9 SURFACE WATER

9.1 INTRODUCTION

This chapter provides responses to submissions received on the draft environmental impact statement (EIS) related to surface water for the Gas Field Component of the Queensland Curtis LNG (QCLNG) Project.

Where changes to the Project description, as detailed in *Volume 2, Chapters 7* and *11*, have impacted surface water, this chapter describes these impacts and the proposed mitigation measures.

9.2 RESPONSES TO SUBMISSIONS

Table 3.9.1 is a summary of the submissions received on the draft EIS related to surface water for the QCLNG Gas Field, and a response to those submissions.

Table 3.9.1 Responses to Submissions on the Draft EIS

Issues Raised	QCLNG Response	Relevant Submissions(s)
The draft EIS does not adequately identify current surface water users that may be impacted. Where water supply is identified as likely to be affected, the Proponent will be required to enter into agreements with the landholders to mitigate these impacts by providing alternative water supply or arrangements	This information was provided in *Appendix 3.3* of the draft EIS, but was inadvertently omitted from the main EIS document. Refer to *Section 9.2.1* for this information	32
The Condamine-Balonne AquaBAMM assessment has been released and is publicly available	While the AquaBAMM document was not available at the time of the assessment, the matters covered by this document were addressed in the Surface Water Report that supported the draft EIS. Wetlands information was obtained from the website that now contains the AquaBAMM document. The AquaBAMM content has been referenced and the AquaBAMM "process" applied in the supplementary EIS.	32

Issues Raised	QCLNG Response	Relevant Submissions(s)
It is not clear in *Section 9.3.1*, Data Collection and Review, whether any biological monitoring data was associated with the listed DERM monitoring sites (422333A, 422336A, 422308C and 422325A)	A web search of the DERM monitoring sites within the study area found no reference to macro-invertebrates. The only data available at the monitoring sites within the study area are "flow" and "water quality". This was confirmed in consultation with DERM staff.	32
There are no mitigation measures provided for the potential impacts on water levels in the Condamine Alluvium.	Surface water modelling was carried out as part of the draft EIS studies. The modelling found no or immeasurable impacts on the Condamine Alluvium from Gas Field activities, therefore mitigation measures were considered unnecessary However, QGC considers monitoring of the Condamine Alluvium is prudent and has included such monitoring in the Groundwater Monitoring Plan (GWMP) submitted to DERM on 30 November, 2009	32
In *Volume 3, Section 9.6*, Mitigation Measures, it is not clear how downstream monitoring alone will be sufficient to mitigate potential impacts. Monitoring should lead to response actions where identified trigger levels are reached	Refer *Section 9.2.3*	32
Volume 3, Section 9.6, Mitigation Measures, should include a water quality monitoring regime to identify any impacts from the Project. The regime should include the water quality parameters to be routinely analysed	Refer *Section 9.2.3*	32
Volume 3, Section 9.6, Mitigation Measures, states that water quality improvement devices would be used if required. The particular devices are not described or assessed in the draft EIS.	Refer to *Section 9.2.2*	32

9.2.1 Existing Surface Water Uses

The predominant water uses in the Project area are irrigation for crops and town water supply. Irrigation farming represents the major category of water use in the catchment, which is estimated at around 80 per cent of all water used (Taylor & Meecham, 2003). Irrigation farmers divert overland flow so it can be pumped from a sump or by high-capacity pumping into a dam or ringtank.

Chinchilla Weir is the main public water storage within the Project area. Chinchilla Weir has the dual purpose of providing an assured supply of irrigation water along the alluvial flats of the Condamine River and augmenting the water supply to the town of Chinchilla. Other weirs include Loudon Weir near Dalby and Dogwood Creek Weir near Miles.

9.2.1.1 Volume of water usage

Based on Department of Local Government and Planning data (Taylor & Meecham, 2003), in August 2001 there were 484 reported irrigation storage structures on the Condamine floodplains. The number and capacity of the main irrigation storages on the Condamine floodplains at Dalby and Chinchilla, which have a combined storage capacity of 8,440 ML, are shown in *Table 3.9.2*.

Table 3.9.2 Irrigation Storages on the Condamine Floodplains

Local Government Area	Overland Flow		Water Harvesting		Total	
	No.	Capacity (ML)	No.	Capacity (ML)	No.	Capacity (ML)
Dalby	1	240			1	240
Chinchilla	10	4,000	8	4,200	18	8,200

Source: Taylor & Meecham (2003)

The draft Water Allocation Management Plan (WAMP), 2000, for the Condamine-Balonne assumed the mean annual diversions of overland flow for on-farm storage capacity within the Condamine and Brigalow-Jimbour Floodplains (Loudon to Chinchilla) as being 19,000 ML/yr with 35,000 ML approximate equivalent offstream storage capacity.

The water allocation for the Chinchilla Weir as identified in the Interim Resource Operations Licence (IROL) for Chinchilla Weir Water Supply Scheme (Natural Resources and Mines, 2006 (now Department of Employment, Economic Development and Innovation) is shown in *Table 3.9.3*

9.2.1.2 Allocations and entitlements

A summary of surface water sharing arrangements within the Condamine-Balonne region in Queensland, based on data extracted from the CSIRO report *Water Availability in the Condamine-Balonne* (2008), is shown in *Table 3.9.4.*

Table 3.9.3 Interim water allocation for Chinchilla weir

Section	Customer	Megalitres of Interim Water Allocation		Purpose	Priority
		Customer	SunWater		
Condamine River – Chinchilla Weir Storage	Chinchilla Shire Council	1,160		Urban	High
	Amenities at Chinchilla Weir		5	Urban	High
	River/Storage Irrigators	2,021		Agriculture	Medium
Condamine River – downstream of Chinchilla Weir	River Irrigators	861		Agriculture	Medium
Total		**4,042**	**5**		

Source: Natural Resources and Mines, 2006.

Table 3.9.4 Summary of surface water sharing arrangements within the Condamine-Balonne Region, Queensland

Water Products	Priority of Access	Allocated Entitlement (ML)		
		Regulated Water Supply Schemes[1]	Unregulated Water Management Area [2]	Nebine Water Resource Plan
Total licensed (long-term) extraction limit		123,394	444,578	2,039
Annual volumetric extraction limit		123,394	Not specified	3,209
Supplemented access	High	7,552	21,522[8]	0
	Risk[7]	8,245		
	Medium	107,597		
Domestic and stock			0[3]	0[3]
Unallocated			0	1,000
Unsupplemented access	Low		1,597,574	2,039
Water harvesting of overland flow[4]			868,375	
Substitution of groundwater[5]			Not specified	
Environmental provisions			[6]	[6]

Note: This table details the entire Condamine-Balonne Region in Queensland, not just the Condamine-Balonne Region within the Project area.

(1) Includes Upper Condamine Water Sharing Scheme, Chinchilla Weir Water Supply Scheme, Maranoa River Water Supply Scheme and the St George Water Supply Scheme.

(2) Includes Upper Condamine Water Management Area, Condamine-Balonne Water Management Area, Tributaries Water Management Area and Lower Balonne Water Management Area.

(3) Domestic and Stock allocations have been converted to nominal allocations.

(4) Lower Balonne Water Management Area. This limit is included in the unsupplemented access storage limit.

(5) Upper Condamine Water Management Area. This volume is not specified because it is tied to groundwater use that is not part of the Condamine and Balonne draft Resource Operations Plan, although it is constrained by existing infrastructure.

(6) Environmental provisions are taken into consideration when setting the conditions of extraction on the entitlement to ensure there is a volume of water available for the environment.

(7) Risk Class A and B as defined in the Condamine and Balonne Resource Operations Plan.

(8) The volume of Cooby Dam and Warra Weir is included, as an allocation has not yet been assigned to demands from these storages.

9.2.2 Mitigation Measures

The draft EIS noted that any evidence of increasing pollutant discharge to the watercourses would trigger an immediate investigation by QGC to determine the direct cause, wherever possible. If Project activities were identified as a likely cause, mitigation measures would include the installation of water quality improvement devices at the sites of concentrated flow discharge from the Gas Field.

Water quality improvement devices would include stormwater management, pollution control and soil erosion protections. Devices could include:

- Swales – vegetated open channels that convey water slowly downstream, enabling removal of coarse-to-medium sediments in transit
- Buffer strips – areas of vegetation designed to take runoff to a discharge point, as shallow, uniformly distributed sheet flow
- Bio-retention systems – involving a basin containing a filter media, a transition layer, a drainage layer and a perforated pipe at the base
- Sediment basins – small ponds which aim to remove coarse and medium sediment particles
- Sediment fences and bunding of disturbed areas to prevent the escape of pollutants to water resources and provide a level of defence against potential flooding
- Installation of check dams in drains to limit flow velocities
- Slope and drain sta bilisation using mulching, rip-rap or similar devices.

9.2.3 Surface Water Monitoring Plan

The draft EIS (*Appendix 3.3)* described the requirements for a Surface Water Monitoring Plan (SWMP), summarised below. QGC will implement a comprehensive SWMP in order to provide data to understand and manage the potential impacts of the Project on local and regional surface water resources.

The program will be derived from a risk-based approach and is a response to the current expected likelihood and consequence of environmental impacts. The monitoring results will be used:

- to guide ongoing operations and closure design
- as an early warning to identify potential impacts
- for improving Associated Water management.

9.2.3.1 Monitoring requirements

The SWMP will cover surface water quantity and quality monitoring, watercourse characteristic and overland flow assessments. In addition to regulatory requirements, a series of monitoring sites are proposed for upstream and downstream of the Project along major watercourses. This would enable monitoring of water quantity and quality in the surrounding watercourses.

Monitoring sites are proposed directly upstream of the most upstream tenement, and directly downstream of the most downstream tenement in each of the major catchment areas, being the Condamine and Moonie rivers and the Wandoan, Horse and Woleebee creek catchments. Where major infrastructure is proposed, particularly large Associated Water ponds, monitoring sites will be located downstream of the infrastructure, and upstream of the infrastructure should changes in downstream water quality be detected.

Visual assessment will be undertaken throughout the Project area to monitor any impacts from overland flow such as gullying, impacts to sediment and erosion control structures and exposure of pipes. The exact location of the proposed monitoring sites will be decided once the Project Infrastructure Layout Plan has been finalised.

Monitoring of the surface water quantity, quality, watercourse characteristics and overland flow will be undertaken throughout all stages of the Project in order to obtain baseline conditions, as well as assessing the impact of the Project on the surface water characteristics. The monitoring will be undertaken on a quarterly, annual and event basis.

9.2.3.2 Surface water quantity monitoring

Water level and flow or velocity measurements will be taken within watercourses upstream and downstream of the Project site. Water level and flow or velocity measurements may be taken manually on an event basis, using instrumentation and visual inspections. Due to the potential for high water levels and velocity during or after flood events, visual inspections may not always be appropriate and it is has been recommended that permanent monitoring equipment be installed.

At least two sites within the Condamine River would be monitored and would be located directly upstream of the most upstream tenement and directly downstream of the most downstream tenement.

Baseline data will be characterised by the collection of water quantity readings prior to extensive development being undertaken within the Project area. Additional water quantity readings will then be taken throughout the life of the Project and compared to baseline data to assess the potential impact on surface water quantity.

9.2.3.3 Surface water quality monitoring

The surface water quality monitoring will include different suites of sampling, which are defined as:

- A field suite covering electrical conductivity, pH, redox potential (Eh), temperature, dissolved oxygen and flow to be taken when samples of laboratory analysis are collected.
- A baseline suite including EC, TDS, TSS, pH, total alkalinity, major cations and anions, nitrates, ammonia, boron, selenium, iron, zinc, manganese and aluminum.
- Associated Water indicators suite including boron, vanadium, iron, selenium and zinc, fluoride, PAH, TPH, BTEX.

The field suite and baseline suite would be monitored quarterly and on an event basis (i.e. whenever more than 50 mm of rain is recorded on the site). Associated Water should be monitored on a quarterly basis for characterisation of the baseline water quality within the watercourses, and then during the Project life on a bi-annual basis or when failure of a water storage structure occurs.

The water quality monitoring may be collected manually in accordance with approved sampling procedures. In order to ensure that water quality samples are collected on a quarterly and event basis, it is recommended that instrumentation be installed that records the field suite and baseline suite parameters. Instrumentation that incorporates a datalogger and telemetry would be suitable for the Project area, as the datalogger can be located in an accessible site above the flood level. This type of system also records all of the field and baseline suites, apart from nitrate, including total metals.

9.2.3.4 Watercourse characteristics monitoring

In order to characterise baseline conditions, during the initial phases of the Project a river geomorphology and watercourse characteristic assessment will be undertaken quarterly and/or after any major flood event. The geomorphology and watercourse characteristic assessment may then be undertaken on a bi-annual or event basis for the duration of the Project. In order to assess the impact of development on the watercourses within the

Project area, recorded characteristics will include bank stability, bed and bar stability, channel diversity and habitat types and riparian and aquatic vegetation.

9.2.3.5 Overland flow monitoring

Visual inspection of the areas of disturbance will be performed on an annual basis and after significant rainfall events, in order to assess gullying and damage to erosion control structures and potential exposure of pipeline supports. Where visual inspection indicates a potential impact, testing of soil stability may be required and, if necessary, remediation measures proposed.

9.3 CHANGES TO THE PROJECT DESCRIPTION

There were no changes to the Project description that created any additional impacts to surface water over those identified within *Volume 3 Chapter 9* of the draft EIS.