



Application for Licence Amendment

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

Licence Number	L9225/2019/1
Licence Holder	Chevron Australia Pty Ltd
ACN	086 197 757
File Number	DER2019/000441
Premises	Wheatstone LNG Project (Stage 2) Legal description - Part Lot 238 on Deposited Plan 195206 and Part Lots 567 and 569 on Deposited Plan 71345 Certificates of Title Volume LR3118 Folio 396, Volume 2779 Folio 361 and Volume LR3161 Folio 383 As defined by the coordinates in Schedule 1 of the Licence
Date of Report	4 November 2022
Proposed Decision	Revised licence granted

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1. Decision summary

Existing licence L9225/2019/1 is held by Chevron Australia Pty Ltd (licence holder) for the Wheatstone LNG Project (the premises).

This amendment report documents the assessment of potential risks to the environment and public health from proposed changes to the emissions and discharges during the operation of the premises. As a result of this assessment, revised licence L9225/2019/1 has been granted.

The revised licence issued as a result of this amendment supersedes the existing licence and associated requirements of works approval W5671/2014/1 previously granted in relation to the premises. The revised licence has been issued with existing conditions being transferred, but not reassessed.

2. Scope of assessment

2.1 Regulatory framework

In completing the assessment documented in this amendment report, the Department of Water and Environmental Regulation (DWER, department) 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

On 23 October 2020 the licence holder submitted an application to the department to amend licence L9225/2019/1 for the Wheatstone LNG Project under section 59 and 59B of the *Environmental Protection Act 1986* (EP Act).

The licence holder is seeking to amend the existing licence to include ongoing operation of a Permanent Marine Outfall (PMO) which was constructed and commissioned under W5671/2014/1 for discharge of wastewater from the premises. Validation commissioning for the PMO in accordance with the *Permanent Onshore Facilities Waste Water Discharge Plan* (POFWWDP) is a requirement of W5671/2014/1 and has been completed allowing for the infrastructure to be included on the licence.

Infrastructure which is proposed for inclusion on the licence is the PMO (including the pipeline and a diffuser) and a combined effluent sump. The combined effluent sump receives wastewater and potentially contaminated stormwater from the premises, as well as treated sewage wastewater from the construction village sewage treatment plants which are operated under a separate licence L8650/2012/1. Combined wastewater accumulated in the combined effluent sump will be discharged to the marine environment adjacent to the product loading facility (PLF) via the PMO. The infrastructure has a design discharge rate of 674 m³/hr however discharge will not occur constantly, rather, discharges will occur in short bursts (typically 11 to 16 minute duration) with longer periods of no discharge (typically 27 to 101 minutes) while the combined effluent sump refills. The frequency and duration of discharge events will therefore vary as will the quality of the wastewater. Further design details for the infrastructure are contained within the POFWWDP.

The licence holder submitted an Effluent Quality Validation Report (EQVR) as part of the licence amendment application. The EQVR (BMT 2020) details the validation monitoring that has been undertaken throughout validation commissioning of the PMO, compares monitoring results with Environmental Quality Criteria (EQC) and includes recommendations for ongoing water quality monitoring to demonstrate that Environmental Quality Objectives (EQO) and levels of ecological protection continue to be achieved during the ongoing operation of the PMO.

Minor administrative clarifications to conditions 1 and 21 have also been requested as part of the amendment.

3. Background and legislative context

The Wheatstone LNG Project, located 12 km south-west of Onslow, is being developed for the production of liquified natural gas (LNG) and domestic gas (Domgas). The proposal to construct and operate the Wheatstone LNG Project was referred to the WA Environmental Protection Authority (EPA) under Part IV of the EP Act in September 2008 and the proposal was assessed through an Environmental Impact Statement / Environmental Review and Management Program (EIS/ERMP) assessment process. A bilateral assessment was undertaken under the EP Act and the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

The Wheatstone LNG Project was granted Commonwealth approval under the EPBC Act by EPBC 2008/4469 and state Ministerial Approval under Part IV of the EP Act by Ministerial Statement (MS) 873.

The Wheatstone LNG Project has also been subject to various works approvals and licences under Part V of the EP Act. Due to the size and complexity of the project, multiple works approvals and licences have been granted to facilitate staged construction, commissioning and operation of the LNG processing facilities and support infrastructure.

3.1 Part IV of the EP Act, Ministerial Statement 873

In June 2011, the EPA released its report and recommendations on the Wheatstone LNG Project (Report 1404), and Ministerial Approval was granted on 30 August 2011 subject to the conditions outlined in MS 873. The approval authorises the construction and operation of up to six LNG trains with a throughput of up to 25 mtpa and up to four Domgas plants in the Ashburton North Strategic Industrial Area (ANSIA). The EPA Report 1404 included recommendations relating to management of wastewater discharges which included a recommendation that any licence issued include conditions that ensure the environmental quality objectives and levels of ecological protection outlined in the Ministerial Conditions are achieved. The report also included some recommendations relating to monitoring frequency, limits and targets for marine outfalls.

In addition to recommendations in EPA Report 1404 MS 873 contains conditions that need to be considered in the assessment of emissions and discharges from the premises and the imposition of regulatory controls under Part V of the EP Act. The conditions that relate to the amendment application are summarised in Table 1.

Table 1: Consideration of MS 873 conditions relevant to this application

Condition	Overview	Delegated Officer considerations
10-11 to 10-16	<p>The condition requires the development of a Conservation Significant Marine Fauna Interaction Management Plan for the purpose of detecting, avoiding and mitigating impacts on conservation significant marine fauna (includes marine mammals, marine turtles, whale sharks and sawfish) during construction and operation of the nearshore and offshore marine facilities, trunkline and Offshore facility. This includes actions for managing impacts on marine turtles.</p> <p>The Proponent is required to implement the approved plan as well as make it publicly available, review the plan on an annual basis and undertake specified reporting.</p>	<p>The primary instrument for regulating the impact on conservation significant marine fauna (including marine turtles) is MS 873 and the Conservation Significant Marine Fauna Interaction Management Plan. The plan includes a marine turtle monitoring program to detect changes to the turtle population.</p>
13-1 to 13-7, 13-11, 13-12, 13-15	<p>The conditions set out criteria for establishing an Environmental Quality Framework for waste water discharges and the location of outfalls. Prior to submitting any works approval application relating to discharge of waste water from onshore facilities, the</p>	<p>EPA Report 1404 recommends that regulation and on-going management of wastewater discharges be under Part V of the EP Act and that instruments include conditions that ensure the EQO and levels of</p>

Condition	Overview	Delegated Officer considerations
	<p>Proponent was required to submit the EQF as well as the documents detailed below.</p> <ul style="list-style-type: none"> A report which maps areas where environmental quality objectives and levels of ecological protection will be achieved, identifies environmental quality criteria for discharge to maintain the environmental quality objectives and levels of ecological protection, and the number of dilutions necessary, to achieve them. An Effluent Quality Validation and Reporting Plan that outlines a program of Whole Effluent Toxicity Testing, and reconsiders environmental quality criteria and dilutions required to achieve environmental quality objectives and levels of ecological protection if there are any significant changes in effluent composition. <p>If monitoring indicates environmental quality objectives and levels of ecological protection are not being met or not likely to be met reporting is required.</p> <p>Schedule 2 sets out the EQO and Levels of Ecological Protection (LEP) to be achieved in marine waters for the Wheatstone LNG Project with reference to condition 13 requirements.</p>	<p>protection in Schedule 2 of MS 873 are met. Condition 13 sets the environmental quality management framework to use for establishing management objectives for any wastewater discharges associated with the Wheatstone LNG Project. The Delegated Officer notes the licence holder developed and submitted a Permanent Onshore Facilities Waste Water Discharge Plan (POFWWDP) in accordance with the requirements of condition 13 prior to application for W5671/2014/1.</p> <p>An EQVR was submitted as part of the licence amendment application.</p> <p>The report states that commissioning monitoring was conducted in accordance with the requirements of the POFWWDP</p> <p>The POFWWDP included proposed monitoring and discharge criteria and a program for Effluent Quality Valuation and Reporting which should be referred to for the assessment.</p>
14-2 to 14- 4	<p>Prior to ground disturbing activities that could impact on mangroves and algal mat habitats the Proponent was required to develop and submit a Mangrove, Algal Mat and Tidal Creek Protection Management Plan for the purpose of minimising impacts on mangroves, algal mats, juvenile turtle habitat and sawfish nursery habitat between and including the Ashburton River and Four Mile Creek.</p> <p>The Plan also details monitoring programs for detecting impacts on mangroves, algal mats and tidal creek systems.</p> <p>The Proponent is required to implement the approved plan as well as make it publicly available.</p>	<p>The Delegated Officer has reviewed the Mangrove, Algal Mat and Tidal Creek Protection Management Plan and considers some management measures are applicable to activities within the Premises however monitoring is limited to within the Mangrove, Algal Mat and Tidal Creek habitats (external to the Premises). Commitments made in the plan will be considered as part of this Decision Report</p> <p>EPA Report 1404 recommends that to prevent marine pollution instruments under Part V of the EP Act include contaminated water should be treated prior to discharge to the marine environment.</p> <p>The Delegated Officer notes the EPA's recommendations and will consider them in accordance with the risk assessment outcomes.</p>

3.1.1 Environmental Quality Objectives and Ecological Protection Areas

Condition 13 and Schedule 2 of MS 873 establish EQO, and ecological protection areas and levels of ecological protection (LEP) required within these areas to achieve the EQO and maintain ecosystem integrity. MS 873 requires that waste and produced water discharges are managed to achieve the defined EQO and LEPs.

The EQO are as follows:

- maintenance of ecosystem integrity;
- maintenance of seafood for human consumption;
- maintenance of aquaculture;
- maintenance of primary contact recreation;
- maintenance of secondary contact recreation;
- maintenance of aesthetic values;
- maintenance of cultural and spiritual values; and
- maintenance of industrial water supply.

MS 873 and EPA Report 1404 set out the criteria for low, medium and high ecological protection areas in marine waters for the Wheatstone proposal.

Low ecological protection area – LEP Area

The low ecological protection area is an area of 70m radius from the PMO diffuser and allows for large in changes to water quality, sediment and biota beyond natural variation. This area has 80% species protection guideline trigger values (*Australian and New Zealand Guidelines for Fresh and Marine Water Quality 2000 (ANZECC 2000)*) for potentially bio-accumulating toxicants in water with no bio-accumulation in adjacent moderate and high ecological protection areas.

Medium ecological protection area – MEP Area

Marine waters beyond 70m radius from the diffuser and within 250 m of the Ashburton Port ship turning basin and berthing areas and the area enclosed by the Marine Offloading Facility breakwaters. This area allows moderate changes in the quality of water, sediment and biota resulting in small changes in ecosystem processes and abundance of marine life but no detectable changes from the natural diversity of species and biological communities. This area has an ANZECC 2000 90% species protection guideline trigger value for toxicants.

High ecological protection area – HEP Area

The marine area beyond the areas of the LEP area and MEP area. Allows for small changes in water quality, sediment and biota. This area should have no detectable changes from natural variation of diversity of species, biological communities, ecosystem processes and abundance of marine life. The ANZECC 2000 99% species protection guideline trigger values are used for this area

The boundaries for the different environmental protection areas are shown in **Figure 1**.

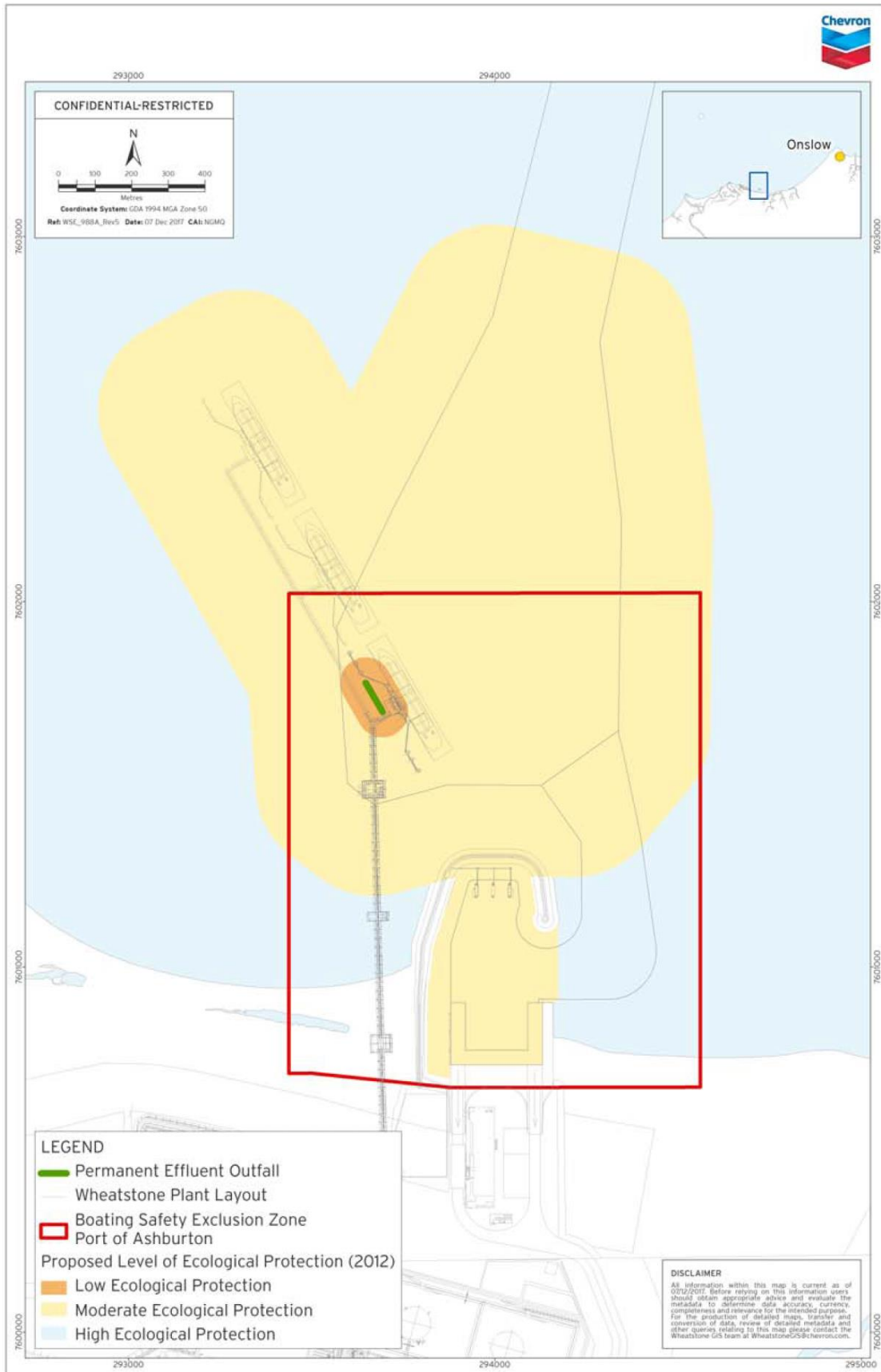


Figure 1: Map showing the boundaries of High/Medium/Low environmental protection areas (Taken from BMP Chevron 2018)

3.1.2 Environmental Quality Criteria

To determine achievement of EQO, a set of EQC are required which measure chemical and physical water quality parameters relevant for baseline water quality conditions at the location of the discharge, and for the constituents contained within the waste stream (Chevron 2018). As per the requirements of condition 13-11, the POFWWDP sets out EQC and predicted number of dilutions (based on modelling) that are necessary to meet the EQO and LEP.

EQC were determined for the expected constituents of the wastewater discharge based on baseline water quality monitoring results (MScience 2013) together with the ANZECC 2000 and for microbiological EQC the *Environmental Quality Criteria Reference Document for Cockburn Sound* (EPA 2017).

The EQC for toxicants, chemical and physical parameters, and biological parameters are set out in Tables 3.2 to 3.4 of the POFWWDP. The number of dilutions of the discharge required to meet these defined EQC at the moderate and high ecological protection area boundaries, based on maximum predicted concentrations in the final wastewater sump, are set out in Table 4.5 of the POFWWDP. The table indicates maximum dilutions of 1:260.9 at the LEP/MEP area boundary and 1:1335.8 at the MEP/HEP area boundary are required to achieve the EQC.

Modelling was undertaken and presented in the POFWWDP to predict dilution rates which would be achieved at the MEP area and HEP area boundaries and compare these with the dilutions required to meet the defined EQC. Based on this it was predicted that a dilution of 1:289 is expected to be achieved at the LEP/MEP area boundary and a dilution of 1:1458 is expected to be achieved at the MEP/HEP area boundary.

MS 873 does not contain specific discharge criteria for water discharged from the PMO but does include a limit on the volume of water which can be discharged from the outfall (13,200 m³/day). Various limits on wastewater quantities and discharges have been removed from MS 873 on the basis they are regulated under Part V of the Act and will therefore require consideration in this assessment.

In addition to EQC and dilution predictions, the POFWWDP includes trigger values based on the modelling outputs and wastewater characterisation for toxicants, chemical and physical parameters, and biological parameters. The trigger values were developed for assessing and managing performance of the wastewater discharge and are the designated values against which investigations and / or modifications will be initiated for system optimisation.

- The level 1 trigger is an hourly average discharge flow rate of 674 m³/hr from the final effluent sump
- The level 2a trigger values apply to the results of monitoring at the final wastewater effluent sump and are based on expected maximum concentrations in the wastewater discharge.
- The level 2b trigger values apply to the results of monitoring at the final wastewater effluent sump and were back calculated based on the most protective EQC for the LEP/MEP and MEP/HEP area boundaries, and a conservative dilution factor derived from modelling. Where a level 2b trigger is reached there is a risk that EQO and LEP will not be met.
- The level 3 trigger values presented are the EQC and apply to the results of monitoring undertaken at sampling locations at the LEP/MEP and MEP/HEP area boundaries. Where a level 3 trigger is reached there is a risk that EQO and LEP will not be met.

3.1.3 Effluent Quality Validation and Reporting Plan

An Effluent Quality Validation and Reporting Plan was included in the POFWWDP. The plan comprised four components which would be undertaken to confirm performance of the wastewater discharge and achievement of the EQO and LEPs defined in MS 873 through commissioning of the PMO. These included:

1. Weekly wastewater discharge monitoring to characterise the wastewater from the final wastewater sump during commissioning and validation commissioning periods.
2. EQC validation monitoring to determine conformance with the EQC at the boundaries of the MEP and HEP areas and evaluate dilutions being achieved at the boundaries to validate model predictions. The monitoring includes marine water quality monitoring at both impact and reference sites as well as a Rhodamine Dye Study to confirm dilutions achieved.
3. Whole Effluent Toxicity (WET) testing on samples taken from the final wastewater sump to evaluate the toxicity of the discharge. The testing would involve determining actual toxicity of the discharge and the number of dilutions required to achieve each LEP. Outcomes of the WET testing program would be used to revise EQC and number of dilutions required at each LEP boundary.
4. Assessment to determine if EQC and dilution requirements need to be revised based on the results of obtained from items 1-3 (Chevron 2018).

Chevron undertook the scope described and reported the results an Effluent Quality Validation Report (BMT 2020) which was submitted with the application.

4. Effluent Quality Validation Report

As part of the application the licence holder submitted the Effluent Quality Validation Report, Wheatstone Permanent Marine Outfall Monitoring (EQVR) (BMT 2020) which presents the results of environmental monitoring required under Condition 13-12 (MS 873), Condition 44a of EPBC 2008/4469 and the commissioning requirements of the works approval (W5671/2014/1).

This included the results of the validation monitoring undertaken onshore at the final effluent sump, marine water quality monitoring undertaken offshore, WET testing and the Rhodamine dye study. Monitoring results were compared against trigger criteria, modelling predictions and the EQC set out in the POFWWDP to assess whether the relevant on-shore (combined effluent sump) trigger values (level 2b) are appropriate to ensure the EQO of MS 873 are met and confirm if EQC are met at the MEP area and HEP area boundaries.

On-shore monitoring from the combined effluent sump was conducted weekly during commissioning and validation commissioning of the PMO and compared to the level 1, 2a and 2b trigger values established in the POFWWDP. There were no exceedances of the level 1 flow rate. During the commissioning period there were regular exceedances of the level 2a triggers for aluminium, chlorine, copper, vanadium, zinc, methyldiethanolamine (MDEA) and TDS and occasional exceedances for chromium (III and VI), nickel, hydrocarbons, total nitrogen, nitrate + nitrite, total phosphorus, pH, temperature, turbidity and faecal coliforms. During validation commissioning plant output was manipulated to ensure that the discharge volumes and composition were consistent with what was modelled and representative of normal worst-case plant operations resulting in exceedance of level 2a triggers only for vanadium, MDEA and TDS. The level 2a triggers are conservative and are based on plant performance therefore are an indicator of whether the facility is operating as designed and within specification rather than indicative of a risk EQC may not be met.

There were occasional exceedances of the level 2b criteria for thermotolerant coliforms, nitrate + nitrite and zinc during the commissioning period and no exceedances of this criteria during the validation commissioning period. The EQVR states that due to their limited duration these exceedances do not pose a substantial risk that the associated EQC are exceeded over the long term. Chlorine concentrations in the discharge routinely exceeded the level 2b trigger during

commissioning but no exceedances occurred during validation commissioning. The EQVR states this appears to primarily be due to the conservative nature of the underlying EQC and is not necessarily an indication of environmental risk (BMT 2020).

Offshore marine water quality monitoring was conducted through a series of five water quality sampling events in October and November 2019 at reference and impact sites and results compared with the level 3 trigger values (aligned to the EQC) at the MEP area and HEP area boundaries. The results were predominantly within the level 3 trigger criteria with some exceedances recorded for copper (proposed to be related to high background rather than the discharge), chlorine, MDEA (potential exceedance only as limit of reporting is above the trigger) and *Prorocentrum* spp.

The results of the Rhodamine dye study indicated that model performance is consistent with the measurements and that verified model estimates of dilution of 1:140 and 1:700 at the MEP area and HEP area boundaries were appropriate to adopt for establishing revised EQC.

Whole of effluent toxicity (WET) testing was conducted on the wastewater to determine the actual toxicity and the number of dilutions required to achieve the relevant LEPs. The WET testing results indicated dilutions of 1:14 are required to meet MEP area EQC and 1:53 dilutions required to meet the HEP area EQC. The EQVR states that modelling suggests that mixing is sufficient to achieve a dilution of 1:289 at the LEP Area – MEP Area boundary and 1:1458 at the MEP Area – HEP Area boundary.

4.1 Proposed changes to monitoring parameters and trigger values

Based on the commissioning monitoring results some revised level 2b trigger values from those set out in the POFWWDP were proposed by Chevron in the EQVR.

The revised level 2b trigger levels and explanation provided by Chevron for their change is provided in Table 2. The EQVR states that factors considered in the refinement of the trigger values from the POFWWDP were (Chevron 2018):

- prevalence in the discharge;
- an assessment of the risk posed by each parameter as identified by section 2 of the EQVR;
- capacity to make a meaningful assessment, particularly availability of guidelines;
- suitable guideline/capacity to assess risk;
- high and/or variable naturally occurring background concentrations;
- similar or lower effluent concentrations to background;
- inadequate analytical techniques; and
- an equivalent or superior surrogate already considered.

The general method applied to the determination of level 2b trigger levels which apply at the final effluent sump from which wastewater is discharged to the PMO is outlined below.

$$C_e = D_x \times (C_x - C_b) + C_b$$

Where:

C_e = effluent concentration (in the combined effluent sump i.e. Limit to achieve the required level of ecological protection)

D_x = dilutions achieved at distance x from the discharge (in this case at the LEPA or HEPA boundaries i.e. concentration of 140 and 700)

C_b = background concentration

C_x = contaminant concentration at distance x (maximum value allowable to ensure environmental value)

Dilutions (D_x) used were taken from the POFWWDP that modelled and verified the dilutions using a rhodamine dye study. The dilutions calculated were 140 dilutions at the LEPA MEPA boundary and 700 dilutions at the MEPA HEPA boundary.

C_x is the *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (ANZG (2018)) 99% and 90% species protection values for the HEPA boundary and the MEPA boundary. ANZG 2018 supersedes ANZECC 2000.

Background values (C_b) were taken from either Wenziker et al 2006, which determined the background levels of some contaminants in marine waters off the North West Shelf, *Ocean Chemistry and Deep Sea Sediments* Bearman 1989, or from the Raw Sea water intake values from Table 4.5 of POFWWDP.

For mercury and cadmium the ANZG 2018 80% species protection value used for on shore sump prior to dilutions as required by MS as they are potential bioaccumulating toxicants in the Australian water quality guidelines

In reviewing the revised level 2b trigger levels in the EQVR the department found not all parameters followed this approach. Further discussion on this is included in the following section with comparison between Chevron's and DWER's calculated values.

Table 2: Revised onshore level 2b trigger values and justification (taken from the EQVR (BMT 2020))

Parameter	Original onshore level 2b trigger value	Baseline concentration	Trigger ³	Dilution ⁴	Revised onshore level 2b trigger value	Reason for change
Flow rate (m ³ /hr)	674	-	-	-	674	No Change
Chlorine (µg/L)	44	0	3	700	2100	Adopts EPA (2017) low reliability trigger
Cadmium (µg/L)	36 ¹	-	36	0	36 ¹	No change
Chromium (III/VI) (µg/L)	5636	0	7.7	700	5041	POFWWDP did not use ANZG (2018) guidelines. Updated to moderate protection. Reduced Dilution
Chromium (VI) (µg/L)	204	0	0.14	700	98	Reduced Dilution
Copper (µg/L)	437	0	0.3	700	210	Reduced Dilution
Lead (µg/L)	467	0.01	6.6	140	923	Previous trigger used baseline that exceeded the trigger. Baseline from Wenziker et al. 2006 used instead
Mercury (µg/L)	1.4 ¹	-	1.4	0	1.4 ¹	No change
Nickel (µg/L)	5107	3.5	7	700	2454	Reduced Dilution
Silver (µg/L)	520	0	1.8	140	252	Reduced Dilution
Vanadium (µg/L)	28,538	1.1	160	140	22,247	POFWWDP did not use 95% species protection guideline. Updated to moderate protection. Reduced Dilution
Zinc (µg/L)	322	3.9	7	700	2174	POFWWDP ECC for zinc was derived using an underlying guideline of 5 µg/L rather than the relevant ANZG (2018) triggers. The EQC for zinc have been revised to reflect the ANZG (2018) guidelines.
TRH (µg/L)	2023	0	7	140	980	Reduced Dilution
MDEA (mg/L)	1.445	0	0.45	700	315	Original trigger for MDEA considered to be too conservative and Piperazine was not previously included but could be present. Trigger values were determined using the <i>Revised method for deriving Australian and New Zealand water quality guideline values (Warne et al., 2018)</i> . Insufficient data was available to use the SSD method to derive a trigger value therefore the Assessment Factor method was used. Laboratory ecotoxicity endpoints were identified through a review of the published literature and an Assessment Factor was applied to the lowest identified ecotoxicity endpoint to derive trigger values and the MEPA/HEPA dilution applied to determine the onshore trigger value.
Piperazine (mg/L)	-	0	1	700	700	
TDS (mg/L)	57,436 ²	37,70	39,500	140	289,700	Level 2a trigger originally based on maximum expected concentration. Environmentally relevant TDS trigger calculated

1. ANZG (2018) 80% species protection guideline (EPA 2016) as the most conservative out of the Low Moderate and High LEP Triggers corrected for the appropriate amount of dilution

2. Level 2a trigger.

3. Trigger determined by Chevron either by the method detailed in section 4.1 or as stated in "reason for change column" above

4. Dilution used determined by the revised model estimates using a rhodamine dye test as explained in section 6.1 of the Effluent Quality Validation Report

4.2 DWER's Marine Ecosystem Branch review of EQVR outcomes and response from licence holder

DWERs Marine Ecosystem Branch reviewed the monitoring results and assessment presented in the EQVR together with the proposed changes to trigger values and made the following conclusions:

- That the proposed trigger values be used as a limit not to be exceeded and that a value 75% of the limit to be used as a trigger to initiate an investigation in the event it is exceeded two times during any three month period;
- Justification for ambient marine environmental monitoring copper exceedances (Level 3 criteria) are provided by the licence holder i.e. provide background levels;

QA/QC supplied by the licence holder shows there was no contamination of sample and background monitoring shows that copper levels in the marine environment regularly exceed the trigger value of 0.3 µg/L.

- Bacterial monitoring continues and is considered in terms of impacts to recreation and catch and eat seafood as there is no approved exclusion area around the outfall and therefore the EQC applies at the point of outfall.

The licence holder has stated that the bacterial parameters (Faecal coliforms and Enterococci) were removed from the potential contaminants of concern list based primarily on the operational concentration data from the sump, and secondarily from the marine water quality validation programme results. Results presented in the EQVR suggest low risk of exceedance of discharge or marine water quality triggers (moderate and high LEP boundary criteria). There were no enterococci exceedances of the Level 2b criteria, and only a single exceedance of the Level 2b criteria for faecal coliforms over the commissioning period which suggests low risk of exceeding the EQC trigger over the long term (refer BMT 2020, Table 2.26 and 2.27). There were no exceedances of Level 3 EQC for either parameter during the validation commissioning period (refer BMT 2020, Table 3.28 and 3.27). This remained the case when assessing these parameters for each depth, per response to next section below.

The Delegated Officer considers that:

- Bacterial concentrations may not have exceeded the 2b or 3 levels but the 2b trigger values are calculated using dilutions and level 3 samples were taken after dilutions. Faecal coliforms had a maximum concentration of 45,000 CFU/100mL and Enterococci had a maximum concentration in the sump of 870 org/100mL which are both above the EQC which would apply at the point of discharge (diffuser) without any dilution.
- Although there may be exceedances of the EQC, the risk is considered low based on public access, taking of seafood, and boating restrictions.
- EQC as the trigger levels for bacterial parameters on sump sampling regime as there are no dilutions for sump sampling trigger values.
- On-shore sampling should be conducted monthly rather than quarterly until there is sufficient evidence to show that on-shore monitoring can protect the EQO;

The Delegated Officer has determined that monthly on shore sampling is appropriate until further data on seasonal variation to wastewater concentrations and changes to the plume concentrations at the environmental protection boundaries is collected and understood.

- There is no justification as to exclusion of ammonia as a contaminant of concern (previously identified by the licence holder as a contaminant of concern);

The licence holder provided information stating that the ammonia was sampled weekly from the sump between August 2019 and April 2021 with the average concentration being 109 ug/L and maximum of 560 ug/L. The EQC's for the MEP and HEP boundaries were 900 and 500 ug/L respectively. Ammonia loads were at 15% of the temporary marine outfall (TMO) EQC for the period of August 2020 to May 2021.

The Delegated Officer determined that ammonia ambient sampling should be continued and added to sump sampling to allow variations to be determined.

- That all parameters are maintained in the on-shore monitoring program with the addition of ammonia;

The Delegated Officer determined that all parameters should continue to be monitored until variations of wastewater concentrations and effects from seasonal changes such as currents, water temperature etc can be determined.

- Ambient marine water monitoring around the outfall should continue as there is limited information to date and it is unclear if the monitoring proposed in the EQVR accurately represents the long term discharge variation;
- The co-mingled wastewater contains contaminated stormwater, process water, sewage and brine from the desalination plant. This co-mingled waste stream could cause potential toxic effects to marine biota. The make-up and potential toxicity of the combined effluent is likely to change over time;
- WET sampling should be undertaken every 3 to 5 years as the make-up and toxicity of the combined effluent sump is likely to change over time. The WET sampling should be consistent with that conducted in the EQVR with the exception that 7 day larval fish imbalance and biomass (Dry weight) test which should use pink snapper or yellowtail kingfish as Barramundi can be less sensitive to toxicants. Additionally, where possible sea water from a reference site should be used as the dilution water.

In summary, the Marine Ecosystem Branch considered that the monitoring program proposed in the EQVR (i.e. no offshore monitoring with revised onshore parameters) is not adequate to demonstrate that the EQO are being achieved. If the above recommendations around monitoring are implemented, then it is considered likely that the licence holder will be able to demonstrate this. Monthly rather than quarterly on-shore sampling should be conducted until there is sufficient evidence illustrating that meeting the proposed trigger levels on-shore will ensure the EQCs will be met at the environmental protection area boundaries.

Bacterial indicators are used to indicate whether it is safe to undertake recreation or to catch and eat seafood, they are not indicators of ecological health and therefore do not apply at the low/moderate LEP boundary. Since there were no approved areas around the outfall where recreation and taking of seafood would be unsafe, the EQC for the bacterial indicators apply at the point of discharge (i.e. in-pipe (sump) concentrations should meet the EQC).

Table 3: DWER's proposed monitoring program, limits and reportable event criteria for PMO discharge

Parameter	DWER justification for inclusion of parameter	Method for determination of limit	Chevron proposed trigger	DWER calculated Limit	Proposed licence limit	Proposed reportable event criteria (75%of limit)
			µg/L unless otherwise stated			
Flow rate	Continuous flow rate required to determine nutrient loads and discharge rates for other pollutants. EPA Report 1404 also recommends flow for continuous monitoring with targets and limits.	Based on the design flow of the diffuser 674 m ³ /hr as per the POFWWDP	NA	674 m ³ /hr	674 m ³ /hr	NA
Aluminium	Chevron initially proposed to remove the parameter however Al is present in discharge and has potential impacts on marine flora and fauna. DWER determined to retain the parameter. Chevron proposed use of the 95% species protection trigger values from the published paper <i>Derivation of a water quality guideline for aluminium in marine waters</i> (Golding et al. 2014) to determine onshore and offshore criteria as existing criteria too conservative given Al was detected at naturally elevated concentrations during baseline monitoring.	Previous criteria were based on the high protection low reliability value from Cockburn Sound EQC reference document (EPA 2017) used as EQC and background value of 0.4ug/L taken from Bearman 1989. Given the EQC value was a low reliability value DWER considered it appropriate to consider the alternate proposed trigger value from Golding et al. 2014 to determine appropriate limits/criteria. Consistent with the approach for other parameters, the 99% and 90% species protection values of 2.1 µg/L and 69 µg/L respectively from Golding et al. 2014 and a background value of 0.4 ug/L from Bearman 1989 were applied with dilution to determine the revised limit.	None proposed	1190	1190	893
Ammonia	Ammonia was not included in the proposed on shore monitoring but was identified as a potential contaminant of concern by the POFWWDP Present in discharge and potential impacts on marine flora and fauna DWER determined to continue monitoring.	High and moderate values from Cockburn Sound EQC reference document (EPA 2017) used and background values based on ANZG 2018 suggested a range of 1 – 10 ug/L for tropical waters with DWER's Marine Ecosystems branch advising the upper end of the range is typical for northern WA to determine the appropriate limit.	None proposed	166,610	166,610	124957.5
Cadmium	Typically not present in the discharge Has potential to bioaccumulate	ANZG 2018 80% species protection value used for on-shore sump prior to dilutions as required by MS 873 as they are potential bioaccumulating toxicants in the Australian water quality guidelines	36	36	36	27
Chlorine	Routinely present in the discharge Added to the waste stream Detected in the offshore samples Available analysis lacks sensitivity	High and moderate values from Cockburn Sound EQC reference document (EPA 2017) used and background level of 0 used. The licence holder's calculated limit is the same as DWER's.	2,100	2,100	2,100	1575
Chromium (III)	Included by Chevron as routinely present in the discharge	Trigger value proposed by Chevron is lower than the value calculated by DWER. DWER used ANZG 2018 values for 99% and 90% species protection used and background values from Bearman 1989 for dissolved chromium (0.15 µg/L) to determine appropriate limit to give a limit value of 5271.17 µg/L. The more conservative of the two values has been applied.	5,041	5,271	5,041	3780.75
Chromium (VI)	Included by Chevron as routinely present in the discharge	Trigger value proposed by Chevron is lower than the value calculated by DWER. DWER used ANZG 2018 values for 99% and 90% species protection and background values from Bearman 1989 for dissolved chromium (0.15 µg/L) to determine appropriate limit. As background levels are higher than the 99% species protection value in ANZG 2018 the trigger was calculated using the moderate species protection value at the MEPA boundary to give a trigger value of 2776 µg/L. The more conservative of the two values has been applied.	98	2,776	98	73.5
Copper	Included by Chevron as routinely present in the discharge and potential for introduction by infrastructure. No background value used for calculations by Chevron. Wenziker et al 2006 show a background value of 0.165ug/L	ANZG 2018 values for 99% and 90% species protection and background values from Wenziker et al 2006 to determine appropriate limit	210	95	95	71.25
Lead	Included by Chevron as routinely present in the discharge	ANZG 2018 values for 99% and 90% species protection and background values to determine appropriate limit	923	923	923	692.25
Mercury	Included by Chevron as has potential to bioaccumulate	ANZG 2018 80% species protection value used for on shore sump prior to dilutions as required by MS as they are potential bioaccumulating toxicants in the Australian water quality guidelines	1.4	1.4	1.4	1.05
Nickel	Included by Chevron as routinely present in the discharge and potential for introduction by infrastructure.	Trigger value proposed by Chevron is lower than the value calculated by DWER. DWER used ANZG 2018 values for 99% and 90% species protection used and background values from Wenziker 2006 (0.5) to determine a trigger value of 4550 µg/L The trigger proposed by Chevron (2,454) appears to be lower than the trigger calculated by DWER (4,550) potentially due to use of a much higher background value (3.5). The more conservative of the two values has been applied.	2,454	4,550	2,454	1840.5
Silver	Included by Chevron as routinely present in the discharge	ANZG 2018 values for 99% and 90% species protection and a background value of 0 to determine appropriate limit.	252	252	252	189
Vanadium	Included by Chevron as routinely present in the discharge and potential for introduction by infrastructure.	ANZG 2018 values for 99% and 90% species protection and background values from POFWWDP to determine appropriate limit.	22,247	22,247	22,247	16685.25
Zinc	Included by Chevron as routinely present in the discharge and single exceedance in offshore monitoring.	The value proposed by Chevron appears to be lower than calculated value. DWER used ANZG 2018 values for 99% and 90% species protection and background values from Wenziker et al 2006 to get a limit of 3,192 µg/L. The more conservative of the two values has been applied.	2,174	3,192	2,174	1630.5
TRH	Included by Chevron as routinely present in the discharge and potential for introduction by process.	Limit calculated using the high protection value from Cockburn Sound EQC reference document (EPA 2017) was used as a protection value i.e. at the LEPA/MEPA boundary in the absence of ANZG 2018 values for 99% and 90% species protection levels.	980	980	980	735

Parameter	DWER justification for inclusion of parameter	Method for determination of limit	Chevron proposed trigger	DWER calculated Limit	Proposed licence limit	Proposed reportable event criteria (75%of limit)
			µg/L unless otherwise stated			
TN	Not proposed to be included by Chevron as nutrient loads are small compared with other marine effluent discharges in the state. DWER included the nutrients to verify that nutrient loads are acceptable. EPA Report 1404 indicates that nutrients in discharge water would be monitored to prevent eutrophication from increased nutrients. Once verified as acceptable through adequate monitoring can potentially be removed from monitoring requirements.	Delegated officer determined the nutrient loading limits from the temporary marine outfall were also appropriate to the PMO and applied limits aligning with these as well as reportable event criteria set to 75%.	NA	NA	60 kg/day	45 kg/day
NOx					24.5 kg/day	18.4 kg/day
TP					8.5 kg/day	6.4 kg/day
FRP					6.5 kg/day	4.9 kg/day
MDEA	Included by Chevron as potential for introduction by infrastructure	As per Table 2 Chevron derived trigger values for MDEA and Piperazine using the Assessment Factor method referred to in the <i>Revised method for deriving Australian and New Zealand water quality guideline values</i> (Warne et al., 2018).	315 mg/L	315 mg/L	315 mg/L	236 mg/L
Piperazine			700 mg/L	700 mg/L	700 mg/L	525 mg/L
TDS	Included by Chevron as reverse osmosis load potentially impacts marine fauna. DWER has included as potentially impacts on water quality and WET testing indicates the bulk of the toxic effect arises from osmotic stress.	The licence holder proposed a limit that was based ANZG 2018 values for 99% and 90% species protection and background values. DWER's Marine Ecosystems Branch advised that this limit was very high and that a lower more suitable limit should be considered and they advised desal brine discharges rarely exceed 70,000 mg/L therefore this has been applied as the limit.	289,700 mg/L	NA	70,000 mg/L	52,500 mg/L
Faecal coliforms	Included by Chevron as a common constituent of treated wastewater. Potential impact on water quality (recreation) and contamination of seafood	The applicant has not proposed, and had approved, any exclusion areas around the outfall for recreation or fishing, therefore the limits of median 14 CFU/100mL and 90th percentile 21 CFU/100mL (seafood safe for human consumption) and 95th percentile 200 enterococci/100mL (primary contact recreation) apply at the discharge point as taken from the <i>Australian Shellfish Quality Assurance Program Operations Manual</i> and the <i>Environmental quality criteria reference document for Cockburn Sound (EPA 2017)</i> . Given the nature of the limits (i.e. median/percentile) they are defined as applying to rolling 12 months of data with a minimum of 12 samples.	NA	NA	Median <14 CFU/100mL and 90th percentile <21 CFU/100mL	NA
Enterococci			NA	NA	95 th percentile <200 Org/100mL	NA
DO	Not proposed to be included by Chevron DWER has included as has potential for reduction in water quality impacting marine flora and fauna, EPA Report 1404 advised for DO to be monitored and Schedule 2 of MS 837 includes DO specifications to meet LEP at the LEPA/MEPA and MEDPA/HEPA boundaries.	Based on requirement in MS 873 that DO should never fall below 60% at the LEP boundaries. From operational monitoring to date DO levels are expected to always be above 80%.	NA	NA	NA	< 60%
pH	Not proposed to be included by Chevron DWER has included as has potential for reduction in water quality impacting marine flora and fauna, the EQC for pH to protect recreation values is >5 and <9 and EPA Report 1404 advised for pH to be continuously monitored.	Based on the <i>Environmental quality criteria reference document for Cockburn Sound (EPA 2017)</i> , the pH to protect recreation values should be >5 and <9 therefore this is applied at the discharge point as a limit as the EQC must be met at the point of discharge (as per the approach for microbiological parameters). Given monitoring is continuous, the limit is applied to the daily average.	NA	NA	< 5 and > 9	NA
Turbidity	Not proposed to be included by Chevron as there is high background and it is unlikely to be altered by discharge. DWER has included as it is a recommendation in EPA Report 1404 for turbidity to be continuously monitored. Marine Branch advised monthly monitoring to be acceptable.	NA	NA	NA	NA	> 40.91

5. 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 *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.

5.1 Source-pathways and receptors

5.1.1 Emissions and controls

The key emissions and associated actual or likely pathway associated with the operation of the PMO which have been considered in this Amendment Report are detailed in Table 4 below which also details the control measures the licence holder has proposed to assist in controlling these emissions, where necessary.

Table 4: Licence Holder controls

Emission	Sources	Potential pathways	Proposed controls
Wastewater from the combined effluent sump comprising: – treated effluent from the construction village sewage treatment plant	Discharge from the PMO	Dispersion/ diffusion in sea water	Maximum discharge of 674m ³ /hr Outfall designed to maximise diffusion Quarterly water quality monitoring at the combined effluent sump Level 2b trigger values for wastewater parameters have been determined for on shore monitoring of wastewater at the effluent sump which are anticipated to ensure EQC, EQO and LEP are met.
– inlet air humidifier blowdown (from turbines)	Overflow from the combined effluent sump		300mm freeboard maintained at all times in the sump.
– RO unit reject water (including backwash) – LNG Primary Water Treatment System wastewater	Rupture or leak of the pipeline between the Combined Effluent Sump and the PMO diffuser	Overland flow to the marine environment Infiltration through soil to groundwater	Risk based inspection and monitoring program in place for the PMO pipeline and diffuser which are informed by operational performance (i.e. reduced performance and anomalies are investigated and rectified where required). Pipeline is visually inspected regularly as part of routine operation as the primary means of leak detection.

5.1.2 Receptors

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

Table 5 below provides a summary of environmental receptors that may be impacted as a result of activities upon or emissions and discharges from the PMO (*Guideline: Environmental Siting* (DWER 2020)).

Table 5: Environmental receptors and distance from prescribed activity

Environmental receptors	Distance from permanent marine outfall
Marine Ecosystem High Ecological protection area	250m from ship turning basin and berthing areas and area enclosed by the marine off-loading facility breakwaters
Ashburton River Delta	5.5 km west of the premises boundary including turtle nesting beach
Groundwater	Groundwater ranges from 1 to 6 mbgl and is not used for potable or industrial use. Groundwater is brackish to hypersaline near neutral to slightly alkaline, and a sodium–chloride type. The premises is located within the Hooley Creek surface water sub-catchment.
Threatened Fauna (Marine turtle rookery)	Nesting and foraging ranges for Flatback, Green and Hawksbill turtles overlap the Wheatstone Project area. Only flatback turtles nest on beaches in proximity to the premises with the nearest flatback turtle nesting beach (Ashburton River delta beach) located approximately 4.5 km west of the Ashburton North Strategic Industrial Area.
Marine environment that provides habitat to threatened fauna	The baseline assessment of the marine environment found that 14 threatened marine fauna species including birds, mammals, reptiles and sharks are known to occur nearshore and offshore to the premises.
Minor creek – Hooley Creek	The creek is located approximately 1.4 km east of the premises boundary at its closest location and has mangrove and tidal habitats which support marine fauna listed under the EPBC Act and WC Act such as sawfish and juvenile turtles.

The premises is located within part of the Ashburton River Delta. The Ashburton River is approximately 5.5 km west of the premises boundary.

Impacts to habitats within the delta/surface water drainage system are managed under the requirements of MS 873 (Mangrove, Algal Mat and Tidal Creek Protection Management Plan)

Outside of the Port of Ashburton is a High Ecological Protection Area (within the port is a Moderate Ecological Protection Area).

5.2 Risk ratings

Risk ratings have been assessed in accordance with the *Guideline: Risk Assessments* (DWER 2020) for those emission sources which are proposed to change and takes into account potential source-pathway and receptor linkages as identified in Section 5.1. Where linkages are incomplete they have not been considered further in the risk assessment. Where impacts are regulated under separate approvals they have not been considered as part of this risk assessment.

Where the Licence Holder has proposed mitigation measures/controls (as detailed in Section 5.1), these have been considered when determining the final risk rating. Where the Delegated Officer considers the Licence Holder's proposed controls to be critical to maintaining an acceptable level of risk, these will be incorporated into the licence as regulatory controls.

Additional regulatory controls may be imposed where the Licence Holder's controls are not deemed sufficient. Where this is the case the need for additional controls will be documented and justified in Table 6.

The amended licence (L9225/2019/1) that accompanies this amendment report authorises emissions associated with the operation of the Premises i.e. wastewater discharge.

The conditions in the Revised Licence have been determined in accordance with *Guidance Statement: Setting Conditions* (DER 2015).

Table 6. Risk assessment of potential emissions and discharges from the Premises during operation

Risk Event				Risk rating ¹ C = consequence L = likelihood	Licence Holder's controls sufficient? (refer to Table 4)	Conditions ² of licence	Justification for additional regulatory controls
Source/Activities	Potential emission	Potential pathways and impact	Receptors				
Operation							
Discharge of comingled wastewater from the combined effluent sump (process wastewater, potentially contaminated stormwater, RO brine, treated sewage from the Plant and Village) to the Port of Ashburton via the PMO diffuser	Wastewater with potentially high concentration of metals, hydrocarbons, nutrients, sediments, MDEA, temperature and salinity	Direct discharge to the ocean causing degradation of marine water quality and ecological impact to marine fauna and their habitats	Ecological protection areas within and outside the Port of Ashburton	C = <i>Moderate</i> L = <i>Unlikely</i> Medium Risk	N	Conditions 1, and 19-22	<p>In considering the discharge of wastewater via the PMO the Delegated Officer determined that the PMO diffuser design and location of the PMO as relevant controls to ensure wastewater is discharged in a manner which mitigates the risk of impact to the marine environment and determined to include operational requirements relating to these in the licence.</p> <p>The Delegated Officer considered the monitoring program and trigger values proposed by the licence holder in the EQVR, together with advice from the Marine Ecosystems Branch and determined it appropriate to authorise discharge from the PMO subject to conditions requiring ongoing monitoring of the discharge water from the final effluent sump for all parameters. The Delegated Officer determined that monitoring should be required on a monthly basis to ensure the EQO and LEP as outlined in MS 873 continue to be met over an extended period of time.</p> <p>Several of the proposed trigger values were revised based on DWER calculations which determined a more conservative value than that proposed by the licence holder. The trigger values have been included in the licence as limits. The limits are intended to ensure EQO and LEP are met in the marine environment. As there is a risk LEP won't be met when the limits are exceeded, the Delegated Officer also determined to also include reportable event criteria in the licence, calculated at 75% of the limits.</p> <p>If a reportable event criteria is exceeded for two monitoring events in any 90 calendar day period the exceedance will be required to be investigated, reported and management actions will need to be put in place to ensure the limits are not exceeded.</p>

Risk Event				Risk rating ¹ C = consequence L = likelihood	Licence Holder's controls sufficient? (refer to Table 4)	Conditions ² of licence	Justification for additional regulatory controls
Source/Activities	Potential emission	Potential pathways and impact	Receptors				
							Details on DWERs calculation of limits and corresponding reportable event criteria are outlined in Table 3.
						Conditions 23 to 27	<p>The Delegated Officer considered that if a discharge limit is exceeded, there is a risk the EQO will not be met. The Delegated Officer has therefore specified in the licence that in the event of a limit exceedance the licence holder:</p> <ul style="list-style-type: none"> • conduct WET testing to ensure that the effluent is capable of meeting the EQO and LEP of MS 873; and • propose management actions to ensure there are no further exceedances of the limits. <p>Given there is potential for the make-up and toxicity of the combined effluent sump to change over time the Delegated Officer also considered it necessary to include a requirement for WET testing to be undertaken at least every three years, commencing at the grant of the amendment considering nearly three years has passed since the last monitoring. The results of the testing will allow for re- assessment of the risk to the marine environment posed by contaminants in the PMO discharge on a three-yearly basis.</p> <p>The results of WET testing (whether undertaken due to a limit exceedance of for the three yearly requirement) are to be reported to DWER and the report is to include and assessment of the risk the effluent poses of not meeting EQO or LEP.</p>

Risk Event				Risk rating ¹ C = consequence L = likelihood	Licence Holder's controls sufficient? (refer to Table 4)	Conditions ² of licence	Justification for additional regulatory controls
Source/Activities	Potential emission	Potential pathways and impact	Receptors				
						Conditions 28 and 29	<p>The Delegated Officer considers that the five ambient marine monitoring events conducted during the period of validation commissioning in 2019 are insufficient to determine whether discharge from the PMO will continue to meet EQO for the marine environment over the longer term. Continued monitoring is required, under different ambient conditions, in order to make this assessment.</p> <p>The Delegated Officer has therefore specified continued ambient monitoring on a quarterly basis, together with reporting of the results in the annual environmental report and reportable event criteria based on the MEP and HEP EQC for the marine environment. The Delegated Officer considered it necessary to include reportable event criteria for ambient marine monitoring to ensure that monitoring results which indicate a potential impact to the marine environment as a result of the discharge are reported to the department, and are investigated by the licence holder to assess whether impacts are occurring, and whether any further measures are required to protect the marine environmental quality.</p>
Leakage from the pipeline between the Combined Effluent Sump and the PMO diffuser		Overland flow to the marine environment causing degradation of marine water or infiltration through soil to groundwater		<i>C = Minor</i> <i>L = Rare</i> Low Risk	Y		Condition 1
Overflow of wastewater from the Combined Effluent Sump			Groundwater 1-6 mbgl				

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

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

6. Consultation

Table 7 provides a summary of the consultation undertaken by the department.

Table 7: Consultation

Consultation method	Comments received	Department response
Letter via email - Local Government Authority advised of the application and invited to provide comment (19/1/2020)	No comments received	NA
Letter via email - Pilbara Ports Authority advised of the application and invited to provide comment (19/11/2020)	Pilbara Ports Authority advised they do not have any comments or concerns with the matters in the application.	NA
Letter via email – Conservation Council of Western Australia advised of the application and invited to provide comment (19/11/2020)	No comments received	NA
Licence holder was provided with the draft amendment on 28 October 2021. As a number of changes were made in response to the first draft a second draft was provided to the licence holder for comment on 16 August 2022.	The licence holder provided a first response on 14 March 2022 and a response to the second draft on 20 October 2022. A summary of the comments provided is included in Appendix 1.	The department's response to the matters raised is provided in Appendix 1.

7. Decision

The Delegated Officer considered the results and recommendations of the EQVR for the PMO and DWER's Marine Ecosystems Branch review and determined to grant an amendment allowing for the discharge of wastewater from the premises to the marine environment via the PMO.

Due to the limited amount of monitoring conducted to date, and potential for impacts to the marine environment to occur over an extended time period, the Delegated Officer determined to include continued on-shore and ambient marine monitoring and reporting requirements, associated limits and reportable event criteria, as well as WET testing in the licence.

The licence holder proposed trigger criteria for the discharged wastewater which it considered adequate to ensure the EQO in MS 873 continue to be met. The Delegated Officer considered most of the proposed trigger criteria to be appropriate to apply as limits on wastewater discharged from the PMO. Some of the trigger values were revised from those proposed by the licence holder on the basis that DWER calculated a more conservative value to be appropriate.

In addition to the limits, the Delegated Officer determined to include reportable event criteria in the licence which require specified investigation and reporting in the event of exceedance. The reportable event criteria for the discharge water equate to 75% of the discharge limits and are intended to reduce the risk of discharge limits being exceeded, and LEP not being met. Reporting requirements have also been applied to EQC for ambient marine monitoring results as exceedance of the EQC indicates there is a risk that EQO and LEP will not be met.

The Delegated Officer considers that on-shore and ambient monitoring of all parameters identified in the POFWWDP should continue until sufficient data on the discharge quality has been collected which is able to demonstrate that the EQO's of MS 873 are being met, taking into account

seasonal variation and potential changes to the effluent being discharged.

The Delegated Officer has amended Licence L9225/2019/1 in accordance with section 59(1) of the EP Act. The amendments are described in Section 8.1.

8. Conclusion

Based on the assessment in this Amendment Report, the Delegated Officer has determined that a Revised Licence will be granted, subject to conditions commensurate with the determined controls and necessary for administration and reporting requirements.

8.1 Summary of amendments

Table 8 provides a summary of the proposed amendments and will act as record of implemented changes. All proposed changes have been incorporated into the Revised Licence as part of the amendment process.

Table 8: Summary of licence amendments

Condition No.	Amendments to Licence L9225/2019/1
1	Inclusion of the combined effluent sump, the permanent marine outfall pipeline and diffuser and associated operational requirements
1	Updated Propane and ethylene storage drums operational requirement to be able to store the refrigerant inventory of 1 LNG train. Licence Holder requested the change in the application as the propane storage capacity was only designed for one train.
2	Inclusion of the PMO as an authorised discharge point
7	Inclusion of monitoring related to the PMO to be recorded by the licence holder
10	Updated to requiring the licence holder to ensure all monitoring equipment used for monitoring related to the PMO is calibrated
19 and 20	Application of limits to discharge water quality and inclusion of monitoring of water from the combined effluent sump which is discharged via the PMO. Limits and reportable event criteria are specified in Table 11 associated with the monitoring requirements.
21	Requirement to investigate exceedances of reportable event criteria and propose management actions to ensure limits are not exceeded
22	Requirement to conduct further testing, investigations and reporting in response to a limit exceedance.
23	Requirement to conduct WET testing in the event of limit (and subsequent resample) exceedance.
24 and 25	Requirement to conduct WET testing within one month of the amendment being granted then at least every 3 years, by a NATA accredited laboratory
26 and 27	Reporting requirements relating to WET testing.
28 and 29	Inclusion of ambient marine water monitoring and reporting requirements
30	Updated to require record maintenance for the additional monitoring requirements included via the amendment and non-compliance/reportable events.
35	Included annual reporting requirements relating to the combined effluent sump and ambient marine monitoring programs.
Table 15 Definitions	Added definitions relevant to the amendment including AS/NZS 5667.9, EQC, FRP, HEPA, Level of ecological protection, LEPA, MDEA, MEPA, quarter and suitably qualified scientist.
Figures: Premises Maps and GPS coordinates	Figures updated to reflect discharge points and inclusion of combined effluent sump.

Condition No.	Amendments to Licence L9225/2019/1
Schedule 4	Environmental quality objective and levels of ecological protection taken from MS 873 added as a schedule.
4, 30, 32 and Table 14	Administrative update to revises references to condition '0' corrected to condition 3.

References

1. ANZECC/ARMCANZ (2000) Australian and New Zealand Guidelines for Fresh and Marine Water Quality. Volume 1: The Guidelines, Australian and New Zealand Governments and Australian state and territory governments, Canberra, ACT
2. ANZG (2018) *Australian and New Zealand Guidelines for Fresh and Marine Water Quality*. Australian and New Zealand Governments and Australian state and territory governments, Canberra ACT, Australia (supersedes ANZECC/ARMCANZ (2000)). Canberra, ACT
3. BMT September (2020), *Effluent Quality Validation Report – Wheatstone Permanent Marine Outfall Monitoring* (attachment 3 of DWER ref DWERDT355594).
4. Chevron Australia Pty Ltd, 2018 *Wheatstone Project – Permanent Onshore Facilities Waste Water Discharge Plan Revision 6* (DWER Ref A1665020)
5. Chevron Australia Pty Ltd, 2020 *Licence amendment* application received by DWER on 26 October 2020. (DWER Ref A1946615)
6. Department of Environment 2011. *EPBC 2008/4469. Environment Protection and Biodiversity Act 1999*. Canberra, ACT
7. Department of Environment Regulation (DER) 2014. *Western Australian Environmental Protection Act 1986 Works Approval W5671/2014/1 for the construction of the Permanent Wastewater Treatment Plant and discharge of waste water*. Perth, Western Australia.
8. DER 2015, *Guidance Statement: Setting Conditions*. Perth, Western Australia.
9. Department of Water and Environmental Regulation (DWER) 2019, *Western Australian Environmental Protection Act 1986 Part V Licence to operate Wheatstone LNG Trains 1 and 2, L9225/2019/1*. Perth, Western Australia
10. DWER 2020a, *Guideline: Environmental Siting*, Perth, Western Australia.
11. DWER 2020b, *Guideline Risk Assessments*, Perth, Western Australia.
12. Environmental Protection Authority. (EPA) 2011 *Ministerial Statement MS873 – Wheatstone Gas Processing Export Facilities and Infrastructure*. Perth, Western Australia
13. EPA 2017, *Environmental quality criteria reference document for Cockburn Sound*. Perth, Western Australia
14. Gerry Bearman (1989) *Ocean Chemistry and Deep Sea Sediments*. Pergamon Sydney in 1989
15. GHD 2022a, *Environmental Assessment Piperazine CAS No. 110-85-0, Formula C₄H₁₀N₂*. Perth, Western Australia
16. GHD 2022b, *Environmental Assessment Methyl Diethanolamine CAS No. 105-59-9, Formula C₅H₁₃O₂*. Perth, Western Australia
17. K. Wenziker, K. Mc Alpine, S. Apte, R. Masini (2006) *Background quality for coastal marine waters of the North West Shelf, Western Australia*. Department of Environment. 2011.

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

Condition	Summary of Licence Holder's comment	Department's response
1 (Table 1) and 2 (Table 2)	<p>Provided additional information and clarification on the PMO diffuser location, design and inspection and maintenance regime. Advised that the diffuser is generally located at 2.5m above the seabed and the water depth at this location is 13.5m at lowest astronomical tide, and 14.8m at mean sea level. Due to sediment and tidal movement the distance varies between, the seabed and the diffuser, and the sea surface and the diffuser. The licence holder therefore requested requirements relating to the diffuser location be revised to approximately 11 m below the sea surface and approximately 2 m above the seabed. They also requested diffuser inspection frequency be amended to align with AS/NZS 3788:2006 on the basis that daily inspections are disproportionate to the assessed low risk of discharge impacts. In follow-up to a request to provide the specific frequency of inspections, the licence holder advised the frequency is risk based and may increase or decrease depending on inspection outcomes. The frequency is currently scheduled as two yearly.</p> <p>The licence holder additionally requested removal of the requirement for composite sampling of treated wastewater from the Primary Water Treatment System (PWTS) on the basis that the amended licence specifies monitoring requirements for discharge from the combined effluent sump.</p>	<p>The Delegated Officer took into account the clarification of the PMO diffuser design, configuration, location, and inspection and maintenance regime in applying operational conditions to the PMO and specifying the discharge location of the diffuser.</p> <p>The Delegated Officer determined to reduce the inspection frequency from daily to monthly on the basis that major leaks are likely to be observed without formal inspection, and a monthly inspection frequency is suitable for detection of minor leaks. The Delegated Officer considered a two-yearly inspection frequency could result in minor leaks occurring undetected over an extended period which could increase the likelihood of ecological impacts occurring and was therefore is not considered to adequately mitigate this.</p> <p>The PWTS infrastructure is not directly related to the scope of the amendment application therefore the Delegated Officer determined it was not appropriate to alter operational conditions for this infrastructure. As per the Decision Report for L9225/2019/1 (DWER 2020) <i>output from the PWTS is sampled and monitored via continuous composite sampling and treated water from this system is discharged to the Combined Effluent Sump</i>. The combined effluent sump receives water input from several sources, not just the PWTS therefore results can be impacted by changes to any of the input sources. Composite sampling is specified as an operational control to confirm effective operation of the PWTS, not as a specific control to monitor the quality of discharges to water. The licence holder may submit an amendment application for the requested change at a future date if they consider the composite sampling requirement is no longer required.</p>
19 (Table 11) 25 (Table 13) MDEA and piperazine	<p>In response to a request to explain how limits for piperazine and MDEA were determined the licence holder provided copies of environmental assessments which were undertaken to determine trigger values for MDEA and piperazine. The assessments were amended a number of times to address department feedback. The assessments derived trigger values using the <i>Revised method for deriving Australian and New Zealand water quality guideline values</i> (Warne et al., 2018) that</p>	<p>The assessments were reviewed by the department's Marine Ecosystems Branch who advised that toxicity data for both marine and freshwater species were combined for the derivation of the trigger value and that this should only be done when it can be shown that there is no statistical difference in toxicity of the chemical between the two media, or where it can be shown that the chemistry and mode of action of the chemical are not influenced by the two different media (i.e. no difference in toxicity). Derivation of the trigger value for</p>

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	<p>underpins the <i>Australian and New Zealand guidelines for fresh and marine water quality</i> (ANZG, 2018)". Laboratory ecotoxicity endpoints (principally EC₁₀ and NOEC) were identified through a review of the published literature and an Assessment Factor of 10 was applied to the lowest identified ecotoxicity endpoint to derive trigger values as the SSD data requirements weren't met.</p> <p>Trigger values of 0.45 mg/L for MDEA and 1.0 mg/L for piperazine were derived using this method, with sump trigger values of 315 mg/L and 700 mg/L calculated accordingly, based on the MEPA/HEPA dilutions (700). Chevron suggested use of the MEPA/HEPA dilutions of 700, rather than the LEPA/MEPA dilutions of 140, to determine sump trigger values will provide sufficiently high level of protection and referred to Warne et al. (2018) noting that guideline values derived using the assessment factor method are considered conservative and very protective of ecosystems.</p> <p>Chevron also advised they have initiated further ecotoxicity work for MDEA and piperazine involving ecotoxicity testing in order to determine more scientifically robust trigger values based on measured biological responses. Chevron suggested it would be beneficial to delay the amendment until these results are available.</p>	<p>MDEA was driven by a marine species (<i>Acartia tonsa</i>) and minimum data requirements were met using marine species therefore the trigger value of 0.45 mg/L was considered appropriate.</p> <p>The initial assessment for piperazine was revised by Chevron following provision of the above advice relating to use of marine and freshwater species to derive trigger values, and other advice regarding minimum data requirements for derivation of trigger values.</p> <p>The revised piperazine assessment, reported suitable toxicity data for one marine and two freshwater species which included a fish, an invertebrate and a plant species. The report included assessment of toxicity in freshwater verses marine environments which indicated there was no statistical difference in toxicity between the two media therefore it is reasonable to combine the datasets to derive trigger values. The minimum data requirements for a low reliability trigger value were met, therefore the derived trigger value of 1.0 mg/L for piperazine (based on the converted NOEC for <i>Oryzias latipes</i>) was considered appropriate. Sump values were determined based on MEPA/HEPA dilutions.</p> <p>Units and values for MDEA and Piperazine were reviewed and aligned between the licence and amendment report.</p> <p>The department is supportive of the licence holder undertaking further ecotoxicity studies to determine more scientifically robust trigger values and using the results to inform any future licence amendment application. However, given the period of time taken to complete the assessment of the application, the department considers there has been ample time for this work to have been completed at an earlier stage of the assessment, and does not wish to further prolong a decision on the application and application of regulatory controls such as monitoring which are necessary to ensure and confirm that levels of ecological protection and environmental quality objectives are being met.</p>
<p>19 (Table 11) 25 (Table 13) Aluminium</p>	<p>The licence holder sought clarification on how the aluminium limit of 70.4 µg/L for the combined effluent sump was derived and requested the reportable event criteria and limit for aluminium be increased on the basis that background concentrations are naturally elevated (based on the results from baseline water quality monitoring conducted in 2008 and 2009, which ranged from <10 to 23.3 µg/L, as well as results for marine sediments from the Ashburton River Mouth which were documented in the <i>Background quality of the marine sediments of the Pilbara Marine Technical Report Series</i> (DEC 2006)). The licence holder noted that the ANZECC 2000 guideline value of 0.5 µg/L is a low reliability value, calculated based on limited data, and the limit of reporting (LOR) and</p>	<p>The initial proposed Al limits were based on the high protection value of 0.5 µg/L specified in the <i>Environmental quality criteria reference document for Cockburn Sound</i> and a background value of 0.4 µg/L from Bearman 1989.</p> <p>Noting that the licence holder considered background concentrations to be elevated, the department provided advice on alternate methods to derive guideline values. Following this the licence holder proposed reference to Golding et al 2014 to determine appropriate criteria. The department's Marine Ecosystems Branch reviewed the paper and noted that the methodology undertaken in the paper is consistent with methods adopted for the derivation of the national guidelines (ANZG 2018). Use of the paper's 99% species</p>

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	<p>background concentrations both exceeded this. The licence holder also noted that the paper <i>Water quality guideline values for aluminium, gallium and molybdenum in marine environments</i> (van Dam et al. 2018) is currently being reviewed to inform the issuance of a marine aluminium criteria and that this paper recommended 56 µg/L as the criteria for aluminium at the 95% species protection level.</p> <p>Following feedback from the department that the above unpublished paper was not suitable to derive criteria for aluminium, the licence holder proposed use of the 95% species protection value in the published paper <i>Derivation of a water quality guideline for aluminium in marine waters</i> (Golding et al. 2014) to determine appropriate Al limits and criteria. The study uses ANZG 2018 protocols to derive marine guideline values of:</p> <ul style="list-style-type: none"> • 2.1 µg/L for 99% species protection • 24 µg/L Al for 95% species protection; and • 69 µg/L Al for 90% species protection. 	<p>protection value of 2.1 µg/L (and 90% species protection value of 69 µg/L) as an interim water quality guideline for a high level of ecological protection (and moderate level of ecological protection) is reasonable and these were additionally applied as relevant EQC. These criteria are also equivalent to EQC previously applied to the TMO. These were also applied together with the relevant dilution factors to determine a sump trigger criteria of 1190 µg/L (based on 700 dilutions).</p>
<p>19 (Table 11) 25 (Table 13) Nutrients</p>	<p>Requested the combined effluent sump limits for nutrients TN, NOx, TP, and FRP be specified in the licence as loading rates rather than concentrations on the basis that ANZECC 2000 identifies nutrients as direct-effect stressors, and loading rates are considered more appropriate in the management of stressors, while concentrations are more relevant to the management of toxicants. Loading rate limits (rather than concentrations) were used for these parameters for the Wheatstone Temporary Marine Outfall (TMO) which was previously used to discharge treated wastewater from the construction village wastewater treatment plant (now being discharged via the PMO with the TMO having been decommissioned). Due to the operational workforce being smaller than the construction workforce, a lower volume (and nutrient load) is being discharged from the PMO compared with historical discharges through the construction period. The licence holder considers the nutrient loads from the PMO discharges are low compared with other marine outfalls (TN load of 4.8 kg/day compared with the Perth Sepia Depression Ocean Outlet TN load of 4900 kg/day). Baseline data from the POFWWDP also indicate that nitrogen and phosphorus concentrations in the water off Onslow are naturally elevated.</p> <p>The licence holder suggested use of equivalent loading rates to those specified in the licence for the TMO (L8650/2012/1) which are as below:</p> <p>TN – 60 kg/day, NOx – 24.5 kg/day, TP – 8.5 kg/day, FRP – 6.5 kg/day, and Ammonia – 2.1 kg/day</p>	<p>Taking into account that nutrients TN, NOx, TP, and FRP are stressors, rather than toxicants, the Delegated Officer considered it appropriate to revise the combined effluent sump concentration limits to loading limits and does not consider that this change will increase the risk of the discharge impacting the marine environment. The loading rates previously specified for the TMO were deemed to be appropriate for application to the PMO.</p>

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19 (Table 11) 25 (Table 13) Ammonia	<p>In addition to nutrients, the licence holder requested the concentration based ammonia criteria in Table 11 and 13 are removed as loading criteria are considered more appropriate (ammonia loading criteria were specified for the TMO licence). Weekly combined effluent sump monitoring results for 13 January 2020-7 December 2021 were provided which indicated the average ammonia concentration in the sump was 109 µg/L and only one result was above 500 (560 µg/L) at end of pipe (without any further dilution). Relevant criteria at the boundaries are 900 and 500 µg/L for the moderate and high ecological protection boundaries respectively, confirming that the risk of ammonia concentrations exceeding EQC in the marine environment is very low.</p>	<p>The Delegated Officer does not consider it appropriate to replace the concentration limit for ammonia with a loading limit as ammonia can have direct toxic effects on aquatic life and is therefore considered a toxicant. A concentration limit as applied in the amended licence is therefore considered the most appropriate control.</p>
19 (Table 11) 25 (Table 13) Faecal coliforms and enterococci	<p>Noted that the proposed limits for faecal coliforms and enterococci in the final effluent appear to have been derived from the <i>Australian Shellfish Quality Assurance Program Operations Manual</i> (Australian Shellfish Quality Assurance Advisory Committee 2019) and are applicable to marine waters where a shellfish harvest area has been approved. The licence holder considers the proposed limits are more suitable as EQC as they do not account for dilution of the waste stream following discharge. The licence holder noted they understand their obligation to meet the requirements of MS 873 (specifically the EQO of "maintenance of seafood for human consumption") but consider that applying the proposed limits as EQC at the LEPA/MEPA boundary (rather than limits on the discharge) will ensure compliance with MS 873 requirements.</p> <p>The suggested limits (based on EQC of 14 CFU/100mL for faecal coliforms and 200 organisms/100mL for enterococci) are 1,960 CFU/100mL for faecal coliforms and 28,000 org/100mL for enterococci.</p>	<p>The Delegated Officer does not consider that application of the faecal coliform and enterococci limits at the LEPA/MEPA boundary, rather than at the combined effluent sump, to be appropriate. Chevron's Environmental Quality Plan for the PMO did not include a defined area where it would be unsafe to catch and eat seafood or to undertake recreation. In the absence of such an area the expectation is that these environmental values will be protected in all surrounding marine waters hence the EQC should be met at the discharge point (i.e. in the combined sump wastewater). The EQC are based on the <i>Australian Shellfish Quality Assurance Program Operations Manual</i> and the <i>Environmental quality criteria reference document for Cockburn Sound (EPA 2017)</i>. As the limits apply to median and percentile values the Delegated Officer determined it appropriate to define an applicable period that the limits apply to and has set this as the rolling 12 months of data with a minimum of 12 samples, which is aligned to the approach taken for licensing of the TMO.</p>
19 (Table 11) 20 21 Nutrients, faecal coliforms and enterococci	<p>It is the licence holder's preference to remove limits and reportable event criteria for TN, NOx, TP, FRP, faecal coliforms and enterococci and there be trigger no trigger to undertake WET Testing associated with these parameters as they are considered stressors rather than toxicants and therefore are not indicators of ecological health. Rather, they indicate whether it is safe to undertake recreation or to catch and eat seafood. The licence holder noted that other licences which authorise discharges to the marine environment in the Pilbara region do not include limits or reportable event criteria for these parameters.</p> <p>If the limits are retained the licence holder considers the limits/reportable event criteria noted in the relevant lines above should be applied and they should not trigger a requirement for WET testing.</p>	<p>The Delegated Officer agreed that WET testing is not relevant to TN, NOx, TP, FRP, faecal coliforms and enterococci as these are stressors rather than toxicants and has therefore excluded WET testing requirements in the event of a limit exceedance for these parameters. The parameters are however relevant to the Environmental Quality Objectives and levels of ecological protection described in MS 873 (also in Schedule 4 of the amended licence) therefore limits and reportable event criteria have been retained to ensure the discharge water quality is managed to achieve these.</p>

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19 (Table 11) Monitoring frequency	<p>The licence holder provided weekly combined effluent sump monitoring results for 13 January 2020-7 December 2021 to demonstrate that most parameters were consistently below the proposed limits and reportable event criteria over the period which is representative of a range of seasonal and plant operating conditions. Exceedances have only occurred during the period for parameters where the limits in the draft licence are considered to be overly conservative and the licence holder considers they require review (aluminium, nutrients, faecal coliforms and enterococci). In the long term the licence holder considers the frequency of onshore sampling could be reduced to quarterly and this could be achieved by requiring monthly sampling for a period of 12 months, reducing to quarterly once twelve months of monitoring have been presented in the Annual Environmental Report and written confirmation has been received from DWER</p> <p>Noting that the draft amended licence specified weekly DO and continuous turbidity monitoring, the licence holder requested the monitoring frequency for these parameters be aligned to the monthly monitoring frequency of the majority of parameters. DO and turbidity have not previously been monitored at this frequency through the commissioning of the PMO (the licence holder does not have instrumentation for continuous monitoring of turbidity and extra resourcing would be required for weekly DO sampling for limited benefit).</p>	<p>The <i>Guidance Statement: Setting conditions</i> establishes the framework for setting conditions on works approvals and licences issued under Part V, Division 3 of the EP Act. The Guidance Statement sets out that a condition must be valid, meaning it must be sufficiently final and certain and not contain secondary approvals.</p> <p>The Delegated Officer considered it would be inconsistent with the Guidance Statement to specify quarterly monitoring subject to written approval from the Department. Noting that there have been occasions when the combined effluent sump monitoring results were outside the limits now set in the licence (i.e. for TRH which is likely to be a key pollutant in the discharge given the nature of the premises), the requirement for monthly monitoring has been maintained and the licence holder is advised to submit a licence amendment application when they have sufficient sustained seasonal data which demonstrates that meeting the trigger levels on-shore ensures the EQC are met at the ecological protection area boundaries.</p> <p>The Delegated Officer considers changing the monitoring frequency of DO and turbidity to monthly is consistent with the monitoring during commissioning and will not increase the risk of impact to the marine environment therefore adjusted to monitoring frequency to monthly to align with other parameters.</p>
19 (Table 11) 25 (Table 13) Chlorine	<p>Due to the short holding time for analysis of chlorine in samples the licence holder requested chlorine monitoring be able to be undertaken in-situ (Tables 11 and 13) rather than sent for NATA accredited analysis.</p>	<p>Given the short-holding timeframe chlorine measurements, and the department having previously allowed for in-situ measurement of chlorine for the TMO the Delegated Officer considered it appropriate to allow for chlorine monitoring to be undertaken in-situ however notes that the resolution of the measurements must be sufficiently less than the limits to be achieved. Adequate QA/QC information should also be maintained for the measurements to provide sufficient confidence in the measured results.</p>
20, 21 and 26	<p>The licence holder advised the 14-calendar day timeframe to conduct an investigation into limit, reportable event criteria and EQC exceedances is insufficient. In order to ensure there is adequate time to conduct a thorough investigation, the licence holder requested that the timeframe in conditions 20, 21 and 26 is amended from 14 calendar days to 30 calendar days.</p>	<p>The Delegated Officer considers the timeframe to report exceedances and the investigation into the exceedances to be appropriate on the basis that the 14 calendar day timeframe specified aligns with that already specified in the licence for other reportable exceedances (condition 15) and is more than the seven calendar day timeframe specified for non-compliances and other limit exceedances in the licence. The specified timeframe does not preclude the licence holder from providing additional supplementary information at a later date provided they have reported required information specified in the relevant condition within the nominated 14 calendar day reporting timeframe.</p>

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22 (Table 12)	<p>Provided information on considerations when determining worst case scenario effluent for three yearly WET testing and requested inclusion of laboratory supplied dilution water for WET testing where it was not feasible to obtain a seawater sample from a reference site as obtaining a sample in a short-timeframe may not be operationally feasible and may result in WET testing delays.</p> <p>The licence holder also considered that the WET testing should not be triggered by a single limit exceedance. Rather, if a limit exceedance occurs, an investigation should be undertaken to determine the cause (considering recent analysis results, operational data and waste streams in the combined effluent sump at the time of the exceedance), and actions taken to reduce potential for future exceedance. A resample and analysis should also be undertaken and if this also exceeds the same parameter limit this should trigger the WET testing requirement.</p> <p>WET testing as a result of limit exceedance should be based on environmental risk. Therefore, if the WET testing results show there is a low risk of ecological impacts for a particular parameter then subsequent limit exceedances should not trigger WET testing. Toxic effects observed in WET testing during the EQVR period were mostly attributable to osmotic stress. The licence holder reviewed the licence requirements for other marine outfalls in the Pilbara Region and noted WET testing was not required under the licences. The licence holder considers the requirement to undertake WET testing on an ongoing basis should be reviewed in the future.</p> <p>The licence holder also suggested more flexibility be built into the species specified for WET testing to account for times when it is difficult to obtain specific species within the 30 day timeframe specified for undertaking WET Testing.</p>	<p>The intent of the approach in the licence conditions was to manage the discharge using the results of the wastewater monitoring to ensure the EQC in Table 13 were never breached, and the surrounding environmental quality objectives and levels of ecological protection were always met. While the approach is conservative it ensures the EQC will be achieved, assuming the expected dilutions of 1:140 (LEPA/MEPA) and 1:700 (MEPA/HEPA) are sufficient and are achieved. The Delegated Officer considered the licence holder's proposed approach to limit exceedances and WET testing and determined it appropriate to amend the requirements such that WET Testing is only required in the event resampling after an exceedance of the wastewater discharge limits, also results in an exceedance of the same parameter. Given metals are generally low, nutrients (except ammonia) not generally toxic, and toxic effects were mainly attributable to osmotic stress it is likely that worst case scenario effluent is effluent with elevated TRH, chlorine and TDS</p> <p>Given the objective of WET testing is to get a measure of actual toxicity of the combined wastewater in combination with the water it is being discharged into, and the quality of receiving waters can be variable depending on location (historical pollution, other discharges, etc) the use of laboratory supplied dilution water is not appropriate and the requirement to use sea water from a reference site was maintained. The Delegated Officer considers that given the triennial frequency of the monitoring requirement, other than in the event of a discharge limit exceedance, there will be ample time and opportunity to plan for collection of sea water from a reference site for dilution water for the testing.</p> <p>The Delegated Officer considers that adequate flexibility has been included in the species listed for WET testing The species specified are based on those listed in the POFWWDP and which WET testing was conducted for the Effluent Quality Validation Report. Three alternative fish species are specified in the licence and the remaining species are expected to be relatively available. Based on this and the licence holder not providing details of any suitable alternative species, no additional species were included.</p> <p>The Delegated Officer noted the licence holder's reference to monitoring requirements for other marine outfalls however advises that direct comparison of Part V licence requirements is not appropriate as risk assessment must take into account the regulatory framework relevant to the outfall and the sensitivity of the receiving environment and these differ for each individual scenario. It is inappropriate to expect alignment with other instruments as they are not directly comparable (different discharges and receiving environments) and may not specify all monitoring requirements where these are already regulated under the requirements of Part IV of the EP Act approvals.</p>

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		<p>It is not possible to account for potential scenarios in the licence conditions as conditions must be certain and final in accordance with the <i>Guidance Statement: Setting conditions</i>. If the licence holder considers a change is required to licence requirements as a result of WET testing outcomes then a licence amendment should be sought supported by sufficient evidence to support the requested change. It is however highlighted that WET testing is based on whole of effluent rather than single triggering parameters so other supporting evidence may be required if the licence holder seeks changes for particular parameters via licence amendment in the future.</p>
20 (Table 11)	<p>Requested clarification that the requirement to report and investigate two or more exceedances of reportable event criteria applies for the same parameter, rather than any parameter (i.e. two different parameters which exceed the criteria would not trigger reporting). Also suggested it is not appropriate to apply the reportable event criteria to parameters measured continuously as there may be times when temporary exceedances occur for a short duration before falling below the criteria and this would not represent the environmental risk for the parameters measured.</p>	<p>The Delegated Officer agreed that reporting and investigation requirements as included in the draft amended licence are not suitable for continuous monitoring. Noting that pH is the only parameter requiring continuous monitoring which has a reportable event criteria set (due to turbidity monitoring being changed to monthly), the reportable event criteria has been amended to apply to the daily average pH.</p> <p>The Delegated Officer also confirms that the reportable event criteria trigger of two exceedances in a 90 day period applies to the same parameter and has altered to condition wording to clarify this.</p>
22 (Table 15)	<p>The definition of suitably qualified scientist in Table 15 may be difficult to assess for assurance purposes and the licence holder suggests condition 22 should make reference to WET testing at a NATA accredited laboratory, rather than the qualifications of the person conducting the test. The licence holder noted the EPA's <i>Technical Guidance – Protecting the Quality of Western Australia's Marine Environment</i> recommends the use of NATA accredited laboratories in analysis of samples but does not specify requirements for the qualifications of the person conducting the analysis.</p> <p>Requested clarification whether the 90-calendar day timeframe is from completion of the Wet Test or from receiving the results and suggested part (b) could be incorporated into condition 24 to state the report needed to be provided to the CEO within 120 days of receiving WET test results.</p>	<p>The intent of the requirements was that the WET testing be undertaken by a NATA accredited laboratory but that the required reporting be undertaken by a suitably qualified scientist. The Delegated Officer has revised the requirements to make this clear. The condition has also been reworded to clarify the submission timeframe for the WET testing report is within 90-calendar days of undertaken WET testing.</p>
23 (d)	<p>CAPL will be better placed to identify management actions required post the review of WET test results (noting it is likely that plant operational conditions will need to be taken into consideration in any management actions). CAPL therefore suggests it would be more appropriate to incorporate condition 23(d) into condition 24.</p>	<p>The Delegated Officer agreed it was more appropriate for management actions to be proposed by the licence holder rather than an environmental consultant and has amended the conditions to include the requirements separately into condition 27.</p>

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25, Table 13	<p>Requested the ambient marine monitoring locations between the ecological protection area boundaries be removed such that monitoring locations are only specified at the LEPA/MEPA boundary, MEPA/HEPA boundary and 3 reference sites. Additionally requested that ambient marine monitoring frequency which is currently set as quarterly, and they had asked for it to be reduced to six monthly, but Marine Branch advised their preference for the ambient monitoring to continue to be undertaken on a quarterly basis to confirm that the environmental quality outcomes of MS 873 are being met on an on-going basis. Chevron has advised that the increasing busyness of the Ashburton Port (which is likely to increase further) impacts on the logistics of the marine sampling therefore there are limited windows when the monitoring can be undertaken. They are also concerned that with increased activity in the port other users could impact monitoring results. It is their preference that the ambient monitoring be conducted six monthly, once in each distinct season. They advised that it was identified in the Effluent Quality Validation report, that there are two distinct seasons (summer and winter) and they consider these to be representative of the two periods of the year where there will be a difference in oceanic conditions, therefore they consider only one monitoring event should be undertaken in each season.</p> <p>Requested footnote 2 be amended to any Western Australian Laboratory from any laboratory.</p>	<p>The Delegated Officer considered it appropriate to remove ambient monitoring locations between the ecological protection area boundaries as these were primarily required for the validation monitoring. Based on advice from the Marine Ecosystems branch, the Delegated Officer also considered it necessary to further define the monitoring locations at the ecological protection boundaries to include three monitoring locations in an arc along the boundary where the plume is expected to intercept based on the drogue deployment.</p> <p>The ambient marine monitoring program is intended to confirm EQO and EQC established under MS 873 are being met on an ongoing basis. The results of the ambient monitoring program provide the evidence required to give confidence that the outfall is being managed to meet regulator and the community expectations. It is expected that the licence holder will undertake sufficient period of monitoring at the specified frequency of quarterly to demonstrate this. Once sufficient evidence has been gathered over an extended period that the discharged is meeting EQO and EQC it would be appropriate for the licence holder to seek to amend the ambient monitoring frequency.</p> <p>Footnote 2 was amended to any Australian laboratory as it is expected that the licence holder considers the scope of monitoring services available Australia wide to address analysis requirements, not just Western Australia. Institutions such as CSIRO should be considered as an option as they may be able to achieve lower limits of reporting than other laboratories.</p>
Tables, 1, 2, 12 and 15 (and Table 6 of the amendment report)	<p>The licence holder advised of a number of editorial and administrative matters and typographical errors in the licence and the amendment report and requested clarification of some matters.</p>	<p>The licence and amendment report were updated to correct errors and make clarifications. Changes included:</p> <ul style="list-style-type: none"> • Removing the distance below the ocean surface and above the sea bed from the Table 2 discharge point height column (instead referenced in Table 1). • Use of symbol <> rather than 'not more than, not less than' for consistency in Table 11. • Updated table number references where incorrect. • Corrected species names in Table 12 • Clarified that condition 22 90-calendar day timeframe relates to • Corrected description of reference sites and foot note references in Table 13. • Corrected LEPA, MEPA and HEPA definitions. • To clarify 26(b)(ii) refers to all monitoring results, not just those relevant to the exceedance.