9 SURFACE WATER

9.1 INTRODUCTION

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

Where changes to the Project description, as detailed in *Volume 2, Chapters 8* and *12*, have impacted on surface water, these impacts, and measures to mitigate impacts are described.

9.2 RESPONSES TO SUBMISSIONS

A summary of the submissions received on surface water for the Pipeline Component and a response to those submissions is provided in *Table 4.9.1*.

Table 4.9.1 Responses to Submissions on the draft EIS

Issue Raised	QCLNG Response	Relevant Submissions(s)
In the discussion of water quality objectives, the EIS does not reference the existing draft Water Quality Guidelines developed for the Condamine/Balonne catchment.	Refer to *Section 9.2.1*	32
Section 9.3 The EIS indicates that field inspections have only been conducted at proposed watercourse crossing sites for 30 of the stream order 3+ sites and only six of the stream order 2 sites. The mitigation measures for permanent creek crossing and other aspects of pipeline construction should be consistent with AS2885 Pipelines-Gas and liquid petroleum and the Australian Pipeline Industry Association Code of Environmental Practice. That standard documents the approach that should be taken when determining the optimal route selection as well as engineering standards that must be applied to the construction.	Refer to *Section 9.2.2*	32
The EIS only considers temporary short-term changes to stream flow during the construction phase of the Pipeline project. Longer-term impacts on flow and sub-surface drainage characteristics of wetlands and watercourses should be identified.	Refer to *Section 9.2.3*	32

9.2.1 Environmental Values

The Queensland Water Quality Guidelines 2009 (QWQG) are the most relevant water quality guidelines for the study area and for lands in proximity to the proposed pipeline construction where the route is located within the Condamine River catchment. The QWQG generally adopts the ANZECC/ARMCANZ (2000) target guidelines for each parameter, except in cases where a sub-regional guideline is available and has been formally

adopted. In some cases, the QWQG identifies other parameters that the ANZECC/ARMCANZ guidelines do not address.

The Australia and New Zealand Environment and Conservation Council/Agriculture and Resource Management Council of Australia and New Zealand (ANZECC/ARMCANZ) (2000) and QWQG (2009) guidelines relevant to the study area and for consideration of the effects of the Pipeline development are set out in *Table 4.9.2*. Generally, the QWQG (2009) refer users to the ANZECC/ARMCANZ (2000) guidelines for rivers within the Murray-Darling Basin, as there is insufficient information for the study area and associated catchment areas to develop local guidelines. The Water Quality objectives for the Condamine-Balonne catchment (2002) have also been considered.

Table 4.9.2 Water quality guidelines applicable to study area of relevance to Pipeline development

Parameter	ANZECC/ARMCANZ (upland river)	QWQG 2009 (Upland River)	CBWC.(2002).
Turbidity (NTU)	2-25	ANZECC	None proposed
pH	6.5-7.5	ANZECC	6-8.5*
Conductivity (uS/cm)	30-350	500 (Condamine River)	4500 **
Dissolved Oxygen (%)	90-110	ANZECC	6.5 (mg/L)*
N (as ammonia- mg/L)	0.01	ANZECC	0.01 *
Total P (mg/L)	0.02	ANZECC	0.05**

* Primary recreation

** Irrigation (only level nominated)

The QWQG classifies the Condamine-Balonne catchment/river system as an upland river within the overall Murray-Darling Basin.

The most important water quality parameter in regard to assessing the effects of pipeline construction is turbidity. Very high existing levels have been described previously in the national water quality audit as presented in: http://www.anra.gov.au/topics/water/quality/qld/basin-condamineculgoa-rivers.html.
The Condamine Balonne Water Committee (CBWC 1999) noted that turbidity levels in the Condamine River downstream of Chinchilla (i.e. in proximity to the Pipeline area of development) were consistently above 100 NTU with levels above 500 NTU being common, especially after intense rainfall and runoff events in the catchment. Total phosphorus concentrations and turbidity also increase with increasing distance downstream and proximity to urban areas. The National Land and Water Resources Audit (NLWRA 2001) indicated that the river's sediment load was broadly derived from river bank, gully and hill-slope erosion in equal proportions, and that the contribution from hill-slope erosion was somewhat higher than the Australia-wide mean value.

During construction, monitoring would be undertaken upstream and downstream of crossing locations where traversing major streams (i.e. stream order 4 and above) with water present. This will include watercourses such as

the Condamine River, Dogwood Creek and Cockatoo Creek. The monitoring program will include event-based (following rainfall) opportunistic sampling during construction and during operations up to a stage where stream rehabilitation at the crossing point has been effectively completed. Analysis will focus on turbidity levels. This water quality monitoring will be combined with monitoring of erosion levels and rehabilitation effectiveness at the crossing point and any evidence of sedimentation caused by the works in areas immediately downstream. The overall water quality monitoring program has been addressed in the construction environmental management plan.

9.2.2 Creek Crossing Methodology

All pipelines will be designed and constructed consistent with AS2885. Construction environmental management will also be consistent with the requirements of the *APIA Code of Environmental Practice for Onshore Pipelines*. The majority of the creeks intersected by the pipelines are ephemeral and every effort will be made to construct across these creeks when they are dry. A list of the watercourse crossings and the method of crossing is detailed in *Volume 2, Chapter 12 Annex A-4* of this supplementary environmental impact statement (sEIS). Specific strategies for each significant watercourse will be determined by design engineers in liaison with consulting ecologists engaged on the Pipeline Project. Standard engineering drawings for minor and major crossings have also been provided in *Volume 2, Chapter 12* of this sEIS. Detailed cross-sections for each watercourse will be created during detailed design of the Pipeline Component.

9.2.3 Impact Assessment

Any pipeline construction that extends into a zone of saturated ground has the potential to alter groundwater flow (and quality) by acting as a physical barrier or preferential pathway for groundwater movement. If locations with saturated ground are identified prior to construction, then based on site investigation the appropriate engineering controls will be designed. In other areas, potential issues may not be identified until after trenching. If trenching and construction is undertaken in periods of drought or dry season, groundwater may not exist and hence the potential to alter groundwater condition may not be evident. The constructed pipeline will be inspected annually for stability and condition. Where impacts are evident, usually as erosion within the pipeline easement, remedial maintenance will be undertaken.

9.2.4 Mitigation Measures

The potential impacts identified can be mitigated by backfilling the trench with the same/similar material to that excavated at a given location, installing higher permeability material/drains to prevent water building up. The prevention of water moving by preferential flow is managed through the use of trench cut-offs (impermeable plugs) as deemed appropriate to each situation.

The location of areas of particular concern that have already been identified (e.g. watercourses) will be taken into consideration during the detailed design phase of the Project.

Any mitigation measures proposed or implemented will be documented on design and as-built drawings to enable supplementary remedial or mitigation measures to be designed and implemented in the future if necessary.

9.3 CHANGES TO PROJECT DESCRIPTION

The Woleebee Creek pipeline route crosses one major stream (Juandah Creek) and a number of significant watercourses including Woleebee and Conloi creeks. Detailed field investigations have not as yet been carried out for this route. However, from initial evaluation it is evident that the braided nature of the drainage pattern will require erosion control and surface water management measures at these crossing points.

Construction methods as set out in *Volume 2, Chapter 12* of this sEIS and the original draft EIS will be implemented to minimise impacts to the watercourses.