
Coal Seam Gas - Joint industry framework

Managing impacts to groundwater resources in the Surat Cumulative Management Area under EPBC Act approvals

17 March 2021

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1. Introduction

1.1 Overview

The purpose of this joint industry framework (**JIF**) is to establish a consistent post-approval framework for the management of impacts on groundwater caused by coal seam gas (**CSG**) developments within the Surat Cumulative Management Area (**Surat CMA**) that are subject to approvals under the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (**EPBC Act**).

The JIF provides a risk management framework to achieve stated outcomes for relevant matters of national environmental significance (**MNES**), also referred to as protected matters, and is intended to reduce duplication between the regulation of groundwater at a Commonwealth and State level.

1.2 EPBC Act process

The EPBC Act provides a legal framework to protect and manage MNES including nationally and internationally important flora, fauna, ecological communities and heritage places.

An action that has, will have, or is likely to have a significant impact on a MNES is a controlled action. A person proposing to take an action that the person thinks may be or is a controlled action must refer the proposal to the Minister administering the EPBC Act (**Minister**) for the Minister's decision on whether or not the action is a controlled action. At the referral stage, significant impact guidelines are used to determine the significance of impacts on MNES for the purposes of making a controlled action decision.

Following referral, the Minister will make a decision on whether or not the proposed action is a controlled action requiring formal assessment and approval by the Minister under the EPBC Act.

If the Minister decides that an action is a controlled action, an assessment of the likely impacts of the action on MNES must be carried out. If an action is approved by the Minister, conditions may be attached that are necessary or convenient to protect the MNES or to repair or mitigate damage to the MNES. Conditions necessary for the protection of MNES are recommended by the Department of Agriculture, Water and the Environment (**Department**) after the assessment process for the Minister's decision on the approval.

The Department's fact sheet on the EPBC Act assessment and approval process can be accessed at the following link: https://www.environment.gov.au/system/files/resources/d60cdd6a-8122-473a-bbd0-d483662cef3e/files/assessment-process_1.pdf

1.3 Approvals which the JIF applies to

The JIF applies to CSG developments that are within the Surat CMA (shown in Figure 1) which are the subject of an EPBC Act approval with:

- one or both of the following controlling provisions:
 - listed threatened species and ecological communities (sections 18 and 18A EPBC Act), which include the community of native species dependent on natural discharge of groundwater from the Great Artesian Basin or other listed threatened species and ecological communities that are supported by springs (**EPBC-listed springs**); and
 - a water resource (section 24D and 24E EPBC Act), in respect of groundwater; and

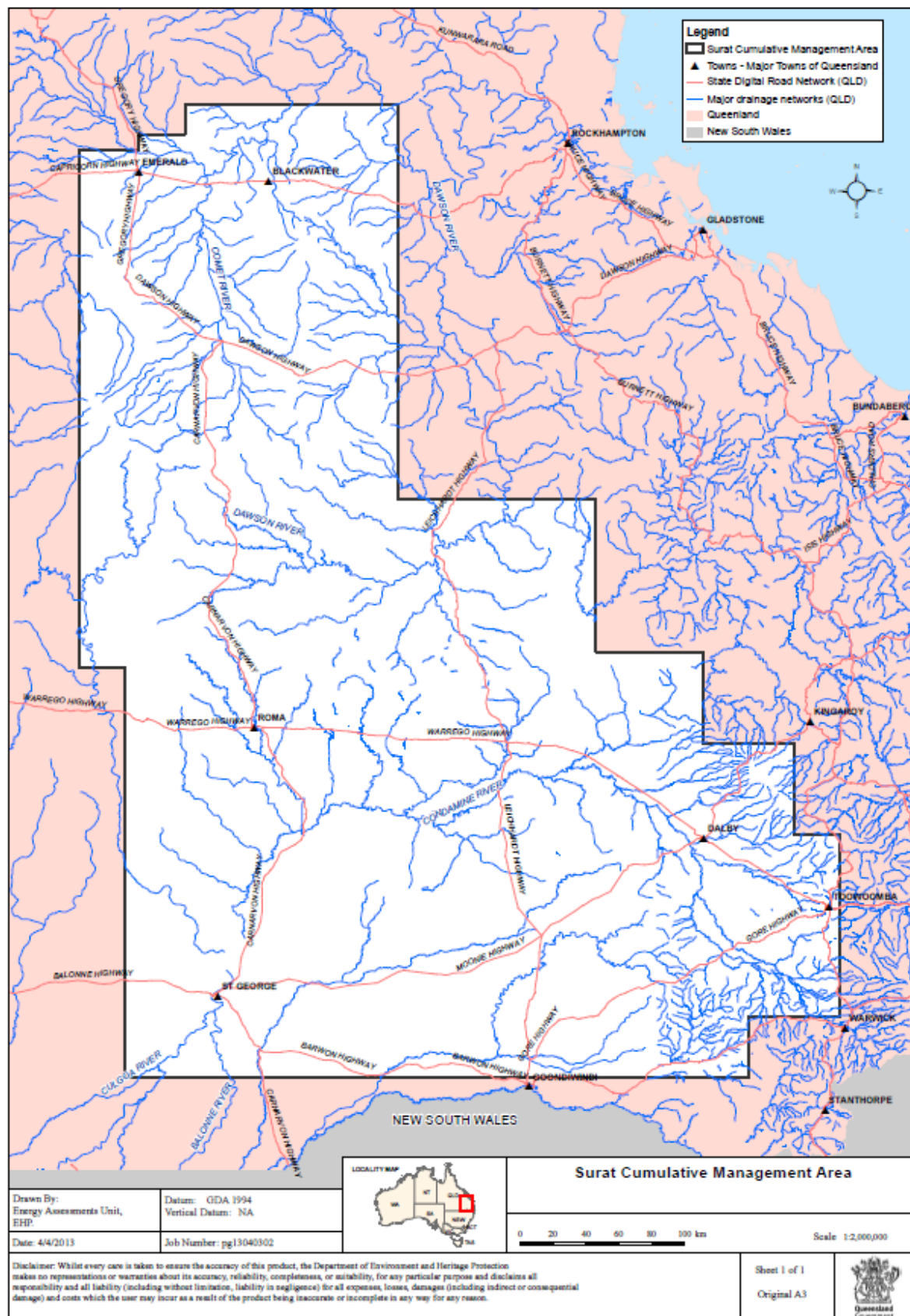
- conditions that reference one or more outcomes and risk management frameworks under the JIF due to a potential impact on EPBC-listed springs and/or a water resource.

1.4 Surat CMA

Under section 365 of the *Water Act 2000* (Qld) (**Queensland Water Act**), a cumulative management area (**CMA**) may be declared where the Chief Executive of the Department of Environment and Science (**DES**) considers that an area containing two or more resource tenures may be affected by the exercise of underground water rights by the tenure holders. Underground water rights are statutory rights provided to resource tenure holders to take or interfere with underground water in the area of the tenure if the taking or interference happens during the course of, or results from, authorised activities on the tenure. Underground water rights are discussed in further detail in Appendix A.

The Surat CMA was declared in August 2011, and covers the area of current and planned CSG development in the Surat Basin and southern Bowen Basin (see Figure 1). In January 2020, the Surat CMA was amended to also include coal mining tenures located within the Surat and Clarence-Moreton basins.

Figure 1. The Surat CMA



Source: State of Queensland 2021 - Official CMA declaration

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1.5 EPBC-listed springs and water resource

1.5.1 EPBC-listed springs

Sections 18 and 18A of the EPBC Act protect:

- communities of native species dependent on the natural discharge of groundwater from the Great Artesian Basin (listed as a threatened ecological community under section 181 of the EPBC Act); and
- other threatened ecological communities listed under section 181 of the EPBC Act or threatened species listed under section 178 of the EPBC Act that are supported by springs.

The springs that support these communities or species are EPBC-listed Springs. It is the listed threatened ecological community or species supported by springs that is protected as an MNES under the EPBC Act, rather than the springs themselves. However, protection of the springs affords protection of the ecological community or species.

A current list of EPBC-listed springs is contained in Appendix B.

The approved conservation advice for communities of native species dependent on the natural discharge of groundwater from the Great Artesian Basin can be accessed at the following link: <http://www.environment.gov.au/node/14508>. Other approved conservation advices for threatened ecological communities or threatened species that are supported by springs may also be relevant for the purposes of the JIF. An approved conservation advice provides guidance on immediate recovery and threat abatement activities that can be undertaken to ensure the conservation of the species or community. Under section 139(2) of the EPBC Act, in deciding whether to approve an action for the purposes of section 18 and 18A of the EPBC Act, the Minister must have regard to relevant approved conservation advices.

The national recovery plan for communities of native species dependent on the natural discharge of groundwater from the Great Artesian Basin can be accessed at the following link: <http://www.environment.gov.au/system/files/resources/0cefc83a-3854-4cff-9128-abc719d9f9b3/files/great-artesian-basin-ec.pdf>. Under section 139(1) of the EPBC Act, in deciding whether to approve an action and what conditions to attach to an approval, the Minister must not act inconsistently with a national recovery plan.

1.5.2 Water resource

Sections 24D and 24E of the EPBC Act protect water resources as an MNES in relation to CSG and large coal mining developments. This MNES was introduced to the EPBC Act in June 2013 and is commonly referred to as the 'water trigger'.

The term 'water resources' has the meaning given in the *Water Act 2007* (Commonwealth Water Act), as follows:

- surface water or groundwater; or
- a watercourse, lake, wetland or aquifer (whether or not it currently has water in it),

and includes all aspects of the water resource (including water, organisms and other components and ecosystems that contribute to the physical state and environmental value of the water resource).

The JIF relates only to groundwater and all aspects of the groundwater resource (including groundwater, organisms and other components and ecosystems that contribute to the physical state and environmental value of the groundwater resource). The management of surface water and other impacts to a water resource unrelated to groundwater is outside the scope of the JIF.

At the referral stage, and having regard to the *Significant Impact Guidelines 1.3: Coal seam gas and large coal mining developments - impacts on water resources* (<https://www.environment.gov.au/system/files/resources/d078caf3-3923-4416-a743-0988ac3f1ee1/files/sig-water-resources.pdf>), the significance of impacts by an action on a water resource is determined by the reduction in the value of the water resource. The key factor in determining the value of a water resource is its utility for third party users, including environmental and other public benefit outcomes. Consequently, the significance of impacts to a water resource is determined through the reduction in the current or future utility of the water resource to third party users (**associated users**) caused by changes to hydrology and water quality from CSG and large coal mining developments. For the purposes of the JIF, associated users are water supply bores and groundwater dependent ecosystems (**GDEs**).

The EPBC Act does not protect these associated users as MNES in their own right, but conditions controlling the impact of an action on these associated users are used to ensure the management of impacts on a water resource. The Department has established outcomes for each associated user, and the JIF establishes the management frameworks to achieve those outcomes. The application of the outcomes and management frameworks to projects through approval conditions aims to ensure the acceptability of impacts by an action on a water resource.

1.5.3 GDEs

GDEs are ecological communities whose species and ecological processes rely on groundwater, either entirely or intermittently. For the purposes of the JIF, there are three categories of GDEs:

- aquatic GDEs, which are ecological communities dependent on the surface expression of groundwater, including springs other than EPBC-listed springs, river baseflow systems (watercourse springs), riparian ecosystems and wetlands;
- terrestrial GDEs, which are surface ecosystems dependent on the sub-surface presence of water (i.e. terrestrial vegetation accessing the water table below ground), including ecosystems that are intermittently and permanently dependent on groundwater; and
- subterranean GDEs, which are subterranean ecosystems dependent on the permanent presence of subsurface water. For the purposes of this document, this includes vertebrates and invertebrates only (i.e. excludes unicellular and simple multicellular organisms).

The location and other attributes of aquatic GDEs in Queensland can be accessed from the Queensland Springs Database: <https://www.data.qld.gov.au/dataset/springs/resource/4cdc89ef-b583-446e-a5c7-0836a91a3767>.

Mapping of potential terrestrial GDEs in Queensland can be accessed from *WetlandInfo*: <https://wetlandinfo.des.qld.gov.au/wetlands/facts-maps/get-mapping-help/metadata/gde/terrestrial-area/>. There may be other relevant databases to identify potential terrestrial GDEs in Queensland.

The Queensland Subterranean Aquatic Fauna Database provides a catalogue of subterranean GDE sampling undertaken in Queensland and compiles data from surveys undertaken by government, industry and research institutions where available. It can be accessed via:

<https://www.data.qld.gov.au/dataset/queensland-subterranean-aquatic-fauna-database>. The database may not contain data from all subterranean aquatic fauna surveys undertaken in Queensland.

EPBC-listed springs are protected in their own right as MNES and as such are treated separately for the purposes of the JIF, even though they are a subset of aquatic GDEs.

1.6 Purpose and application of the JIF

Following the declaration of the Surat CMA, the Department and CSG development approval holders within the Surat CMA sought to improve the consistency with which groundwater impacts are regulated under EPBC Act approvals, and in particular, how post-approval groundwater management plans are approved and administered.

The JIF serves this function, as a consistent post-approval groundwater management framework for the CSG developments described in Section 1.3.

The JIF:

- provides an outcomes and risk-based approach to the monitoring and management of impacts on groundwater;
- provides risk management frameworks to ensure the outcomes for EPBC-listed springs and water resources established by the Department, as described in Section 2, can be achieved; and
- is intended to reduce duplication between the regulation of groundwater at a Commonwealth and State level.

Built around the outcomes in Section 2, the JIF moves the CSG industry from prescriptive conditions to a more streamlined, consistent approach, targeting effort in areas where the risk of impact due to CSG development is predicted. Regulatory and environmental certainty is provided through appropriate reporting, early intervention management actions and compliance.

Together with approval conditions, the management frameworks in Sections 3 to 7 and reporting requirements in Sections 9 and 10 describe how approval holders must manage and monitor EPBC-listed springs and water resources to meet the outcomes for these matters.

An approval holder must comply with the JIF if its approval conditions reference all or some of the JIF outcomes and risk management frameworks. The standard conditions contained in Appendix C (**standard conditions**) will form the basis of these approval conditions. However, the Minister's power to impose conditions on a project is not limited by the JIF or the standard conditions.

Conditions requiring compliance with the EPBC-listed springs outcome and management framework are only applied to approvals subject to the EPBC-listed springs controlling provisions (ss 18 and 18A).

Conditions requiring compliance with an associated user outcome and management framework are only applied to approvals that post-date the introduction of the water trigger and are subject to the water resource controlling provisions (ss 24D and 24E).

For approvals subject to the water resource controlling provisions, an associated user management framework will only be included in the approval conditions if, in the assessment stage of the action, it was assessed that the action would likely result in impacts of a sufficient scale or intensity as to significantly reduce the current or future utility of the water resource to that associated user.

Approvals granted prior to the endorsement of the JIF will be aligned with the JIF if the Minister approves a variation under section 143 of the EPBC Act to vary the existing conditions of the approval to manage impacts in accordance with the JIF.

The JIF and variations to existing approval conditions will be managed such that there are no unwanted retrospective implications for approvals granted before the JIF takes effect, including that approval conditions will require compliance only with the outcomes and management frameworks that are relevant to the action.

1.7 Relationship with Queensland regulatory framework

1.7.1 The UWIR and OGIA model

The JIF reflects and adopts relevant aspects of the regulatory environment administered by the Queensland Government.

The framework for groundwater management in the Surat CMA is provided by the Surat underground water impact report (**UWIR**), prepared in accordance with the Queensland Water Act. The UWIR reports on the groundwater impacts of the exercise of underground water rights by resource tenure holders in the Surat CMA and establishes:

- strategies to manage the predicted impacts; and
- responsibilities for implementing various aspects of the strategies.

The UWIR is prepared by the Office of Groundwater Impact Assessment (**OGIA**). OGIA is a statutory entity established under the Queensland Water Act to advise the Chief Executive of DES about the impacts on groundwater caused by the exercise of underground water rights by resource tenure holders. OGIA monitors activities within the Surat CMA area, while DES operates as the regulatory agency.

The UWIR is updated every three years in accordance with section 370 of the Queensland Water Act, in order to keep up to date with changes to industry development plans and new information about the groundwater flow system. Each UWIR is drafted by OGIA in accordance with the requirements in Chapter 3, Division 4 of the Queensland Water Act, subject to public consultation under sections 381 to 383 of the Queensland Water Act, and approved by the Chief Executive of DES under section 385 of the Queensland Water Act.

The UWIR incorporates the results from OGIA's groundwater flow model, which is a tool used to predict the impacts of development on groundwater in the Surat CMA (**OGIA model**). The OGIA model is a computer-based three-dimensional mathematical representation of the groundwater system using the laws of physics to predict changes in water pressure or flow in response to various development scenarios. The modelling process involves:

- under sections 376(1)(a) of the Queensland Water Act, consideration of the quantity of water produced or taken from the area in the past and an estimate of water to be produced or taken during the next three year-period to which the UWIR will apply; and
- under section 376(1)(b) of the Queensland Water Act, description of each aquifer affected or likely to be affected by the exercise of underground water rights and an analysis of how the groundwater moves, the aquifers interact, trends in water level change and predictions of water level decline due to the exercise of these rights.

The UWIR also includes these key requirements, among other matters:

- under section 376(1)(c) of the Queensland Water Act, a description of how the OGIA model predictions are made;
- under sections 376(1)(f) and 378 of the Queensland Water Act, a water monitoring strategy (**WMS**), including, in summary, a requirement for responsible tenure holders to provide water monitoring data to OGIA in accordance with the UWIR; (see Sections 1.7.2 and 8);
- under sections 376(1)(g) and 379 of the Queensland Water Act, a spring impact management strategy (**SIMS**), which identifies predicted impacts on 'springs of interest' in the Surat CMA (springs that overlie an aquifer with a predicted impact of more than 0.2 metres drawdown at any time), and provides:
 - the details of the spring, including its location;
 - an assessment of the connectivity between the spring and the aquifer over which the spring is located;
 - the predicted risk to, and likely impact on, the ecosystem and cultural and spiritual values of the spring because of a decline in water level of the aquifer over which the spring is located (referred to in the UWIR as a spring impact risk assessment);
 - the responsible tenure holder assigned to develop a strategy for preventing or mitigating predicted impacts to the spring and a timetable for implementing the strategy including a program for reporting to OGIA about the implementation of the strategy (referred to in the UWIR as the mitigation plan); and
- under sections 376(1)(h) and 380 of the Queensland Water Act, the identification of responsible tenure holders who are assigned specified obligations under the UWIR (see Section 1.7.2); and
- under section 376(1)(e) of the Queensland Water Act, a program for conducting an annual review of the accuracy of predicted impacts and for giving the Chief Executive of DES a summary of the outcome of each review, including a statement of whether there has been a material change in the information or predictions used to prepare the maps in the UWIR.

The update of the UWIR may also consider the incorporation of UWIR WMS data, and other scientific studies, into the three-yearly updates of the UWIR and OGIA model, particularly as a calibration data set.

In the most recent UWIR, OGIA included a qualitative assessment of the previously prepared SIMS mitigation plans (where available) on risk of the predicted drawdown being realised, and provided a residual risk ranking of the mitigated risk. For the purposes of the JIF, the assessment of risk is based on the unmitigated predicted impact to EPBC-listed springs and aquatic GDEs (referred to in the UWIR as a spring impact risk assessment).

A detailed overview of the Queensland framework for managing impacts to groundwater from CSG developments and the legislative requirements of the UWIR is provided in Appendix A.

1.7.2 Responsible tenure holders

Under section 376(1)(h) and 380 of the Queensland Water Act, OGIA must identify responsible tenure holders who are assigned specific impact management obligations in the UWIR.

These obligations can include requirements to:

- conduct bore assessments and enter into make good agreements in relation to water supply bores;
- under the WMS, undertake water monitoring obligations and prepare monitoring reports; and
- under the SIMS, implement a program to monitor springs, prepare watercourse spring investigation reports, and prepare mitigation plans where impacts on springs are considered high risk.

Responsible tenure holders are assigned based on standard rules set out in the UWIR. These rules may change between UWIRs. The most recent UWIR does not assign management obligations or responsible tenure holders for impacts on terrestrial GDEs and subterranean GDEs.

Under section 390 of the Queensland Water Act, responsible tenure holders must comply with each obligation assigned to them under the UWIR. DES may take compliance action against responsible tenure holders in the event that they fail to comply with their obligations. A responsible tenure holder may also transfer to another tenure holder the obligation to carry out future activities required of it under the UWIR, if the transfer is approved by OGIA.

Generally, approval holders will be required to take management action under the JIF frameworks only if they are the **Responsible CSG Operator** (RCO) for a protected matter. RCOs are either as identified in the most recent UWIR (as an responsible tenure holder with obligations relevant to EPBC-listed springs, aquatic GDEs and/or water bores), or assigned in accordance with the process in the management frameworks for terrestrial GDEs and subterranean GDEs (which adopts the assignment rules for reporting obligations identified in the most recent UWIR). An approval holder may or may not be a RCO at any time. If an approval holder is not a RCO, its management actions under the JIF and approval conditions will generally be limited to routine annual reporting against outcomes to the Department, and it will continue to implement the standard monitoring and reporting actions required under its State approvals.

1.7.3 Utilisation of Queensland framework in the JIF

The JIF utilises elements of the Queensland regulatory framework to reduce duplication between the State and Commonwealth legislative requirements. This includes:

- using OGIA modelling as a screening tool for determining risk to EPBC-listed springs and associated users, predicted impacts are based on risk thresholds and attribution results are identified in the UWIR, under the Queensland Water Act. This approach identifies areas at risk in advance of actual impacts, providing time to develop appropriate site-specific monitoring, management and mitigation. The risk assessments undertaken as a requirement of the SIMS and assessment of impacts to environmental values¹ in the UWIR (including terrestrial GDEs) include consideration of:
 - the magnitude and timing of the predicted impact;
 - uncertainty analysis performed in preparation of the UWIR; and

¹ As defined under section 9 of the EP Act

- current hydrogeological and ecological conceptualisation of the EPBC-listed springs and associated users, which are continuously improved through the monitoring requirements of the SIMS;
- adopting SIMS mitigation plans as site-specific assessments for EPBC-listed springs and aquatic GDEs, provided the plan meets the requirements of the site-specific assessment as outlined in the approval conditions. These plans will identify areas that are at risk of impacts, and develop strategies to prevent, minimise, and mitigate impacts to ensure that outcomes are achieved;
- reflecting the make good provisions in Chapter 3 of the Queensland Water Act and the assignment of make good obligations under the UWIR as a post-approval management process for water supply bores to ensure that bores continue to supply water for their intended purpose or are made good;
- using the legislated three-yearly updates and annual reviews of the UWIR as a routine opportunity for approval holders to determine unexpected changes to the predicted risk to EPBC-listed springs and associated users, and notify the Department of these changes; and
- leveraging the routine reporting associated with the UWIR to enable approval holders to remove duplicative reporting requirements.

1.8 Implementation of the JIF

Once an approval is granted with conditions referencing one or more JIF outcomes and management frameworks, the approval holder must comply with each of its obligations under the JIF and the approval conditions, including the various notification and reporting requirements outlined in the management frameworks and conditions. The JIF defines the process to be used by approval holders to determine the risk level of a particular impact on EPBC-listed springs and/or GDEs and understand their related obligations under approval conditions. Where there is any inconsistency between the JIF and an approval condition, the approval condition will prevail.

The approval holder's management actions and the Department's involvement in those management actions will be commensurate to the level of risk to the EPBC-listed spring or associated user, and the level of regulation at a State level.

For:

- very low, low and moderate risks to EPBC-listed springs and GDEs; and
- water supply bores,

management actions required by the approval holder will generally be limited to annual compliance reporting to the Department about how relevant outcomes are being achieved. The management of these matters in accordance with the JIF and the Queensland regulatory framework is considered to be sufficiently robust to meet the relevant outcomes, and it is therefore appropriate for Departmental involvement to be minimal. Annual compliance reports submitted by approval holders must detail what make good or monitoring actions have been assigned to them under the UWIR, and any changes to predicted impacts that are identified by the approval holder or by OGIA in the annual review of the UWIR.

High and very high risks to EPBC-listed springs and GDEs will require additional management actions in order to ensure that outcomes are achieved. This will include the submission of site-specific

assessments to the Department and approval by the Minister of performance criteria, trigger levels, and limits that are outlined in site-specific assessments.

Table 1 provides a summary of the responsibilities of the various entities in implementing each management framework.

Table 1. Responsibilities under legislation and JIF

Entity	Responsibility			
	Water supply bores	EPBC-listed springs/aquatic GDEs	Terrestrial GDEs	Subterranean GDEs
OGIA	- Undertake cumulative impact assessment and prepare the UWIR, including the WMS and SIMS, in accordance with legislated requirements - Conduct annual reviews of the UWIR			
	Identify bores that require assessment and (if necessary) entry into make good agreements	- Predict impacts at EPBC-listed springs/aquatic GDEs within the Surat CMA - Assess risks to springs - Provide technical review of mitigation plans required under the SIMS	- Predict drawdown in hydrogeological units which support, or could support terrestrial GDEs - Assess impacts to mapped potential terrestrial GDEs	Predict drawdown in hydrogeological units that support, or could support, subterranean GDEs
	Identify in the UWIR the responsible tenure holder for management of predicted impacts			
Approval holders	Comply where relevant with responsible tenure holder obligations identified in the UWIR		Agree the RCO for terrestrial GDEs based on the assignment rules for reporting obligations identified described in the most recent approved UWIR	- Review UWIR output to identify areas where the risk threshold is exceeded - Agree the RCO for subterranean GDEs based on the assignment rules for reporting obligations identified described in the most recent approved UWIR
	Where identified in a UWIR as a bore in a immediately affected area (IAA) and where the approval holder is the responsible tenure holder: - Undertake bore assessments - Use best endeavours to negotiate and enter into a make good agreement	Where relevant to the risk level of an EPBC-listed spring or GDE and where the approval holder is the RCO: - Undertake preliminary and, where required, supplementary risk assessments for terrestrial GDEs and subterranean GDEs - Undertake monitoring and SIMS obligations For high to very high risks to an EPBC-listed spring or GDE: - Notify the Department of identified high or very high risk impacts		

Entity	Responsibility			
	Water supply bores	EPBC-listed springs/aquatic GDEs	Terrestrial GDEs	Subterranean GDEs
	• Comply with the make good agreement	• Prepare a site-specific assessment with performance criteria, trigger values and limits and provide to the Minister for approval • Implement monitoring and management obligations under the site-specific assessment and assess monitoring data against approved and interim trigger values and limits • Provide outcomes assurance statement to the Minister • Notify the Department that a trigger value or limit has been exceeded and undertake associated actions		
	Prepare annual compliance reports and provide to the Department			
DES	• Approve the UWIR • Administer Chapter 3 of the Queensland Water Act and the EP Act			
	Enforce responsible tenure holder make good obligations	• Endorse SIMS mitigation plans • Enforce responsible tenure holder obligations		
Minister	• Where relevant to the risk level of an EPBC-listed spring or GDE, approve performance criteria, trigger values and limits that are contained in site-specific assessments • Impose conditions referencing the JIF where appropriate on new CSG developments within the Surat CMA • Vary the conditions of existing approvals to manage impacts in accordance with the JIF • Take appropriate enforcement action under the conditions where outcomes are not achieved			

2. Outcomes

The Department has established outcomes to be achieved for EPBC-listed springs and water resources. The JIF has been designed to protect EPBC-listed springs and water resources from impacts from CSG development by meeting these outcomes.

The level of protection under the outcome for EPBC-listed springs is consistent with the level of protection for this MNES in approval conditions in existence before the endorsement of the JIF. The outcome for EPBC-listed springs is derived from the national recovery plan for the communities of native species dependent on the natural discharge of groundwater from the Great Artesian Basin.

The JIF management frameworks in Sections 3 to 7 are designed to achieve protection of EPBC-listed springs and water resources by meeting these outcomes. Where CSG development impacts exceed a risk threshold (based on OGIA model drawdown prediction), approval holders are required to implement the relevant risk management framework. Where a risk threshold has not been exceeded, and/or is not predicted to be exceeded, the CSG development is taken not to have impacted the protected matters and approval holders are not required to undertake risk management in order to comply with their approval conditions.

The outcome for water resources has a corresponding sub-outcome for each associated user. Approval holders will achieve the outcome for water resources if they achieve the corresponding sub-outcome for the associated user.

For clarity, where a risk threshold has been, or is predicted to be, exceeded:

- for high or very high risks identified in the risk assessment process under the relevant management framework for EPBC-listed springs and GDEs, approval holders will achieve the outcome or sub-outcome for that protected matter where the approval holder does not reach or exceed a relevant approved or interim limit as a result of the CSG development;
- for very low, low or moderate risks identified in the risk assessment process under the relevant management framework for EPBC-listed springs and GDEs, and where no limit is required to be identified in a site-specific assessment, the approval holder is taken to have achieved the outcome or sub-outcome for that protected matter; or
- where the risk relates to a water supply bore, the approval holder is taken to have achieved the outcome where it has complied with its make good obligations identified under the Queensland Water Act and UWIR.

The outcomes, sub-outcomes and risk thresholds are presented in Table 2 below.

Table 2. Outcomes and risk thresholds

Controlling provision	Sections 18 and 18A EPBC Act	Sections 24D and 24E EPBC Act			
MNES or associated user of MNES	EPBC-listed springs	Water supply bores	Aquatic GDEs	Terrestrial GDEs	Subterranean GDEs
Outcome	Groundwater impacts due to CSG development must have no impact on the EPBC-listed springs. No impact is achieved by maintaining or enhancing groundwater discharge and environmental values at EPBC-listed springs	Conditions within unconsolidated and consolidated hydrogeological units, including water level/pressure and water quality, maintain or improve ecosystem services and access by associated users			
Sub-outcome	None	Water supply bore continues to supply water for its intended purpose, or is made good	No adverse effects on the function and environmental values due to CSG development		No adverse effects to ensure habitat is maintained or improved
Applicable Queensland legislative instrument	Chapter 3, Queensland Water Act UWIR	Chapter 3, Queensland Water Act UWIR <i>Planning Act 2016</i> (Qld)	Chapter 3, Queensland Water Act UWIR	<i>Environmental Protection Act 1994</i> (EP Act) UWIR	EP Act
Risk threshold (OGIA model drawdown prediction)	Over 0.2m	Over 5m in a consolidated aquifer Over 2m in an unconsolidated aquifer	Over 0.2m in outcropping formation	Over 0.2m	Over 2m for unconfined hydrogeological units Dewatering* of aquifer habitat for confined hydrogeological units * model prediction at any point in time where aquifer pressure in confined units is reduced to the top of the hydrostratigraphic unit, after which point dewatering occurs.

Where a risk threshold has been, or is predicted to be, exceeded and impacts to EPBC-listed springs or GDEs are identified as being high or very high risk (in accordance with Sections 3 to 7), the management frameworks require the relevant approval holder to prepare and implement site-specific assessments to ensure that relevant outcomes are met.

Where a risk threshold has been exceeded and impacts to EPBC-listed springs or GDEs are identified as being very low risk, low risk or moderate risk (and therefore, will not require site-specific

assessments), approval holders will remain subject to State legislation that regulates impacts to ensure that relevant outcomes are met.

3. Management framework – EPBC-listed springs

3.1 Outcome

The outcome for EPBC-listed springs is that cumulative groundwater impacts due to CSG development must have no impact on the EPBC-listed springs. No impact is achieved by maintaining or enhancing groundwater discharge and environmental values at EPBC-listed springs. This is in turn achieved by not reaching or exceeding an approved or interim limit as a result of the CSG development.

3.2 Application

The management framework applies where an approval requires that the EPBC-listed springs outcome is achieved and maintained through the implementation of this management framework.

Elements of the management framework are only required to be implemented by an approval holder where the approval holder is a RCO, identified as the responsible tenure holder in the most recent UWIR as responsible for mitigation of impacts to a relevant EPBC-listed spring.

3.3 Risk threshold

The risk threshold for EPBC-listed springs is a prediction in the OGIA model of a drawdown of 0.2m at the location of the EPBC-listed spring that is caused by CSG development.

This risk threshold is consistent with the spring trigger threshold, which results in the EPBC-listed spring being a 'spring of interest' in accordance with section 379(3) of the Queensland Water Act.

3.4 Risk framework

The risk framework for EPBC-listed springs (including relevant steps to be taken under the UWIR and approval conditions) is illustrated in Figure 2. Responsibilities for the implementation of the framework are identified in Table 1.

If the UWIR predicts an impact on an EPBC-listed spring that exceeds the relevant risk threshold (identified in the UWIR as a 'spring of interest') and the overall spring risk assessment score in the UWIR (which is unmitigated) is a very low, low or moderate (and the UWIR does not otherwise identify the approval holder as a responsible tenure holder required to prepare a mitigation plan for the EPBC-listed spring), the approval holder whose tenure the EPBC-listed spring is located on or in closest proximity to:

- must notify the Department of this finding in the approval holder's annual compliance report (see Section 10);
- is otherwise not required to take any further action under the JIF until the next UWIR (or amended UWIR) takes effect; and
- is taken to have achieved the outcome for EPBC-listed springs.

Despite not requiring any further action under the JIF for an EPBC-listed spring assessed in the UWIR as having very low, low or moderate (unmitigated) risks, the approval holder must continue to perform any obligations for which the approval holder is identified as the responsible tenure holder under the UWIR. Monitoring data must be provided to OGIA for ongoing trend analysis and reporting. Assigned monitoring must also continue for high and very high risks.

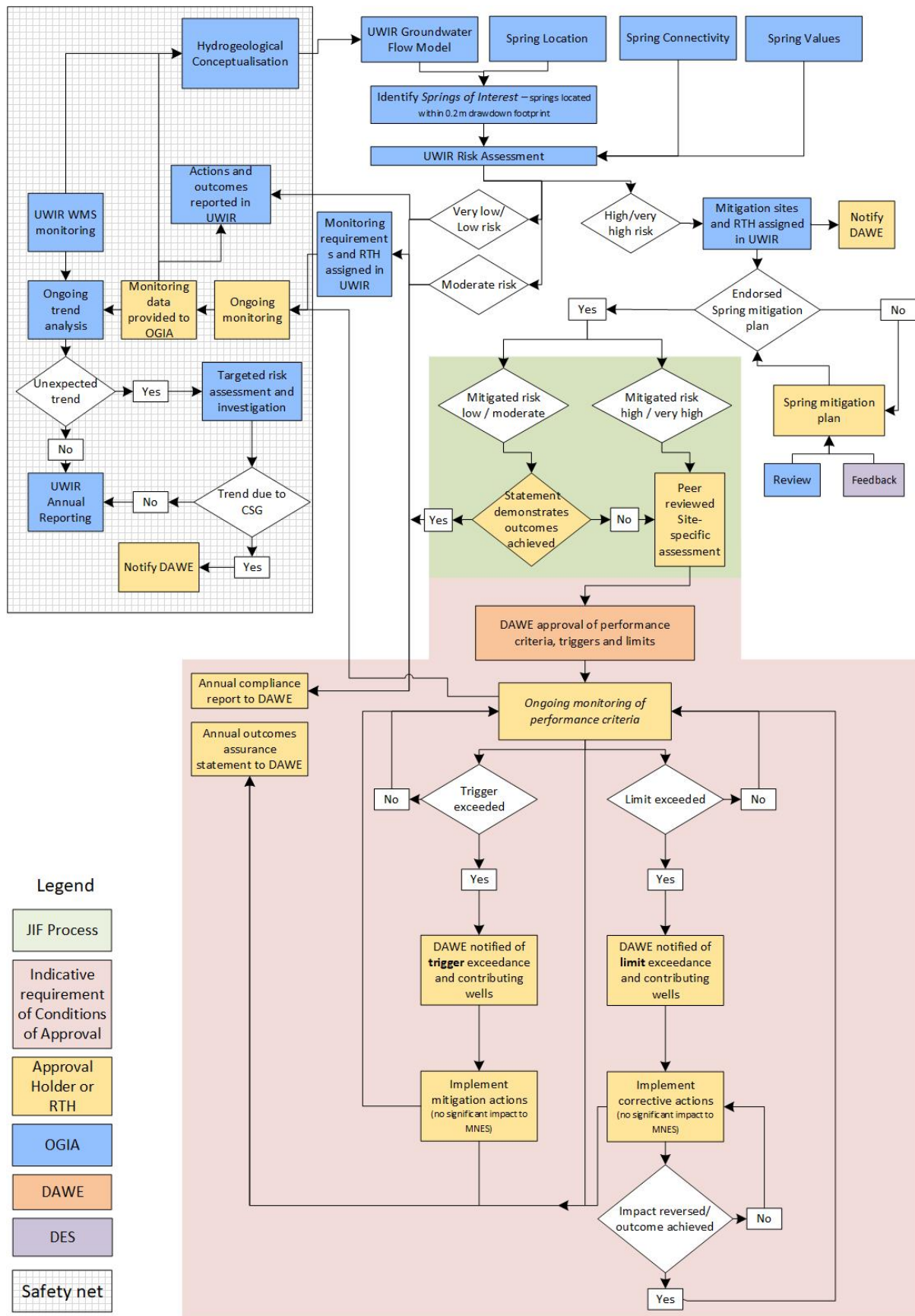
3.4.1 High and very high risk impacts

If the UWIR identifies that an EPBC-listed spring as a 'spring of interest' and the overall spring risk assessment score in the UWIR is high or very high (or otherwise identifies the approval holder as a responsible tenure holder in the UWIR), the approval holder is taken to be the RCO for that EPBC-listed spring and must comply with its approval conditions relevant to the EPBC-listed spring. Appendix C provides a general description of the standard conditions that may apply to the management of high risk and very high risk impacts to EPBC-listed springs. These include that the RCO must:

- notify the Department of the high or very high risk within 20 business days (see Section 10.1);
- if following endorsement of the SIMS mitigation plan the mitigated risk will be low or moderate, provide a statement to DAWE for approval demonstrating how the outcomes for the EPBC-listed springs will be achieved;
- if following endorsement of the SIMS mitigation plan the mitigated risk will be high or very high, or the statement is not approved, provide information to the Minister within 9 months (or a timeframe otherwise agreed to by the Minister in writing) of notifying the Department of the high or very high risk. This information must include a description and location of impacts on the EPBC-listed spring, performance criteria, trigger values, limits, and the contributing well/s, including identification number, GPS coordinates and shapefiles for the written approval by the Minister. This information must be accompanied by a peer-reviewed site-specific assessment. If an endorsed SIMS mitigation plan is submitted as a site-specific assessment, then a separate peer review is not required (see Sections 9.3 and 9.4);
- implement impact management in accordance with approved or interim performance criteria, trigger values and limits;
- report an exceedance of an approved or interim trigger value, and the contributing well/s for that exceedance, to the Department within 10 business days of the detection;
- report an exceedance of an approved or interim limit, and the contributing well/s for that exceedance, to the Department within 10 business days of the detection;
- where required under approval conditions, cease groundwater extraction associated with the contributing well/s, and take corrective actions to reverse the impact and achieve the outcome for the EPBC-listed spring; and
- submit an outcomes assurance statement for the high risk or very high risk impact for each relevant 12 month period (see Section 10.3).

Where performance criteria, trigger values and limits have been approved by the Minister or set by the Minister on an interim basis under approval conditions and the limits have not been reached or exceeded as a result of the CSG development, the approval holder is taken to have achieved the outcome for EPBC-listed springs.

Figure 2. EPBC-listed Spring framework



4. Management framework - Water supply bores

4.1 Outcome and sub-outcome

The outcome for water resources is that 'conditions within unconsolidated and consolidated hydrogeological units, including water level/pressure and water quality, maintain or improve ecosystem services and access by associated users'.

The sub-outcome for water supply bores is that each 'water supply bore continues to supply water for its intended purpose, or is made good'. In turn, this sub-outcome is achieved where the approval holder has complied with its make good obligations which are defined in section 409 of the Queensland Water Act.

4.2 Application

The management framework applies where an approval requires that the water supply bore outcome is achieved and maintained through the implementation of this management framework.

Consistent with section 363(1) of the Queensland Water Act, the management framework applies to water bores:

- if the taking of, or interference with, water from the bore is authorised under the Queensland Water Act; and
- if the *Planning Act 2016* (Qld), the repealed *Sustainable Planning Act 2009* (Qld) or the repealed *Integrated Planning Act 1997* (Qld) required a development approval under that Act in relation to the bore for operational work for the taking of, or interfering with, water under the Queensland Water Act, and the approval has been granted.

The management framework does not apply to a water supply bore if it is used only for water monitoring.

4.3 Risk threshold

The risk threshold for water supply bores is a prediction in the OGIA model of:

- unconsolidated formations – greater than 2m water level drawdown that is caused by CSG development; and
- consolidated formations – greater than 5m water level drawdown that is caused by CSG development.

These risk thresholds are consistent with the bore trigger thresholds identified in section 362 of the Queensland Water Act.

4.4 Risk framework

The risk framework for water supply bores (including relevant steps to be taken under the UWIR and approval conditions) is illustrated in Figure 3. Responsibilities for the implementation of the framework are identified in Table 1.

If:

- the bore is not located within the immediately affected area (IAA) in the UWIR; and

Coal Seam Gas - Joint industry framework: Managing impacts to groundwater resources in the Surat Cumulative Management Area under EPBC Act approvals

- the approval holder has not otherwise been directed by DES under section 418 of the Queensland Water Act to undertake a bore assessment;

then the approval holder:

- is not required to take any action under the JIF until the next UWIR takes effect; and
- is taken to have achieved the outcome for water supply bores.

If either:

- the bore is located in the IAA in the UWIR; or
- DES directs an approval holder under section 418 of the Queensland Water Act to undertake a bore assessment
- the approval holder that is the responsible tenure holder for the bore identified in the UWIR or that has received a direction from DES must comply with its make good obligations under the UWIR and Chapter 3 of the Queensland Water Act, including, as relevant, to:
 - conduct a bore assessment to determine if the bore has impaired capacity;
 - enter into a make good agreement with the bore owner, including to contemplate make good measures if the bore assessment concludes that the bore has or is likely to have impaired capacity; and
 - comply with the conditions of the make good agreement.

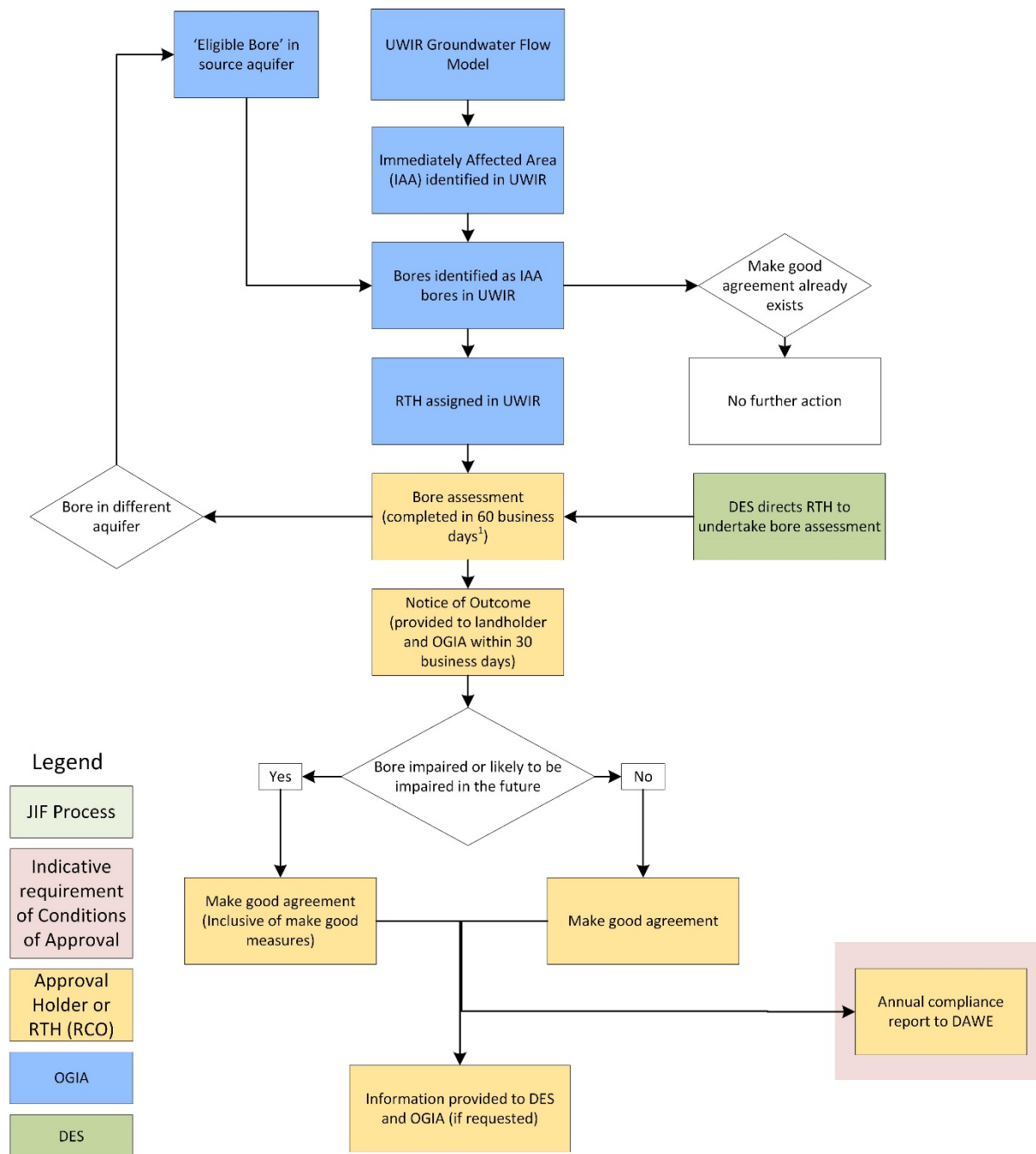
Where a RCO, identified as the responsible tenure holder in the most recent UWIR for an IAA bore, has complied with its make good obligations, the RCO is taken to have achieved the outcome for water supply bores.

The RCO must provide the Department with a progress report of its make good obligations in the annual compliance report (see Section 10.6).

4.5 Approval conditions

The majority of the standard conditions in Appendix C are not relevant to the management of impacts to water supply bores. Where the relevant risk threshold has been or is predicted to be exceeded, standard conditions will require that approval holders comply with this management framework (and by extension, their make good obligations) in order to achieve the outcome for water supply bores.

Figure 3. Water supply bore framework



¹ subject to s417(2) of the Queensland Water Act 2000

5. Management framework - Aquatic GDEs

5.1 Outcome and sub-outcome

The outcome for water resources is that conditions within unconsolidated and consolidated hydrogeological units, including water level/pressure and water quality, maintain or improve ecosystem services and access by associated users.

The sub-outcome for aquatic GDEs is that there are no adverse effects on the function and environmental values due to CSG development. No adverse effects means not reaching or exceeding an approved or interim limit as a result of the CSG development.

5.2 Application

The management framework applies where an approval requires that the aquatic GDEs outcome is achieved and maintained through the implementation of this management framework.

Elements of the management framework are only required to be implemented by an approval holder where the approval holder is a RCO, identified as the responsible tenure holder in the most recent UWIR, and is responsible for mitigation of impacts to a relevant aquatic GDE. The action of the RCO for each relevant aquatic GDE (identified as a watercourse spring) is identified in the most recent UWIR.

5.3 Risk threshold

The risk threshold for aquatic GDEs is a prediction in the UWIR of a drawdown of 0.2m at the location of the aquatic GDE that is caused by CSG development.

This risk threshold is consistent with the spring trigger threshold, which results in the aquatic GDE being a 'spring of interest' in accordance with section 379(3) of the Queensland Water Act.

5.4 Risk framework

The risk framework for aquatic GDEs (including relevant steps to be taken under the UWIR and approval conditions) is illustrated in Figure 4. Responsibilities for the implementation of the framework are identified in Table 1.

If the UWIR predicts an impact on an aquatic GDE that exceeds the relevant risk threshold (identified in the UWIR as a watercourse spring) and the overall spring risk assessment score in the UWIR (which is unmitigated) is a very low, low or moderate (and the UWIR does not otherwise identify the approval holder as a responsible tenure holder required to prepare a mitigation plan for the aquatic GDE), the approval holder whose tenure the aquatic GDE is located on or in closest proximity to:

- must notify the Department of this finding in the approval holder's annual compliance report (see Section 10.6);
- is otherwise not required to take any further action under the JIF until the next UWIR (or amended UWIR) takes effect; and
- is taken to have achieved the outcome for aquatic GDEs.

Despite not requiring any further action under the JIF for a watercourse spring assessed as having very low, low or moderate (unmitigated) risks, the approval holder must continue to perform any obligations

for which the approval holder is the responsible tenure holder under the UWIR. Monitoring data must be provided to OGIA for ongoing trend analysis and reporting. Assigned monitoring must also continue for high and very high risks.

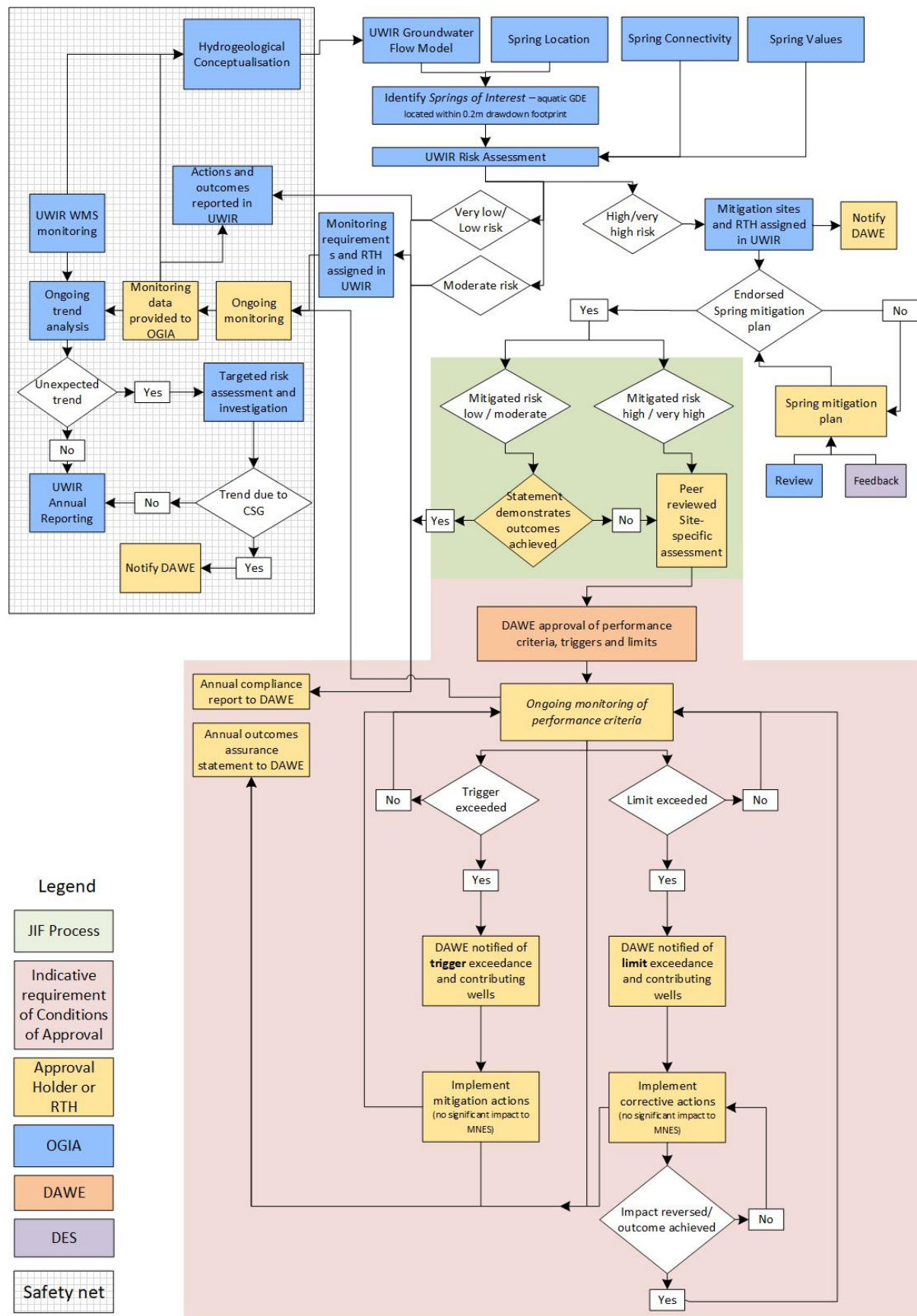
5.4.1 High or very high risk impacts

If the UWIR identifies that an aquatic GDE as a watercourse spring and the overall spring risk assessment score in the UWIR is high risk or very high risk (or otherwise requires that the approval holder identified a responsible tenure holder in the UWIR that must prepare a SIMS mitigation plan for the aquatic GDE), the approval holder is taken to be the RCO for the aquatic GDE and must comply with its approval conditions relevant to the aquatic GDE. Appendix C provides a general description of the standard conditions that may apply to the management of high risk and very high risk impacts to aquatic GDEs. These include that the RCO must:

- notify the Department of the high or very high risk within 20 business days (see Section 10.1)
- if following endorsement of the SIMS mitigation plan the mitigated risk will be low or moderate, provide a statement to DAWE for approval demonstrating how outcomes for the EPBC-listed springs will be achieved;
- if following endorsement of the SIMS mitigation plan the mitigated risk will be high or very high, or the statement is not approved, provide information to the Minister within 9 months (or a timeframe otherwise agreed to by the Minister in writing) of notifying the Department of the high or very high risk. This information must include a description and location of impacts on the aquatic GDE, performance criteria, trigger values, limits, and the contributing well/s, including identification number, GPS coordinates and shapefiles for the written approval by the Minister. This information must be accompanied by a peer-reviewed site-specific assessment. If an endorsed SIMS mitigation plan is submitted as a site-specific assessment, a separate peer review is not required (see Sections 9.3 and 9.4);
- implement impact management in accordance with approved or interim performance criteria, trigger values and limits;
- report an exceedance of an approved or interim trigger value and the contributing well/s for that exceedance to the Department within 10 business days of the detection;
- report an exceedance of an approved or interim limit and the contributing well/s for that exceedance to the Department within 10 business days of the detection;
- where required under approval conditions, cease groundwater extraction associated with the contributing well/s and take other corrective actions to reverse the impact and achieve the outcome for the aquatic GDE; and
- submit an outcomes assurance statement for the high risk or very high risk impact for each relevant 12 month period (see Section 10.3).

Where performance criteria, trigger values and limits have been approved by the Minister or set by the Minister on an interim basis under approval conditions and the limits have not been reached or exceeded as a result of the CSG development, the approval holder is taken to have achieved the outcome for aquatic GDEs.

Figure 4. Aquatic GDE framework



6. Management framework - Terrestrial GDEs

6.1 Outcome and sub-outcome

The outcome for water resources is that conditions within unconsolidated and consolidated hydrogeological units, including water level/pressure and water quality, maintain or improve ecosystem services and access by to the associated user.

The sub-outcome for terrestrial GDEs is that there are no adverse effects on the function and environmental values due to CSG development.

6.2 Application

This management framework applies where an approval requires that the terrestrial GDE outcome is achieved and maintained through the implementation of this management framework.

6.3 Risk threshold

The risk threshold for terrestrial GDEs is a prediction in the OGIA model of a long term predicted drawdown of more than 0.2m in the outcrop of the formation that is caused by CSG development.

This risk threshold is consistent with the 'area of interest' for terrestrial GDEs identified in the UWIR as part of the description of impacts to environmental values² provided in accordance with section 376(1)(da) of the Queensland Water Act. The UWIR identifies potential terrestrial GDEs within this 'area of interest' using Queensland *WetlandInfo* terrestrial GDE mapping.

6.4 Risk framework

The risk framework for terrestrial GDEs (including relevant steps to be taken under the UWIR and approval conditions) is illustrated in Figure 5. Responsibilities for the implementation of the framework are identified in Table 1.

If the UWIR identifies an area that is to be the subject of an exceedance of the relevant risk threshold for terrestrial GDEs, that area is an 'area of interest'. When an 'area of interest' is identified, each approval holder must take the appropriate steps to determine if they are the RCO for a mapped potential terrestrial GDE within the 'area of interest', adopting the assignment rules for reporting obligations identified in the most recent UWIR.

If an approval holder is not a RCO for any terrestrial GDE under the rules identified in the most recent UWIR, the approval holder:

- must notify DAWE of the process it followed to confirm it is not a RCO for a mapped potential terrestrial GDE within the 'area of interest';
- is not required to take any further action under the JIF until the next UWIR (or amended UWIR) takes effect; and
- is taken to have achieved the outcome for terrestrial GDEs.

The RCO for each mapped potential terrestrial GDE within the 'area of interest' must notify DAWE of the process it followed to identify the mapped potential terrestrial GDE(s) for which it is the RCO, and

² As defined under section 9 of the EP Act

complete a preliminary risk assessment for that terrestrial GDE within three months following the UWIR taking effect.

Content requirements for the preliminary risk assessment are set out in Section 9.1.1.

The RCO is not required to reassess a risk if a preliminary risk assessment has been previously prepared for the terrestrial GDE and there is no substantial change to the predicted drawdown or conceptual understanding of the terrestrial GDE.

If the preliminary risk assessment identifies that the terrestrial GDE is at low or moderate risk (as described in Section 9.1.1), the RCO:

- must notify the Department of this finding in the approval holder's annual compliance report (see Section 10.6);
- is otherwise not required to take any further action under the JIF until the next UWIR (or amended UWIR) takes effect; and
- is taken to have achieved the outcome for terrestrial GDEs.

If the preliminary risk assessment identifies that the terrestrial GDE is at high risk (as described in Section 9.1.1), the RCO must complete a supplementary risk assessment for the terrestrial GDE within three months (or a timeframe otherwise agreed to by the Minister in writing) of the completion of the preliminary risk assessment.

Content requirements for the supplementary risk assessment are set out in Section 9.2.

If the supplementary risk assessment identifies that the terrestrial GDE is at low or moderate risk (as described in Section 9.2), the RCO:

- must notify the Department of this finding in the approval holder's annual compliance report (see Section 10.6);
- is otherwise not required to take any further action under the JIF until the next UWIR (or amended UWIR) takes effect, other than providing data and reporting associated with the supplementary risk assessment to OGIA for use in the update of conceptualisation in the Surat CMA; and
- is taken to have achieved the outcome for terrestrial GDEs.

Despite not requiring any further action under the JIF for low or moderate risks identified using the preliminary risk assessment, the approval holder must continue to perform any obligations for which the approval holder is identified as a responsible tenure holder under the UWIR. Monitoring data must be provided to OGIA for ongoing trend analysis and reporting. Assigned monitoring must also continue for high and very high risks.

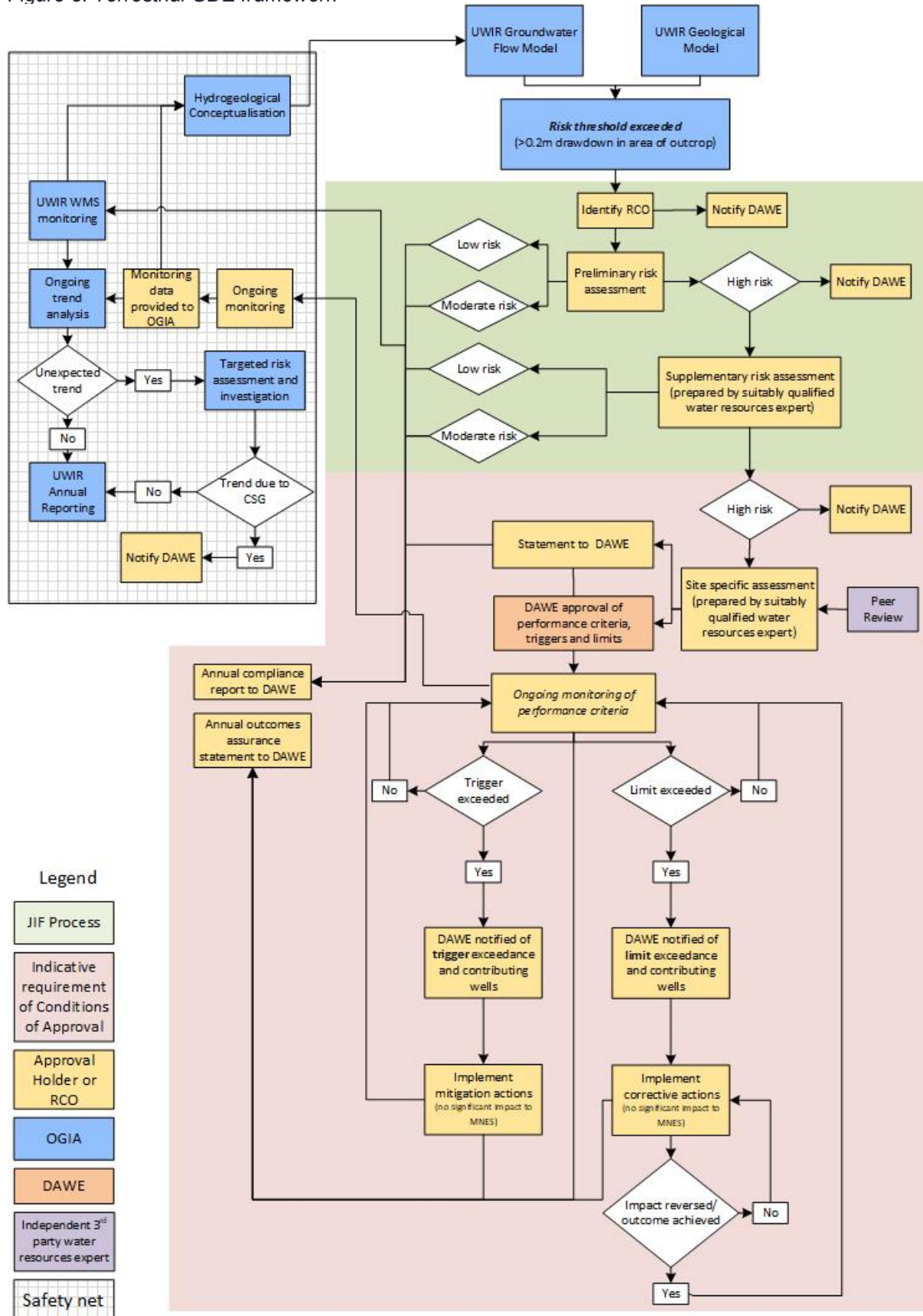
6.4.1 High risk impacts

If the supplementary risk assessment identifies that the terrestrial GDE is at high risk (as described in Section 9.2), the RCO must comply with its approval conditions for the protection of the terrestrial GDE. Appendix C provides a general description of the standard conditions as they apply to the management of high risk impacts to terrestrial GDEs. These include that the RCO must:

- notify the Department of the high risk within 20 business days (see Section 10.1);
- provide to the Minister within 9 months (or a timeframe otherwise agreed to by the Minister in writing) of notifying the Department of the high risk, either:
 - a description and location of impacts on the terrestrial GDE, performance criteria, trigger values, limits, and the contributing well/s, including identification number, GPS coordinates and shapefiles for the written approval by the Minister. This information must be accompanied by a site-specific assessment and site-specific assessment peer review; or
 - a statement as to why the provision of performance criteria, trigger values, limits and contributing well/s is not necessary, for the written agreement by the Minister;
- implement impact management in accordance with approved or interim performance criteria, trigger values and limits;
- report an exceedance of an approved or interim trigger value and the contributing well/s for that exceedance to the Department within 10 business days of the detection;
- report an exceedance of an approved or interim limit and the contributing well/s for that exceedance to the Department within 10 business days of the detection;
- where required under approval conditions, cease groundwater extraction associated with the contributing well/s and take corrective actions to reverse the impact and achieve the outcome for the terrestrial GDE; and
- submit an outcomes assurance statement for the high risk impact for each relevant 12 month period (see Section 10.3).

Where performance criteria, trigger values and limits have been approved by the Minister or set by the Minister on an interim basis under approval conditions and limits have not been reached or exceeded as a result of the CSG development, the approval holder is taken to have achieved the outcome for terrestrial GDEs.

Figure 5. Terrestrial GDE framework



7. Management framework - Subterranean GDEs

7.1 Outcome and sub-outcome

The outcome for water resources is that conditions within unconsolidated and consolidated hydrogeological units, including water level/pressure and water quality, maintain or improve ecosystem services and access by the associated user.

The sub-outcome for subterranean GDEs is that habitat is maintained or improved.

7.2 Application

This management framework applies where an approval requires that the subterranean GDE outcome is achieved and maintained through the implementation of this management framework.

7.3 Risk threshold

The risk threshold for subterranean GDEs is a prediction in the OGIA model of:

- a long term predicted drawdown of more than 2m for unconfined hydrogeological units caused by CSG development; or
- a long term predicted drawdown that dewateres the aquifer habitat for confined hydrogeological units.

Dewater in this instance means a model prediction at any point in time where aquifer pressure in confined units is reduced to the top of the hydrostratigraphic unit, after which point dewatering occurs.

7.4 Risk framework

The risk framework for subterranean GDEs (including relevant steps to be taken under the UWIR and approval conditions) is illustrated in Figure 6. Responsibilities for the implementation of the framework are identified in Table 1.

If the UWIR provides information that indicates an area that is to be the subject of an exceedance of the relevant risk threshold for subterranean GDEs, each approval holder must take the appropriate steps to determine if they are the RCO for a subterranean GDE within that area, adopting the assignment rules for reporting obligations identified in the most recent UWIR.

If an approval holder is not a responsible tenure holder for any subterranean GDE under the rules identified in the most recent UWIR, the approval holder:

- must notify DAWE of the process it followed to confirm it is not a RCO for a subterranean GDE;
- is not required to take any further action under the JIF until the next UWIR (or amended UWIR) takes effect; and
- is taken to have achieved the outcome for subterranean GDEs.

The RCO for a subterranean GDE must notify DAWE of the process it followed to identify the subterranean GDE(s) for which it is the RCO, and complete a preliminary risk assessment for the

subterranean GDE within three months following the notice of approval of the UWIR under section 385(4) of the Queensland Water Act.

Content requirements for the preliminary risk assessment are set out in Section 9.1.2.

The RCO is not required to reassess a risk if a preliminary risk assessment has been previously prepared for the subterranean GDE and there is no substantial change to the predicted drawdown or conceptual understanding of the hydrogeological system.

If the preliminary risk assessment identifies that the subterranean GDE is at low or moderate risk (as described in Section 9.1.2), the RCO:

- must notify the Department of this finding in the approval holder's annual compliance report (see Section 10);
- is otherwise not required to take any further action under the JIF until the next UWIR (or amended UWIR) takes effect ; and
- is taken to have achieved the outcome for subterranean GDEs.

If the preliminary risk assessment identifies that the subterranean GDE is at high risk (as described in Section 9.1.2), the RCO must complete a supplementary risk assessment for the subterranean GDE within three months (or a timeframe otherwise agreed to by the Minister in writing) of the completion of the preliminary risk assessment.

Content requirements for the supplementary risk assessment are set out in Section 9.2.

If the supplementary risk assessment identifies that the subterranean GDE is at low or moderate risk (as described in Section 9.2), the RCO:

- must notify the Department of this finding in the approval holder's annual compliance report (see Section 10.6);
- is otherwise not required to take any further action under the JIF until the next UWIR (or amended UWIR) takes effect, other than providing data and reporting associated with the supplementary risk assessment to OGIA for use in the update of conceptualisation in the Surat CMA; and
- is taken to have achieved the outcome for subterranean GDEs.

Despite not requiring any further action under the JIF for low or moderate risks identified using the preliminary risk assessment, the approval holder must continue to perform any obligations for which the approval holder is the responsible tenure holder under the UWIR. Monitoring data must be provided to OGIA for ongoing trend analysis and reporting. Assigned monitoring must also continue for high and very high risks.

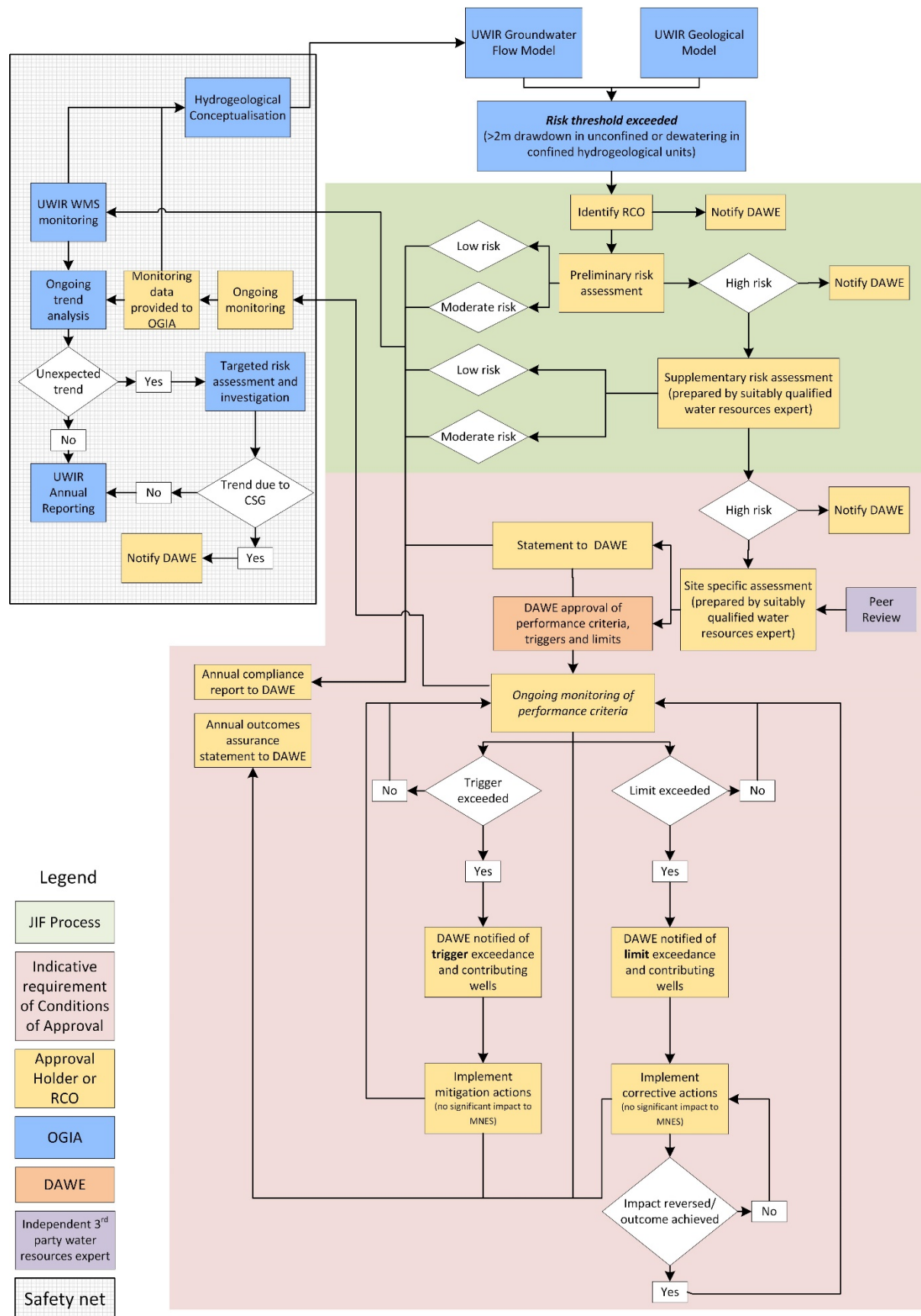
7.4.1 High risk impacts

If the supplementary risk assessment identifies that the subterranean GDE is at high risk (as described in Section 9.2), the RCO must comply with its approval conditions for the protection of the subterranean GDE. Appendix C provides a general description of the standard conditions as they apply to the management of high risk impacts to subterranean GDEs. These include that the RCO must:

- notify the Department of the high risk within 20 business days (see Section 10.1);
- provide to the Minister within 9 months (or a timeframe otherwise agreed to by the Minister in writing) of notifying the Department of the high risk, either:
 - a description and location of impacts on the subterranean GDE, performance criteria, trigger values, limits, and the contributing well/s, including identification number, GPS coordinates and shapefiles for the written approval by the Minister. This information must be accompanied by a site-specific assessment and site-specific assessment peer review; or
 - a statement as to why the provision of performance criteria, trigger values, limits and contributing well/s is not necessary for the written agreement by the Minister;
- implement impact management in accordance with approved or interim performance criteria, trigger values and limits;
- report an exceedance of an approved or interim trigger value and the contributing well/s for that exceedance to the Department within 10 business days of the detection;
- report an exceedance of an approved or interim limit and the contributing well/s for that exceedance to the Department within 10 business days of the detection;
- where required under approval conditions, cease groundwater extraction associated with the contributing well/s and take corrective actions to reverse the impact and achieve the outcome for the subterranean GDE; and
- submit an outcomes assurance statement for the high risk impact for each relevant 12 month period (see Section 10.3).

Where performance criteria, trigger values and limits have been approved by the Minister or set by the Minister on an interim basis under approval conditions and limits have not been reached or exceeded as a result of the CSG development, the approval holder is taken to have achieved the outcome for subterranean GDEs.

Figure 6. Subterranean GDE framework



8. Regional safety net

Fundamental to the risk-based approach of the JIF is the regional 'safety net' that assesses, and monitors predicted modelling impacts based on actual monitoring data. This safety net provides additional early warning for those impacts on EPBC-listed springs and associated users that are not considered high or very high risk and do not require site-specific assessments or make good agreements.

The collection and analysis of ongoing monitoring data under the UWIR provides a regional-scale early warning system to monitor changes in the system and potential impacts to EPBC-listed springs and associated users. Outputs from this early-warning system can also be used to notify the Department of any changes to the risk level of an EPBC-listed spring or associated user.

The adaptive management approach of the UWIR provides a means of assessing and managing potential changes to predicted risks to EPBC-listed springs and associated users in the Surat CMA from CSG development. Relevant aspects of the legislated UWIR process include:

- under sections 370 and 376 of the Queensland Water Act, a three-yearly update of the UWIR with annual reviews as required under the Queensland Water Act;
- the requirement for all approval holders to provide monitoring data to OGIA in accordance with the UWIR, including:
 - WMS network implementation and water monitoring reports by 1 April and 1 October each year; and
 - SIMS monitoring reports by 1 April and 1 October each year;
- under section 376(1)(b) of the Queensland Water Act, analysis of movement and trends in water level changes as a result of the exercise of underground water rights, including mapping of predicted declines in aquifer water levels;
- under section 376(1)(e)(i) of the Queensland Water Act, a program for OGIA to annually review the accuracy of mapping of predicted water level declines prepared under section 376(1)(b);
- under section 376(e)(ii) of the Queensland Water Act, reporting by OGIA of the results of the annual review program to the DES, including whether there have been material changes to the information or predictions used to prepare the maps; and
- the incorporation of the WMS data, and other scientific studies, into the updates of the UWIR, particularly as a OGIA model calibration data set.

Further detail on the relevant components of the safety net are described in Appendix A.

In addition to WMS data providing a calibration target for the OGIA model, ongoing monitoring in accordance with the WMS post OGIA model calibration provides data for the validation of the predicted impacts, which is undertaken during the legislated annual UWIR reviews and report. The ongoing monitoring data provides a regional-scale early warning monitoring system for changes to potential risks to EPBC-listed springs and associated users. OGIA also reviews the adequacy of the monitoring network, and may, at its discretion, add additional monitoring points.

For example, in the annual review of the UWIR, OGIA may determine that monitoring data identifies a material change to the model predictions, which results in a change to the predicted impacts on EPBC-listed springs and associated users. DES may use this information to review compliance or make an amendment to the UWIR under the Queensland Water Act. DES may also amend the associated environmental authority, under the Queensland Environmental Protection Act, if the UWIR identifies impacts or potential impacts on an environmental value.

In annual compliance reports, approval holders will be required to report to the Department on any unexpected changes to the predicted impacts on EPBC-listed springs and associated users identified through monitoring data and in OGIA's annual review. In response to these reports, the Department may, under standard approval conditions, require approval holders to take adaptive management measures to ensure outcomes are met.

The State regulator may also directly notify the Department of predicted changes in the level of potential risk to an EPBC-listed spring or associated user determined through the annual review process.

9. Risk assessments and site-specific assessments

9.1 Preliminary risk assessments

Where the risk threshold has been exceeded for a terrestrial GDE or subterranean GDE, the management frameworks require that the RCO undertake a preliminary risk assessment. The preliminary risk assessment is an initial desktop assessment to determine the level of potential risk to the terrestrial GDE or subterranean GDE, and is undertaken using existing data.

The level of risk to the GDE is assessed following the process set out below.

9.1.1 Preliminary risk assessment - terrestrial GDEs

The preliminary risk assessment for terrestrial GDEs adopts a similar risk assessment undertaken by OGIA in assessment of potential impact to terrestrial GDEs as part of the 2019 UWIR. This risk assessment predicts impacts on potential terrestrial GDEs within the area of interest (area of long-term predicted drawdown of more than 0.2m) identified in the UWIR. While the UWIR risk assessment includes the biodiversity status of the terrestrial GDE, the Water Trigger considers the terrestrial GDE as an associated user regardless of its Conservation status, and inclusion of this factor is not appropriate for the preliminary risk assessment for the JIF management framework. The inclusion of the biodiversity or conservation status, which will include consideration of MNES habitat and other ecological values, should be included in the supplementary risk assessment (Section 9.2).

The preliminary risk assessment includes a magnitude and timing component to the likelihood - the sooner the predicted exceedance of the risk threshold, the higher the potential risk. The consequence is based on the potential for groundwater interaction by the ecosystem, utilising Queensland WetlandInfo confidence mapping categories of:

- Known GDE.
- Derived GDE – High Confidence: high potential for groundwater interaction.
- Derived GDE – Moderate Confidence: moderate potential for groundwater interaction.
- Derived GDE – Low Confidence: low potential for groundwater interaction.

The derived GDEs were identified through GIS analysis of existing spatial data sets. The spatial data sets were weighted to a set of rules identified through a literature review and based on local expert knowledge. The results of the GIS analysis were validated against previous studies, which were presumed to reliably identify the interaction between the ecosystem and the underlying groundwater. Where terrestrial GDEs were known to exist from previous studies, these locations were

superimposed onto the derived GDE maps. The confidence attribute provides a good overall indicator of the potential presence of a GDE at a particular location.

The preliminary risk rating is determined by applying the following likelihood and consequence categorisations using the matrix at Table 4 below:

- The likelihood score is the sum of the L1 + L2 scores in Table below.
- The consequence is determined based on the level of confidence in the terrestrial GDE in the *Wetlandinfo* mapping, as set out in Table below.

The RCO must provide to the Department a summary report of how the preliminary risk assessment process was undertaken. This report should include a list of the spatial data sets used to define risk categorisation, the key assumptions in the GIS analysis, outcomes of the GIS analysis and scoring used to determine preliminary risk rating.

Table 3. Terrestrial GDEs Preliminary Risk Assessment Categories and Scores

Description	Score
L1 - Magnitude of maximum drawdown prediction (within area of outcrop)	
>0.2m and <1.0m	1
>1.0m	2
L2 - Timing of predicted exceedance	
>12 years	1
<12 years and >3 years	2
<3 years	3
Likelihood (max 5) = L1 + L2	
Consequence of predicted drawdown based on WetlandInfo mapping	
Derived GDE – Low Confidence	1
Derived GDE – Moderate Confidence	2
Derived GDE – High Confidence	3
Known GDE	4

Table 4. Terrestrial GDE – Preliminary Risk Assessment Matrix

Likelihood	Consequence			
	0-1	2	3	4
1-3	Low	Low	Low	Low
4	Low	Moderate	Moderate	High
5	Moderate	Moderate	High	High

9.1.2 Preliminary risk assessment - subterranean GDEs

The preliminary risk assessment for subterranean GDEs assesses the risk to the GDE through a combination of the likelihood of the predicted drawdown, and the potential consequence to the GDE if the predicted drawdown does materialise. Likelihood categories consider the maximum magnitude of predicted drawdown and the timing of the predicted drawdown. The preliminary risk assessment may identify potential subterranean GDEs in areas where the groundwater model predicts the risk threshold will be exceeded. The responsible tenure holder may ask the Department to exclude subterranean GDEs in certain areas from further risk assessment where they can reasonably demonstrate that:

- the area of predicted trigger threshold exceedance has been identified as a result of a numerical model issue associated with model instability, relatively thin models layers or any other unreasonable prediction;
- the aquifer thickness in the area of predicted trigger threshold exceedance is unreasonably thin;

- the height of the potentiometric surface of the confined aquifer being considered is unreasonably close to the top of the formation (e.g. less than 50 m for the Hutton and Precipice Sandstones or less than 25 m for the Springbok and Boxvale Sandstones); or
- any other reason that would make further risk assessment unreasonable.

Ongoing monitoring through the UWIR WMS, UWIR SIMS and other investigations will lead to improved hydrogeological conceptualisation and model predictions, which may change the predictions and risk category.

Consequence categories consider the outcrop geology and hydrogeological or ecological attributes relevant to the GDE. The assigned scores for each likelihood and consequence category are then added, and the total likelihood and total consequence score compared in the risk matrix to identify the risk rating.

Table 5 provides the likelihood and consequence categories and scores for subterranean GDEs. Table 6 provides a matrix to assign the overall risk rating.

Table 5. Subterranean GDE preliminary risk assessment categories

Description	Score
L1 - Timing of predicted exceedance	
>12 years	1
<12 years and >3 years	2
<3 years	3
C1 - Outcrop geology	
Consolidated and confined – the predicted exceedance of the risk threshold is within a consolidated formation in an area of the hydrostratigraphic unit which is not mapped in outcrop or subcrop beneath Quaternary or Tertiary cover	0
Consolidated and unconfined¹ aquifer of minimum thickness² – the predicted exceedance of the risk threshold is within a consolidated formation in which the hydrostratigraphic unit is mapped in outcrop	1
Unconsolidated/unconfined - the predicted exceedance of the risk threshold is within an unconsolidated formation that is mapped in outcrop	2
C2 - Rate of CSG drawdown	
Less than 1m/day	0
Greater than 1m/day and background trend	2
C3 - Knowledge of subterranean fauna presence	
Field survey undertaken – no unique species identified (based on comparison to Surat Basin studies)	0
No field survey undertaken	2
Field survey undertaken – unique species identified (based on comparison to Surat Basin studies)	2
Consequence (max 6) = C1 + C2 + C3	

¹Unless otherwise known, only the outcrop portion of a consolidated aquifer is considered unconfined.

²Minimum thickness is 25 m for the Springbok and Boxvale Sandstones and 50 m of the Hutton and Precipice Sandstones.

Table 6. Subterranean GDE preliminary risk assessment matrix

		Consequence		
		1-2	3-4	5-6
Likelihood	1	Low	Low	Low
	2	Low	Moderate	Moderate
	3	Moderate	High	High

Further explanation of the consequence categories is provided below.

Consequence category 1 (C1) – Outcrop geology

Hose et al. (2015) identify key factors for determining the presence of stygofauna in aquifers as:

- predominantly found in aquifers with large (mm or greater) pore spaces, which are more common for alluvial, karstic and some fractured rock aquifers. They have occasionally been found in coal seam aquifers;
- abundance and diversity of stygofauna typically decreases with depth below ground with fauna rarely found more than 100m below ground level;
- stygofauna are most commonly found in, but are not limited to, fresh and brackish water with electrical conductivity less than 5000 μ S/cm; and
- stygofauna are more abundant in areas of surface water-groundwater exchange, compared with areas deeper or those further along the groundwater flow path. They are rarely found in hypoxic groundwater (<0.3mg O₂/L).

These key factors have informed the preliminary risk assessment matrix in helping to determine whether the aquifer is consolidated (less vulnerable), confined (less vulnerable), unconfined (more vulnerable) and unconsolidated (more vulnerable) as follows:

- **consolidated and confined** - aquifer conditions are not likely to be conducive to stygofauna presence as there is limited potential for recharge and depths are likely to be greater than 100m;
- **consolidated and unconfined** - there is a possibility that aquifer conditions are conducive to stygofauna presence as there is the potential for recharge and the formation depth is sufficiently shallow (<100m); and
- **unconsolidated/unconfined** - the unconsolidated sediments are most likely to have the greatest pore size, potential for active recharge (either directly through rainfall or surface water leakage) and contain fresh, relatively oxygen rich waters.

Outcrop geology is based on the OGIA geological model. Consolidated formations include all Permian, Triassic, Jurassic and Cretaceous aged formations of the Surat Basin and Bowen Basin geological basins. Unconsolidated aquifers include Quaternary and Tertiary sedimentary deposits, generally associated with rivers/creeks, and incorporated within the alluvium and Cenozoic layers within the OGIA model. For the purposes of the preliminary risk assessment, a hydrostratigraphic unit is assumed to be unconfined if the area in which the risk threshold is exceeded is an area of outcrop of the hydrostratigraphic unit.

Consequence category 2 (C2) - Rate of CSG drawdown

Stygofauna can be sensitive to changing water levels or disturbance because they adapt to specific groundwater conditions and can have narrow spatial distributions. The key threat from CSG development to stygofauna is water level drawdown due to depressurisation at a rate so rapid that it results in the stranding of stygofauna above the water table (Hose et al., 2015). In a confined aquifer, this would necessitate the water level at least being drawn down below the top of the aquifer. Stumpp and Hose (2013) demonstrated that stygofauna may become stranded when the water table receded by 2.6 m/day or 1.0 m/day and the response was taxon specific.

In accordance with Stumpp and Hose (2013), rates of predicted drawdown greater than 1.0 m/day are conservatively considered to be a higher risk.

Consequence category 3 (C3) – Knowledge of subterranean fauna presence

Category C3 relates to the current understanding of the likely presence and endemism of stygofauna in the area in which the risk threshold is exceeded. The category is broadly based on the DSITI (2016), which identifies three phases of assessment:

- desktop review;
- pilot survey; and
- comprehensive survey.

In many cases, stygofauna assessments may have been completed as part of the referral of the CSG development under the EPBC Act, which would generally provide, at a minimum, a desktop review and pilot survey. Hose et al. (2015) provides a comprehensive listing of publicly available information prior to the date of publication.

Levels of species identification should be commensurate with those identified in DSITI (2016) i.e.:

- **genus level:** *amphipoda; copepoda; isopoda; ostracoda; remipedia; spelaeogriphacea; syncarida; and thermosbaenacea; and*
- **family level:** *arcarina; coleoptera; decapoda; mollusca; nematoda; oligochaeta; rotifer; polychaeta; and turbellaria.*

If no site-specific information is available, the consequence score will be higher, leading to an increased risk rating.

9.2 Supplementary risk assessments – terrestrial GDEs and subterranean GDEs

Where a preliminary risk assessment identifies a high risk to a terrestrial GDE or subterranean GDE, the responsible tenure holder must complete a supplementary risk assessment.

The content of a supplementary risk assessment will vary depending on the nature of the GDE and the circumstances of the relevant project.

The supplementary risk assessment should include:

- the details of the GDE, including its location;

- an assessment of the connectivity between the GDE and the aquifer for which a decline in water level in exceedance of the risk threshold is predicted; and
- the predicted risk to, and likely impact on, the GDE because of a decline in water level. Unless multiple lines of evidence are used to show that the associated user is not in hydraulic connection to the hydrostratigraphic unit in which the risk threshold is exceeded, then the risk must be assessed to be high.

The supplementary risk assessment should include:

- a consideration of references and field validation that can map and identify the GDE (e.g. Doody et al. (2019): <https://www.iesc.environment.gov.au/publications/information-guidelines-explanatory-note-assessing-groundwater-dependent-ecosystems>);
- a description of the source, timing and extent of CSG development-related depressurisation in the vicinity of the GDE;
- a description of the potential pathways and mechanisms of connectivity of CSG production to the source hydrogeological unit and the GDE;
- a description of the environmental context that is unrelated to CSG development in the vicinity of the GDE (for example, surrounding groundwater or surface water users, mines, abandoned exploration wells or coal exploration bores);
- a review of the available historical monitoring data;
- where appropriate, local-scale modelling that assesses potential drawdown at the GDE. This modelling may be analytical or numerical, depending on the complexity of the hydrogeological setting and the availability of data to inform a model. For example, qualitative modelling may be employed to conceptually test whether impact pathways and mechanisms are plausible. Local scale modelling may not be appropriate if there is no plausible pathway between CSG development and the GDE, or if there is insufficient data to inform realistic parameterisation of a model;
- an assessment of the vulnerability and sensitivity of the GDE to changes in groundwater pressure;
- consideration of the ecological status of the GDE, including its biodiversity status under the *Nature Conservation Act 1992* (Qld) and whether it contains threatened ecological communities and species listed under the EPBC Act;
- hydrogeological and ecological conceptualisation of the associated user and the mechanisms for impact due to CSG development;
- if required, the scope of investigations and/or monitoring that may improve the supplementary risk assessment; and
- the likelihood and consequence of impact to the outcome for that GDE from CSG production.

An impact to a terrestrial GDE or subterranean GDE will not be a high risk if (among other things):

- the hydrostratigraphic unit in which the risk threshold is exceeded is not present at the mapped location;

- the GDE is not present in the mapped location;
- multiple lines of evidence show that the GDE is not in hydraulic connection to the hydrostratigraphic unit in which the risk threshold is exceeded;
- the modelled drawdown can be shown to not impact on water availability to the GDE (e.g. through confined aquifer conditions in outcrop areas where a drawdown will not result in loss of saturated thickness); and
- the timing of predicted exceedance of the risk threshold is greater than 12 years into the future.

Approval holders must provide data and reporting associated with the supplementary risk assessment to OGIA for use in the update of conceptualisation in the Surat CMA.

9.3 Site-specific assessments

Once a high or very high risk impact has been identified (either by the UWIR for EPBC-listed springs and aquatic GDEs, or a supplementary risk assessment for terrestrial GDEs and subterranean GDEs) and has been notified to the Department, approval conditions will generally require that the RCO provide for the approval by the Minister:

- a description and location of the impact/s and EPBC-listed spring or associated user;
- performance criteria;
- trigger values;
- limits; and
- the contributing well/s, including identification number, GPS coordinates and shapefiles.

This information must be submitted to the Minister with an accompanying site-specific assessment prepared by a suitably qualified water resources expert and a peer review undertaken by an independent suitably qualified water resources expert (see Section 9.4). Approval conditions will require that this is submitted to the Minister within 9 months of notifying the Minister of the high or very high risk impact.

The site-specific assessment must explain the scientific basis for how the description and location of impacts to EPBC-listed springs or associated users, performance criteria, trigger values, limits and contributing well/s have been derived, or not derived, and how any areas of CSG development contributing to the exceedance of a limit will be identified, including:

- local scale (conceptual and where appropriate analytical or numerical) modelling with consideration of potential contributing well/s;
- multiple lines of evidence used to derive, and monitoring proposed to implement, scientifically robust performance criteria, trigger values and limits;
- methodology for the application of trigger values and limits, and the application of triggers to proposed mitigation measures; and
- methodology for determining the area of approved CSG development activity that could influence the exceedance of a trigger values and/or limit.

Performance criteria should relate to the function of the EPBC-listed spring or water resource (ecosystem components, processes and benefits or services that characterise the spring or associated user, including support for biological diversity or species composition), and will be monitored to demonstrate that the relevant outcomes of EPBC-listed springs and associated users are being achieved.

Trigger values:

- should be based on SMART (means specific, measurable, achievable, relevant and time bound) principles;
- should be based on leading performance criteria (e.g. water level/pressure) which provide advance warning of potential impacts to outcome for the EPBC-listed spring or associated user;
- may include both a magnitude and timing component;
- may consider more than one performance indicator constituting the trigger value for the EPBC-listed spring or associated user; and
- could include either a comparison to model data or be based only on monitoring data.

Limits:

- must be based on SMART principles;
- can include lagging performance indicators (e.g. vegetation health) that identify when the outcome has not been met, and also leading performance indicators;
- should be based on measured impacts to the EPBC-listed spring or associated user and may include pressure, water quality indicators, ecological processes such as growth, reproduction, recruitment, mortality or changes in structure (Eamus et al., 2006), or a combination thereof; and
- where appropriate and with adequate justification and data, may consider multiple indicators constituting one limit.

A site-specific assessment should also include an assessment of potential mitigation options. Specifically:

- options should be prioritised on the risk management hierarchy of *avoid, mitigate and manage*;
- the assessment must include supporting evidence that preferred mitigation options will be effective at managing the risk (e.g. a mitigation feasibility study), including site and action-specific modelling. Any modelling undertaken must include an assessment of the uncertainties in the understanding of the system and the predictions;
- mitigation measures must not be likely to result in significant impacts to the EPBC-listed spring or GDE beyond the scope of the approval, unless those actions are separately referred to the Minister for assessment and approval; and
- a realistic schedule for the implementation of mitigation measures following the exceedance of a trigger value.

For impacts on EPBC-listed springs and aquatic GDEs, a RCO may provide a SIMS mitigation plan as its site-specific assessment, provided that it meets the requirements of the site-specific assessment.

9.4 Site-specific assessment peer review report

For impacts on EPBC-listed springs and aquatic GDEs, where a RCO has provided a SIMS mitigation plan as its site-specific assessment, and the Department has accepted that this plan meets the intent of the site-specific assessment, the assessment will be taken to be adequately peer reviewed and will not be required to be accompanied by a peer review report.

For other site-specific assessments, a peer review of the site-specific assessment must be carried out by an independent suitably qualified water resources expert to evaluate the applicability and scientific robustness of performance criteria, trigger values and limits.

This peer review must include, but is not limited to, a review of the adequacy of the:

- local scale (conceptual and where appropriate analytical or numerical) modelling with consideration of potential contributing well/s;
- multiple lines of evidence used to derive, and monitoring proposed to implement, scientifically robust performance criteria, trigger values and limits;
- methodology for the application of trigger values and limits, and the application of triggers to proposed mitigation measures; and
- methodology for determining the area of approved CSG development activity that could influence the exceedance of a trigger values and/or limit.

Where inadequacies are identified in the site-specific assessment, the independent suitably qualified water resources expert must state what the inadequacy is, why it has occurred and what work must be taken to rectify it.

10. Other notices and reporting

Approval conditions will require approval holders to submit notifications and reports to the Department in accordance with the relevant management frameworks and approval conditions.

Approval holders must publish all notifications and reports on a relevant website available to the public.

An outline of the notification and reporting requirements is provided below.

10.1 Notice of high risk or very high risk impacts

Where an impact is identified under the risk management frameworks as a high or very high risk, the approval holder that is the RCO for that impact will be required to notify the Department of this risk in accordance with their approval conditions.

10.2 Notice of exceedance of trigger value or limit

Where an approved trigger value or limit has been exceeded, the approval holder that is the RCO will be required to notify the Department of this exceedance and provide relevant information as required under approval conditions. This will require the identification of the contributing well/s that has caused

the exceedance of the trigger value or limit. Timeframes for notification will be undertaken in accordance with approval conditions.

10.3 Outcomes assurance statement

Where a RCO has submitted a site-specific assessment to the Minister in respect of a high or very high risk impact, the responsible tenure holder must prepare and submit an outcomes assurance statement in accordance with approval conditions. This can be in relation to the relevant 12 month period which is set out in the approval conditions (commencing generally on the date of approval of trigger values, limits and performance criteria).

The outcomes assurance statement must include:

- details of performance against the approved or interim trigger values and limits, including analysis of trends that indicate that reaching or exceeding an approved or interim trigger value or limit is likely during or before the next reporting period;
- details, with demonstrated scientifically robust evidence, of how and to what extent relevant outcomes have been achieved, including:
 - analysis of key monitoring data, which is quality controlled and assured;
 - an analysis of trends that indicate that reaching or exceeding an approved or interim trigger value or limit is unlikely during or before the next reporting period;
 - quantification and assurance of the performance of any mitigation measures that have been implemented, including that no significant impacts will occur in relation to the protected matter beyond the scope of the approval; and
- any changes to the existing regulatory arrangements in place for the protection of water resources or EPBC-listed springs, not limited to legislation, standards or codes or practice, governance arrangements and existing controls.

Under approval conditions, the Minister may seek advice from experts and identify specific matters that must be addressed in any outcomes assurance statement or further information that must be provided following the submission of an outcomes assurance statement. In those circumstances, approval holders will be provided with the opportunity to submit information and respond to the specific matters identified in order to ensure outcomes assurance statements are based on the best available information.

10.4 Setting of interim performance criteria, trigger values and limits

If, within 6 months of an approval holder submitting a site-specific assessment, the Minister is not satisfied that the description and location of impact/s and associated users, performance criteria, trigger values and limits provided will or will be likely to achieve the relevant outcomes, the Minister may set interim performance criteria, trigger values and limits and notify the approval holder under approval conditions.

In deciding to impose interim performance criteria, trigger values and limits, the Minister must act reasonably and give appropriate consideration to the material provided by the approval holder, including under the site-specific assessment peer review report.

Approval holders will be required to comply with interim performance criteria, trigger values and limits until the Minister approves final performance criteria, trigger values and limits.

10.5 Report on adaptive management responses

If the Minister believes, on the basis of the outcomes assurance statement or further information provided by the approval holder or another entity (including a notification of a change in predicted impacts in an annual compliance report), that relevant outcomes are not likely to be achieved, the Minister may notify the approval holder in writing and specify the areas requiring improvement and additional information.

If notified, the approval holder will be required under approval conditions to develop and implement adaptive management responses to address the specified areas and provide a written report to the Minister setting out the responses and their effectiveness.

10.6 Annual compliance report

All approval holders will be required, under standard administrative approval conditions, to submit an annual compliance report within 3 months of the anniversary of the commencement of the action.

Approval holders will be required to report on their compliance with all conditions.

The report must include:

- a statement of compliance against outcomes. This should include the area or site to which it relates;
- for a very low or low risk EPBC-listed spring or GDE, a confirmation statement that OGIA/UWIR and all other legislative requirements have also been met, and thus the outcomes for the relevant protected matters have been maintained;
- for a moderate and above risk EPBC-listed spring or GDE, a confirmation statement that all requirements, including monitoring, specified by OGIA in the UWIR are being undertaken and that data has been submitted to OGIA;
- a summary of progress in the preparation a SIMS mitigation plan or implementation of an endorsed SIMS mitigation plan and mitigation actions, if described in the most recent UWIR to manage potential impacts on springs and watercourse springs;
- a description of any unexpected changes to circumstances that may affect the predictions of impact made in the UWIR, as identified in monitoring data or by OGIA in the annual report on the UWIR;
- a status update on the approval holder's make good obligations in relation to water supply bores, including the status of any bore assessment and make good agreement the approval holder was required to conduct or enter into under the UWIR and Queensland Water Act;
- a status update on other relevant conditions, including a statement on trigger values and limits, and that any resulting requirements have been implemented;
- a summary of any exceedances reported under the conditions in the reporting period;
- links to all site-specific assessments completed by the approval holder in the reporting period; and

- any changes to the existing regulatory arrangements in place for the protection of water resources, not limited to legislation, standards or codes or practice, governance arrangements and existing controls.

Additionally, in the year following a new UWIR taking effect, the annual compliance report must include:

- a summary of EPBC-listed springs and associated users including:
 - a description of sites with identified risk status moderate and above in the immediately preceding UWIR;
 - an outline of any site-specific monitoring requirement specified in the most recent UWIR;
 - a description of any changes to the risk status identified in the immediately preceding UWIR, with supporting evidence for any change to the risk status;
 - any predicted exceedance of a risk threshold (as outlined in the appropriate management framework), including locations and timing;
 - identification of any risk thresholds which are no longer exceeded or predicted to be exceeded; and
 - all EPBC-listed springs and associated users where the approval holder is the responsible tenure holder if assigned, and all other EPBC-listed springs or associated users which have not been assigned a responsible tenure holder in the most recent UWIR and which are located on the approval holders' tenure. A summary should also include any change to the contributing well/s;
- a summary of progress of any site-specific assessments for each EPBC-listed spring or associated user for which the approval holder is identified as the RCO, inclusive of a timeframe for completion; and
- a summary of progress of the preparation and implementation of new or endorsed SIMS mitigation plans or make good agreements for each EPBC-listed spring or associated user for which the approval holder is identified as the RCO, inclusive of a timeframe for completion.

11. Review of the JIF

The JIF will be reviewed after every second UWIR (excluding an amended UWIR) takes effect after the endorsement of the JIF.

The JIF will also be reviewed in the event that the following regulatory instruments are amended or replaced in a manner which affects the operation of the JIF, or if new scientific information is available which affects the operation of the JIF not exhaustive:

- the EPBC Act;
- the *Significant impact guidelines 1.3: Coal seam gas and large coal mining development – impacts on water resources* (to the extent that the amendments are relevant to the formulation of the JIF management frameworks, particularly with respect to manner in which the value of,

and acceptability of impacts to, a water resource is determined, including how associated users of a water resource are relevant to that value and acceptability);

- the Queensland Water Act, or other state legislation or policy; or
- the UWIR.

If the JIF is reviewed and amended, the conditions of approvals that reference the JIF may also require variation in accordance with the process in section 143 of the EPBC Act.

The latest version of the endorsed JIF will be maintained on the Department's website.

12. References

Doody T.M., Hancock P.J. and Pritchard J.L. (2019). Information Guidelines Explanatory Note: Assessing groundwater-dependent ecosystems. Report prepared for the Independent Expert Scientific Committee on Coal Seam Gas and Large Coal Mining Development through the Department of the Environment and Energy, Commonwealth of Australia 2019.

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State of Queensland (2017). Bore assessments. Guideline. ESR/2016/2005. Version 5.02. Effective 5 July 2017.

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Stumpp C. and Hose G.C. (2013). The Impact of Water Table Drawdown and Drying on Subterranean Aquatic Fauna in In-Vitro Experiments. PLoS ONE 8(11): e78502. <https://doi.org/10.1371/journal.pone.0078502>

13. Definitions

Annual compliance report means an annual report to be provided by approval holders to the Department in accordance with administrative approval conditions and Section 10.6.

Approval holder means the holder of an EPBC Act approval for an action that is a CSG development in the Surat CMA with one or more of the following controlling provisions:

- sections 18 and 18A (EPBC-listed springs)
- sections 24D and 24E (water resources).

Aquatic GDE means ecosystems dependent on the surface expression of groundwater, including:

- river baseflow systems, aquatic and riparian ecosystems that exist in or adjacent to streams (including the hyporheic zone) which are fed by groundwater; and
- wetlands (aquatic communities and fringing vegetation dependent on groundwater-fed lakes and wetlands), including palustrine and lacustrine wetlands that receive groundwater discharge, and can include spring and swamp ecosystem.

Area of interest means, in respect of a terrestrial GDE, the area of long-term predicted drawdown of more than 0.2m identified in the UWIR.

Associated user means a third party user of a water resource, including ecosystems (aquatic GDEs, terrestrial GDEs and subterranean GDEs) or human use (via water supply bores).

Bore assessment has the meaning given in the Queensland Water Act.

Confined hydrogeological unit means hydrogeological unit is not at the ground surface in the OGIA model.

Contributing well/s means the CSG development well/s identified as, or likely to be, contributing to the exceedance of a trigger value and/or limit, in accordance with the methodology in the site-specific assessment.

Controlled action has the meaning given in the EPBC Act.

Controlling provision has the meaning given in the EPBC Act.

(CSG) development means any activity associated in the exploration, construction, operation, production and decommissioning of a coal seam gas action.

Department means the Commonwealth Government department responsible for administering the EPBC Act.

DES means the Department of Environment and Science or its successors responsible for administering Chapter 3 of the Queensland Water Act and EP Act.

Dewatering means a model prediction at any point in time where aquifer pressure in confined units is reduced to the top of the hydrostratigraphic unit, after which point dewatering occurs.

Ecosystem services means the benefits and services obtained from groundwater resources. These include:

- provisioning services (e.g. use by other industries and use as drinking water);
- regulating services (such as the climate regulation or the stabilisation of coastal systems);
- cultural services (including recreation and tourism, science and education); and
- supporting services (e.g. maintenance of ecosystem function).

Environmental value for the purposes of the JIF means a quality or physical characteristic of the associated user that is conducive to ecological health, public amenity or safety. In determining environmental value, the approval holder must take into consideration relevant threatened ecological communities and threatened species listed under the EPBC Act and their associated conservation advices and recovery plans.

EP Act means the *Environmental Protection Act 1994* (Qld).

EPBC Act means the *Environment Protection and Biodiversity Conservation Act 1999* (Cth).

EPBC-listed springs means groundwater fed springs within the Surat CMA that support 'The community of native species dependent on natural discharge of groundwater from the Great Artesian Basin threatened ecological community', as listed under the EPBC Act, and/or listed threatened species and/or their habitat.

Function means the ecosystem components, processes and benefits or services that characterise the associated user, including support for biological diversity or species composition.

Groundwater means water occurring naturally below ground level (whether in an aquifer or otherwise), or water occurring at a place below ground that has been pumped, diverted or released to that place for the purpose of being stored there, but does not include water held in underground tanks, pipes or other works.

Groundwater dependent ecosystem (GDE) means ecological communities whose species and ecological processes rely on groundwater, either entirely or intermittently.

Groundwater extraction means the process of extracting groundwater from an aquifer, including as a by-product of CSG production.

Habitat means the subterranean living and non-living components of where an organism and/or ecological community exists.

High risk/very high risk for:

- EPBC-listed springs and aquatic GDEs, has the meaning given to a high (4) or very high (5) risk level for springs in the UWIR, or any spring that is assigned a mitigation plan under the UWIR;
- terrestrial GDEs, has the meaning given in Section 0; and
- subterranean GDEs, has the meaning given in Section 7.

IAA means the immediately affected area for water supply bores identified under the UWIR.

Impact/s (verb) means to cause any measurable direct or indirect disturbance or harmful change as a result of any activity associated with the action. **Impact** (noun) means any measurable direct or indirect disturbance or harmful change as a result of any activity associated with the action.

Impaired capacity has the meaning given in the Queensland Water Act.

Independent suitably qualified water resources expert means a person with at least a postgraduate degree (or equivalent) in a suitable area (such as hydrology or hydrogeology) and a minimum of 10 years relevant experience in water resources assessment, including at least one year of experience in Australia, who is independent of the suitably qualified water resources expert.

JIF means this joint industry framework as endorsed by the Department on 17 March 2021 including subsequent endorsed versions.

Limit means a threshold greater than a trigger value that must not be exceeded.

Listed threatened ecological community means a threatened ecological community listed under section 178 of the EPBC Act.

Listed threatened species means a threatened species listed under section 178 of the EPBC Act (other than a conservation dependent species).

Low risk for:

- EPBC-listed springs and aquatic GDEs, has the meaning given to a low (2) risk level for springs in the UWIR;
- terrestrial GDEs, has the meaning given in Section 0; and
- subterranean GDEs, has the meaning given in Section 7.

Make good agreement has the meaning given in section 420 of the Queensland Water Act.

Make good obligations means the obligations outlined in section 409 of the Queensland Water Act.

Minister means the Australian Government Minister responsible for administering the EPBC Act, including any delegate thereof.

Moderate risk for:

- EPBC-listed springs and aquatic GDEs, has the meaning given to a moderate (3) risk level for springs in the UWIR;
- terrestrial GDEs, has the meaning given in Section 0; and
- subterranean GDEs, has the meaning given in Section 7.

No adverse effect/s means not reaching or exceeding an approved or interim limit as a result of CSG development.

Note: If a high risk or very high risk is not identified in accordance with the relevant risk management framework/s and limits are not required to be provided to the Minister for approval, a limit is taken to not have been exceeded.

No impact means not reaching or exceeding an approved or interim limit as a result of the CSG development.

Outcomes Assurance Statement means a statement to be submitted by an approval holder to the Minister for each high risk or very high risk impact in accordance with Section 10.3.

OGIA means the Office of Groundwater Impact Assessment, an independent entity established under the Queensland Water Act. OGIA's functions are specified in section 456 of the Queensland Water Act.

OGIA model means the numerical groundwater flow model used by OGIA, among other things, to predict the cumulative impacts on groundwater levels of current and proposed CSG development in the Surat CMA.

Performance criteria means specific parameters, associated with and relevant to EPBC-listed springs or water resource function, that will be monitored to demonstrate that the outcome of no impact to EPBC-listed springs or no adverse effect to water resource function is being achieved, measured at a specific time and place.

Protected matter means a matter protected under a controlling provision in Part 3 of the EPBC Act for which an approval has effect.

Queensland Water Act means the *Water Act 2000* (Qld).

Responsible CSG Operator means the approval holder that is either identified in the UWIR as the responsible tenure holder (with obligations relevant to EPBC-listed springs, aquatic GDEs and/or water bores), or is assigned in accordance with the management frameworks outlined in the JIF for terrestrial GDEs and/or subterranean GDEs..

Risk threshold means the minimum drawdown predicted by the UWIR at which an EPBC-listed spring or associated user may be at risk, as identified in Section 3 for EPBC-listed springs, Section 4 for water supply bores, Section 5 for aquatic GDEs, Section 6 for terrestrial GDEs and Section 7 for subterranean GDEs.

Shapefiles means a mapping file or files showing polygons outlining all site boundaries and delineating all relevant sub-zones on site. The shapefiles must use the GDA94 coordinate system, and be in either of the following formats:

- a KML file (file extension either '.KML' or '.KMZ'); or
- a zip folder using the '.zip' file extension (other formats such as '.7z' are not acceptable), and containing a single unique occurrence of each of '.shp', '.prj', '.dbf' and '.shx' file types.

If a '.zip' format is used, the shapefile may also contain unique occurrences of any or all of the following file types: '.qix', '.fix', '.sld', '.sbn', '.sbx', '.lyr', '.avl', '.xml' or '.cpg'. Each polygon must be provided as a separate '.zip' or KML file.

Significant impact/s means an impact on protected matters which is important, notable, or of consequence, having regard to its context or intensity, and determined with consideration of the Department's significant impact guidelines.

SIMS means the spring impact management strategy developed as part of the UWIR in accordance with the Queensland Water Act.

SIMS mitigation plan means a mitigation plan to be completed by approval holders as directed by OGIA in the UWIR and as required under section 379(1)(d)(e) and (f) of the Queensland Water Act and endorsed by the relevant Queensland agency, currently DES.

Site-specific assessment means a report that meets the requirements specified in Section 9.3 in the JIF which includes the explanation of the scientific basis on which the description and location of impact/s and associated users, **performance criteria**, **trigger values**, **limits** and **contributing well/s** have been derived, or not derived, to ensure that outcomes will be achieved and how any areas of a coal seam gas action contributing to the exceedance of a **limit** will be identified, including those outside of the project area.

Site-specific assessment peer review means a review carried out by an independent suitably qualified water resources expert that meets the requirements specified in Section 9.4 in the JIF including the evaluation of whether the site-specific assessment will ensure the outcomes will be met. Where inadequacies are identified by the independent suitably qualified water resources expert, the approval holder must describe in the site-specific assessment what the inadequacy is, why it has occurred and what work must be taken to rectify it.

SMART principles means specific, measurable, achievable, relevant and time bound principles.

Spring means a hydrogeological feature by which groundwater discharges naturally to the land or cave surface. This includes springs with permanent and non-permanent (i.e. intermittent or ephemeral) saturation regimes, dynamic or static geographic locations, and diffuse or point source geographic locations (State of Queensland, 2019b).

Springs of interest means a spring overlying an aquifer affected by underground water rights, if:

- the water level in the aquifer is predicted, in an underground water impact report or final report, to decline by more than the spring trigger threshold at the location of the spring at any time; and
- the cause of the predicted decline is, or is likely to be, the exercise of the underground water rights.

Spring trigger threshold for an aquifer, means a decline in the water level of the aquifer that is:

- if a regulation prescribes the threshold for a particular area – the prescribed threshold for the area; or
- otherwise – 0.2m.

Standard conditions means the conditions in Appendix C.

Subterranean GDEs means aquifer ecosystems, including stygofauna.

Suitably qualified water resources expert means a person with at least a degree in a suitable area (such as hydrology or hydrogeology) and a minimum of 5 years relevant experience in water resources assessment, including at least one year of experience in Australia.

Surat CMA means the Surat cumulative management area declared under the Queensland Water Act.

Terrestrial GDEs means surface ecosystems dependent partially or wholly on the sub-surface presence of groundwater

Trigger value means where reached or exceeded (either through modelling or monitoring), the approval holder will implement an appropriate management response to ensure approved or interim **limits** are not exceeded.

Unconfined hydrogeological unit means a hydrogeological unit that is at the ground surface (outcropping) in the OGIA model.

UWIR means the underground water impact report prepared by OGIA and submitted to DES under section 370 of the Queensland Water Act for the Surat CMA.

Very high risk has the meaning given to a very high (5) risk level for springs in the UWIR.

Very low risk has the meaning given to a very low (1) risk level for springs in the UWIR.

Water resource means surface water or groundwater; or a watercourse, lake, wetland or aquifer (whether or not is currently has water in it); and includes all aspects of the water resource (including water, organisms and other components and ecosystems that contribute to the physical state and environmental value of the water resource), as defined in the *Water Act 2007* (Cth).

Water supply bore means infrastructure specifically constructed for the extraction of groundwater from a subterranean geological formation, and as applicable under Chapter 3 of the Queensland Water Act.

Watercourse spring means a section of a watercourse where groundwater enters the stream from an aquifer. Also referred to as a baseflow-fed section of a watercourse.

WMS means the water monitoring strategy developed as part of the UWIR in accordance with section 376(1)(f) and 378 of the Queensland Water Act.

Appendix A - Queensland regulatory framework

Underground water rights

Underground water rights are provided to authority to prospect (**ATP**) and petroleum lease (**PL**) holders (**tenure holders**) in the *Petroleum and Gas (Production and Safety) Act 2004* (Qld) and to PL holders in the *Petroleum Act 1923* (Qld). Since 2016, this same right has applied to mineral development licence (MDL) and mining leases (ML) holders granted under section 334ZP *Mineral Resources Act 1989* (**Mineral Resources Act**). Underground water rights provide the tenure holder with a statutory right to take or interfere with underground water in the area of the tenure if the taking or interference happens during the course of, or results from, authorised activities on the tenure. A necessary corollary of these rights is the obligation on tenure holders to monitor and assess their impact on groundwater, water supply bores and springs. These potential impacts are managed by a comprehensive regulatory framework administered by DES and includes the EP Act and Chapter 3 of the Queensland Water Act. When a tenure holder is assigned a reporting, make good or bore assessment responsibilities under the UWIR they are considered to be a responsible tenure holder pursuant to section 369 of the Queensland Water Act.

The requirements of section 126A (requirements for site-specific environmental authority applications involving the exercise of underground water rights) and section 227AA (requirements for amendment applications for site-specific environmental authorities involving the exercise of underground water rights) of the EP Act are complimentary to the information requirements for a UWIR in section 376 of the Queensland Water Act.

The Surat CMA

Under Chapter 3 of the Queensland Water Act, a CMA may be declared where groundwater impacts from more than one resource development overlap. When a CMA is established, individual tenure holders' obligation to prepare the UWIR are displaced and OGIA becomes responsible for preparing a single UWIR for the entire CMA. To achieve this purpose, OGIA carries responsibilities under the regulatory framework established under the Queensland Water Act as it relates to the UWIR. The framework is based on a comprehensive system of integrated management arrangements with tenure holders in order to assess cumulative groundwater impacts. Specifically, section 361 of the Queensland Water Act provides that a purpose of the regulatory framework is to require tenure holders to monitor and manage impacts on aquifers, springs and water bores. The UWIR helps achieve this purpose, ensuring that the assessment is completed every three years in order to accommodate changes to industry development plans and document new information about the groundwater flow system.

The Surat CMA was declared in 2011 in response to the development of CSG resources in the area and applied to petroleum tenure holders only. In January 2020, following the expansion of the regulatory framework to include impacts from mining tenures, the Surat CMA was amended to also include coal mining tenures located within the Surat and Clarence-Moreton basins. The extent of the Surat CMA as at the date of the JIF is shown in Figure 1.

The UWIR as prepared by OGIA

The requirements of the UWIR are extensive. Section 376 of the Queensland Water Act provides that the UWIR must include (not exhaustive):

- an analysis and description of groundwater movement and trends in aquifers;

- prediction of water level change in aquifers caused by resource tenure holders exercising their underground water rights;
- an assessment of the impacts to the environmental values³ (as defined under the EP Act i.e. ecological health or public amenity or safety) from the exercise of underground water rights;
- a WMS which includes an overall strategy for monitoring the quantity of water produced or taken from the area because of the exercise of relevant underground water rights and changes in the water level of, and the quality of water in, aquifers in the area because of the exercise of these rights. The strategy must include a timetable for implementation and a program for resource tenure holders reporting to OGIA about the implementation of the strategy.
- a SIMS which includes, for each spring of interest in the area, an assessment of connectivity between the springs and the aquifer over which the spring is located, predicted risk to and likely impacts on the ecosystem and cultural and spiritual values of the spring and a strategy for preventing or mitigating predicted impacts (**SIMS mitigation plan**). The SIMS mitigation plan must include a timetable for implementation and a program for resource tenure holders reporting to OGIA about the implementation of the strategy;
- assignment of responsible tenure holders for various obligations relating to:
 - requirements to undertake bore assessments and enter into make good agreements;
 - implementation of the WMS
 - implementation of the SIMS; and
- a program for conducting an annual review of the accuracy of predicted impacts and for giving DES a summary of the outcome of each review, including a statement of whether there has been a material change in the information or predictions.

To meet these regulatory requirements, OGIA have developed a groundwater flow model (the OGIA model).

The Queensland Water Act requires that a UWIR must be reviewed and revised within 10 business days after each third anniversary that the initial UWIR took effect. An annual report is also required.

The OGIA model

The OGIA model is used to predict the cumulative impacts of petroleum and gas production on groundwater within the Surat CMA. The OGIA model is a computer-based three-dimensional representation of the groundwater system that predicts changes in water pressure and flow in response to various development scenarios. It is revised and updated with the three-yearly review of the UWIR to take into account new information, including monitoring data acquired through the WMS, and conceptual understanding gained through ongoing investigations in the intervening period between UWIRs.

For example, the 2019 iteration incorporates (non-exhaustive):

- a revised regional geology model based on data from 7,000 petroleum and gas wells;

³ As defined under section 9 of the EP Act

- updated geological mapping; and
- expanded lithological and hydraulic parameter datasets.

A range of datasets are utilised to construct and calibrate the OGIA model. Geological data for approximately 7,000 CSG wells and 24,500 water bores, and lithological data for approximately 6,000 CSG wells informs the structure of the 2019 OGIA model. It is calibrated by groundwater level data from WMS monitoring points, landholder bores, industry monitoring data and the state groundwater database. Sections 366 and 367 of the Queensland Water Act require tenure holders to use their best endeavours to obtain necessary approvals and information about water bores necessary to comply with their obligations under Chapter 3 of the Queensland Water Act.

After a quality control process, the finalised UWIR mode for 2019 is based upon data from approximately 10,000 monitoring points within the Surat CMA. OGIA also calibrates the OGIA model in line with current Australian Groundwater Modelling Guidelines (Barnett et al. 2012) and assesses assumptions, limitations and uncertainty using, the Guidance for Groundwater Modelling Within a Risk Management Framework (Middlemis & Peeters 2018).

Predictions of groundwater impacts

The OGIA model is used to predict groundwater impacts in each updated UWIR. The output illustrates the distribution of water level decline in each aquifer within the Surat CMA area. The output can then be used to identify and summarise short and long term impacts of CSG development, predictions of water extraction and reinjection, and impacts on environmental values⁴.

The UWIR refers to specific groundwater impacts as outlined and defined in the Queensland Water Act, including:

- Bore trigger threshold refers to the water level decline in an aquifer. Section 362 of the Queensland Water Act defines the bore trigger threshold as two or five metres depending on the nature of the aquifer. The threshold is used to identify bores that are likely to be impacted by development and therefore require further bore assessment to determine whether the bore has impaired capacity due to development;
- IAA refers to short term impacts. IAA is defined by the Queensland Water Act as the area of an aquifer that has a predicted water level decline of more than 2 metres for an unconsolidated aquifer (5m for a consolidated aquifer) due the exercise of underground water rights by resource tenure holders.. Bores that access water from an IAA are IAA bores;
- Make good agreement refers to the general agreements about water bores outlined under Part 4 of the Queensland Water Act; and
- Long-term Affected Area (**LAA**) refers to areas predicted to have a decline in water level of more than 2 metres for an unconsolidated aquifer (5m for a consolidated aquifer) at any time in the future due to the exercise of underground water rights by resource tenure holders. Bores that access water from a LAA are LAA bores.

The UWIR and OGIA model establish IAAs and LAAs within the Surat CMA and are updated at every UWIR review. The 2019 UWIR identifies a total of 122 IAA bores and predicts 571 LAA bores. These predictions are approximately 30% lower than those in the previous UWIR. OGIA states that this change

⁴ As defined under section 9 of the EP Act

is primarily due to major improvements in the model since 2016 and is consistent with smaller-scale predictions made by individual tenure holders.

Due to amendments to the Queensland Water Act, namely the addition of sections 376(1)(da) and (db), the scope of the 2019 UWIR was extended to include the impact of the exercise of underground water rights on environmental values⁵.

Water Monitoring Strategy

Groundwater monitoring, as stipulated in the UWIR, is required to inform three key outcomes:

- to identify groundwater impacts from resource development;
- to improve knowledge about the groundwater system, which improves OGIA's ability to predict groundwater impacts; and
- to support the evaluation of UWIR impact management strategies.

To achieve these outcomes, OGIA develops a WMS which includes:

- the specification of a groundwater monitoring network; and
- tenure holder obligations for implementing that network and reporting data back to OGIA.

The WMS groundwater monitoring network has grown progressively since its initial specification in the UWIR 2012. Changes since then reflect the availability of existing infrastructure at the time of periodic review, groundwater system conceptualisation and data needs, and the progressive deterioration of early network installations. Section 378 of the Queensland Water Act provides that the WMS must include a strategy for monitoring the quantity of water taken and changes in the aquifer water levels and water quality in aquifers in the area due to the exercise of underground water rights. To achieve this purpose, responsible tenure holders must regularly monitor water pressure, chemistry and volume, and sample monitoring bores. This data must then be regularly reported to OGIA.

The WMS is implemented by responsible tenure holders at individual monitoring points in accordance with the UWIR. As of late 2018, the UWIR monitoring network comprises about 600 WMS monitoring points that are already in place, 90% of which are providing reliable data (State of Queensland, 2019a). The CSG operators undertake additional monitoring in excess of the UWIR network, and Queensland Government monitoring and community science programs provide additional data. During the UWIR cycle, OGIA may identify additional monitoring sites within the Surat CMA if critical information gaps become apparent.

The WMS is revised based on the current understanding of the groundwater system and CSG development within the Surat CMA with every major revision of the UWIR.

Spring Impact Management Strategy

The SIMS is developed for managing potential impacts on springs and watercourse springs within the Surat CMA. The SIMS is specified to achieve the following key outcomes:

⁵ As defined under section 9 of the EP Act

- enhance hydrogeological knowledge about springs, including connectivity to underlying source aquifers;
- improve the prediction and assessment of potential impacts on springs; and
- prescribe actions for the management and mitigation of predicted impacts where necessary.

Section 379 of the Queensland Water Act provides that the SIMS must include the following components:

- characterisation of springs and an assessment of connectivity to underlying aquifers;
- identification of the 'springs of interest';
- an assessment of risks to springs: the risk of current and planned resource development impacting on the source aquifers of the springs of interest including risk to and likely impact on surrounding ecosystems, cultural and spiritual values of the spring due to a decline in aquifer water levels; and
- a spring impact mitigation strategy (SIM mitigation plan): a strategy for preventing or mitigating predicted impacts on springs of interest. This is typically divested to the responsible tenure holder to develop and implement, and may include a spring monitoring program to identify monitoring sites, appropriate techniques and frequency. The SIMS mitigation plan must include a timetable for implementing the strategy including a program for reporting to OGIA about the implementation of the strategy.

OGIA also considers the ecological, cultural and spiritual value and wetland typography of springs to better understand the dependency of an ecosystem on the aquifer and its likely response to development.

At each UWIR review, OGIA carries out a risk assessment on all springs of interest to ensure the management strategies employed by responsible tenure holders are congruent with predicted impacts. This may require a tenure holder to develop and implement a mitigation plan or a monitoring plan for specific springs in accordance with their individual responsibilities. The springs and their corresponding management strategies are identified in the UWIR and OGIA provides DES with a progress update at each annual review. When a watercourse spring is not yet verified by OGIA, the tenure holder may be required to perform field verification of the spring. The data is then submitted to OGIA as a Watercourse Spring Investigation Report. Once the spring is verified, OGIA may specify monitoring and mitigation actions where necessary.

The SIMS is reviewed and revised with every major revision of the UWIR.

Baseline Assessment

A baseline assessment is a field survey of a water supply bore by a tenure holder to obtain information about bore construction, water levels and water quality. The information provides a baseline of a bore's condition and usage and assists in understanding aquifer conditions ahead of any predicted impacts occurring at the bore. This information supports any future assessment of bore or aquifer impacts, including those that may be related to make good agreements.

There are four broad criteria for undertaking baseline assessment of a water supply bore:

- water supply bores on tenures prior to production commencement;

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- water supply bores for which the tenure holder is directed by DES to undertake a baseline assessment;
- bores drilled subsequent to the initial baselining of an area; or
- any other water supply bores within long-term affected areas for which the UWIR contains a program for baseline assessments.

Baseline assessment reports must be completed and returned to OGIA within 12 months of the UWIR approval.

Responsible tenure holder

In a CMA, where multiple resource tenure holders operate, there may be overlapping impacts on groundwater in an aquifer from separate operations. In such areas, supply from a water supply bore may be impaired, or a GDE may be potentially impacted, because of the cumulative impacts from water extraction by multiple tenure holders. Therefore, within a CMA, individual tenure holders are identified as the responsible tenure holders for specific monitoring, management and mitigation activities in the UWIR. These arrangements ensure that in areas where integrated approaches are needed to manage cumulative impacts, there is clear legal responsibility for actions.

A major part of responsible tenure holders' responsibility is compliance with reporting requirements pursuant to the WMS and SIMS strategies in the UWIR. Data collected by tenure holders must be submitted to OGIA periodically. The management strategies are reviewed by OGIA and are submitted to DES in the UWIR annual review. By 1 April and 1 October every year, responsible tenure holders must submit:

- a WMS network implementation report that includes the current status of groundwater monitoring points, outlines any planned installation of new monitoring points, and proposed changes to and any issues with monitoring points; and
- a WMS water monitoring report that includes the data collected at each monitoring location including groundwater pressure, water chemistry, volumes and reinjection volumes. The water monitoring report must also explain any gaps or changes in the monitoring record due to maintenance issues or failure of a monitoring point.

OGIA conducts a quality assurance process to ensure the data issued by tenure holders is complete by comparing the data against past submissions and identifying errors. If OGIA concludes a tenure holder needs to amend the data, the tenure holder must submit a data correction report.

The responsible tenure holders may be required to submit:

- under the SIMS, a mitigation plan that details the actions the tenure holder will take to prevent or mitigate any predicted impacts for each 'spring of interest'. The responsible tenure holder must submit the mitigation plan to be approved in consultation between DES and OGIA as part of the UWIR; and
- where required under the UWIR, a monitoring plan, which must include spring monitoring data collected by the responsible tenure holder including wetland and discharge extent and field observations on surrounding ecosystems and flora. The monitoring report must be submitted to OGIA by 1 April and 1 October each year.

For unverified watercourse springs identified by OGIA in the UWIR, the UWIR requires that responsible tenure holders must first perform field verification and submit a Watercourse Spring Investigation Report within 12 months of the UWIR. This may include water chemistry analysis, stream gauging, measurement of water levels and findings on groundwater-surface water connectivity. OGIA may then require the responsible tenure holder to perform mitigation or monitoring actions consistent with the SIMS.

The UWIR identifies the rules that determine how responsibilities are assigned to responsible tenure holders, which may change between UWIRs. The Queensland Water Act requires that the responsible tenure holder must comply with the obligations outlined in the approved UWIR. The UWIR recognises that the ownership of tenures can change over time and identifies that the obligations of the responsible tenure holder will fall to the new owner of the tenure.

A responsible tenure holder may also transfer to another tenure holder the obligation to carry out future activities required of it under the UWIR, if the transfer is approved by OGIA.

Appendix B - EPBC-listed springs

Site Number ¹	Preliminary Site Number ²	Site Name ¹	WGS84 Longitude ¹	WGS84 Latitude ¹	Complex Number ¹	Complex Name ²	EPBC Community ²	EPBC Species ²	Conservation Ranking ¹	Conservation Ranking Rationale ¹
SPR1	1	1-Boggo1	150.0253	-25.4341	5	DawsonRiver6	Yes	Yes	1b	<i>Arthraxon hispidus</i>
SPR2	2	2-Mt Rose1	150.0215	-25.4576	5	Boggomoss	Yes	No	2	<i>Adenostemma lavenia</i> , <i>Desmodium</i> , <i>Schoenoplectus validus</i>
SPR3	3	3-Mt Rose2	150.0292	-25.4526	5	Boggomoss	Yes	No	2	<i>Ficus rubiginosa</i> , <i>Physalis minima</i> , <i>Schoenoplectus validus</i> , <i>Solanum americanum</i> , <i>Panicum maximum</i> , <i>Xanthium pungens</i> , <i>Adenostemma lavenia</i> , <i>Physalis</i> , <i>Isachne globosa</i>
SPR4	4	4-Mt Rose3	150.0237	-25.4458	5	DawsonRiver6	Yes	Yes	1b	<i>Arthraxon hispidus</i>
SPR5	5	5-Mt Rose 4	150.026	-25.4456	5	DawsonRiver6	Yes	Yes	1b	<i>Thelypteris confluens</i> , <i>Arthraxon hispidus</i>
SPR6	6	6-Boggo2	150.0227	-25.4275	5	DawsonRiver6	Yes	Yes	1b	<i>Arthraxon hispidus</i>
SPR7	7	7-Boggo3	150.0282	-25.4268	5	Boggomoss	Yes	Yes	1b	<i>Arthraxon hispidus</i>
SPR8	8	8-Boggo4	150.0237	-25.4154	5	Boggomoss	Yes	No	2	<i>Panicum maximum</i> , <i>Xanthium pungens</i> , <i>Eleocharis tetraquetra</i>
SPR9	9	9-Boggo5	150.0236	-25.4148	5	Boggomoss	Yes	No	2	<i>Adenostemma lavenia</i> , <i>Leptospermum juniperinum</i> ,
SPR10	10	10-Boggo6	150.0209	-25.4125	5	Boggomoss	Yes	No	2	<i>Hypolepis muelleri</i> , <i>Eleocharis tetraquetra</i>
SPR11	11	11-Boggo7	150.0436	-25.4512	5	Boggomoss	Yes	No	2	<i>Panicum maximum</i> , <i>Laportea interrupta</i> , <i>Physalis</i> , <i>Cardamine</i> sp. (R.J.Fensham 3774), <i>Solanum americanum</i>

Site Number ¹	Preliminary Site Number ²	Site Name ¹	WGS84 Longitude ¹	WGS84 Latitude ¹	Complex Number ¹	Complex Name ²	EPBC Community ²	EPBC Species ²	Conservation Ranking ¹	Conservation Ranking Rationale ¹
SPR12	12	12-Boggo8	150.0564	-25.4414	5	Boggomoss	Yes	No	3	<i>Alternanthera denticulata</i> , <i>Carex appressa</i> , <i>Eleocharis cylindrostachys</i> , <i>Eucalyptus camaldulensis</i> , <i>Juncus prismatocarpus</i> , <i>Juncus usitatus</i> , <i>Persicaria hydropiper</i> , <i>Philydrum lanuginosum</i> , <i>Schoenoplectus mucronatus</i> , <i>Centella asiatica</i> , <i>Callitriche sonderi</i> , <i>Cyperuse</i>
SPR13	13	13-Boggo9	150.0563	-25.4409	5	Boggomoss	Yes	No	3	<i>Alternanthera denticulata</i> , <i>Carex appressa</i> , <i>Eucalyptus camaldulensis</i> , <i>Juncus prismatocarpus</i> , <i>Juncus usitatus</i> , <i>Persicaria hydropiper</i> , <i>Philydrum lanuginosum</i> , <i>Schoenoplectus mucronatus</i> , <i>Centella asiatica</i> , <i>Phragmites australis</i> , <i>Callitriche sonderi</i> , <i>Cyperuse</i>
SPR14	14	14-Boggo10	150.0427	-25.4476	5	Boggomoss	Yes	No	3	<i>Eriocaulon scariosum</i> , <i>Fimbristylis dichotoma</i> , <i>Juncus usitatus</i> , <i>Persicaria hydropiper</i> , <i>Philydrum lanuginosum</i> , <i>Schoenoplectus mucronatus</i> , <i>Viola betonicifolia</i> subsp. <i>betonicifolia</i> , <i>Centella asiatica</i> , <i>Hydrocotyle peduncularis</i> , <i>Hypericum gramineum</i> , <i>Paspalum</i>
SPR15	15	15-Boggo11	150.0337	-25.4435	5	Boggomoss	Yes	No	2	<i>Panicum maximum</i> , <i>Adenostemma lavenia</i>

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SPR22	22	22-Boggo13	150.0275	-25.4281	5	DawsonRiver6	Yes	Yes	1b	<i>Arthraxon hispidus</i>
SPR23	23	23-Boggo15	150.0256	-25.4359	5	DawsonRiver6	Yes	Yes	1b	<i>Thelypteris confluens</i> , <i>Arthraxon hispidus</i>
SPR24	24	24-Boggo16	150.0256	-25.4384	5	DawsonRiver6	Yes	Yes	1b	<i>Arthraxon hispidus</i>
SPR25	25	25-Boggo17	150.0233	-25.4368	5	DawsonRiver6	Yes	Yes	1b	<i>Arthraxon hispidus</i>
SPR26	26	26-Palm1	149.8071	-25.5524	8	DawsonRiver8	Yes	No	2	<i>Schoenoplectus validus</i>
SPR27	27	27-Boggo14	150.0254	-25.4323	5	DawsonRiver6	Yes	Yes	1b	<i>Arthraxon hispidus</i>
SPR28	28	28-Palm2	149.8071	-25.5524	8	DawsonRiver8	Yes	No	3	<i>Phragmites australis</i>
SPR29	29	29-Mt Rose8	150.0205	-25.4516	5	Boggomoss	Yes	No	2	<i>Eleocharis tetraquetra</i> , <i>Ficus rubiginosa</i> , <i>Xanthium pungens</i> , <i>Solanum americanum</i>
SPR30	30	30-Mt Rose9	150.0055	-25.4423	5	DawsonRiver6	Yes	Yes	1b	<i>Arthraxon hispidus</i>
SPR31	31	31-Mt Rose10	150.0049	-25.4409	5	DawsonRiver6	Yes	Yes	1b	<i>Arthraxon hispidus</i>
SPR32	32	32-Boggo18	150.026	-25.4412	5	DawsonRiver6	Yes	Yes	1b	<i>Arthraxon hispidus</i>
SPR33	33	33-MtRose11	150.0286	-25.4591	5	Boggomoss	Yes	No	2	<i>Solanum americanum</i> , <i>Isachne globosa</i> , <i>Panicum maximum</i> , <i>Schoenoplectus validus</i> , <i>Xanthium pungens</i>
SPR37	37	37-Sprck4	150.0805	-25.4609	371	Boggomoss	Yes	No	4a	Several plant species
SPR37.1	37Vent2	37.1-Sprck4	150.0798	-25.4608	371	Boggomoss	Yes	No	NA	There is no plant collection allowing for assessment
SPR38	38	38-MrsWhite	149.8021	-25.5685	8	DawsonRiver8	Yes	No	2	<i>Callistemon viminalis</i> , <i>Muehlenbeckia florulenta</i>
SPR40	40	40-Prices2	150.1287	-25.4753	580	Prices	Yes	Yes	1b	<i>Eriocaulon carsonii</i>
SPR41	41	41-Prices3	150.1309	-25.4767	580	Prices	Yes	Yes	1b	<i>Eriocaulon carsonii</i>
SPR42	42	42-Balk11	150.0586	-25.515	6	DawsonRiver2	Yes	No	2	<i>Stylidium rotundifolium</i> , <i>Cyperus unioides</i> , <i>Isachne globosa</i>

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SPR43	43	43-Balkl2	150.0567	-25.4633	6	DawsonRiver6	Yes	No	2	<i>Solanum americanum</i> , <i>Stylidium rotundifolium</i>
SPR44	44	44-Balkl3	150.0476	-25.4586	370	Boggomoss	Yes	No	2	<i>Schoenoplectus validus</i> , <i>Adenostemma lavenia</i> , <i>Stellaria angustifolia</i>
SPR52	52	52-Prices5	150.1257	-25.4773	580	Prices	Yes	Yes	1b	<i>Eriocaulon carsonii</i>
SPR53	53	53-Mt Rose12	150.021	-25.4549	5	Boggomoss	Yes	No	2	<i>Schoenoplectus validus</i> , <i>Isachne globosa</i>
SPR54	54	54-Boggo18	150.0592	-25.4454	5	Boggomoss	Yes	No	2	<i>Cardamine</i> sp. (R.J.Fensham 3774)
SPR55	55	55-Boggo19	150.0227	-25.4219	5	Boggomoss	Yes	No	2	<i>Schoenoplectus validus</i> , <i>Eleocharis tetraquetra</i>
SPR56	56	56-Boggo20	150.0217	-25.4247	5	Boggomoss	Yes	No	2	<i>Marsilea exarata</i>
SPR56.1	56B	56.1-Boggo20.1	150.0211	-25.4246	5	Boggomoss	Yes	No	NA	There is no plant collection allowing for assessment
SPR57	57	57-Boggo21	150.0265	-25.4202	5	Boggomoss	Yes	No	2	<i>Leptospermum juniperinum</i> , <i>Schoenoplectus validus</i>
SPR58	58	58-Boggo22	150.0271	-25.4225	5	Boggomoss	Yes	No	2	<i>Schoenoplectus validus</i> , <i>Solanum americanum</i> , <i>Adenostemma lavenia</i>
SPR59	59	59-Mt Rose13	150.0235	-25.4421	5	DawsonRiver6	Yes	Yes	1b	<i>Arthraxon hispidus</i>
SPR60	60	60-Bogres22	150.0216	-25.4302	5	DawsonRiver6	Yes	Yes	1b	<i>Arthraxon hispidus</i>
SPR61	61	61-Mt Rose14	150.0275	-25.4544	5	Boggomoss	Yes	No	2	<i>Schoenoplectus validus</i> , <i>Stellaria angustifolia</i> , <i>Cyperus unioides</i>
SPR62	62	62-Bogres23	150.0252	-25.4311	5	Boggomoss	Yes	No	2	<i>Eleocharis tetraquetra</i> , <i>Adenostemma lavenia</i>
SPR63	63	63-Boggo stat	150.0464	-25.4502	5	Boggomoss	Yes	No	2	<i>Isachne globosa</i>

Site Number ¹	Preliminary Site Number ²	Site Name ¹	WGS84 Longitude ¹	WGS84 Latitude ¹	Complex Number ¹	Complex Name ²	EPBC Community ²	EPBC Species ²	Conservation Ranking ¹	Conservation Ranking Rationale ¹
SPR64	64	64-SandCk1	150.2409	-25.7177	362	CockatooCrk	Yes	Yes	1b	<i>Eriocaulon carsonii</i> , <i>Myriophyllum artesium</i>
SPR64.1	64Vent2	64.1-SandCk1	150.2407	-25.7178	362	CockatooCrk	Yes	No	NA	There is no plant collection allowing for assessment
SPR65	65	65-SandCk2	150.2391	-25.7165	362	CockatooCrk	Yes	Yes	1b	<i>Eriocaulon carsonii</i> , <i>Myriophyllum artesium</i>
SPR65.1	65Vent2	65.1-SandCk2	150.239	-25.7163	362	CockatooCrk	Yes	No	NA	There is no plant collection allowing for assessment
SPR65.2	65Vent3	65.2-SandCk2	150.2391	-25.7162	362	CockatooCrk	Yes	No	NA	There is no plant collection allowing for assessment
SPR66	66	66-SandCk3	150.2381	-25.7194	362	CockatooCrk	Yes	No	2	<i>Xanthium pungens</i>
SPR67	67	67-Prices12	150.1272	-25.4755	580	Prices	Yes	No	2	<i>Cyperus unioides</i> , <i>Isachne globosa</i>
SPR68	68	68-Bogres24 (Mound 1)	150.027	-25.4312	5	Boggomoss	Yes	Yes	1b	<i>Arthraxon hispidus</i>
SPR68.1	68B	68.1-Bogres24 (Mound 2)	150.0267	-25.4312	5	Boggomoss	Yes	Yes	1b	<i>Arthraxon hispidus</i>
SPR189	189	189-Saltfla1	149.286	-25.8915	260	Scotts Creek	Yes	Yes	1b	<i>Eriocaulon carsonii</i>
SPR190	190	190-Saltfla2	149.2874	-25.8884	260	Scotts Creek	Yes	Yes	1b	<i>Eriocaulon carsonii</i>
SPR191	191	191-Saltfla3	149.2875	-25.8918	260	Scotts Creek	Yes	Yes	1b	<i>Eriocaulon carsonii</i>
SPR192	192	192-Creek	149.279	-25.889	260	Scotts Creek	Yes	Yes	1b	<i>Eriocaulon carsonii</i>
NA	192.1	192.1-Creek	149.2792	-25.8881	#N/A	Scotts Creek	Yes	No	NA	NA
SPR286	286	286-Abyss	148.7691	-25.7982	592	Abyss	No	Yes	1b	<i>Eriocaulon carsonii</i>
SPR287	287	287-Fourdog	148.7756	-25.7981	230	LuckyLast	Yes	Yes	1b	<i>Eriocaulon carsonii</i>
SPR319	319	319-Marama	150.2689	-25.7255	362	CockatooCrk	Yes	No	1b	<i>Myriophyllum artesium</i>
SPR320	320	320-Blackle1	150.2519	-25.7318	362	CockatooCrk	Yes	No	1b	<i>Myriophyllum artesium</i>
SPR320.1	320Vent2	320.1-Blackle1	150.252	-25.7319	362	CockatooCrk	Yes	No	NA	There is no plant collection allowing for assessment

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SPR321	321	321-Blackle2	150.25	-25.7294	362	CockatooCrk	Yes	Yes	1b	<i>Eriocaulon carsonii</i> , <i>Myriophyllum artesium</i>
SPR321.1	321Vent2	321.1-Blackle2	150.2499	-25.7297	362	CockatooCrk	Yes	No	NA	There is no plant collection allowing for assessment
SPR321.2	321Vent3	321.2-Blackle2	150.25	-25.7297	362	CockatooCrk	Yes	No	NA	There is no plant collection allowing for assessment
SPR321.3	321Vent4	321.3-Blackle2	150.2501	-25.7298	362	CockatooCrk	Yes	No	NA	There is no plant collection allowing for assessment
SPR321.4	321Vent5	321.4-Blackle2	150.2499	-25.7296	362	CockatooCrk	Yes	No	NA	There is no plant collection allowing for assessment
SPR321.5	321Vent6	321.5-Blackle2	150.2498	-25.7294	362	CockatooCrk	Yes	No	NA	There is no plant collection allowing for assessment
SPR321.6	321Vent7	321.6-Blackle2	150.2501	-25.7293	362	CockatooCrk	Yes	No	NA	There is no plant collection allowing for assessment
SPR321.7	321Vent8	321.7-Blackle2	150.2501	-25.7289	362	CockatooCrk	Yes	No	NA	There is no plant collection allowing for assessment
SPR321.8	321Vent9	321.8-Blackle2	150.2502	-25.7287	362	CockatooCrk	Yes	No	NA	There is no plant collection allowing for assessment
SPR340	340	340-Lucky last	148.7732	-25.794	230	LuckyLast	Yes	Yes	1b	<i>Eriocaulon carsonii</i>
SPR534	534	534-Yabnasboggo	149.1028	-25.7326	591	Yebna2	Yes	No	2	<i>Schoenoplectus validus</i>
SPR540	540	540-GlenElgin	149.1696	-24.5341	431	Elgin2	Yes	No	2	<i>Schoenoplectus validus</i> , <i>Cyperus flavidus</i>
SPR681	25B	681	150.023	-25.4361	5	DawsonRiver6	Yes	Yes	1b	<i>Arthraxon hispidus</i>
SPR683	29B	683-Mt Rose8	150.0206	-25.4531	5	Boggomoss	Yes	No	2	<i>Schoenoplectus validus</i>
SPR684	319A	684-Marama 1	150.2694	-25.7258	362	CockatooCrk	Yes	No	2	<i>Cyperus laevigatus</i>
SPR686	340ii	686-Lucky Last 2	148.7734	-25.7948	230	LuckyLast	Yes	No	2	<i>Isachne globosa</i> , <i>Cirsium</i> , <i>Schoenoplectus validus</i>

Site Number ¹	Preliminary Site Number ²	Site Name ¹	WGS84 Longitude ¹	WGS84 Latitude ¹	Complex Number ¹	Complex Name ²	EPBC Community ²	EPBC Species ²	Conservation Ranking ¹	Conservation Ranking Rationale ¹
SPR687	340ii(b)	687-Lucky Last 3	148.7738	-25.7948	230	LuckyLast	Yes	Yes	1b	<i>Eriocaulon carsonii</i>
SPR687.1	340iiBvent1	687.1-Lucky Last 4.1	148.7739	-25.7946	230	LuckyLast	Yes	No	NA	There is no plant collection allowing for assessment
SPR687.2	340iiBvent2	687.2-Lucky Last 4.2	148.7738	-25.7946	230	LuckyLast	Yes	No	NA	There is no plant collection allowing for assessment
SPR687.3	340iiBvent3	687.3-Lucky Last 4.3	148.7736	-25.7942	230	LuckyLast	Yes	No	NA	There is no plant collection allowing for assessment
SPR687.4	340iiBvent4	687.4-Lucky Last 4.4	148.7735	-25.7941	230	LuckyLast	Yes	Yes	1b	<i>Eriocaulon carsonii</i>
SPR687.5	340iiBvent5	687.5-Lucky Last 4.5	148.7733	-25.7937	230	LuckyLast	Yes	No	NA	<i>There is no plant collection allowing for assessment</i>
SPR687.6	340iiBvent6	687.6-Lucky Last 4.6	148.7733	-25.7936	230	LuckyLast	Yes	Yes	1b	<i>Eriocaulon carsonii</i>
SPR688	340iii	688-Lucky Last 5	148.7738	-25.7951	230	LuckyLast	Yes	No	1b	<i>Eriocaulon carsonii</i>
SPR689	340iv	689-Lucky Last 6	148.7728	-25.794	230	LuckyLast	Yes	Yes	1b	<i>Eriocaulon carsonii</i>
SPR691	44B	691	150.0471	-25.4873	6	Boggomoss	Yes	No	2	<i>Muehlenbeckia florulenta</i>
SPR712	Phaius	712-Phaius	148.1904	-25.1312	308	Carnarvon Gorge	No	Yes	1b	<i>Phaius australis</i>

¹ Queensland springs database (State of Queensland, 2019b)

² Joint Industry Plan for an Early Warning System for the Monitoring and Protection of EPBC Springs, 30 September 2013

Appendix C – Standard conditions

Note: The Minister's power to impose conditions on a project is not limited by the JIF or these standard conditions. As projects are assessed on a case by case basis, the Minister may impose conditions that are different to these standard conditions as appropriate.

Condition no.	Condition text
1	For the protection of [CHOOSE water resources and/or EPBC-listed springs as per controlling provisions] within the Surat CMA, the approval holder must ensure that the outcomes [INSERT and sub-outcome/s for water resources] specified in the table below are achieved and maintained: [INSERT relevant outcomes and sub-outcome/s depending on controlling provisions] Note: The approval holder is considered to have achieved and maintained an outcome for water resources within the Surat CMA when it has achieved and maintained the corresponding sub-outcome/s for water resources.
2	To ensure the outcomes in Condition 1 are achieved and maintained, the approval holder must manage impacts on [CHOOSE water resources and/or EPBC-listed springs] in accordance with the relevant risk management framework/s.
3	If, at any time during the period for which this approval has effect, an impact/s potentially occurring within the approval holder's project area is, or has been, identified as a high risk or very high risk impact in accordance with the relevant risk management framework/s, the approval holder must notify the Department within 20 business days.
4	Within 9 months (or a timeframe otherwise agreed to by the Minister in writing) of notifying the Department of the very high risk or high risk impact, the approval holder must provide for the written approval of the Minister: a) description and location of impact/s and associated users; b) performance criteria; c) trigger values; d) limits; and e) the contributing well/s, including identification number, GPS coordinates and shapefiles. Or provide a statement as to why the provision of performance criteria, trigger values, limits and contributing well/s is not necessary for the written agreement of the Minister.
5	If the statement provided under Condition 4 is not agreed to by the Minister in writing, the approval holder must provide the description and location of impact/s and associated users, performance criteria, trigger values, limits and contributing well/s for the written approval of the Minister within a timeframe specified by the Minister in writing.
6	A description and location of impact/s and associated users, performance criteria, trigger values, limits and contributing well/s, or statement provided under Condition 4, must be submitted to the Minister with an accompanying site-specific assessment prepared by a suitably qualified water resources expert and accompanied by a peer review undertaken by an independent suitably qualified water resources expert. Note: The approval holder may submit a SIMS mitigation plan as its site-specific assessment for EPBC-listed springs and aquatic GDEs provided that it meets the requirements of the site-specific assessment. Where a SIMS mitigation plan is determined by the Minister in writing to meet the requirements of the, site-specific assessment, the SIMS

Condition no.	Condition text
	mitigation plan is taken to be peer reviewed and therefore does not need to be accompanied by a site-specific assessment prepared by a suitably qualified water resources expert .
7	If the information specified in Conditions 4a to 4e have not been approved by the Minister in writing within 6 months of being provided to the Minister, the approval holder must undertake impact management in accordance with any interim performance criteria, trigger values and limits set by the Minister in writing. Note: The approval holder will only be required to undertake impact management in accordance with interim performance criteria, trigger values and limits where the Minister is not satisfied that the information specified in Conditions 4a to 4e will ensure the outcome/s specified under Condition 1 will be, or is likely to be, achieved. Note: The Minister, in determining whether to direct the approval holder to undertake impact management in accordance with interim performance criteria, trigger values and limits, will consider all relevant information including but not limited to legislation and policy, information provided by the approval holder under Condition 4 and Condition 6, and any other relevant information available to the Minister at the time of the decision.
8	The approval holder must undertake impact management in accordance with the interim performance criteria, trigger values and limits until the performance criteria, trigger values and limits required under Condition 4 are approved by the Minister in writing.
9	The approval holder must submit an Outcomes Assurance Statement for each high risk or very high risk impact to the Minister for each 12 month period: a) following the date of approval of the description and location of impact/s and associated users, performance criteria, trigger values and limits; or b) following the date the Minister notified the approval holder in writing that interim performance criteria, trigger values and limits had been set; or c) following the date otherwise agreed to in writing by the Minister. The Outcomes Assurance Statement must be submitted in accordance with reporting requirements specified in the JIF.
10	The approval holder must provide any additional information requested by the Minister in writing, within a timeframe specified by the Minister in writing, to substantiate an Outcomes Assurance Statement and/or to verify the risk of not achieving the outcome/s specified in Condition 1. Note: The Minister may throughout the life of this approval seek advice from experts, or an expert panel. As a consequence, specific matters identified through such advice may need to be addressed in the site-specific assessment or any Outcomes Assurance Statement. Where such advice is sought, the approval holder will be provided with the opportunity to submit information and respond to the specific matters identified, in order to ensure Outcomes Assurance Statements are based on the best available information. Review requirements will facilitate adaptive management, align with Queensland Government approval requirements, and account for potential cumulative impacts as new scientific information becomes available over the life of this approval.
11	If the Minister believes on the basis of the Outcomes Assurance Statement, any information provided under Condition 12 and any other relevant information that the outcomes in Condition 1 are not likely to be achieved, the Minister may notify the approval holder in writing specifying the areas requiring improvement or additional information. If notified, the approval holder must develop and implement adaptive management responses to address the specified areas and provide a written report to the Minister within [3] months of the notification setting out the responses and their effectiveness.

Condition no.	Condition text
	Note: If there is an exceedance of a limit, Condition 13 requires this to be reported to the Minister and Condition 14 requires the approval holder to cease groundwater extraction within 10 business days of that notification.
12	If the approval holder detects that an approved or interim trigger value has been exceeded, the approval holder must implement an appropriate management response to ensure approved or interim limits are not exceeded. The approval holder must report this exceedance, and the contributing well/s, to the Department within 10 business days of the detection.
13	If the approval holder detects that a limit has been exceeded, the approval holder must report this and the contributing well/s to the Department within 10 business days of the detection.
14	Unless otherwise notified by the Minister in writing, the approval holder must cease groundwater extraction associated with the contributing well/s identified in Condition 13 within 10 business days of an exceedance of a limit being reported to the Department, or of receiving notification that the Minister has determined that the outcome/s specified under Condition 1 have not been achieved. Note: The Minister, in determining whether to give notice to the approval holder that it is not required to cease groundwater extraction, will consider all relevant information including but not limited to legislation and policy, information provided by the approval holder (including any submissions made by the approval holder on alternative corrective actions that it proposes to take) and any other information available to the Minister at the time of the decision.
15	If the approval holder has been required to cease groundwater extraction pursuant to Condition 14, the approval holder must urgently implement corrective actions to reduce performance criteria below approved or interim limits and trigger values. The approval holder must not recommence groundwater extraction until: a) the impact has been reversed; or b) the Minister has agreed, in writing, that the outcome/s specified in Condition 1 has been achieved; and c) written approval to recommence groundwater extraction has been given by the Minister. Note: Approval to recommence groundwater extraction may be subject to conditions that the Minister considers reasonable.

Definitions
Aquatic GDEs means ecosystems dependent on the surface expression of groundwater, including: - river baseflow systems, aquatic and riparian ecosystems that exist in or adjacent to streams (including the hyporheic zone) which are fed by groundwater; and - wetlands (aquatic communities and fringing vegetation dependent on groundwater-fed lakes and wetlands), including palustrine and lacustrine wetlands that receive groundwater discharge, and can include spring and swamp ecosystems.
Business day/s means a day that is not a Saturday, a Sunday or a public holiday in the state or territory of the action.
Cease groundwater extraction means to promptly discontinue all groundwater extraction from the contributing well/s.
Contributing well/wells means the coal seam gas development well(s) identified as, or likely to be, contributing to the exceedance of a trigger value and/or limit, in accordance with the methodology in the site-specific assessment.
Department means the Commonwealth Government department responsible for the administration of the EPBC Act.
Development means any activity associated in the exploration, construction, operation, production and decommissioning of a coal seam gas action.
Ecosystem services means the benefits and services obtained from groundwater resources. These include: - provisioning services (e.g. use by other industries and use as drinking water); - regulating services (such as the climate regulation or the stabilisation of coastal systems); - cultural services (including recreation and tourism, science and education); and - supporting services (e.g. maintenance of ecosystem function).
Environmental value means a quality or physical characteristic of the associated user that is conducive to ecological health, public amenity or safety. In determining environmental value, the approval holder must take into consideration relevant threatened ecological communities and threatened species listed under the EPBC Act and their associated conservation advices and recovery plans.
EPBC Act means the <i>Environment Protection and Biodiversity Conservation Act 1999</i> (Cth).
EPBC-listed springs means groundwater fed springs within the Surat CMA that support 'The community of native species dependent on natural discharge of groundwater from the Great Artesian Basin threatened ecological community', as listed under the EPBC Act, and/or listed threatened species and/or their habitat.
Function means the ecosystem components, processes and benefits or services that characterise the associated user, including support for biological diversity or species composition.
Groundwater extraction means the process of extracting groundwater from an aquifer, including as a by-product of coal seam gas production.
Habitat means the subterranean living and non-living components of where an organism and/or ecological community exists.
High risk/very high risk means the overall unmitigated risk rating in the UWIR and as otherwise determined in accordance with the relevant risk management framework/s. Note: Any impact/s requiring mitigation is considered high risk/very high risk.

Definitions
Impact/s (verb) means to cause any measurable direct or indirect disturbance or harmful change as a result of any activity associated with the action. Impact (noun) means any measurable direct or indirect disturbance or harmful change as a result of any activity associated with the action.
Independent suitably qualified water resources expert means a person with at least a postgraduate degree (or equivalent) in a suitable area (such as hydrology or hydrogeology) and a minimum of 10 years relevant experience in water resources assessment, including at least one year of experience in Australia, who is independent of the suitably qualified water resources expert.
Joint Industry Framework (JIF) means the <i>Joint Industry Framework</i> (or chosen document title) as endorsed by the Department on 17 March 2021, including subsequent endorsed versions.
Limit/s means a threshold greater than a trigger value that must not be exceeded. Note: An exceedance of a limit/s constitutes a failure to achieve the outcome/s specified in Condition 1 and compliance actions will be implemented.
Listed threatened species means a threatened species listed under section 178 of the EPBC Act (other than a conservation dependent species).
Maintaining means the level and quality of groundwater discharge remains within the bounds of natural variability.
Minister means the Australian Government Minister administering the EPBC Act including any delegate thereof.
No adverse effect/s means not reaching or exceeding an approved or interim limit, as a result of the development. Note: If high risk or very high risk is not identified in accordance with the relevant risk management framework/s, and limits are not required to be provided to the Minister under Condition 4, a limit is taken to not have been exceeded.
No impact means not reaching or exceeding an approved or interim limit, as a result of the development.
Outcomes Assurance Statement means the statement to be submitted by the approval holder to the Minister for each high risk or very high risk impact in accordance with Condition 9 and specifications in the JIF.
Performance criteria means specific parameters, associated with and relevant to EPBC-listed springs or water resource function, that will be monitored to demonstrate that the outcome of no impact to EPBC-listed springs or no adverse effect to water resource function is being achieved, measured at a specific time and place.
Protected matter means a matter protected under a controlling provision in Part 3 of the EPBC Act for which this approval has effect.
Relevant risk management framework/s means as outlined in the endorsed JIF for EPBC-listed springs; water supply bores; aquatic GDEs; terrestrial GDEs and subterranean GDEs.
Reversed means impact/s have been reduced to levels below the approved or interim limit and sustained for 10 business days. Note: This is to achieve the outcome/s for EPBC-listed springs and water resources.

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Shapefiles means a mapping file or files showing polygons outlining all site boundaries and delineating all relevant sub-zones on site. The shapefiles must use the GDA94 coordinate system, and be in either of the following formats: • a KML file (file extension either '.KML' or '.KMZ'); or • a zip folder using the '.zip' file extension (other formats such as '.7z' are not acceptable), and containing a single unique occurrence of each of '.shp', '.prj', '.dbf' and '.shx' file types. If a '.zip' format is used, the shapefile may also contain unique occurrences of any or all of the following file types: '.qix', '.fix', '.sld', '.sbn', '.sbx', '.lyr', '.avl', '.xml' or '.cpg'. Each polygon must be provided as a separate '.zip' or KML file.
SIMS mitigation plan means the mitigation plan to be completed by approval holders as directed by the Queensland Office of Groundwater Impact Assessment and as required under section 379 of the Queensland <i>Water Act 2000</i> and endorsed by the relevant Queensland agency.
Site-specific assessment means a report that meets the requirements specified in Section 9.3 in the JIF which includes the explanation of the scientific basis on which the description and location of impact/s and associated users, performance criteria, trigger values, limits and contributing well/s have been derived, or not derived, to ensure that Condition 1 will be achieved and how any areas of a coal seam gas action contributing to the exceedance of a limit will be identified, including those outside of the project area.
Site-specific assessment peer review means a review carried out by an independent suitably qualified water resources expert that meets the requirements specified in Section 9.4 in the JIF including the evaluation of whether the site-specific assessment required under Condition 6 will ensure the outcomes specified under Condition 1 will be met. Where inadequacies are identified by the independent suitably qualified water resources expert, the approval holder must describe in the site-specific assessment what the inadequacy is, why it has occurred and what work must be taken to rectify it.
Subterranean GDEs means aquifer ecosystems, including stygofauna.
Suitably qualified water resources expert means a person with at least a degree in a suitable area (such as hydrology or hydrogeology) and a minimum of 5 years relevant experience in water resources assessment, including at least one year of experience in Australia.
Surat CMA means the Surat cumulative management area declared under the Queensland <i>Water Act 2000</i>.
Terrestrial GDEs means ecosystems partially or wholly dependent on the subsurface presence of groundwater.
Trigger value/s means where reached or exceeded (either through modelling or monitoring), the approval holder will implement an appropriate management response to ensure approved or interim limits are not exceeded.
UWIR means the Office of Groundwater Impact Assessment, Department of Natural Resources, Mines and Energy (2019). <i>Underground Water Impact Report for the Surat Cumulative Management Area, July 2019</i>. State of Queensland, or subsequent published versions.
Water resources means: • surface water or groundwater; or • a watercourse, lake, wetland or aquifer (whether or not is currently has water in it); and

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- includes all aspects of the water resource (including water, organisms and other components and ecosystems that contribute to the physical state and environmental value of the water resource), as defined in the *Water Act 2007* (Cth).