9 LNG COMPONENT OPERATIONS

9.1 RESPONSE TO SUBMISSIONS ON DRAFT EIS

Submissions relating to LNG Component operations, and in particular as described in the Queensland Curtis LNG (QCLNG) Project draft environmental impact statement (EIS) *Volume 2, Chapter 9: LNG Component Operations*, are summarised in *Table 2.9.1* below.

Table 2.9.1 Response to Submissions on Draft EIS: LNG Component Operations

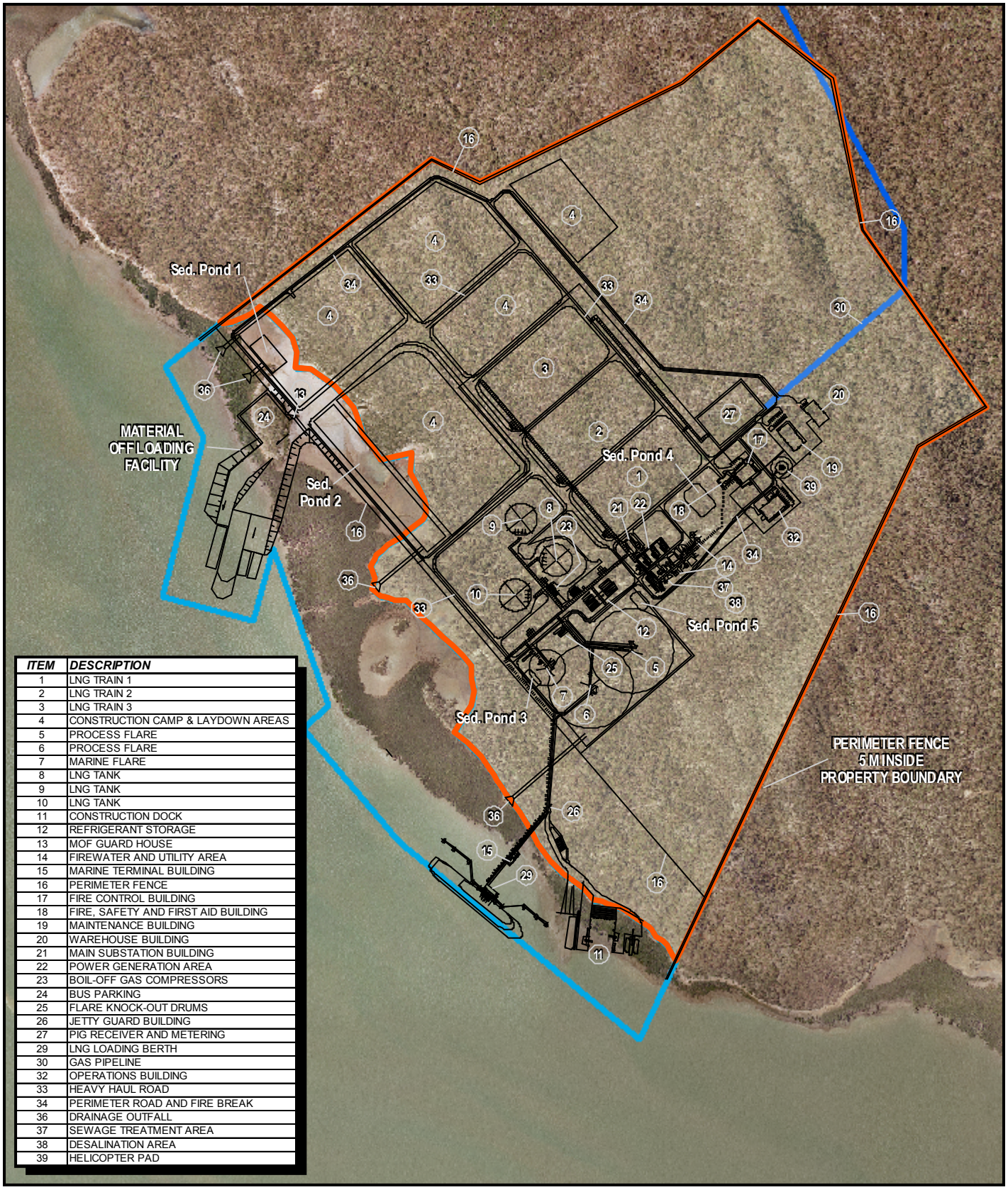
Issue Raised	QCLNG Response	Relevant Submission(s)
Submissions were made concerning possible environmental and cultural impacts associated with the potential bridge from the Gladstone mainland to Curtis Island via Laird Point and Friend Point, and/or supported the no-bridge (marine transport) option for the Project, and/or requested additional detail regarding bridge construction. The bridge was described in the draft EIS as a potential site access alternative (refer *Vol 2, Ch 9, Section 9.15.1.7 – 9.15.1.9* of the draft EIS for consideration of the Bridge vs. Marine Transport for site access, and *Vol 5* for assessment of potential impacts). The draft EIS stated that the Bridge/Road Access to Curtis Island is not QGC's preferred option and is not proposed for the QCLNG Project.	A bridge from Gladstone mainland to Curtis Island is not proposed for the QCLNG Project, and forms no part of planning for construction, operation or decommissioning of the LNG Facility.	24, 29, 30, 31, 32, 37
The draft EIS described the use of propane for spiking LNG before export to achieve a higher heating value (HHV) to meet market/consumer demands for natural gas with a specific HHV (refer *Vol 2, Ch 9, Section 9.1.1.2* of the draft EIS), with bulk propane to be delivered to site by LPG carrier unloading at the LNG Facility product jetty (refer *Vol 2, Ch 9, Section 9.2.6*, and *Vol 5, Ch 15* of the draft EIS for further description). Submissions were made requesting additional detail as to differing risk profiles of LNG vs. LPG shipping.	Spiking of LNG with propane before export is no longer proposed for the QCLNG Project, due to further analysis of market requirements. The need for bulk propane storage on-site, and bulk LPG carriers to deliver propane, has therefore been removed from the Project description and the associated risk assessments. Propane will still be used on-site as a refrigerant in the LNG liquefaction process, with storage and transport in ISO containers.	21, 24

Issue Raised	QCLNG Response	Relevant Submission(s)
The draft EIS described management of sewage on the LNG Facility site during operations with treatment via an extended aeration-activated sewage treatment plant before irrigation and / or discharge via outfall to Port Curtis. Water for Facility operations was described as being sourced through use of a reverse osmosis (RO) desalination system to treat sea water to an appropriate quality, with discharge of RO brine stream to outfall in Port Curtis (refer draft EIS *Vol 2, Ch 9, Sections 9.10* and *9.11*). Submissions were made requesting: • greater emphasis on sewage effluent reduction and reuse on site • tertiary treatment for sewage effluent before discharge from the site • additional assessment of potential impacts arising from site effluent discharges, including cumulative impacts associated with discharges from other potential projects on Curtis Island.	As the Project proceeds through detailed design, further consideration will be given to options for management of sewage effluent other than discharge, including reuse on-site. For discharged waters, QGC will consider treatment of sewage effluent to a standard meeting the definition of tertiary treated sewage specified by sub regulation 135(3) of *The Great Barrier Reef Marine Park Regulations 1983 (Statutory Rules 1983 No. 262 as amended)* before discharge from the LNG Facility site. However, this is subject to ongoing assessment of treatment technologies. Further assessment of potential impacts arising from discharge of treated sewage and RO brines, including discussion of the need for cumulative assessment of impacts to address discharges from other potential projects on Curtis Islands, is provided in *Volume 5, Chapter 8* of this supplementary EIS.	32

9.2 AMENDMENTS TO DESCRIPTION OF PROJECT ELEMENTS

A summary of the principal amendments or modifications to the LNG Component Operations description which have been made subsequent to the draft EIS as a result of ongoing refinement of Project design and construction planning, is provided in *Table 2.9.2* below.

A revised LNG Facility layout for operations, superseding that provided in *Figure 2.9.2* of the draft EIS, is provided in *Figure 2.9.1* below. This incorporates the physical changes to the layout described in *Table 2.9.2*. It should be noted that optimisation of the LNG Facility layout continues through the detailed design stage, which may result in amendment to the layout shown in *Figure 2.9.1.*



ITEM	DESCRIPTION
1	LNG TRAIN 1
2	LNG TRAIN 2
3	LNG TRAIN 3
4	CONSTRUCTION CAMP & LAYDOWN AREAS
5	PROCESS FLARE
6	PROCESS FLARE
7	MARINE FLARE
8	LNG TANK
9	LNG TANK
10	LNG TANK
11	CONSTRUCTION DOCK
12	REFRIGERANT STORAGE
13	MOF GUARD HOUSE
14	FIREWATER AND UTILITY AREA
15	MARINE TERMINAL BUILDING
16	PERIMETER FENCE
17	FIRE CONTROL BUILDING
18	FIRE, SAFETY AND FIRST AID BUILDING
19	MAINTENANCE BUILDING
20	WAREHOUSE BUILDING
21	MAIN SUBSTATION BUILDING
22	POWER GENERATION AREA
23	BOIL-OFF GAS COMPRESSORS
24	BUS PARKING
25	FLARE KNOCK-OUT DRUMS
26	JETTY GUARD BUILDING
27	PIG RECEIVER AND METERING
29	LNG LOADING BERTH
30	GAS PIPELINE
32	OPERATIONS BUILDING
33	HEAVY HAUL ROAD
34	PERIMETER ROAD AND FIRE BREAK
36	DRAINAGE OUTFALL
37	SEWAGE TREATMENT AREA
38	DESALINATION AREA
39	HELICOPTER PAD

Legend

- Proposed QCLNG Site Boundary
- Indicative Wet Lease Area
- QCLNG Footprint Plant Layout
- Proposed Export Pipeline

Source Note:
Aerial Photo - Department of Infrastructure and Planning for QCLNG Project
Plant Layout - Bechtel SK-00-00001-00B

Projection: UTM MGA Zone 56 Datum: GDA 94

0 100 200 400 m

N

QUEENSLAND CURTIS LNG
A BG Group business

Project	Queensland Curtis LNG Project	Title	Revised LNG Facility Layout
Client	QGC - A BG Group business		

ERM
Environmental Resources Management Australia Pty Ltd

Drawn	KP	sEIS Volume 2	Figure S2.9.1
Approved	RS	File No:	0086165b_SUP_GIS001_S2.9.1
Date	19.01.10	Revision	0

Disclaimer:
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ERM does not warrant the accuracy of any such Maps and Figures.

Table 2.9.2 Amendments to Project Elements

Project Element	Draft EIS description	Section of Draft EIS	Supplementary EIS description	Factors Affected by Change	Section Describing Impact Assessment of Change
Plant Layout	Plant layout as per *Figure 2.9.2* in draft EIS.	*Vol 2, Ch 9*	Revised layout as per *Figure 2.9.1* above. Key amendments include: • LNG loading jetty has been moved south (new location provides approximately 600 m between the manifold and southern plant boundary) to reduce the amount of dredging required • propane tank removed (refer propane item below) • tanks and other infrastructure close to the foreshore moved further inland to reduce disturbance of acid sulfate soils.	• Marine Ecology • Quantitative Risk Assessment	*Vol 5, Ch 8* *Vol 5, Ch 18*
Plant Throughput	The LNG Facility will have annual production capacity of nominally 12 mtpa of LNG with the three producing trains. The average production capacity of each train is approximately 3.68 mtpa as it takes into consideration the expected average feed gas-flow rates and long-term availability of the processing equipment. It should be noted that the draft EIS impact assessment incorporated air dispersion modelling of three trains at 4 mtpa production each.	*Vol 2, Ch 9, Section 9.1*	The average production capacity of each train is approximately 4.0 mtpa, as it takes into consideration the expected average feed gas-flow rates and long-term availability of the processing equipment, but through optimisation of design, in any given year, production could be up to approximately 4.3 mtpa of LNG per train, subject to optimisation of operations and maintenance scheduling.	• Greenhouse Gas	*Vol 7*
LNG Storage: LNG Tank Size	QGC proposes initially to construct two LNG storage tanks for Trains 1 and 2, each with capacity up to 180,000 m^3 (detailed design is ongoing but preliminary design indicates tank size of between 160,000 m^3 and 180,000 m^3). A third tank of similar capacity will be constructed and commissioned when the third LNG train is built.	*Vol 2, Ch 9, Sections 9.1* and *9.2.3*	QGC proposes initially to construct two LNG storage tanks for Trains 1 and 2. Detailed design is ongoing, but preliminary design indicates a reduction in tank capacity to between 140,000 m^3 and 160,000 m^3. A third tank of similar capacity will be constructed and commissioned when the third LNG train is built.	• Quantitative Risk Assessment	*Vol 5, Ch 18*

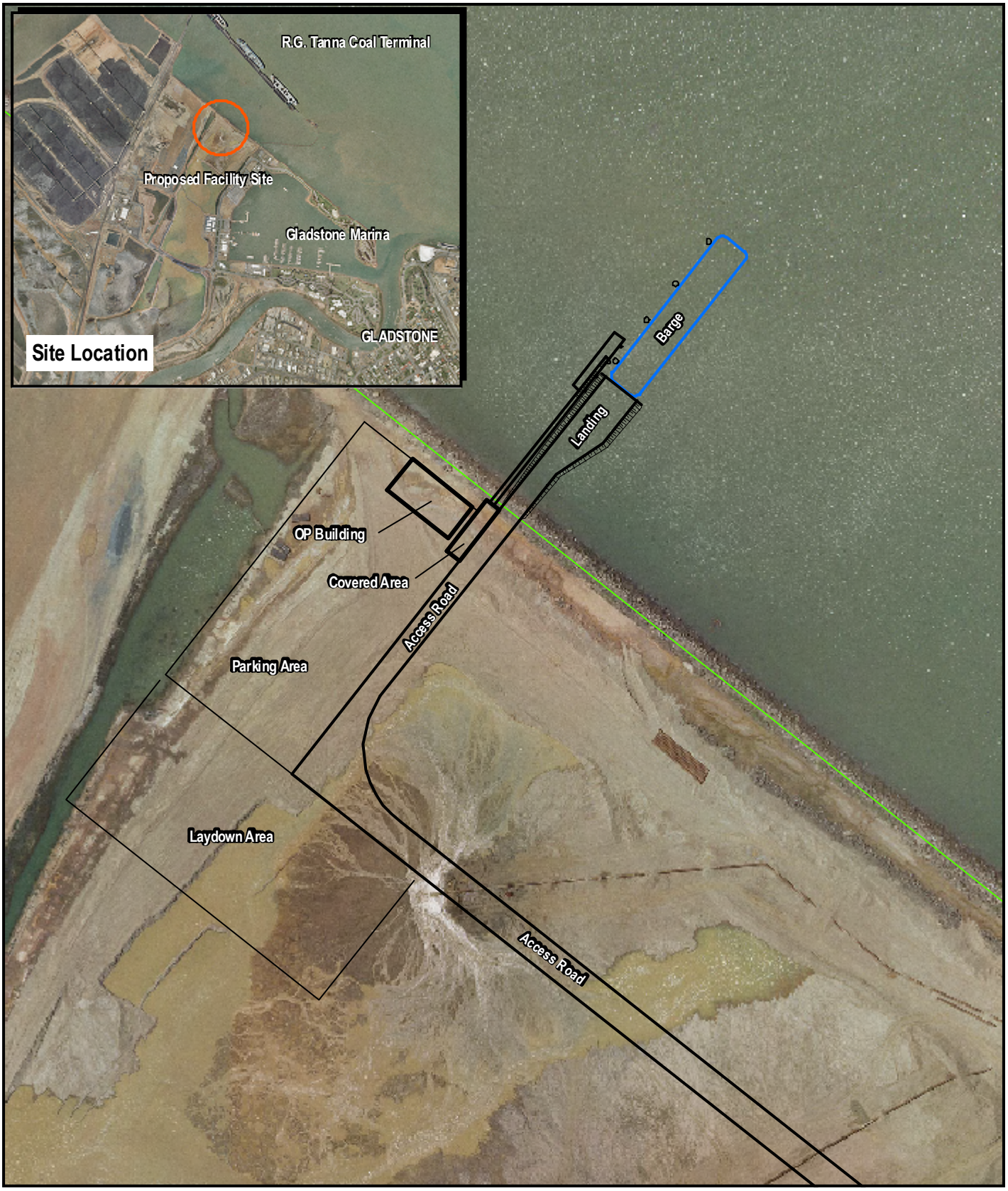
Project Element	Draft EIS description	Section of Draft EIS	Supplementary EIS description	Factors Affected by Change	Section Describing Impact Assessment of Change
Propane Spiking	One tank with capacity of approximately 100,000 m^3 may be used to store propane before use in spiking LNG, as propane may be required sometimes to spike LNG before export to achieve a higher heating value (HHV) to meet market/consumer demands for natural gas with a specific HHV.	*Vol 2, Ch 9, Sections 9.1, 9.2.3* and *9.2.4*	The QCLNG Project no longer proposes spiking of LNG with propane before export, and consequently this bulk propane storage tank has been removed from the design. Site layout (refer *Figure 2.9.1* above) no longer shows a propane tank. Ancillary equipment associated with bulk unloading and storage of propane at the site has also been removed from the Project design.	• Quantitative Risk Assessment: LNG Facility	*Vol 5, Ch 18*
Operational Workforce	Total permanent workforce for operations of approximately 162 workers, including employees and contractors. This will include approximately 115 workers (operational, maintenance and security personnel) working at the LNG Facility. These will be split between: • an eight-hour day shift (general staff) • a 12-hour day shift (6am to 6pm for operations, maintenance and security personnel) • night shift (6pm to 6am being primarily operations and security personnel, with maintenance as required). Numbers of personnel on site will vary subject to maintenance requirements.	*Vol 2, Ch 9, Section 9.6*	Total permanent workforce for operations will be as described in the draft EIS for operations of Train 1 and 2. Once Train 3 is commissioned, approximately 40 additional workers (employees and contractors) will be required for a total permanent workforce of approximately 200 personnel. These will be split between: • an eight-hour day shift (general staff) • a 12-hour day shift (6am to 6pm for operations, maintenance and security personnel) • night shift (6pm to 6am being primarily operations and security personnel, with maintenance as required). Numbers of personnel on site will vary subject to maintenance requirements.	• Traffic • Social	*Vol 5, Ch 14* *Vol 8*
Operations Logistics	Logistical planning for the operations phase is based around a marine-only option, with operational and maintenance personnel working out of Gladstone daily, via a new land-based and marine terminal to be located behind RG Tanna Coal Terminal at the end of Alf O'Rourke Drive.	*Vol 2, Ch 9, Section 9.7* and *Figure 2.9.13*	In addition to operations and maintenance, operations phase consumables and equipment will also be loaded at the RG Tanna marine terminal via a roll on-roll off (RO-RO) facility. An amended schematic of the proposed operations phase marine terminal at RG Tanna is provided as *Figure 2.9.2*. It should be noted that final location and design of the operations marine terminal is subject to detailed engineering and commercial agreements.	• Traffic	*Vol 5, Ch 14*

Project Element	Draft EIS description	Section of Draft EIS	Supplementary EIS description	Factors Affected by Change	Section Describing Impact Assessment of Change
Sewage Treatment	Sewage will be treated via an extended aeration-activated sewage treatment plant. Treated wastewater is further processed through tertiary filters and stored before it is pumped to an irrigation system or discharged to outfall.	*Vol 2, Ch 9, Section 9.11*	As the Project proceeds through detailed design, further consideration will be given to options for management of sewage effluent other than discharge, including reuse on site. For discharged waters, QGC will consider treatment of sewage effluent to a standard meeting the definition of tertiary treated sewage specified by *sub regulation 135(3)* of *The Great Barrier Reef Marine Park Regulations 1983 (Statutory Rules 1983 No. 262* as amended) before discharge from the LNG Facility site. However, this is subject to ongoing assessment of treatment technologies. Notwithstanding any potential tertiary treatment, near-field and far-field modelling of the secondary treated effluent described in the draft EIS indicates that impacts on marine biota from discharge of the secondary treated sewage would not be significant.	• Marine Ecology	*Vol 5, Ch 8*
Shipping	Approximately 62 LNG ships per year per LNG train (approximately 186 per year once three trains are operational), plus LPG (propane) vessels.	*Vol 2, Ch 9, Section 9.2.6* and *Vol 5, Ch 15*	The QCLNG Project no longer proposes spiking of LNG with propane before export. Bulk LPG carriers to deliver propane will not be required.	• Quantitative Risk Assessment: Ship loading	*Vol 5, Ch 18*

Project Element	Draft EIS description	Section of Draft EIS	Supplementary EIS description	Factors Affected by Change	Section Describing Impact Assessment of Change
Shipping	Shipping outside the bounds of the Port of Gladstone within Australian Territorial Waters will be undertaken within approved shipping channels. Within the bounds of the Great Barrier Reef Marine Park (GBRMP) shipping will be limited to the transit of ships through designated channels (Capricorn and Curtis channels) to shipping channels outside GBRMP. The anticipated QCLNG Project LNG shipping route starts from the Gladstone Fairway Buoy to the outer route via the Capricorn Channel or Curtis Channel Entrance, then along the outer route toward Torres Strait and then traverses the Torres Strait. The total length of the route, from Sandy Cape (north of Brisbane) to the western approaches to the Torres Strait (Booby Island) is approximately 1,344 nautical miles.	*Vol 2, Ch 9, Section 9.2.6,* and *Vol 5, Ch 15, Section 15.2.2*	LNG shipping associated with the Project will primarily use the outer route. However, cyclones or other weather conditions may require use of the inner route through the GBRMP for safety, at the discretion of the LNG ship captain. LNG ships will comply with the same routing, reporting, draft, and pilot requirements of similar size ships using the inner route.		

9.2.1 Proposed Operations Phase Marine Terminal, RG Tanna Coal Terminal

An indicative schematic of the proposed operations phase marine terminal at RG Tanna is provided as *Figure 2.9.2* below. It should be noted that final location and design of the operations marine terminal is subject to detailed engineering and commercial agreements.



Legend

- Cadastral Boundary
- Facility Footprint

Source Note:

Aerial Photo - Department of Infrastructure and Planning for QCLNG Project
Marine Operations Terminal - Bechtel K0-1T00-00010_00C

Projection: UTM MGA Zone 56 Datum: GDA 94

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QUEENSLAND CURTIS LNG A BG Group business	Project: Queensland Curtis LNG Project		Title: Layout of Marine Operations Terminal
	Client: QGC - A BG Group business		
ERM Environmental Resources Management Australia Pty Ltd	Drawn: KP	sEIS Volume 2 Figure S2.9.2	Disclaimer: Maps and Figures contained in this Report may be based on Third Party Data, may not to be to scale and are intended as Guides only. ERM does not warrant he accuracy of any such Maps and Figures.
	Approved: RS	File No: 0086165b_SUP_GIS002_S2.9.2	
	Date: 19.01.10	Revision: 0	