS) advised of proposal 24 October 2023	DMIRS replied on 27 October 2023 advising that the proposal covers two separate licence holders under the <i>Dangerous Goods Safety Act 2004</i> . The applicant has engaged with DMIRS who have requested further information. DMIRS notes that the proposal includes relatively novel technology at scale and as a result some to the risks will be difficult to quantify accurately.	The Delegated Officer acknowledges the comments provided and notes that it is the responsibility of the works approval holder to ensure they comply with requirements under the <i>Dangerous Goods Safety Act 2004</i> , and any specific requirements from DEMIRS regarding premises operations.
Applicant was provided with draft documents on 22/5/24	Applicant replied on 14/8/2024 and 20/09/2024 with a number of suggested amendments and a change of the details of the proposed plant. Refer to Appendix 1.	Refer to Appendix 1

5. Decision

Based on the assessment in this decision report the Delegated Officer has determined that the proposal to construct and operate a renewable fuels facility at the Kwinana Energy Hub will not pose an unacceptable risk of impact to receptors. The determination is based on the following:

- Air emissions modelling indicates that GLCs will be below AGLs at all surrounding receptors.
- An odour survey and assessment indicates odour emissions will be less than the precious emissions from the former oil refinery and the footprint will be close to the premises boundary. The conclusions of the report are somewhat speculative but the large separation distance to sensitive receptors mean the risk of odour impacts is low.

- Noise modelling indicates noise emissions from the premises will comply with the Noise Regulations during both daytime and nighttime operations.

In order to mitigate the potential for environmental, amenity of health impacts to occur applicant has proposed the following key controls imposed in the works approval as they are considered critical to maintaining an acceptable level of risk:

- Pretreatment unit has filters for receipt of bleaching earth
- Pretreatment unit has caustic scrubber with 40 metre stack
- An odour survey will be conducted in time limited operations
- Noise monitoring will be carried out during time limited operations
- Flare to prevent release of H₂S

The delegated officer is satisfied that the above controls lower the overall risk profile of the premises. Works Approval W6845/2023/1 that accompanies this report authorises construction, commissioning and time-limited operations only. The conditions in the issued works approval as outlined in the above risk table has been determined in accordance with the *Guidance Statement: Setting Conditions* (DER 2015)

A licence amendment is required to authorise the ongoing emissions associated with the operation of the premises. A risk assessment for the operational phase has been included in this report, however licence conditions will not be finalised until the department assesses the licence amendment application.

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.

References

1. Department of Environment Regulation (DER) 2015, *Guidance Statement: Setting Conditions*, Perth, Western Australia.
2. Department of Water and Environmental Regulation (DWER) 2020, *Guideline: Environmental Siting*, Perth, Western Australia.
3. DWER 2020, *Guideline: Risk Assessments*, Perth, Western Australia.
4. bp Refinery (Kwinana) Pty Lt 2023 *Application for works approval* Perth Western Australia
5. Aurecon Australasia Pty Ltd 2023 *Kwinana Renewable Fuels Works Approval Supporting Documentation* Perth Western Australia
6. Acoustic Engineering Solutions 2023 *Noise Assessment of KRF Project*. Perth Western Australia
7. Ramboll Australia Pty Ltd 2023 *BP Kwinana – Renewable Fuels Project Air Quality Impact Assessment* Perth Western Australia
8. OPAM Consulting 2023 *BP Kwinana Refinery Works Approval Application for Renewable Fuels Project Odour risk assessment* Perth Western Australia

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

Section	Summary of applicant's comment	Department's response
Decision report Section 2.2	Remove reference to bio digestion unit from list of infrastructure.	The delegated officer has removed the bio digestion unit from the decision report and instrument.
Decision report Section 2,2	<p>Remove reference to CEMS on the product fractionation unit.</p> <p>Through project reviews, installation of a CEMS is not commensurate to the level of environmental impact with the existing controls in place</p> <ul style="list-style-type: none"> • H2S analyser on the mixed fuel gas line, can predict the SOx emitted from HYD2, HYD3 and PFU stacks • Ultra low NOx burners installed • Stack design including monitoring ports that meet AS4323.1 to ensure routine manual sampling can occur <p>As the emissions can be monitored and measured and estimated by other means, the PFU CEMS has been removed from scope.</p>	The delegated officer accepts this change and has amended the report and works approval accordingly.
Decision report page 5 Contaminated sites	Update the procedure title to <i>Management of Soil and Groundwater Procedure</i> .	The delegated officer agrees to this change.
Decision report Table 3	<p>Change the wording that states "construction work to be limited to daytime operations." to "Construction work will occur within daytime hours where possible."</p> <p>Construction work will comply with the <i>Environmental Protection (Noise) Regulations 1997</i>. Some construction activities are expected to occur at night such as non-destructive testing and module movement.</p>	The delegated officer agrees to this change.
Decision report Table 3 Leaks and spills Works approval table 1	<p>Change reference to bund for HGU, PFU and Hydrofiners and replace with hardstand that drains to oily water sewer and WWTP.</p> <p>The design concept included in the application included all process units banded.</p> <p>Further risk assessment of the banded areas (especially from a process safety standpoint) indicated that bunding can prevent liquid pools draining away from equipment and vessels, resulting in increased ignition and escalation potential. Subsequently, the design has been revised to impervious hardstand sloping towards graded drainage.</p>	The delegated officer accepts this change, noting that the risk to the environment does not increase. The Decision report and works approval have been amended accordingly.
Decision report Table 3 Leaks and spills	<p>Insert the word New into All new tanks' effective secondary containment volume equals to or greater than 110% of largest tank.</p> <p>It was unclear whether these statements applied to the new build tanks or the existing tanks in the terminal. The current licence outlines the controls for the existing terminal tanks</p>	The delegated officer agrees to this change.

Section	Summary of applicant's comment	Department's response
Decision report Table 3 Leaks and spills	Remove statement that all tanks are fitted with unexpected movement alarms because only the tanks in the terminal have these.	The delegated officer accepts that the secondary containment of the tanks is sufficient to address the risk from spills in tanks.
Works approval cover page	Amend throughput from 510,000 tonnes to 600,000 tonnes. Advice from DWER is that this category should represent all renewable feedstocks (waste and oils) hence amount increased to include vegetable and seed oils	The delegated officer agrees that the original volume was based on a misunderstanding of the requirements and the meaning of the word "waste".
Works approval Table 1 PTU, HGU PFU, Closed loop cooling system	Change requirement for permeability of 1×10^{-9} m/s in bunds and hardstand. bp practice states that hardstands require 1×10^{-7} m/s permeability for under bund/ hardstand floors and 1×10^{-9} m/s for under tanks. This is based on industry standards (CIRIA Report C736 [52], Department of Environmental Protection [53], US EPA (1991) [55] and DER-17(2008)	The delegated officer acknowledges that the permeability requirement is not included in Australian Standard 1940 and accepts adherence to CIRIA C736 is sufficient to minimise impact on the environment.
Works approval table 1 PFU	Remove reference to volumes of individual products in the table. PFU is part of the processing complex with HYD2 and HYD3, which all have been designed on fresh feed rate of 1600 klpd. This is the design capacity of the biorefinery. The biorefinery can have different operating modes which can change these product volumes, depending on feedstock and product quality required. It is possible to produce poor quality fuels greater than these volumes	The reference has been removed.
Works approval Table 1 6 PFU	Remove the requirement for CEMS on the PFU. Through project reviews, installation of a CEMs is not commensurate to the level of environmental impact with the existing controls in place <ul style="list-style-type: none"> H2S analyser on the mixed fuel gas line, can predict the SOx emitted from HYD2, HYD3 and PFU stacks Ultra low NOx burners installed Stack design including monitoring ports that meet AS4323.1 to ensure routine manual sampling can occur As the emissions can be measured and estimated by other means, the PFU CEMs has been removed from scope.	The delegated officer agrees that the existing controls will be sufficient to manage risk from the PFU. The works approval has been altered.
Table 1 7 Closed loop cooling water system	Change specified design from 2.571 tonnes per hour to 3,450 m ³ per hour Design progression has resulted in increased cooling circulation rate. The increase has not changed the environmental impact.	The delegated officer accepts this change.
Table 1 7 Closed loop cooling water system	Change wording to "hardstand and bunds drain to oily water sewer and WWTP." The cooling tower is on hardstand. Chemical tanks required for the cooling tower system are within bunds.	The delegated officer agrees to this change to better reflect the design of the system.

Section	Summary of applicant's comment	Department's response
Table 1 Hydrofiner 2 and Hydrofiner 3	Change located in a bund to located on existing hardstand. Existing unit is hardstand with open drains to the oily water sewer and WWTP	
Table 1 Hydrofiner 2 and Hydrofiner 3	Remove references to individual components of the two hydrofiners bp propose that this is removed. The other units don't individually specify equipment and this list isn't exhaustive of all the changes within HYD2 and HYD3	The delegated officer agrees to this change.
Table 1 West Flare	Change nomenclature from West Flare to Main Flare. bp acknowledge that the 'west flare' terminology was associated with the old crude oil refinery and propose to change the name to Main Flare	The delegated officer agrees to this change.
Table 2 Hydrofiner 2 and Hydrofiner 3	Produced sour water to recycled to be used as washwater or discharged to the BRU	The delegated officer notes that this is change for use of sour water because of the removal of the biodigester and accepts this wording change. There is no change in risk due to this wording change.
Table 2 PFU	Produced sour water directed to existing WWTP. Remove reference to CEMS	The Delegated officer agrees to this wording change.
Table 3 Authorised discharge points PFU	Discharge height changed from 18 m to 40 metres. The air dispersion modelling was carried out with a PFU reboiler height of 18m. However, as design progressed, the stack height has increased to a minimum of 40 metres. A taller stack will increase dispersion of pollutants into the atmosphere and will reduce the ground level concentrations onsite and offsite, hence this change is not increasing air emissions.	The delegated officer notes that this will bring about a small decrease in environmental impact from air emissions and agrees to this change.
Table 3 Authorised discharge points PTU	Discharge height to be between 33 and 50 metres	The delegated officer notes the principal emission from the pre-treatment unit is odour. The wording has been entered as not less than 33 metres.
Table 4 Continuous monitoring during time limited operations	Remove the PFU as requiring time limited operation. PFU CEMS have been removed from the scope	The delegated officer agrees to this change.
Table 6	Change rate at which was is accepted to less than or equal to 600,000 tonnes per year.	The delegated officer has agreed to this change as discussed above.

Appendix 2: Application validation summary

SECTION 1: APPLICATION SUMMARY		
Application type		
Works approval	<input checked="" type="checkbox"/>	
Date application received	26 September 2023	
Applicant and Premises details		
Applicant name/s (full legal name/s)	BP Refinery (Kwinana) Pty Ltd	
Premises name	BP Kwinana Energy Hub	
Premises location	Lot 18 on Plan 17311	
Local Government Authority	City of Kwinana	
Application documents		
HPCM file reference number:	DER2018/001042/9-99	
Key application documents (additional to application form):	BP KRF WAA supporting document Air quality assessment Odour risk assessment Noise risk assessment	
Scope of application/assessment		
Summary of proposed activities or changes to existing operations.	Works approval Construction of renewable fuels facility using some existing infrastructure and some new infrastructure. Feedstock possibly includes used cooking oil, tallow, and palm oil mill effluent. Construction of new road unloading facility, Pre-treatment Unit, Bio digestion unit, Product Fractionating unit. Reuse of existing storage tanks and pipeline and 2 hydrofining units	
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	Proposed changes to the production or design capacity (amendments only)
Category 31: Chemical Manufacturing	600,000 tonnes	NA
Cat 61: Liquid waste facility	Current licence: 200,000 tonnes per year	600,000
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 checked="" type="checkbox"/> No <input type="checkbox"/>	Referral decision No: Managed under Part V <input type="checkbox"/> Assessed under Part IV <input checked="" type="checkbox"/>
Does the applicant hold any existing Part IV Ministerial Statements relevant to the application?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Ministerial statement No: 1218 EPA Report No: 1754
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 checked="" type="checkbox"/> General lease <input type="checkbox"/> Expiry: Mining lease / tenement <input type="checkbox"/> Expiry: Other evidence <input type="checkbox"/> Expiry:
Has the applicant obtained all relevant planning approvals?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A <input type="checkbox"/>	Approval: Development application being prepared for submission 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 type="checkbox"/> No <input checked="" type="checkbox"/>	CPS No: N/A No clearing is proposed.
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 No clearing is proposed.
Has the applicant applied for, or have an existing RIWI Act licence or permit in relation to this proposal?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Application reference No: Licence/permit No: GWL60605(6) Licence / permit not required.
Does the proposal involve a discharge of waste into a designated area (as defined in section 57 of the EP Act)?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Name: N/A Type: Has Regulatory Services (Water) been consulted? Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input checked="" type="checkbox"/> Regional office:
Is the Premises situated in a Public Drinking Water Source Area (PDWSA)?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Name: N/A Priority: N/A Are the proposed activities/ landuse compatible with the PDWSA (refer to WQPN 25)? Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input checked="" type="checkbox"/>
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 Act xxxx</i>)	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Dangerous Goods Safety Act 2004.
Is the Premises within an Environmental Protection Policy (EPP) Area?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Environmental Protection (Kwinana) (Atmospheric Wastes) Policy
Is the Premises subject to any EPP requirements?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Site is subject to SO ₂ requirements of Kwinana EPP.
Is the Premises a known or suspected contaminated site under the <i>Contaminated Sites Act 2003</i> ?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Classification: contaminated – remediation required (C-RR) Date of classification: 5/12/2019