



## Application for Licence Amendment

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

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<b>Licence Number</b>	L6465/1989/10
<b>Licence Holder</b>	Alcoa of Australia Limited
<b>ACN</b>	004 879 298
<b>File Number</b>	DWERVT15844
<b>Premises</b>	Willowdale Mine Part of Mineral Lease 1SA  Willowdale Rd (via Wagerup Refinery Access Rd) WAROONA WA 6215  As defined by the maps in Schedule 1
<b>Date of Report</b>	28 October 2024
<b>Decision</b>	Revised licence granted

**MANAGER, RESOURCES INDUSTRIES  
INDUSTRY REGULATION (STATEWIDE DELIVERY)**

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

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## 1. Decision summary

The Delegated Officer has determined to make amendments to Licence L6465/1989/10. With exception to one amendment (discussed in section 2.2.2) all other proposed amendments are administrative in nature therefore they do not alter the risk profile of the Premises, providing that activities, emissions and receptors as stated in existing approvals remain unchanged.

This Amendment Report documents the amendments made pursuant to section 59 and 59(B) of the *Environmental Protection Act 1986* (EP Act).

The decision report for the existing licence will remain on the department's website for future reference and will act as a record of the department's decision making.

## 2. Scope of assessment

### 2.1 Regulatory framework

In completing the assessment documented in this Amendment Report, the 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

Licence L6465/1989/10 is held by Alcoa of Australia Limited (licence holder) for the Willowdale Mine (the Premises), located on Part of Mineral Lease 1SA at Willowdale Rd (via Wagerup Refinery Access Rd) Waroona, Western Australia.

On 11 June 2024, the licence holder submitted an application to the department to amend Licence L6465/1989/10 under section 59B of the EP Act. The amendments requested are outlined below:

- Amendment to remove the approved oil/water separator (OWS) at Arundel workshop from the licence as it's no longer required;
- Amendment to allow the construction of proposed pipelines underground in culverts where vehicle access is required;
- Change in liner permeability construction requirements from  $2.27 \times 10^{-17}$  m/s to  $1 \times 10^{-9}$  m/s for the Anpress Pre-treatment sumps;
- McKnoes Brook water level monitoring to now measure "relevant parameters" instead of water levels only and for the monitoring location to be situated downstream of the discharge point instead of upstream;
- A change in operation of the Orion Sumps by removing the freeboard requirements for sumps OS1 and OS2;
- Removal of the requirement for National Accredited Testing Associated (NATA) accredited analysis of Perfluoro-1-octanesulfonamidoacetic acid (FOSAA) at laboratories;
- Amendment to allow monitoring samples not to be taken in the absence of wastewater or water; and
- An amendment to include a new licence condition to allow minor changes to the infrastructure where it does not materially change or affect the infrastructure or the change does not increase risks to public health, public amenity or the environment (section 2.2.6).

### 2.2.1 Oil / Water separator and concrete waste holding pit

The licence holder identified that the OWS that was originally proposed to be installed at the Arundel Workshop is no longer required and has requested it to be removed from the Licence. The licence holder still plans to construct the concrete waste holding pit originally approved, to capture potential hydrocarbon contaminated flows from the Arundel Workshop. The waste within the concrete holding pit will be collected by a vacuum truck and transported to Arundel Pre-Treatment Sump 1 (ASP1), Arundel Pre-Treatment Sump 2 (ASP2) or Arundel Pre-Treatment Sump 3 (ASP3) for storage (Figure 1). The untreated wastewater will be directed to the Anpress Treatment Unit which operates a dissolved air floatation (DAF) process to remove hydrocarbons. The treated wastewater is then transported to the Per- and polyfluoroalkyl substances (PFAS) treatment unit (PTU) for final treatment. Water is then discharged to Arundel Treated water Ponds 1, 2 and 3 (ATWP-001, ATWP-002 and ATWP-003) (Figure ).

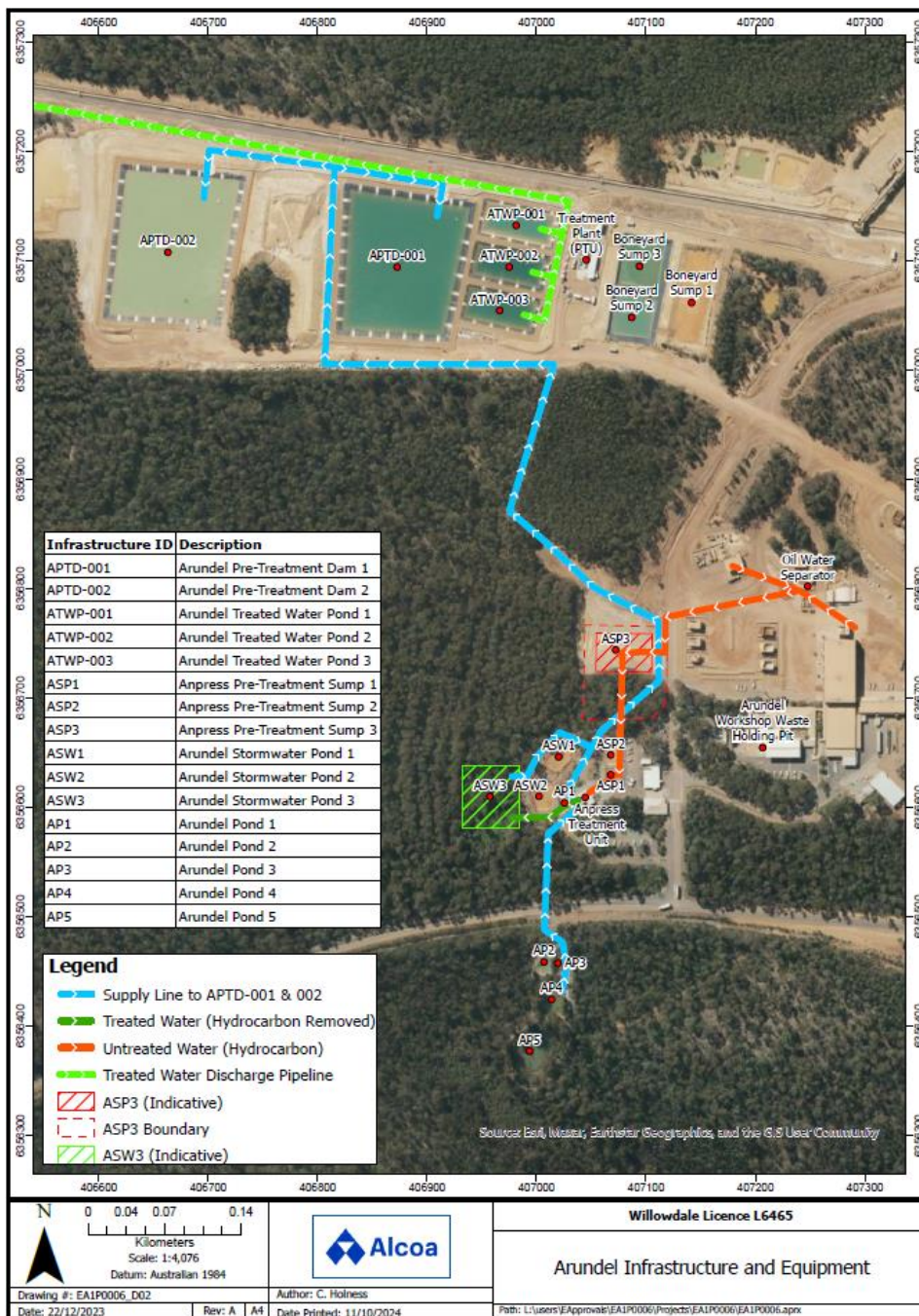


Figure 1: Arundel infrastructure and equipment

## Departments decision on Oil / Water separator

The removal of the OWS alters the original risk assessment and this request has therefore been risk assessed, see section 3.2.

### 2.2.2 Operation of Orion Sumps

The licence holder has requested to remove the freeboard requirement for Orion Sump 1 (OS1) and Orion Sump 2 (OS2) required by condition 12 of the licence. The Orion sumps collect stormwater generated from within the Orion facility (Figure ). The licence holder has indicated that OS1 and OS2 having a relatively small volume capacity and were designed to overflow in sequence to Orion Sump 3 (OS3). The total volume of the series of sumps is equal to the capacity required to contain water from the input catchment. The ability to manage freeboard within OS1 and OS2 below the design capacity is limited during rain events, as the rate of surface water inflow during these events fills the sumps in a very short timeframe.

The freeboard requirement of 30% capacity was included into the Licence as a result of an Environmental Prevention Notice (EPN) under section 73A *Environmental Protection Act 1986* (WA). The notice was issued to the licence holder on 5 May 2023 on the grounds that a condition of pollution is likely to arise or has arisen. The department identified PFAS concentrations within OS3 exceeded specified environmental guidelines in March 2023 and assessed that there were potential risks of PFAS entering the environment via overtopping of water within infrastructure. The 30% capacity freeboard was implemented for any water storage infrastructure within the Premises that holds PFAS contaminated wastewater above the *PFAS NEMP (2020) – ANZG Guidelines for Fresh and Marine Water Quality 99% species protection for freshwater with exception to Orion Sump 3 (OS3)*. The EPN specifically required OS3 to have a freeboard of 50% capacity. The latest analysed water sample retrieved from OS3 is presented in Table 1 and is compared with relevant assessment criteria.

**Table 1: Orion Sump 3 water compared against relevant assessment criteria**

	Units	<sup>1</sup> Freshwater 99% species protection	<sup>2</sup> Drinking water quality	<sup>3</sup> Recreational water quality	Orion Sump 3
					Sampled:11/06/2024
PFOS	µg/L	0.00023	NL	NL	<b>0.0006</b>
PFOA	µg/L	19	0.56	10	0.0008
PFOS+PFHxS	µg/L	NL	0.07	2	0.0011

<sup>1</sup> NEMP 2020, high conservation value systems

<sup>2</sup> Department of Health (DoH) 2019

<sup>3</sup> National Health and Medical Research Council (NHMRC) 2019

There is no recent monitoring data for water quality within OS1 and OS2. It has been assumed however that water quality within OS1 and OS2 is similar to water quality within OS3 and that the water within the sumps may contain low levels of PFAS.

It is understood that the only discharge to the sumps is limited to stormwater runoff generated from within the nearby Orion operating area as presented in Figure . Current operations to maintain the required freeboard in all three sumps involves the pumping of water into trucks when required and then transported under the *Environmental Protection (Controlled Waste) Regulations 2004* (Controlled Waste Regulations) to an offsite facility licensed to accept the waste for treatment. It is noted that once the PFAS Treatment Unit (PTU) at Arundel has been constructed under condition 1 of Licence L6465/1989/10 and commissioned under condition 4, the operation will change with wastewater being transported to Arundel Pre-treatment Dams APTD-001 and APRD-002 via public roads using licensed controlled waste carriers under the

Controlled Waste Regulations.

The licence holder has indicated that the sumps were and are designed to be operated in sequence where water overflow is transported via gravity through buried pipelines from OS1 to OS2 to OS3 (Figure ). The OS1 to OS2 overflow pipeline connection comprises of five 83.6 m underground pipelines each with a diameter of 600 mm. The OS2 to OS3 overflow pipeline connection involves a separate pipeline for operation during low flow conditions and another two pipelines for high flow conditions. Maintaining the 30% freeboard within OS1 and OS2 results in the ponds not being able to function properly as designed as it prevents water levels within the ponds reaching the overflow pipes. A summary of the pipelines is presented in Table 2 and the layout and cross sections are presented in Figure .

The licence holder has provided the department with conservative calculated surface runoff rates entering the Orion Sumps from the surrounding catchment (Figure ) during a 72-hour one in 100-year rainfall event. A summary of the calculated surface water flow rates is presented in Table 3.

**Table 2: Orion Sumps pipelines specifications**

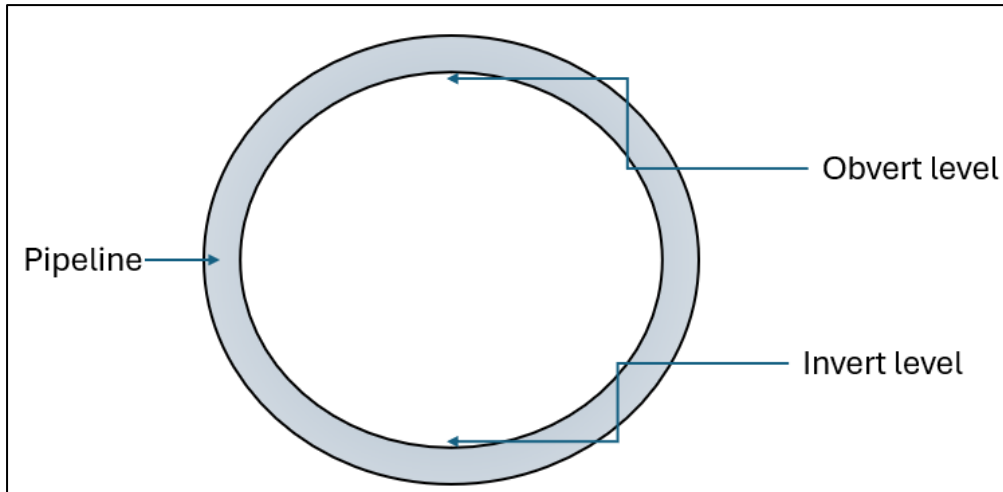
	OS1 to OS2	OS2 to OS3	
		Low flow conditions	High flow conditions
<b>Number of pipelines</b>	5	1	2
<b>Nominal diameter</b>	600 mm	150 mm	150 mm
<b>Pipe invert level</b>	303.5 mRL	301.0 mRL	302.5 mRL
<b>Top of sump</b>	304.3 mRL	303.0 mRL	303.0 mRL
<b>Distance from <sup>2</sup>invert level to top of sump</b>	0.8 m	2.0 m	0.5 m
<b>Distance from <sup>2</sup>obvert level to top of sump</b>	0.2 m	1.85 m	0.35 m
<b>Max transfer rate</b>	11.066 Mega litres per hour (ML/h)	0.185 ML/h	0.35 <sup>1</sup> ML/h

<sup>1</sup>Under high flow conditions transfer from OS2 to OS3 occurs via both the one 150 mm pipeline (0.185 ML/h) and the two 150 mm HDPE pipelines (0.165 ML/h). The low flow pipeline is able to achieve greater flows than the two high flow pipelines due to water pressure and angle of the pipeline.

<sup>2</sup>Invert and obvert levels are presented in Figure .

**Table 3: Calculated surface water flow rates**

Duration	Rainfall event	Total volume	Rate of runoff
72-hour	223 mm	20.2 ML	0.28 ML/h



**Figure 2: Figure detailing pipeline invert and obvert.**

### **Departments decision on the removal of freeboard in Orion Sumps 1 and 2**

This has been risk assessed, please see section 3.2.

#### **2.2.3 Streamflow monitoring within McKnoes Brook**

Condition 1 of the licence requires the licence holder to install a water level monitoring device within McKnoes Brook to measure daily water levels upstream of the McKnoes Brook discharge point prior to discharge occurring to the brook. This requirement was added to the licence in February 2024 during a licence amendment which authorised the licence holder to discharge treated water from the PTU to the McKnoes Brook. Condition 1 also required the licence holder to consult with the department's environmental water planning and regional hydrologists regarding the technical aspects of the monitoring device and its installation.

The licence holder has requested to amend the Licence to allow the McKnoes Brooke water level monitoring device to be installed downstream of the McKnoes Brook discharge point (Figure 6) instead of the original required upstream location (Figure ). The requirement for the monitor to be installed upstream of the discharge point was to obtain an accurate flow reading within the brook that is unaffected by the treated water discharge. After consulting with the department's regional hydrogeologists, the licence holder is proposing a new location for the device that is downstream of the discharge point in a culvert located under the conveyor.

The installation of the monitoring device within the culvert is better situated as the diameter of the culvert and fall/slope are fixed known variables allowing a more accurate calculation of streamflow. If the monitoring device is located on a sandy colluvium sediment, there is a potential for the brook in the vicinity of the monitoring device to change shape impacting the accuracy of calculating stream flow due to the change in widths and depths of the brook. Upstream of the discharge point there is no suitable location where changes to the shape etc. of the brook won't occur, making calculation of streamflow less accurate.

Data will be manually downloaded, and average daily streamflow will be calculated. As the monitoring location is downstream of the emission point, to discount the influence of treated water discharges, the discharge volume will be subtracted from the calculated streamflow.

### **Departments decision on streamflow monitoring location amendment**

The departments regional hydrologists were consulted to provide guidance with the assessment and determination of the proposed location and are supportive of the downstream monitoring location and proposed methodology to calculate streamflow. As a result, the licence has been amended to approve the new location of the water level monitor.

Additional changes have been made to conditions based on advice from the department's regional hydrologists relating to additional requirements to ensure the installation and operation of the device complies with the Water Monitoring Standardisation Technical Committee (WMSTC), National Industry Guidelines for hydrometric monitoring: Part 1 (WMSTC 2019a) and Part 3 (WMSTC 2019b). It was also recommended that quality assurance testing is to be carried out on the monitoring device in accordance with WMSTC, hydrometric monitoring guidelines National Industry Guidelines for hydrometric monitoring: Part 6 (WMSTC 2019c) which includes discrete discharge methods to determine the accuracy of the monitoring device. The requirement for the licence holder to consult with the departments South-West regional hydrologist has been removed from condition 1, table 1 as consultation has occurred and the locations and installation methodology has been agreed upon by the licence holder and the departments hydrologists.

The licence holder has communicated to the department that to facilitate imminent commissioning of the Arundel PFAS treatment unit, a water level monitoring device has already been installed upstream of the discharge point, in accordance with the existing conditions of the licence dated 20 February 2024. A compliance document for this work was submitted on 24 October 2024. The compliance document did not address the requirements of the relevant WMSTC guidance documents for the downstream location as these were not prescribed as installation requirements in the licence dated 20 February 2024. Following relocation of the water level monitoring device downstream of the emission point (once this amendment has been granted), a secondary compliance document will be submitted prior to decommissioning of the upstream water level monitoring device. The requirement for an upstream monitoring device will therefore remain on the licence as part of this amendment.

It is noted that the licence holder has requested to amend the frequency of water level monitoring from continuous to 60-minute intervals. The departments hydrologists have recommended that the frequency remains continuous.

#### **2.2.4 Removal of NATA accredited analysis for FOSAA**

Condition 20 Table 10 in Licence L6465/1989/10 requires the licence holder to undertake monitoring for a variety of chemical and physical parameters prior to the water being discharged at the McKnoes Brook. Monitoring requirements includes a suite of PFAS analytes that requires NATA accredited analysis as specified in condition 21.

It was identified by the licence holder that there are only two laboratories within Australia that have NATA accreditation for FOSAA analysis which are located in Newcastle and Tasmania. Due to the time it takes to transport samples to Newcastle or Tasmania there is a potential for the extended transport time to impede the licence holders ability to discharge the batches of treated water in a timely manner in order to maintain the operating freeboard requirements at Arundel Treated Water Dams 1, 2 and 3 listed within condition 12.

The licence holder has requested that the requirement for a NATA accredited analysis for FOSSA be removed from the licence and non-NATA laboratory analysis for FOSSA be required instead.

#### **Departments decision on the removal for NATA accredited analysis for FOSAA**

This request was reviewed by the department's technical experts, and it has been determined that this request is acceptable. The department has included a note beneath table 10 to allow FOSAA to be determined through non-NATA accredited analysis for water samples collected at Arundel Treated Water Dams 1 to 3.



## 2.2.5 Other amendments

### Underground Pipelines

The licence holder has requested an administrative amendment for condition 1 to allow pipelines carrying PFAS or hydrocarbon contaminated water to be authorised to be constructed underground within culverts under roads or where vehicle access is required. In most cases pipelines will be installed above ground.

The department has reviewed the proposed amendment and has determined that there is no additional risk associated with the proposed change to allow the pipeline to be within culverts to grant access for vehicles to areas where required. Amendments have been made to condition 1. The licence holder's requested amendment by addition the words 'where practicable' is unenforceable and therefore more prescriptive wording has been adopted.

### Wording changes to Tables 12, 16 and 17

To avoid any potential administrative non-compliances the licence holder has requested a minor change to wording within tables 12, 16 and 17 to allow no sampling/monitoring of water / wastewater to be required when water is not present, or the brook is not flowing. The department has granted the amendment and has added a note in the Tables 12, 16 and 17 to not require the licence holder to sample water when wastewater/water is not present or flowing.

### Liner Permeability

The licence holder has requested to amend the construction requirements of the Anpress Pre-treatment sumps liner from  $2.27 \times 10^{-17}$  m/s to  $1 \times 10^{-9}$  m/s permeability.

The departments standard liner permeability requirement to manage seepage is  $1 \times 10^{-9}$  m/s and deems this suitable and an effective control to prevent emissions to potential receptors via seepage within sumps and ponds. The permeability requirement of  $1 \times 10^{-9}$  m/s is repeated throughout all other construction requirements within the Licence and for consistency purposes the department has granted the request to change the permeability requirement from  $2.27 \times 10^{-17}$  m/s to  $1 \times 10^{-9}$  m/s.

## 2.2.6 Proposed new condition

The licence holder has requested to include a new licence condition to allow minor changes to the construction/installation requirements listed in condition 1 table 1 where changes are minor in nature and don't materially change or affect the infrastructure, or where the departure improves the functionality and does not increase risks to public health, public amenity or the environment.

### Decision

It is noted that the proposed licence condition was once used in licences granted and amended by the department. Recent legal advice recommended that this type of condition should no longer be added to licences. As a result, this condition was removed from the department's approved list of standard conditions. This request has therefore not been approved.

If minor deviations are expected to occur that differs from those presented in condition 1 of Licence L6465/1989/10 the department recommends the licence holder to submit a Licence Amendment to update condition wording prior to construction commencing.

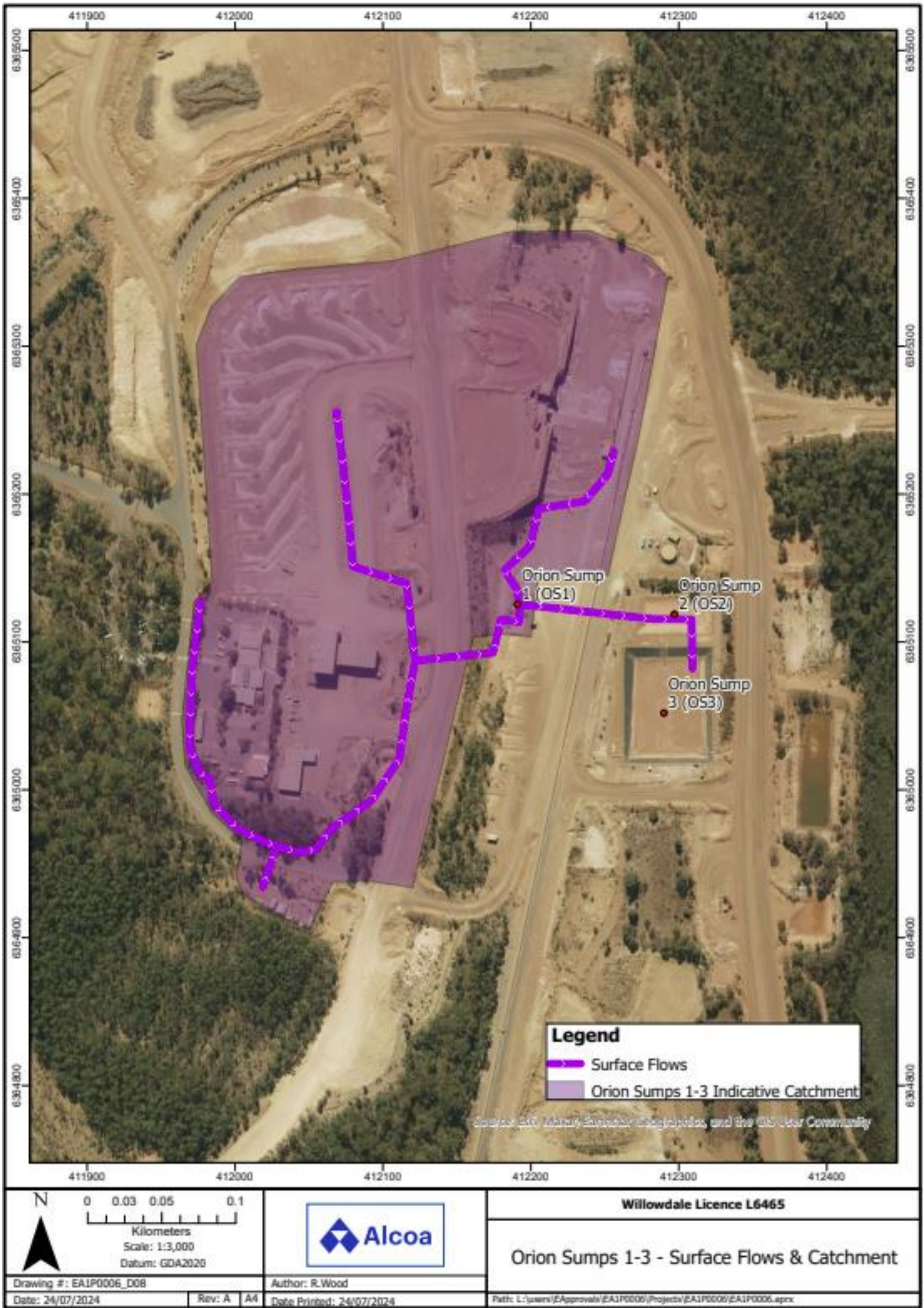


Figure 3: Orion Sumps Flow and Catchment

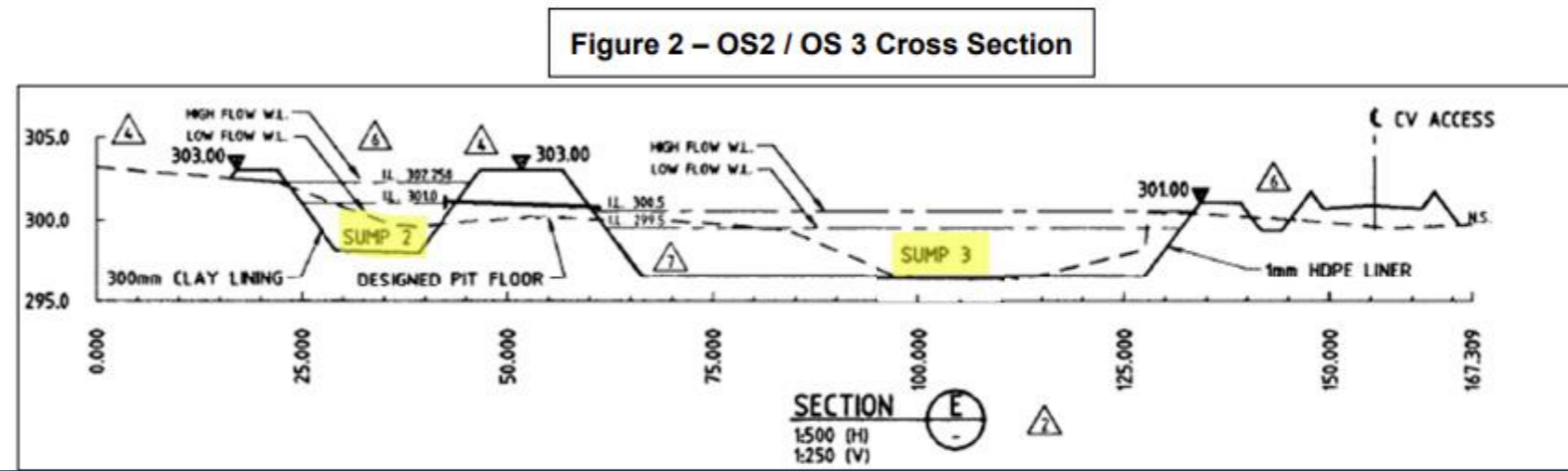
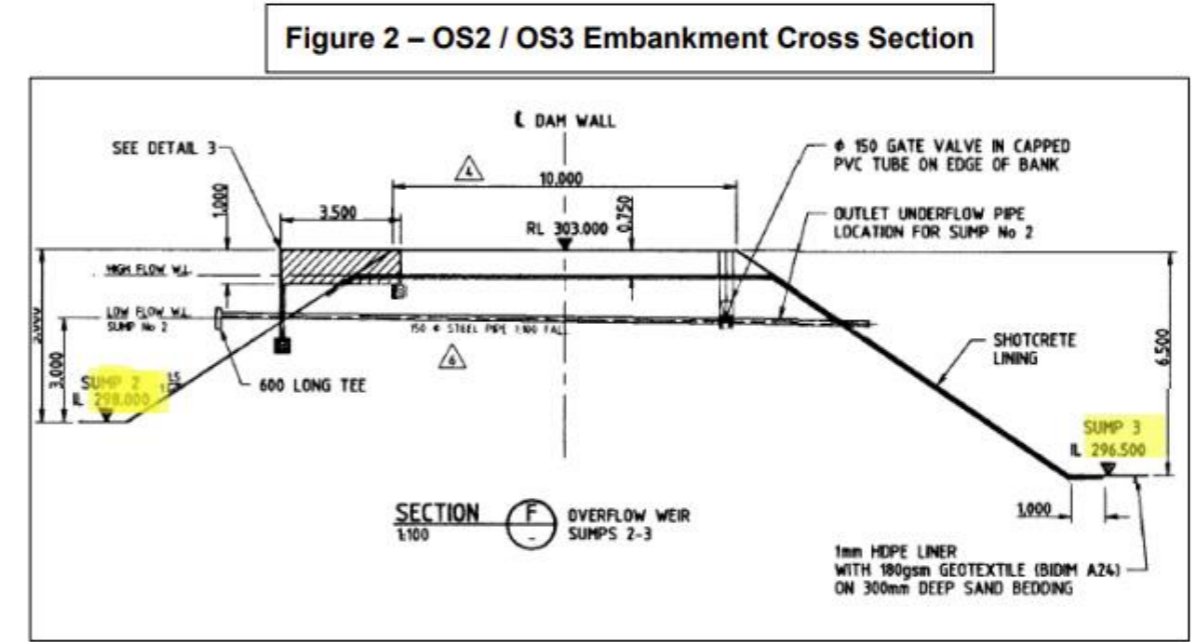
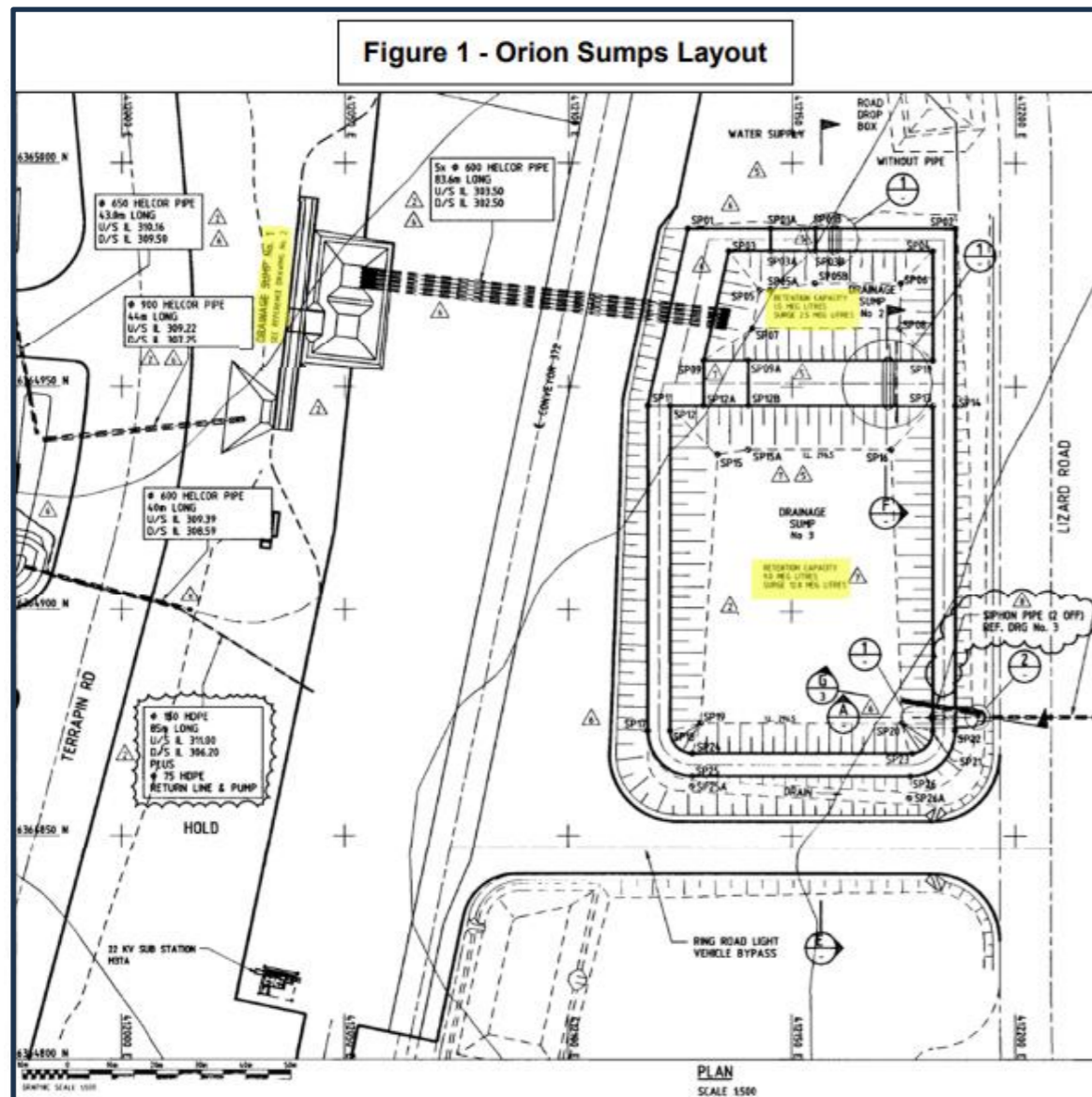


Figure 4: Orion Sumps layout

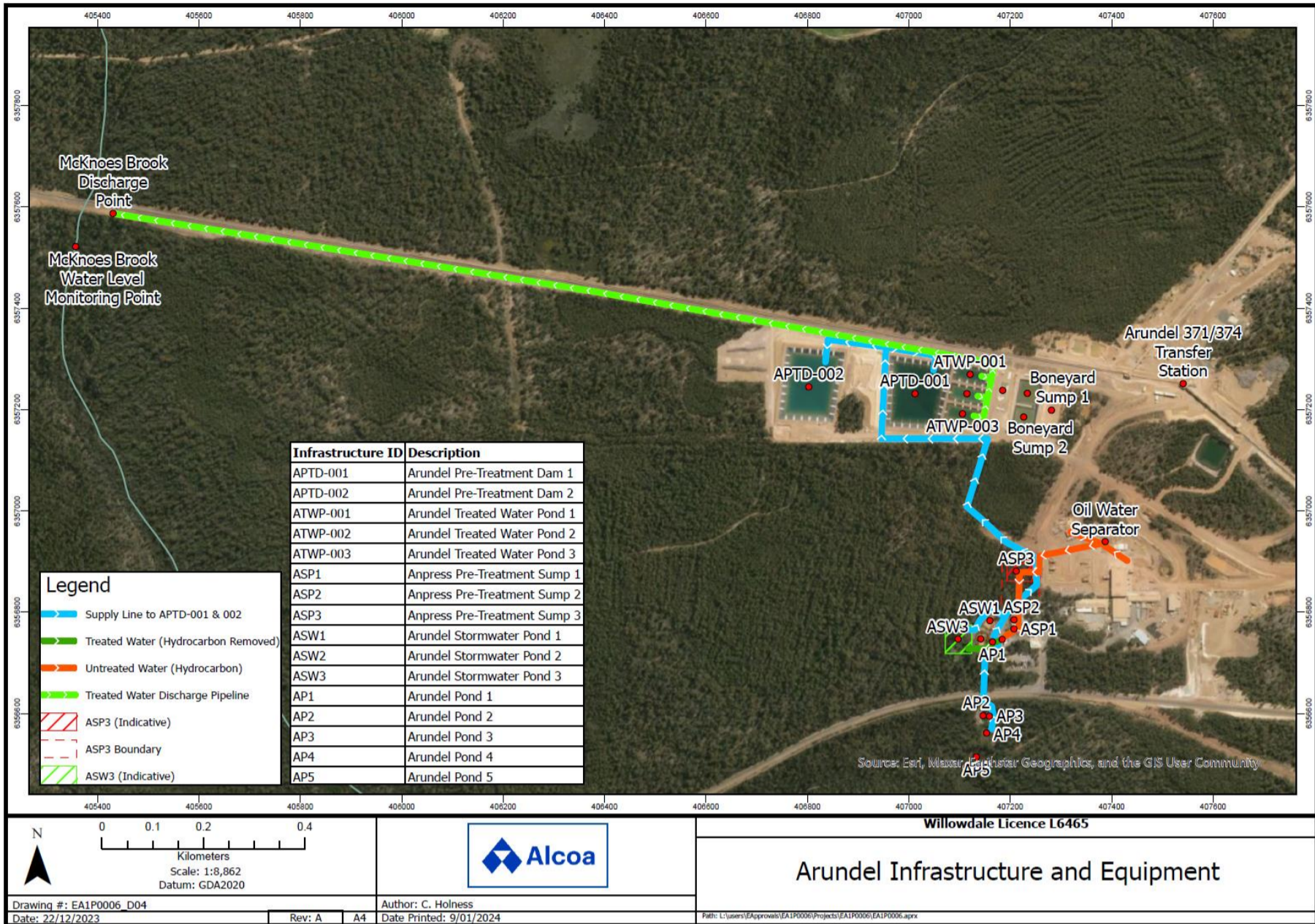


Figure 5: Previous location of McKnoes Brooks Water Level Monitoring Point

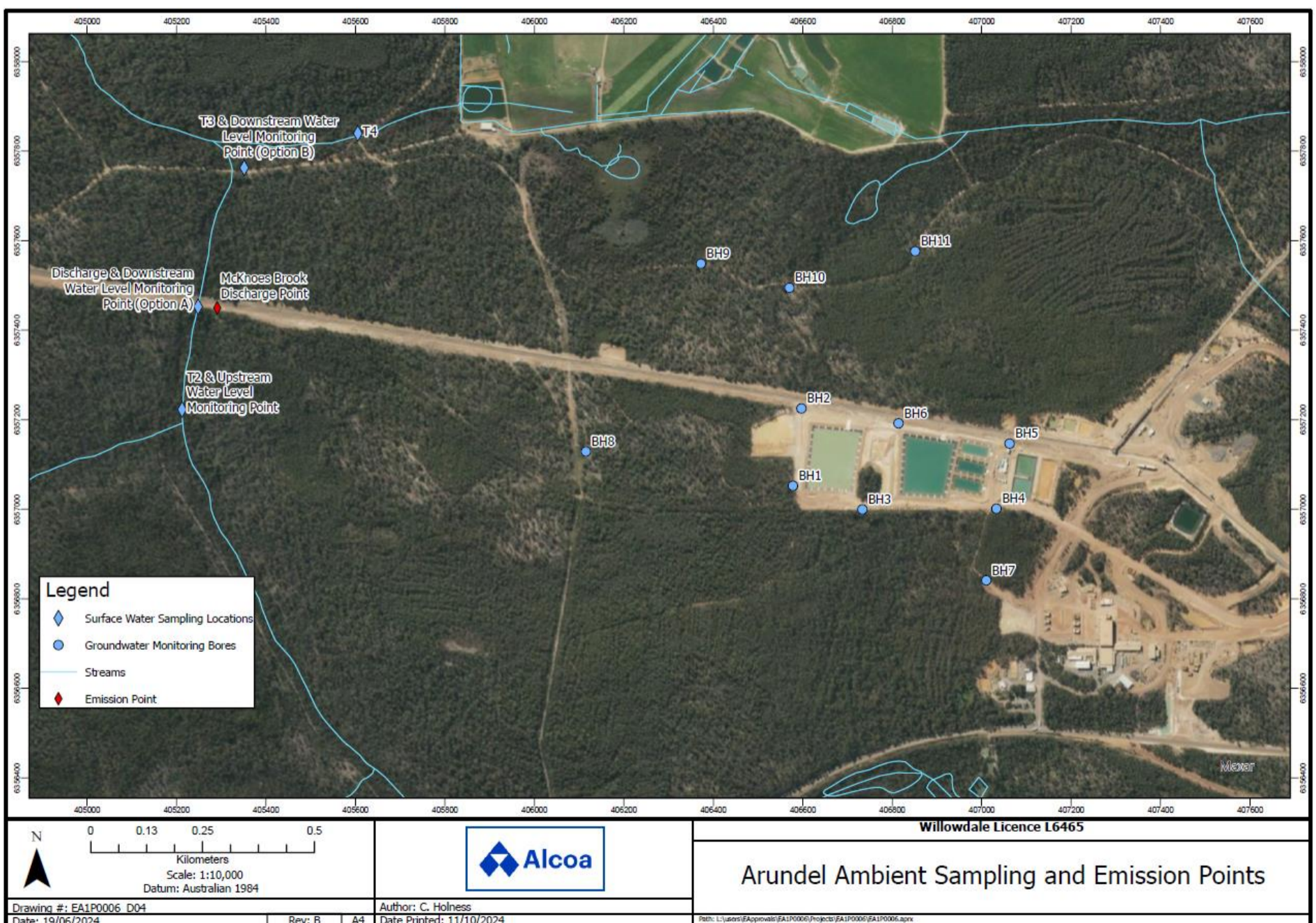


Figure 6: Proposed location of McKnoes Brooks Water Level Monitoring Point

### 3. Risk assessment

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

To establish a Risk Event there must be an emission, a receptor which may be exposed to that emission through an identified actual or likely pathway, and a potential adverse effect to the receptor from exposure to that emission. The department considers the proposed amendments do not result in a change of operation or risk that has previously been assessed with exception to the change in operation of the Orion Sumps (removal of freeboard in OS1 and OS2).

#### 3.1 Source-pathways and receptors

##### 3.1.1 Emissions and controls

The key emissions and associated actual or likely pathway during premises operation which have been considered in this Amendment Report are detailed in Table 4 below. Table 4 also details the proposed 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
Water containing PFAS	Orion Sumps	Overtopping of OS1 and/or OS2.	<ul style="list-style-type: none"> <li>• Pipeline infrastructure designed to overflow in sequence to OS3;</li> <li>• OS1 and OS2 to be operated in a series to ensure all overflows are contained within OS3; and</li> <li>• Condition 13 of the licence requires the licence holder to inspect dams and sumps at Orion daily.</li> </ul>
		Leaks or spills from underground pipelines interconnecting the Orion sumps.	<ul style="list-style-type: none"> <li>• Condition 13 of the licence requires the licence holder to inspect dams and sumps at Orion daily.</li> </ul>
Hydrocarbon impacted wastewater	Arundel Workshop	Loss of containment from Anpress Pre-Treatment Sumps (ASPs) from overtopping or leaks.	<ul style="list-style-type: none"> <li>• Condition 1 of the licence requires Anpress Pre-Treatment Sumps 2 and 3 (ASP2 and ASP3) to: <ul style="list-style-type: none"> <li>○ Have a storage capacity up to 280 kL and 1.5 ML (respectively);</li> <li>○ Be lined to meet a maximum permeability of <math>1 \times 10^{-9}</math> m/s; and</li> <li>○ Have a minimum design freeboard 1 m (sufficient to cater for a 1:100 year annual exceedance probability 72 hour rainfall event).</li> </ul> </li> </ul>

### 3.1.2 Receptors

In accordance with the *Guideline: Risk assessments* (DWER 2020), the Delegated Officer has excluded employees, visitors and contractors of the licence holder's 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 potential human and environmental receptors that may be impacted as a result of activities upon or emission and discharges from the prescribed premises (*Guideline: Environmental siting* (DWER 2020)).

**Table 5: Sensitive human and environmental receptors and distance from prescribed activity**

Human receptors	Distance from prescribed activity
Nearby human receptors	None within 2km of the Orion sumps. Screened out.
Environmental receptors	Distance from prescribed activity
Public Drinking Water Source Area (PDWSA) Samson Brook Reservoir and surrounding Priority 1 PDWSA with creeks feeding into the reservoir.	Samson Brook Reservoir is a reservoir that contributes to the metropolitan drinking water supply. The premises and the Orion Sumps are situated within the PDWSA.
State forest and native vegetation	State forest is present as the underlying land tenure within the State Agreement area that Alcoa operates within. The closest native vegetation is approximately <b>80 m</b> east of OS2 and approximately <b>20 m</b> from the Anpress pre-treatment sumps.
Minor ephemeral watercourse	Minor ephemeral watercourse that flows from north to south towards Lake Kabbamup (approximately 3.1 km south-east of the sumps). The ephemeral watercourse is located approximately <b>400 m</b> south-east of OS2.
Groundwater	Depth to groundwater at the Arundel area (approximately 2.5 km from the Orion Sumps) ranges from <b>14 - 18 mbgl</b> .

### 3.2 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 3.1. Where linkages are in-complete they have not been considered further in the risk assessment.

Where the licence holder has proposed mitigation measures/controls (as detailed in section 3.1), these have been considered when determining the final risk rating. Where the Delegated Officer considers the 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 Revised Licence L6465/1989/10 that accompanies this Amendment Report authorises emissions associated with the operation of the Premises.

The conditions in the Revised Licence have been determined in accordance with *Guidance Statement: Setting Conditions* (DER 201

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

Risk Event					Risk rating <sup>1</sup> C = consequence L = likelihood	Licence holder's controls sufficient?	Conditions <sup>2</sup> of licence	Comments or justification for additional regulatory controls
Source/Activities	Potential emission	Potential pathways and impact	Receptors	Licence holder's controls				
<b>Operation</b>								
Operation of Orion Sump 1 (OS1) and Orion Sump 2 (OS2) without a freeboard.	PFAS /hydrocarbon contaminated water	<p><b>Potential Pathway</b></p> <p>Overtopping of sumps through malfunction of pipeline/s resulting in a discharge of contaminated water to either the immediate vicinity or transported via preferential pathways.</p> <p><b>Potential Impact</b></p> <ul style="list-style-type: none"> <li>• Degradation to environmental values;</li> <li>• Bioaccumulation in the environment; and</li> <li>• Human health impacts</li> </ul>	<ul style="list-style-type: none"> <li>• PDWSA</li> <li>• Minor ephemeral watercourse (<b>400 m</b>)</li> <li>• State forest and native vegetation (<b>80 m</b>)</li> </ul>	Refer to section 3.1.1	C = Major L = Rare <b>Medium Risk</b>	Y	<p><b>Condition 12: Requires the licence holder to ensure OS1 and OS2 are maintained and operated to ensure all overflows are contained within OS3.</b></p> <p>Existing condition 13: Requires the Licence Holder to inspect OS1 and OS2 daily.</p> <p>Existing condition 14: Requires the Licence Holder to as soon as practical recover PFAS-contaminated water either inside or outside containment infrastructure.</p>	<p>It is acknowledged that the sumps have been designed to overflow into each other and that the current licence conditions (freeboard of 30%) prevent the proper functioning of the sumps. It is also acknowledged that the capacity of the sump system to contain rainfall and stormwater runoff from the catchment area is significantly reduced due to the application of the 30% freeboard.</p> <p>The 30% freeboard was applied to OS1 &amp; OS2 as the sumps may contain low level PFAS and hydrocarbon contaminated wastewater which has the potential to be discharged into the environment (a PDWSA) if the sumps were to overtop. The freeboard was also applied to remain consistent with the prevention notice.</p> <p>As the sumps are located in a PDWSA the impact from overtopping of these ponds could result in the release of PFAS, heavy metals and hydrocarbons to soils and / or surface water, causing contamination of soils, surface water and groundwater and therefore, potential adverse impacts to human health, flora, fauna and ecological communities.</p>
		<p><b>Potential Pathway</b></p> <p>Discharge to land from rupture/leak of underground pipeline.</p> <p><b>Potential Impacts</b></p> <ul style="list-style-type: none"> <li>• Degradation to environmental values; and</li> <li>• Bioaccumulation in the environmental.</li> </ul>	<ul style="list-style-type: none"> <li>• PDWSA</li> <li>• Groundwater (<b>~14-18 mbgl</b>)</li> </ul>	Refer to section 3.1.1	C = Moderate L = Rare <b>Medium Risk</b>	Y	<p><b>Condition 12: Requires the Licence Holder to ensure OS1 and OS2 are maintained and operated to ensure all overflows are contained within OS3.</b></p> <p>Existing condition 13: Requires the Licence Holder to inspect OS1 and OS2 daily</p>	<p>The most significant risk event would be from release of PFAS compounds, which are persistent, bioaccumulative, toxic, and have potential to travel long distances once released into the environment. The high solubility of many PFAS compounds in water means that PFAS may readily leach from soils and sediments into surface water and groundwater, where they can enter creeks, rivers and lakes, and become part of the food chain, being transferred from organism to organism as they accumulate, posing a risk of causing adverse effects to human health and the environment, even at low concentrations.</p> <p>It has been determined that the freeboard requirement from OS1 and OS2 can be removed, to allow the ponds to operate as designed. The removal of the freeboard has been granted due to a number of factors including the max transfer rate during high flow conditions (Table 2) exceeding the conservative rate of runoff during a 72-hour 1:100 rainfall event (Table 3). The requirement for a freeboard has been replaced with a condition which requires 'OS1 and OS2 to be maintained and operated in series to ensure overtopping of the sump embankments does not occur and that all overflows (directed by underground pipes) are contained within OS3'. This condition is outcome based and gives the licence holder flexibility in managing water levels within OS1 and OS2 while ensuring that overtopping does not occur.</p> <p>There is no change to OS3 and a minimum freeboard of 50% will still be maintained.</p>



Risk Event					Risk rating <sup>1</sup> C = consequence L = likelihood	Licence holder's controls sufficient?	Conditions <sup>2</sup> of licence	Comments or justification for additional regulatory controls
Source/Activities	Potential emission	Potential pathways and impact	Receptors	Licence holder's controls				
Increase of hydrocarbon concentration within wastewater discharged to the Anpress pre-treatment sumps (via Arundel Workshop underground concrete waste holding pit) caused by the removal of the proposed OWS	Hydrocarbon contaminated wastewater	<p><b>Potential Pathway</b></p> <p>Loss of containment from Anpress pre-treatment sumps from overtopping or leaks.</p> <p><b>Potential Impacts</b></p> <p>Contamination of groundwater and impacts to ecological health</p>	<ul style="list-style-type: none"> <li>State forest and native vegetation (<b>20 m</b>)</li> <li>Groundwater (<b>~14-18 mbgl</b>)</li> </ul>	Refer to section 3.1.1	C = Slight L = Unlikely <b>Low Risk</b>	Y	Condition 1: Design and construction requirements including capacity, liner and freeboard requirements.	<p>Due to the removal of the OWS from the Arundel Workshop there is expected to be higher concentrations of hydrocarbons discharged to the pre-treatment sumps.</p> <p>No additional regulatory controls have been imposed. The department considers the existing construction requirement and containment conditions within the licence adequately regulates this risk event.</p>

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

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

## 4. Consultation

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

**Table 7: Consultation**

Consultation method	Comments received	Department response
Licence holder was provided with draft amendment on 20 September 2024. Comments were provided on 11 October 2024.	Refer to Appendix 1	Refer to Appendix 1

## 5. 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.

### 5.1 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.	Proposed amendments
Front Page	Amended DWER file number.
Licence History	Provided summary of this licence amendment
1	Defined PFAS Treatment Unit.
	Removed the requirement to construct an oil / water separator at Arundel Workshop
	Added requirement to construct a 5,000 L underground concrete waste holding pit.
	Amended a construction requirement to pipelines from Arundel mining area to PTU, and from PTU to McKnoes Brook discharge point to allow the pipeline to be installed below ground in a culvert where roads or area that require vehicle access are required.
	Amended the liner permeability requirement for ASP2 and ASP3 from $2.27 \times 10^{-17}$ to $1 \times 10^{-9}$ m/s.
	<p><b>McKnoes Brook water level monitoring device</b></p> <ul style="list-style-type: none"> <li>Removed the requirement to monitoring instantaneous water levels from the McKnoes Brook water level monitoring device and replaced with the capacity to monitor "relevant parameters".</li> <li>Added the requirement to install the monitoring device from upstream of the discharge point to downstream of the discharge point. Retained the upstream device.</li> <li>Additional note to require the monitoring device to be installed under the WMSTC National</li> </ul>

Condition no.	Proposed amendments
	Industry Guidelines for hydrometric monitoring. <ul style="list-style-type: none"> <li>Changed the construction timeframe to “Prior to decommissioning of the installed upstream water level monitoring device as presented in Figure 10 and before June 2026”</li> </ul>
4	Added a requirement for the daily inspections of the PTU are logged and recorded. This amendment was made based on feedback received from the department’s Assurance team.
5	Added acronyms for Arundel treated water ponds and included a figure reference to the location of sample points. Spot sample changed to composite sample Note 3 added to define what composite sample means
11	Added a note to Table 5 to prevent the mixing of sludge to be mixed for the purpose of on-site disposal. This amendment was made based on feedback received from the department’s Assurance team.
12	<b>Orion Sumps 1, 2 and 3</b> <ul style="list-style-type: none"> <li>Removed the freeboard requirement of 30% sump capacity and including a requirement for all sump overflows to be contained within OS3.</li> <li>Added requirement for OS1 and OS2 to be maintained and operated so that overtopping of sump embankments does not occur and that overflow is contained within OS3.</li> </ul>
20	Added a note to allow non-NATA accredited analysis for FOSAA. Amended typographical error requiring oil and grease parameter to be sampled with USEPA method 5520B. Added acronyms for Arundel treated water ponds and included a figure reference to the location of sample points.
22	Added a requirement for quarterly monitoring to be undertaken at least 45 days apart.
23	Added a condition to require monitoring equipment to be operated and calibrated in accordance with the manufactures specifications.
25	Added acronyms for Orion wastewater sump No. 3 and Arundel wastewater sump No. 4. Provided full name for APTD-001 and APTD-002 sample locations. Added a note to not require monthly monitoring when there is no wastewater in sumps or damns.
26	Added acronyms for Arundel treated water ponds and included a figure reference to the location of sample points. Spot sample changed to composite sample Note 3 added to define what composite sample means
29	<b>Table 16</b> <ul style="list-style-type: none"> <li>Included a requirement for the logger to records at a maximum of 15-minute intervals.</li> <li>Added a note to not require quarterly monitoring due to no flow conditions.</li> </ul> <b>Table 17</b> <ul style="list-style-type: none"> <li>Added a note to not require monthly monitoring in the absence of sufficient water within the bores.</li> </ul>

Condition no.	Proposed amendments
34	Added a requirement to include evidence and results for quality assurance completed for the McKnoes Brook water level monitoring.
	Added a requirement to provide calibration certificates and calibration fieldsheets (if available).
	Included the requirement for the licence holder to include the volumes recorded both graphically and tabularly at the Mcknoes Brook monitoring point. and Provide evidence of quality assurance has occurred to confirm accuracy of the streamflow volumes derived from the McKnoes Brook streamflow monitoring device.
Definitions	Added additional definitions within the table.
Figures	Updated Figure 7 (Orion sumps).
	Updated Figure 8 (Arundel site layout and drainage plan)
	Updated Figure 9 (Arundel Infrastructure and equipment)
	Updated Figure 10 (Arundel Infrastructure and equipment).

## References

1. Department of Environment Regulation (DER) 2015, *Guidance Statement: Setting Conditions*, Perth, Western Australia.
2. Department of Water and Environmental Regulation (DWER) 2020, *Guideline: Environmental Siting*, Perth, Western Australia.
3. DWER 2020, *Guideline: Risk Assessments*, Perth, Western Australia.
4. PFAS National Environmental Management Plan (NEMP) Version 2.0. National Chemicals Working Group of the Heads of the EPAs Australia and New Zealand.
5. Water Monitoring Standardisation Technical Committee (WMSTC) 2019a National Industry Guidelines for hydrometric monitoring. Part 1: Primary Measured Data, NI GL 100.01-2019.
6. WMSTC 2019b National Industry Guidelines for hydrometric monitoring. Part 3: Instrument and Measurement Systems Management, NI GL 100.03-2019.
7. WMSTC 2019c National Industry Guidelines for hydrometric monitoring. Part 6: Stream Discharge Relationship Development and Maintenance, NI GL 100.06-2019.

## 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)	<p>The licence holder advised the department that the proposed upgrade for the OWS at Arundel workshop from 30 L/min to 100 L/min is no longer required and that the construction of the OWS is removed from the scope of works.</p> <p>The potentially hydrocarbon impacted wastewater generated from the Arundel workshop will be directed to the 5,000 L underground concrete water holding pit. The waste will be collected via a vacuum truck and transported to ASP1, ASP2 or ASP3 for storage prior to being directed to the Anpress Treatment Unit and PTU for treatment.</p> <p>The licence holder informed the department that the McKnoes Brook water level monitoring device was already installed as per the old requirements and the licence holder will submit the compliance document no later than 24 October 2024.</p> <p>The licence holder proposed a change to the timeframe for the Mcknoes Brook water level monitoring device to instead reach "Prior to decommissioning of the upstream water level monitoring device."</p> <p>Comments on a specified timeframe: it is anticipated the downstream water level monitoring device may be installed by Q2 2026 (i.e. 18 months from now).</p> <p>Site investigations are ongoing as to the most suited location. If a location can be identified which is able to be safely accessed by personnel, the water level monitoring device may be able to be installed sooner. However, if clearing of native vegetation is required to facilitate access, the need to undertake baseline surveys and obtain additional statutory approvals is likely to push the timeframe out to at least 18 months.</p>	<p>The department has removed the requirement to construct the OWS at the Arundel workshop. See risk assessment table.</p> <p>The department has granted this request and has added an additional requirement for the downstream McKnoes Brook water level monitoring device to be installed before a specified date. The inclusion of this timeframe is to prevent the upstream monitoring device to be permanently used to comply with monitoring requirements instead of the downstream monitoring device.</p> <p>The department has accepted the proposed timeframe outlined by the licence holder, noting that additional approvals may be required if clearing of vegetation is needed for access.</p>

Condition	Summary of licence holder's comment	Department's response
13 (Table 7)	<p>The licence holder requested to remove the department's inclusion of additional inspection requirements for OS1 and OS2 which requires an inspection of OS1 and OS2 immediately after a rainfall event to confirm that there is no risk of overtopping.</p> <p>Additional data was provided regarding the orion sump pipeline specifications and maximum transfer rate that can be achieved by the as-built infrastructure (data detailed in section 2 of this report). The maximum transfer rate of 11.066ML/h and 0.35ML/h achieved by the pipelines connecting OS1 to OS2 and OS2 to OS3, respectively, is sufficient to cater for a 1:100, 72-hour rainfall event which results in a runoff rate on 0.28ML/h. The likelihood of overtopping is considered rare/improbable and therefore the licence holder deems the after-rainfall event inspection as unnecessary.</p> <p>The licence holder has mentioned that if the inspection is still considered warranted that the proposed frequency of inspection is used: "Within 24 hours of a rainfall event (20 mm or more in the preceding 24-hour period), where it is safe to do so."</p>	<p>After considering the additional information provided by the licence holder regarding pipeline transfer rates etc the department has determined to remove the extra requirement for inspection to occur immediately after a rainfall event. Daily inspections are required regardless of rain (condition 13) and condition 14 requires OS1 and OS2 to be maintained and operated in a series to ensure overtopping of the embankment does not occur and that all overflows are contained within OS3. It has been determined that these regulatory controls are sufficient to manage this risk event.</p>
Table 13	<p>The licence holder has requested to change the wording of the averaging period in Table 13 from 'spot' sample to 'composite' sample.</p> <p>Justification provided:</p> <p>The PTU will operate 24 hrs a day, 7 days a week and will be predominantly unmanned. Water samples will be automatically collected at the unit discharge by an autosampler. A sample will be scheduled for every 0.5 ML of treated water to form a composite sample which will be sent for laboratory analysis. Water can be discharged from the treated water dams remotely following confirmation the discharge criteria have been met.</p> <p>As detailed within the PFAS Treatment Unit (PTU) Process Flow Diagram (Willowdale PFAS Treatment System licence Amendment Application – Attachment 8A) the autosampler will be located within the battery limits of the PTU and will collect a composite sample from the treated water pipeline prior to release to treated water ponds 1, 2 and 3.</p> <p>The installed autosampler is a higher specification than that described in the original licence submission and will continuously collect small volumes from the treated water pipeline to form a composite sample. The composite water sample will comply with all relevant methods and standards prescribed by Condition 21.</p>	<p>The department has granted this request.</p>

Condition	Summary of licence holder's comment	Department's response
29 (Table 16)	<p>The licence holder proposed that the McKnoes Brook water level monitoring device monitoring frequency is logged at a maximum of 15-minute intervals.</p> <p>Both the water level monitoring devices will collect continuous data. Whilst the loggers are capable of recording data at 5-minute intervals, the higher frequency data capture will reduce storage capacity and battery life, requiring more frequent site visits and changeout of the logger to ensure continuation of data capture. It is proposed data capture at 15-minute intervals is adequate to identify changes in water level height.</p>	The department has granted this request.