

Notice

Environmental Protection Act 1994

Information request

This information request is issued by the administering authority under section 140 of the Environmental Protection Act 1994 to request further information needed to assess an amendment application for a site-specific environmental authority.

To: Arrow CSG (Australia) Pty Ltd
Level 39, 111 Eagle Street,
Brisbane QLD 4001

ATTN: Mitchum Gregory | Mitchum.Gregory@arrowenergy.com.au
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Our reference: EA0001401 | C-EA-101098822

Further information is required to assess an amendment application for environmental authority

1 Application details

The **amendment application** for the site-specific environmental authority (EA) **EA0001401** was received by the administering authority on **1 May 2026**.

The application reference number is A-EA-AMD-101098745.

Land description: Petroleum Lease (PL) 253.

2 Information request

The administering authority has considered the abovementioned application and is writing to inform you that further information is required to assess the application (an information request).

The information requested is provided in the following table:

Item	Issue / Action Required
1.	Spatial Data–Biodiversity Matters Spatial data has been provided for the footprint of Stage 2 development, however, mapped ground-truthed biodiversity spatial information has not been provided. Spatial data describing biodiversity matters provides for a detailed assessment of the proposal and corresponding impacts. Additionally, several items raised within this information request would benefit from the inclusion of spatial data to support the assessment process. Action required: Provide ground-truthed spatial data files that were relied upon to determine the extent of impacts proposed to biodiversity matters with this amendment including;

	- Mapped Ground-truthed Regional Ecosystems (GTRE) - Environmentally Sensitive Areas (ESAs) and their protection zones (identifying the individual ESA trigger), and - Areas mapped as Matters of State Environmental Significance (MSES) and Prescribed Environmental Matters (PEMs).
2.	Disturbance figures: The supporting information report and draft EA provide inconsistent disturbance figures that require reconciliation. ▪ The stage 2 disturbance total is 70 ha in Tables 1-2 and 2-1, however section 4.4 refers to approximately 81 ha of additional disturbance. ▪ Total authorised disturbance for the Hopeland EA is referred to as ~256 ha in section 4.4, ~265 ha in Section 2.1, however the total disturbance in <i>General, Table 1 – Authorised Petroleum Activities</i> in the draft EA equals to ~300 ha. ▪ Access tracks are listed as 21 km in Table 1-2 versus approximately 22 km in Table 2-1, with no confirmed total increase proposed in the draft EA. ▪ Section 4.4 states an existing 18.36 ha of land has been disturbed as of 31 December 2025, however the annual return referenced with this figure is for a different EA (EA0001399). Action required: 1. Provide a reconciled disturbance and infrastructure schedule for this stage 2 proposal and the entire Hopeland project to date (stages 1 and 2). 2. Indicate areas of permanent vs temporary disturbance, or construction vs operational disturbance. 3. Confirm the correct figure for existing disturbance under the Hopeland EA, if this figure has changed from the 6ha authorised in <i>General, Table 1 – Authorised Petroleum Activities</i> of the EA, provide an explanation and justification as to why. 4. If any of the above indicates a requirement to amend spatial data for the stage 2 development footprint, resubmit these revised GIS/shapefiles.
3.	Impacts to Connectivity Impacts to Connectivity have been discussed in the submitted Biodiversity Impact Assessment, however it was determined that the impact to connectivity areas is not significant. It is unclear whether the Landscape Fragmentation and Connectivity (LFC) Tool has been run on the known footprint of the combined stage 1 and 2 footprints for the Hopeland development. Action required: Confirm if the LFC tool has been run on the combined Stage 1 and Stage 2 footprints. If not, perform this analysis and submit results from the LFC tool to determine if the impact total for Connectivity needs to be updated and authorised for Stage 2.
4.	Vegetation within the defined distance of a watercourse When determining impacts to vegetation occurring within the defined distance of a watercourse, the BIA report states the following: <i>"As part of the ecological survey the high banks of watercourses associated with the Project were mapped. The Project footprint will impact 0.14 ha of RE 11.3.25 watercourse vegetation associated with the Wambo Creek and Sixteen Mile Creek crossings."</i> However no further detail has been provided identifying these areas. As Wambo and Sixteen Mile Creek both have proposed pipeline right of way (RoW) crossings, the impact to watercourse vegetation seems underestimated. The

	Queensland Offsets Policy identifies watercourses in the Brigalow Belt bioregion with a stream order of 3 or 4 as having a 50m distance from the defining banks which trigger a Significant Residual Impact (SRI) assessment. Schedule 2 of the Environmental Offsets Regulation 2014, section 2(4) - <i>A prescribed regional ecosystem is a matter of State environmental significance to the extent the ecosystem is located within a defined distance from the defining banks of a relevant watercourse.</i> It is unclear if impacts to every regional ecosystem, regardless of biodiversity status, within the defined banks of the relevant watercourses within a mapped category B area, have been quantified. Action required: 1. Provide information detailing the ground-truthed defining banks of Wambo and Sixteen Mile Creeks, and confirm if all vegetation within Category B mapped areas located within 50m of these defining banks have been quantified, regardless of biodiversity status. 2. Provide the results of the assessed defined banks of watercourses either in pdf map format or spatial data files.
5.	Sensitive Receptors The supporting information main report indicates that previous modelling for the SGP Project (for air and noise) has been utilised to determine locations of proposed activities to sensitive receptors and predicted impacts. There has been no site-specific information supplied detailing the locations of these sensitive receptors. The report explains receptor categories and gives generic separation distances (for example, most wells are stated to be >400 m from sensitive receptors and dwellings are the main nearby receptors), however these separation distance statements cannot be verified. Action required: 1. Identify all sensitive receptors located within proximity of the Hopeland Stage 2 development footprint. 2. For each receptor, include the following information: a. Geographic location (supplied as coordinates). b. Type of sensitive receptor (e.g. residential property) 3. Include this information with PDF maps that clearly illustrate the proximity of these sensitive receptors to the proposed Stage 2 development footprint. 4. Provide predicted impacts for air and noise emissions specific to the closest sensitive receptors to the stage 2 development.
6.	Impacts to sensitive receptors Following item 4, further information is required regarding the potential impacts that may arise due to the construction and operation of the Stage 2 development. The current reporting does not provide an adequate discussion of the anticipated effects on these receptors or outline any additional assessments conducted to evaluate such impacts. Additionally, section 5.1.5 of the supporting information report states the location of wells are <i>“almost all located greater than 400 m from a sensitive receptor”</i> followed by <i>“with unacceptable operational noise impacts predicted for sensitive receptors located less than 400 metres from a well site”</i> – the statement indicating <i>almost all</i> well pads being located greater than 400m from a sensitive receptor implies that there are some located closer than 400m, which will experience unacceptable operational noise impacts. Action required: 1. Provide a detailed explanation of the potential impacts (e.g. noise, air quality) from both the construction and operational phases of the Stage 2 development on each of the identified sensitive receptors. 2. Where applicable, update the noise and air quality assessments to reflect the risks specific to these identified sensitive receptors. Include any revised analysis or additional mitigation measures proposed to minimise or manage the identified risks.

7.	Groundwater Issue: The modelled gasifier voids provided in '<i>Arrow Energy - Additional Information to support Hopeland Stage 2</i>' (v1.0 dated 23/06/2026) shows a significant difference between the burn cavities reported by AECOM (2018) and total volume generated by multiplying seam thickness and area calculated by Perkins (2018), with the latter being significantly higher than the former. Action required: 1. Provide the sensitivity analysis on gasifier volume and altered rock volume to justify this. Issue: Additional cross-sections (Figure 2 and Figure 3) were provided in '<i>Arrow Energy - Additional Information to support Hopeland Stage 2</i>' (v1.0 dated 23/06/2026) to expand on the conceptual site model. Further clarifications are required on these cross-sections and conceptual site model. Action required: 2. The horizontal scale is missing in these cross-sections. Provide updated Figure 2 and Figure 3 cross-sections including the horizontal scale. Writing/ labelling groundwater elevation (in mAHD) next to the observed water level in the bores as well as key hydro-stratigraphic units (e.g. base of the Macalister coal seam) would also be helpful. 3. Clarify if the extrapolated hydraulic heads presented in these figures are based on modelling. 4. Initial contamination migration has been attributed to high gas pressure conditions, which suggests dual phase flow conditions at the site. Clarify if the dual phase flow condition was considered during numerical modelling or during conceptualisation. Issue: Comparison of the calibrated (posterior) hydraulic property ranges from ensemble P5, P50 and P95, against parameter bounds from OGIA (2019) was provided in '<i>Arrow Energy - Additional Information to support Hopeland Stage 2</i>' (v1.0 dated 23/06/2026) in Tables 4-5-6. Action required: 5. If the values for P5, P50 and P95 are not available from OGIA's model, are there measured/tested values with P5, P50 and P95? Issue: The prior and posterior distributions of horizontal hydraulic conductivity (kh), vertical hydraulic conductivity (kv), specific storage (ss), and specific yield (sy) parameters were provided in '<i>Arrow Energy - Additional Information to support Hopeland Stage 2</i>' (v1.0 dated 23/06/2026) in Appendix A. The following were noted in relation to the posterior P50 parameters: <i>For Gasifier G1:</i> - $Sy_g1s = 5.55 \times 10^{-1}$ - $Sy_g1ki = 5.62 \times 10^{-2}$ - $Sy_g1m = 5.42 \times 10^{-1}$ Sy_g1s is very high, which is unlikely to be representative of the site conditions and requires further explanation. <i>For Gasifier G2:</i> - $Sy_g2s = 7.5 \times 10^{-1}$ (Sy is very high) - $Sy_g2ki = 1.39 \times 10^{-1}$ - $Sy_g2m = 1.0 \times 10^0$
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Sy_g2s is very high.

Sy_g2m value represents void, meaning the rock above the Macalister seam has not collapsed.

For Gasifier G3:

- Sy_g3s = 2.94×10^{-1}
- Sy_g3ki = 7.69×10^{-2}
- Sy_g3m = 1.0×10^0

Sy_g3m value represents void, meaning the rock above the Macalister seam has not collapsed.

For Gasifier G4:

- Sy_g4s = 7.5×10^{-1}
- Sy_g4ki = 1.24×10^{-1}
- Sy_g4m = 1.0×10^0

Sy_g4s is very high.

Sy_g4m value represents void, meaning the rock above the Macalister seam has not collapsed.

For Gasifier G5:

- Sy_g5s = 2.66×10^{-1}
- Sy_g5ki = 6.28×10^{-1}
- Sy_g5m = 2.22×10^{-1}

Sy_g5ki is very high.

Specific yield (Sy) value used for the units impacted by the gasifiers are questionable. There is key concern about the Sy values being very high for most of the units and used in the model. Because of the high Sy values used in the model, it has taken longer for the water level to recover at the gasifier sites. This has may have resulted in inwards hydraulic gradient for a long period of time, meaning potential offsite impacts in terms of migration of contamination may have been underestimated by the model.

In addition, only a part of the Springbok Sst appears to be affected by the gasifier (according to CSM diagram) activities, and applying altered model parameters to the entire model layer (which is relatively thick (96 m)) may not be accurate. This model layer 3 (Springbok Sst) may need to be split into two or more layers so that the altered model parameters can be assigned properly in the relevant part of the model domain.

Action required:

6. To ensure that the rest of the modelling results are valid, provide further clarifications for those posterior P50 parameters as detailed above.

Issue:

The response provided in 'Arrow Energy - Additional Information to support Hopeland Stage 2' (v1.0 dated 23/06/2026) for inward flow toward Lot 40 DY85, in the Springbok Sandstone (Figure 4), through to the end of the recovery period (2225) is not satisfactory. Inappropriate model parameters used at the gasifier and gasifier affected areas may be impacting the flow pattern and time of recovery.

Action required:

7. Clarify and provide further justification for the model parameters used.

Issue:

A contaminant transport model was developed to simulate the fate and transport of dissolved benzene and naphthalene within the Springbok sandstone and the Macalister coal seam. Section 2.4.2 of Report PL253 Groundwater Impact Assessment – Clines Road FDP provides information justifying the selection of benzene and naphthalene as representative contaminants in the contaminant transport model.

	Previous groundwater investigations have identified elevated concentrations of other chemicals of potential concern (COPC) including total dissolved solids, metals, ammonia and cyanide which have not been considered by the groundwater model. These COPC have different characteristics (i.e. solubility, degradation rates) which may not correlate with the characteristics of benzene and naphthalene. Action required: 8. Clarify how does the current contaminant transport model assess the risks associated with the fate and transport of other COPC identified at the site.
	Informative: Section 5.10 of the '<i>EA Amendment Application Supporting Information Report - Hopeland Stage 2</i>' (dated 31/04/2026) report provides a list of relevant legislation, industry guidelines and code practices. - It is noted that the list does not include the <i>Environmental Protection (Water and Wetland Biodiversity) Policy 2019</i>. The EPP is critical in identifying relevant environmental values, water quality objectives and management intent. - The <i>Draft Guidelines for the Assessment and Management of Contaminated Land 1998</i> is referred to as the applicable document for the assessment and management of contaminated land under the EP Act. This guideline is no longer in affect. Key guidance documents used in QLD for the assessment and management of contaminated land are <i>The National Environment Protection (Assessment of Site Contamination) Measure (2013)</i> and the <i>Queensland Auditor Handbook for Contaminated Land</i>.

3 Actions

The abovementioned application will lapse unless you respond by giving the administering authority -

- (a) all of the information requested; or
- (b) part of the information requested together with a written notice asking the authority to proceed with the assessment of the application; or
- (c) a written notice –
 - i. stating that you do not intend to supply any of the information requested; and
 - ii. asking the administering authority to proceed with the assessment of the application.

A response to the information requested must be provided by **8 January 2027** (the information response period). If you wish to extend the information response period, a request to extend the period must be made at least 10 business days before the last day of the information response period.

The response to this information request or a request to extend the information response period can be submitted to the administering authority by email to EnergyandExtractive@detsi.qld.gov.au.

If the information provided in response to this information request is still not adequate for the administering authority to make a decision, your application may be refused as a result of section 176 of the *Environmental Protection Act 1994*, where the administering authority must have regard to any response given for an information request.

4 Human rights

A human rights assessment was carried out in relation to this decision, and it was determined that no human rights are engaged by this decision.

Notice

Information request

Should you have any questions about the notice, please contact Danielle Spelman using the details provided below.



Signature

8 July 2026

Date

Helena Braye

Department of the Environment, Tourism, Science and Innovation

Delegate of the administering authority

Environmental Protection Act 1994

Enquiries:

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