
1 **LNG COMPONENT - ENVIRONMENTAL MANAGEMENT PLAN**

1.1 **STATUTORY PURPOSE OF ENVIRONMENTAL MANAGEMENT PLAN**

This draft Environmental Management Plan (EMP) has been prepared in accordance with the Terms of Reference (ToR) issued for the Queensland Curtis LNG (QCLNG) Project. It contains mitigation and management measures presented in the draft Environmental Impact Statement (EIS) prepared for public consultation under the process set down by the *State Development and Public Works Organisation Act 1971* (Qld). The content of this draft EMP will be revised as a result of stakeholder consultation, including comments from the Commonwealth Department of Environment, Water, Heritage and the Arts (DEWHA) and, following the issue of conditions set by the Coordinator General, will be reissued in an application for an environmental authority to conduct chapter 5 activities.

Under Section 310D of the *Environment Protection Act 1994* (Qld) (EP Act):

“The purpose of an environmental management plan is to propose environmental protection commitments to help the administering authority decide the conditions of the environmental authority (chapter 5A activities).”

Furthermore, section 309Z(5) requires:

“Despite subsections (1) to (4), if a relevant resource authority for the environmental authority is, or is included in, a significant project—

- a. all conditions for the environmental authority stated in the Coordinator-General’s report for the project (the Coordinator-General’s conditions) must be imposed on the environmental authority; and*
- b. any other condition imposed on the environmental authority must not be inconsistent with the Coordinator-General’s conditions.”*

QGC will prepare detailed management procedures and performance criteria based on the final EMP to be issued to construction contractors to manage compliance of those parties engaged in Project activities.

1.1.1 **EMP Overview**

This volume provides draft EMPs for construction and operation of the LNG Component of the Project. The draft EMPs have been prepared based on the findings outlined in *Volume 5* of this Environmental Impact Statement (EIS).

QGC places a high value on social performance, which it supports by its Social Performance Policy, Standard and Guidelines. A social impact assessment has been carried out for the Project (refer *Volume 8*) and a

separate Social Environmental Management Plan has been prepared to address social and community values and impacts.

EMPs for the LNG Component of the Project have been prepared in consultation with BG Group's Environmental and Social Managers. These EMPs are consistent with BG Group's Business Principles for the protection of environmental and social values across all the company's activities, operations and projects.

BG Group will require QGC, within two years of commencement of Project operations, to prepare and obtain ISO accreditation (ISO 14000) for an Environmental Management System. All operations EMPs will be reviewed and amended as required to comply with requirements for ISO 14000 accreditation.

Draft EMPs outline proposed management strategies in accordance with proposed performance criteria for specified acceptable levels of environmental performance. EMPs identify:

- potential impacts on environmental values
- mitigation strategies
- relevant monitoring
- appropriate indicators and performance criteria
- reporting requirements
- appropriate corrective actions should an undesirable impact or unforeseen level of impact occur.

The structure of the EMP is outlined in *Table 11.1.1*. Activity phases referred to in *Table 11.1.1* comprise Construction, Operations, and Decommissioning.

Table 11.1.1 EMP Structure

Element/issue	How elements of the Activity phases are to be managed (as it affects environmental and social values).
Policy objective	The Activity policy or management objective that applies to each element.
Performance criteria	Measurable performance criteria (outcomes) for each element of each Activity phase.
Implementation strategy	The strategies, tasks or action program (to nominated operational design standards) that will be implemented to achieve the performance criteria.
Monitoring	The monitoring requirements to measure actual performance (i.e. specified limits to pre-selected indicators of change).
Auditing	The auditing requirements to demonstrate implementation of agreed environmental management strategies and compliance with agreed performance criteria.
Reporting	Format, timing and responsibility for reporting and auditing of monitoring results.
Corrective action	The action (options) to be implemented in case a performance requirement is not reached and the person responsible for that

Element/issue	How elements of the Activity phases are to be managed (as it affects environmental and social values).
	action (including staff authority, responsibility and management structure).

1.2 **PURPOSE AND OBJECTIVES**

EMPs have been prepared to cover activities associated with the LNG Component of the QCLNG Project. As stated in Section 1.1.1, the purpose of these EMPs is to outline appropriate management strategies and actions in order to meet acceptable levels of environmental performance.

The LNG Component comprises the development, construction and operation of an LNG plant or facility (LNG Facility) and associated onshore and marine facilities, located within the Curtis Island Industry Precinct of the Gladstone State Development Area (GSDA) (refer *Volume 1, Chapter 2*).

The draft Construction EMP (CEMP) and draft Operations EMP (OEMP) have been developed as part of an overall framework for the management of environmental hazards, risks and impacts during the construction and operation of the Project.

The objective of these EMPs is to provide:

- environmental management procedures and mitigation measures for control of impacts during the construction and operation of the Project to ensure that environmental requirements are specified and complied with
- environmental performance indicators, monitoring requirements and review procedures for Project activities
- government authorities, stakeholders and the Proponents with a common focus for approvals and compliance with relevant policies, approvals, licences, agreements, legislation and other requirements
- the community with evidence that the environmental management of the Project is acceptable.

QGC will have ultimate responsibility for implementing the EMPs.

1.3 **RESPONSIBILITIES**

QGC will be responsible for carrying out the EMP.

All employees are responsible for the environmental performance of their activities and for complying with the General Environmental Duty as set out in *Section 319(1)* of the *EP Act*, which states:

“A person must not carry out any activity that causes, or is likely to cause, environmental harm unless the person takes all reasonable and practicable measures to minimise the harm.”

This section sets out the environmental responsibilities of key Project positions. These are preliminary and nominal position titles based on an assumed organisation chart for construction and for operations. Titles and accountabilities may alter as organisational structures are finalised closer to commencement of construction and operations. Revised and updated EMPs with final position titles and accountabilities will be prepared prior to commencement of construction (CEMP) and operations (OEMP).

1.3.1 Construction Manager/Operations Manager

The Construction or Operations Manager is ultimately responsible for construction and operational activities, with specialised personnel providing environmental management support. It is the responsibility of the Construction/Operations Manager to ensure that the Project is adequately resourced to enable all personnel to carry out their duties in an environmentally responsible manner.

1.3.2 Construction/Operations Environmental Manager

The Construction/Operations Environmental Manager is responsible for environmental aspects associated with construction/operational activities and will direct work in a manner that complies with relevant environmental procedures, adheres to all legislative requirements and ensures that all environmental objectives associated with the Project are achieved. This includes implementation of the CEMP/OEMP and the overseeing environmental compliance audits and monitoring programs.

1.4 OBJECTIVES AND PERFORMANCE CRITERIA

Environmental objectives and performance criteria for the construction and /or operation of the LNG Facility are listed in *Table 11.1.2*.

Table 11.1.2 Environmental and Social Objectives and Performance

Aspect	Activity Phase	Objective	Performance Criteria
Noise and vibration	Construction and operation	To undertake construction and operation in a manner that minimises the impact of noise and vibrations on surrounding residences and industry.	No exceedence of Project specific noise criteria at sensitive receptors. No noise-related complaints received from residents and landholders. Consultation with potentially affected sensitive receptors.
Traffic / Transport	Construction and operation	To minimise as far as practicable potential impacts associated with traffic generated by the Project.	Minimal traffic-related complaints and incidents.
Shipping transport	Operation	To minimise any potential impacts associated with shipping traffic generated by operation of the LNG Facility.	Minimise Project impacts on shipping transport in the Port of Gladstone.
Visual amenity	Construction and operation	To minimise impacts on visual amenity associated with the LNG Facility.	Respond to all complaints regarding visual amenity.
Lighting	Construction and operation	To reduce as far as practicable lighting impacts on sensitive receptors. To minimise negative impacts on EPBC Act-listed marine fauna as a result of LNG Facility lighting.	Undertake modeling of LNG Facility lighting during design to reduce as far as practicable light spill outside the LNG Facility perimeter. Respond to all complaints on lighting.
Weeds and pests	Construction and operation	To prevent spread or introduction of pest and weed species as a results of Project activities.	No increase in abundance or distribution of weed and pest species as a result of Project activities.
Air quality and dust	Construction and operation	To construct and operate in a manner that minimises impacts on ambient air quality.	No exceedence of Project derived air quality criteria at sensitive receptors. Consultation with potentially affected sensitive receptors. Respond to all complaints on air quality.
Groundwater quality	Construction and operation	To protect existing groundwater resource quality.	Groundwater quality not impacted by Project activities. Spill containment facilities to be constructed in accordance with AS 1940 (2004) and AS 3780 (1994).
Surface water quality	Construction and operation	To minimise the potential impacts associated with erosion and to prevent the release of contaminants that may adversely affect downstream surface-water quality	No release of contaminants to surface waters outside the LNG Facility boundary. No failures of sediment and erosion control techniques leading to unacceptable sediment release.
Soil erosion and control	Construction	To minimise environmental impacts caused by soil loss and erosion.	Erosion and sediment control techniques implemented onsite where necessary. No failures of sediment and erosion control techniques leading to unacceptable sediment release.
Acid sulfate soils	Construction	To minimise environmental impact arising from disturbance of acid sulfate soils.	Develop and implement an approved acid sulfate soils management plan (ASSMP).
Soil contamination	Construction and	No contamination of soils arising from Project activities.	LNG Facility site not added to Queensland Contaminated Land

Aspect	Activity Phase	Objective	Performance Criteria
	operation	To manage any pre-existing contaminated soils such that extent of contamination is not exacerbated by Project activities.	Register (CLR). No release of hazardous substance or dangerous goods to soil. Identify all pre-existing contaminated soils likely to be impacted by Project activities. Where pre-existing contaminated soils are identified, and disturbance by Project activities is unavoidable, develop and implement appropriate management strategies.
Terrestrial Flora and Fauna	Construction and operation	To minimise impacts on abundance and distribution of terrestrial flora and fauna as a result of Project activities.	No unauthorised clearing of native vegetation. Permits and approvals in place for any unavoidable disturbance of endangered, vulnerable and rare (EVR) flora and fauna species. No introduction of declared pests as a result of Project activities. Develop and implement an environmental offsets strategy.
Marine Flora and Fauna	Construction and operation	To minimise impacts on abundance and distribution of marine flora and fauna as a result of Project activities.	No unauthorised clearing of marine plants. No introduction of declared marine pests as a result of Project activities. Develop and implement an environmental offsets strategy.
Mosquito and biting midge	Construction and operation	To undertake Project activities such that potential health impacts on Project personnel and nearby sensitive receptors arising from mosquitoes and biting midges are minimised.	<ul style="list-style-type: none"> Minimise potential mosquito and biting midge breeding sites resulting from Project activities.
Eastern Red fire ant	Construction	To prevent spread or introduction of Eastern Red Fire Ant as a result of Project activities.	No evidence of Eastern Red Fire Ant on Project sites.
Marine fuel and oil spill	Construction and operation	To protect marine environment by prevention or mitigation of fuel or oil spills to the marine environment.	Compliance with local and international regulations based on the International Convention for Prevention of Pollution from ships, known as MARPOL.
Waste management	Construction and operation	To minimise waste generation and maximise reuse and recycling of construction waste products. To dispose of waste in an appropriate manner.	No contamination of soil, air or water as a result of inappropriate waste management. Develop and implement a plan for waste minimisation and management. All waste disposal to be carried out by a licensed waste contractor. Waste management practices to not result in loss of health to personnel or sensitive receptors.
Mulch stockpile	Construction	To mitigate the risk of spontaneous combustion of mulch stockpiles on-site.	No combustion of mulch stockpiles across the site.
Effluent disposal	Construction and operation	To release treated effluent and manage sewage sludge without causing environmental harm.	Treated effluent meets quality requirements of design parameters. All sewage sludge is disposed of at an appropriate sewerage disposal facility.
Fire management	Construction and	To prevent the initiation of bushfires as a result of Project	Develop and implement an Emergency Response Plan that includes

Aspect	Activity Phase	Objective	Performance Criteria
	operation	activities. To protect Project personnel and key Project infrastructure from bushfire impacts.	fire management. No unplanned and uncontrolled fires caused by Project Activities. Consultation with relevant fire management authorities.
Incidents and complaints	Construction and operation	To have a process whereby complaints can be lodged and responded to in an appropriate manner.	Record complaints and responses in an incidents and complaints register. Respond appropriately to incidents and complaints.
Environmental induction and training	Construction and operation	To ensure that all Project personnel, including contractors, comply with the environmental requirements of all tasks.	All personnel undergo site inductions and, where necessary, additional training, that address environmental requirements of Project activities. Full compliance with induction and training procedures.
Emergency response for environmental incidents.	Construction and operation	To ensure that Project personnel can respond effectively and efficiently in the event of an environmental incident to ensure no long-term adverse impacts on health, safety or the environment.	Any emergency response addressed in accordance with the QGC Emergency Management Plan. Nil government notices.
Dangerous goods and hazardous substances	Construction and operation	To protect Project personnel, the public and the environment from harm due to the transport, storage or use of dangerous goods or hazardous substances.	No unplanned release of dangerous goods or hazardous substances. All transport, storage and handling of dangerous goods or hazardous substances is performed in accordance with applicable legislation, guidelines and standards.
Decommissioning	Construction and decommissioning	To decommission Project facilities such that they do not present an ongoing environmental risk. To plan for decommissioning in consultation with relevant stakeholders.	Develop and implement, in consultation with stakeholders, a detailed decommissioning plan for facilities prior to the end of their useful life.

1.5 ***CORRECTIVE ACTION***

QGC has adopted the BG Group Standard for reporting incidents, near misses and hazards. This standard will be followed in the event of any potential or actual environmental harm, including concerns raised by the community, entered in the complaints register. Corrective actions will be documented and tracked within the BG Group Synergi incident reporting database. The Environmental Manager (depending on phase of activity) will determine whether reporting to any external agency is required.

1.6 ***INCIDENT MANAGEMENT***

An environmental incident will be regarded as any incident that harms or has the potential to harm environmental and social values. In the event that an environmental incident occurs, the following steps will be followed immediately:

- prevention of further pollution/environmental harm (including impacts on air, water quality, flora and fauna and noise environment)
- clean-up and/or control of polluting substance(s)
- implementation of mitigation measures to prevent recurrence of similar incident
- document incident and instigate incident investigation as appropriate.

All incidents are to be reported to the relevant Environmental Manager. Incidents likely to cause off-site impacts or significant environmental harm will be reported by the Environmental Manager or Construction/Operations Manager (subject to finalisation of detailed organisation chart with roles and responsibilities) to the Department of Environment and Resource Management (DERM) or appropriate authority immediately, in accordance with statutory requirements.

Incidents that impact EPBC listed species will be reported to DEWHA.

1.7 ***MONITORING***

Activity phases will be monitored against EMPs and environmental-value-specific monitoring plans.

Results of monitoring will be recorded and reported internally and available for inspection as required by QGC's Environmental Management System. Results of external audits conducted by DERM or other government agencies and auditors appointed by QGC for review will also be recorded.

All monitoring results will be maintained on record for a minimum of five years.

1.8***EMP REVIEW, REPORTING AND UPDATING***

The mitigation measures and environmental management procedures included in these EMPs have been designed with the ultimate goal of avoiding or managing identified potential impacts. As noted previously, the content of these draft EMPs will be revised as a result of stakeholder consultation and, following the Coordinator General setting conditions, will be reissued in the application for an environmental authority.

Once EMPs are implemented, management will consider issues on an ongoing basis and conduct formal review of the EMPs, to be undertaken one month after commencement of each activity phase of the Project (construction and operations).

EMP reviews will include a framework for a “corrective action loop”, which will ensure that mechanisms are in place with clearly defined actions and responsibilities, to correct any unforeseen impacts or failure of mitigation or management measures to meet their objectives, should they become evident. Accordingly, any unforeseen impacts or any mitigation or management measures which do not achieve their objectives will be reported and an appropriate response action will be implemented and monitored.

Following review of the EMP, documented outcomes will include, as applicable:

- a summary of complaints and response actions to these complaints
- data on the scheme’s performance in meeting EMP objectives and targets
- a brief description of the causes and effects of any failings, and actions taken to remedy them
- an overall assessment of the environmental performance of the scheme
- an assessment of opportunities to improve environmental performance
- suggested changes to the EMP to be made as a result of the review.

An annual performance report will be produced and made available to personnel with operational and management responsibilities, as well as to stakeholders and regulatory authorities. The annual performance report should:

- summarise environmental monitoring results over the preceding year against numerical guideline values, regulatory requirements or agreed commitments, and identify trends and any problems
- summarise any system failures and the action(s) taken to resolve them.

1.9***AUDITING***

Environmental audits are intended to determine whether the requirements of the EMP are properly implemented and maintained. Accordingly, auditing is to be undertaken to confirm that activities are carried out in line with the defined

requirements, and are producing the required outcomes. The audits will cover the full spectrum, from compliance with strategic procedures to compliance with job-specific procedures. These audits will be initiated by the relevant Environmental Manager and performed by an internal or external auditor.

While detailed audit protocols have yet to be developed and will be subject to revision following finalisation of the EMPs, an indicative audit procedure would include the following:

1. Review the scope, plan and schedule of the audit.
 - a. Examine objective evidence (documented environmental records, direct observations of non-conformance/potential opportunities and personnel interviews) to verify conformance with EMP requirements.
 - b. Give specific attention to continual improvement actions developed in response to previous audit findings.
 - c. Post-audit communication to present audit findings, clarify any misunderstandings and summarise the audit findings.
2. The audit program will be reviewed annually and revised to reflect any improvements to the methodology, auditors or timeframe of audits.
3. An Audit Summary Report will be completed and the results discussed at the next management meeting.
4. The Audit Summary Report will list continual improvement actions required to prevent a recurrence of any identified issues or to maximise opportunities for improvement.

A summary of Project elements which may be subject to audit is provided in *Table 11.1.3*.

Table 11.1.3 Audit requirements

Element to be Audited	Area or Function to be Audited
Application of EMP	Audit to determine the extent of compliance with the various components of the EMP.
Monitoring results and documentation	<ul style="list-style-type: none"> • Audit monitoring results against relevant guidelines. • Have results of monitoring and inspection programs been documented? • Have environmental or health risks been documented and managed?
Incident documentation and emergency preparedness	<p>Reporting and managements of incidents.</p> <ul style="list-style-type: none"> • An audit to assess management, documentation and reporting of incidents/emergency situations. Are all incidents reported and documented? • Are there options available for improvement and management of processes where incidents have occurred?
Induction, training and awareness	Induction and training registers will be audited periodically to ensure personnel receive relevant inductions and training, as appropriate to their roles and responsibilities within the scheme.
Management review	<p>Audit whether:</p> <ul style="list-style-type: none"> • information and environmental management strategies remain current • opportunities for improvement have been identified • requests or directions from relevant stakeholders have been considered • changes in environmental management practices or pollution, contamination or legislation have been incorporated • the EMP has been reviewed/updated to account for changes to the program.

1.10**COMPLAINTS REGISTER**

The relevant Environmental Manager will maintain a record of complaints received. The Project Manager and/or Construction/Operations Environmental Manager (as applicable) shall review complaints and assess or direct a response (as appropriate). Corrective actions and other recommendations including, where applicable, modifications to practices and procedures shall be made and closed out under the direction of the Project Manager.

2 ENVIRONMENTAL MANAGEMENT PLANS

2.1 CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN

2.1.1 Noise and Vibration

Noise and Vibration Management Plan	
Operational policy	To construct in a manner that minimises the impact of noise and vibrations on surrounding residences and industry.
Performance criteria	<p>No exceedence of Project specific noise criteria at sensitive receptors.</p> <p>No noise-related complaints received from residents and landholders.</p> <p>Consultation with potentially affected sensitive receptors.</p>
Implementation strategy	<p>The following strategies will be implemented to minimise potential noise and vibration habitats:</p> <ul style="list-style-type: none"> • Where practicable, construction works will be undertaken during daylight hours (noting that night works may be required for special activities and for schedule makeup as required). • Where practicable, noisy activities at the Auckland Point laydown area will be scheduled between 7am - 6pm on weekdays. • Transport routes suitable for construction traffic (e.g. Port Access Road, and Hanson Road) will be used. • Construction equipment to be kept in good repair, including mufflers and equipment covers. • Once the need for blasting on LNG Facility site has been determined (currently being assessed in the light of ongoing geotechnical work), a detailed assessment will determine what noise mitigation measures are required.
Monitoring and auditing	<ul style="list-style-type: none"> • All complaints relating to noise and vibration will be recorded on the Complaints Register and complaints will be investigated.
Reporting and corrective action	<ul style="list-style-type: none"> • Non-compliance and reported incidents will be investigated and closed out. • QGC and Engineering, Procurement and Construction (EPC) contractor will maintain records of complaints received and corrective actions undertaken to prevent recurrence.

2.1.2 Traffic /Transport

Traffic / Transport Management Plan	
Operational policy	To minimise as much as practicable potential impacts associated with traffic generated by the Project.
Performance criteria	Minimal traffic-related complaints and incidents.
Implementation strategy	The following strategies will be implemented to minimise potential impacts on traffic and transport:

Traffic / Transport Management Plan

- Shuttle buses and car pooling will be used as far as practicable for construction personnel.
- Heavy vehicles and vehicles carrying large indivisible articles are to avoid built-up and residential areas where possible, and travel on specified haulage routes (e.g. Port Access Road and Hanson Road).
- Movement of large vehicles, vehicles carrying large indivisible articles or Dangerous Goods (e.g. 20-tonne flammable and combustible liquids) to be managed in accordance with guidelines, regulations and permits.
- Concept design layouts for intersections and associated concept stormwater upgrades to pits and pipe sizes to be in accordance with the *Queensland Urban Drainage Manual*.
- Preliminary conceptual layout for the Access Roads 1 and 2 at Auckland Point and site preparation of Areas 1 - 4 to be designed in accordance with the *Queensland Urban Drainage Manual*, to ensure overland flow and road drainage do not adversely affect the continuing operation and maintenance of the Auckland Point rail balloon loop.

Air Services

- Air carriers will be notified of potential additional demand.

Monitoring and auditing	<ul style="list-style-type: none"> • The number of incidents or complaints received in relation to Project traffic will be monitored. Incidents will be investigated and complaints responded to.
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Reporting and corrective action	<ul style="list-style-type: none"> • Non-compliance and reported incidents will be investigated and closed out. • QGC and EPC contractor will maintain records of complaints received and corrective actions undertaken to prevent recurrence.
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2.1.3

Visual Amenity

Visual Amenity Management Plan

Operational policy	To minimise any potential impacts on visual amenity associated with the LNG Component.
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Performance criteria	Respond to all complaints regarding visual amenity.
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Implementation strategy	<p>The following strategies will be implemented to minimise potential impacts on visual amenity during construction:</p> <ul style="list-style-type: none"> • construction areas will be maintained in a safe, neat and orderly manner. • disturbed areas of mangroves will be allowed to re-establish as much as practicable along the shoreline of the LNG Facility.
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Monitoring and auditing	The number of incidents or complaints received in relation to visual amenity will be monitored. All incidents will be investigated and all complaints responded to.
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Reporting and corrective action	QGC and EPC contractor will maintain records of complaints received and corrective actions undertaken to prevent recurrence.
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2.1.4

Lighting

Lighting Management Plan	
Operational policy	To reduce as much as practicable lighting impacts on sensitive receptors.
Performance criteria	Respond to all complaints on lighting.
Implementation strategy	<p>The following strategies will be implemented to minimise potential lighting impacts:</p> <ul style="list-style-type: none"> • External lighting will be as necessary to comply with occupational health and safety (OHS) requirements. • All complaints and responses will be logged in an incidents and complaints register. • All complaints will be responded to.
Monitoring and auditing	<ul style="list-style-type: none"> • All complaints and responses will be logged in an incidents and complaints register
Reporting and corrective action	<ul style="list-style-type: none"> • Non-compliance and reported incidents will be investigated and closed out. • QGC and EPC contractor will maintain records of complaints received and corrective actions undertaken to prevent recurrence.

2.1.5

Weeds and Pests

Weed and Pest Management Plan	
Operational policy	To prevent spread or introduction of pest and weed species as a results of Project activities.
Performance criteria	No increase in abundance or distribution of weed and pest species as a result of Project activities.
Implementation strategy	<p>The following strategies will be implemented to aid in reducing the spread of weeds and pests:</p> <ul style="list-style-type: none"> • all vehicles and plant will require certification that they are weed free prior to their initial commencement of works on Curtis Island. • cleaning/wash-down protocols will be established for vehicles and equipment transiting to Curtis Island, with an inspection/wash down/weed shaker to be established at Auckland Point. • vermin control for the construction camp will be undertaken, as required, by an appropriately licensed pest controller.
Monitoring and auditing	<ul style="list-style-type: none"> • Regular visual inspections of identified weeds and pest species will be conducted.
Reporting and corrective action	<ul style="list-style-type: none"> • Non-compliance and reported incidents will be investigated and closed out. • QGC and EPC contractor will maintain records of complaints received and corrective actions undertaken to prevent recurrence.

2.1.6 *Air Quality and Dust Management*

Air Quality and Dust Management Plan	
Operational policy	To construct in a manner that minimises impacts on ambient air quality.
Performance criteria	<ul style="list-style-type: none"> • No exceedence of Project derived air quality criteria at sensitive receptors. • Respond to all complaints on air quality.
Implementation strategy	<ul style="list-style-type: none"> • Advise potential sensitive receptors prior to commencement of construction activities. • Construction equipment to be kept in good repair, including exhaust systems and emission control devices. • Haul vehicles carrying dust-generating materials outside the boundary of the LNG Facility site will use material covers as necessary. • Cleared areas and access roads will be watered on an as-required basis to minimise dust generation. • Vehicle speeds will be limited on unsealed areas.
Monitoring and auditing	The number of incidents or complaints received in relation to visual amenity will be monitored. All incidents will be investigated and all complaints responded to.
Reporting and corrective action	<ul style="list-style-type: none"> • Non-compliance and reported incidents will be investigated and closed out. • QGC and EPC contractor will maintain records of complaints received and corrective actions undertaken to prevent recurrence

2.1.7 *Groundwater Quality Management Plan*

Groundwater Quality Management Plan	
Operational policy	To protect existing groundwater resource quality.
Performance criteria	<ul style="list-style-type: none"> • Groundwater quality will not be impacted by construction activities. • Spill containment facilities constructed in accordance with AS 1940 (2004) and AS 3780 (1994).
Implementation strategy	<ul style="list-style-type: none"> • The LNG Facility does not propose to extract groundwater during the construction phases. • In the event that dewatering of foundation excavations is required, extracted water will be managed through sediment ponds on-site. • Seepage water in areas of potential ASS will be managed in accordance with the Acid Sulfate Soils Management Plan. • Chemicals and fuels stored in accordance with AS 1940-2004: <i>The storage and handling of flammable and combustible liquids</i>, AS 3780-1994: <i>The storage and handling of corrosive substances</i>, and AS/NZS 4452:1997: <i>The storage and handling of toxic substances</i> (or as amended). • Vehicle maintenance and washdown areas, waste storage areas, and other areas as appropriate will be designed in accordance with appropriate Australian standards. • Spill control kits will be provided on all construction sites.

Groundwater Quality Management Plan

Monitoring and auditing	<ul style="list-style-type: none"> The integrity of storage facilities for hazardous materials and wastes and bunded areas will be routinely inspected. An appropriate groundwater monitoring program will be developed in consultation with DERM.
Reporting and corrective action	<ul style="list-style-type: none"> Non-compliance and reported incidents will be investigated and closed out. All observed spill or leaks will be contained and remediated. Storage/handling non-compliance will be rectified. Contain and remediate or dispose of contaminated material/contaminants Investigate and implement measures to prevent recurrence.

2.1.8

Surface Water Quality Management

Surface Water Quality Management Plan

Operational policy	To minimise the potential impacts associated with erosion and to prevent the release of contaminants that may adversely affect downstream surface-water quality.
Performance criteria	<ul style="list-style-type: none"> No release of contaminants to surface waters outside the LNG Facility boundary. No failures of sediment and erosion control techniques leading to unacceptable sediment release.
Implementation strategy	<p>The following strategies will be implemented to help reduce impacts on surface-water quality:</p> <ul style="list-style-type: none"> Seepage water in areas of potential ASS will be managed in accordance with the Acid Sulfate Soils Management Plan. In the event that dewatering of foundation excavations is required, extracted water will be managed through sediment ponds on-site Chemicals and fuels stored in accordance with AS 1940-2004: <i>The storage and handling of flammable and combustible liquids</i>, AS 3780-1994: <i>The storage and handling of corrosive substances</i>, and AS/NZS 4452:1997: <i>The storage and handling of toxic substances</i> (or as amended). Vehicle maintenance and washdown areas, waste storage areas, and other areas as appropriate will be designed in accordance with appropriate Australian standards. Spill control kits will be provided on all construction sites. Stormwater control, comprising: <ul style="list-style-type: none"> a stormwater collection and control system will be designed and constructed to reduce suspended solids from the surface runoff before discharging to Port Curtis diversion channels and erosion control devices will be utilised around topsoil stockpiles natural watercourses will be redirected around the outside of the construction site stormwater drains and sediment control devices will be utilised throughout construction stabilisation of the faces of engineered slopes will follow completion of construction graded areas will be mechanically compacted to minimise

Surface Water Quality Management Plan

	<p>the potential for erosion.</p> <ul style="list-style-type: none"> • Hydrotest water will be reused as much as practicable, with storage in on-site sediment ponds. • Long-term soil stockpiles will be stabilised to minimise erosion using vegetation. • Staff training will be carried out for awareness in spill prevention and response. • Sewage will undergo secondary treatment on site. • Contaminated soils (if identified) will be stockpiled in an appropriately lined area on-site prior remediation or disposal.
Monitoring and auditing	<ul style="list-style-type: none"> • Visual inspections will be undertaken to assess the integrity of diversion bunds, drains and storage facilities on an as-needs basis. • Sediment ponds will be tested for pH in relation to run-off from ASS prior to discharge to the environment
Reporting and corrective action	<ul style="list-style-type: none"> • Non-compliance and reported incidents will be investigated and closed out. • QGC and EPC contractor will maintain records of complaints received and corrective actions undertaken to prevent recurrence • Degradation to sediment control structures or stormwater control devices will be made good.

2.1.9

Soil Erosion and Sedimentation Control

Soil Erosion and Sedimentation Management Plan

Operational policy	To minimise environmental impacts caused by soil loss and erosion.
Performance criteria	<ul style="list-style-type: none"> • Erosion and sediment control techniques implemented onsite where necessary. • No failures of sediment and erosion control techniques leading to unacceptable sediment release.
Implementation strategy	<p>The following strategies will be implemented to aid in reducing soil erosion and sedimentation:</p> <ul style="list-style-type: none"> • Excavations and clearing will be restricted as far as practicable • Stormwater drains and sediment control devices will be utilised throughout construction • Natural watercourses will be redirected around the outside of the construction site • Dust suppression measures (primarily water spray) will be used on an as needs basis on stockpile areas and roadways • Permanent site strip and soil disposal stockpiles not to be used as fill material or for landscaping during construction will be revegetated • Stormwater runoff will be managed to minimise erosion, including diverting flow over stable areas and away from disturbed areas and topsoil stockpiles, and maximising sheet flow • Erosion/stormwater control structures (e.g. berms, silt fences,

Soil Erosion and Sedimentation Management Plan

	<p>turnoff drains) will be checked periodically to ensure they remain effective</p> <ul style="list-style-type: none"> • Stabilisation of the faces of engineered slopes will be undertaken on an as-needs basis • Graded areas will be mechanically compacted to minimise the potential for erosion
Monitoring and auditing	<ul style="list-style-type: none"> • Visual inspections will be undertaken to assess the integrity of diversion bunds, drains and storage facilities on an as-needs basis. • Erosion and sedimentation controls will be inspected following significant rainfall.
Reporting and corrective action	<ul style="list-style-type: none"> • Non-compliance and reported incidents will be investigated and closed out. • QGC and EPC contractor will maintain records of complaints received and corrective actions undertaken to prevent recurrence. • Degradation to sediment control structures or stormwater control devices will be made good.

2.1.10

Acid Sulfate Soils

Acid Sulfate Soils (ASS) Management Plan

Operational policy	To minimise environmental impact arising from disturbance of acid sulfate soils (ASS).
Performance criteria	<ul style="list-style-type: none"> • Develop and implement an approved acid sulfate soils management plan (ASSMP). • Nil distribution of ASS to adjacent land by construction activities. • Effective management of ASS or PASS encountered during construction.

Implementation strategy **OVERVIEW**

Preliminary design information for the LNG Facility and Pipeline crossing of The Narrows is currently available. Specific details concerning the final location and extent of excavations, volumes of soil to be excavated and locations of infrastructure are subject to ongoing geotechnical investigation to enable optimisation of the LNG Plant design and Export Pipeline crossing of The Narrows. Therefore, detailed management strategies are not provided at this time, with the draft strategies provided below intended as preliminary strategies subject to ongoing investigations which will be integrated into the development of a final Acid Sulfate Soils Management Plan (ASSMP) which will address specific issues in detail.

The development of a final ASSMP will involve consultation with relevant regulators (Department of Environment and Resource Management) (DERM). Management strategies that will be determined based on the potential impacts identified from the final engineering design will include the construction of ASS stockpiling and treatment pads, leachate water treatment and neutralisation facilities where necessary, and detailed groundwater monitoring and soil validation and reporting program.

Consultation with DERM on the final ASSMP will be undertaken prior to the commencement of construction works.

The following management strategies have been based on field investigations undertaken in accordance with, and prepared with reference to, QASSIT Guidelines Queensland Acid Sulfate Soil Technical Manual – Soil Management Guidelines (version 3.8); State Planning Policy 2/02

Acid Sulfate Soils (ASS) Management Plan

Planning and Managing Development Involving Acid Sulfate Soils; Instructions for the Treatment and Management of Acid Sulfate Soils (2001); and Dear SE, Moore NG, Watling KM, Fahl D and Dobos SK (2004). Queensland Acid Sulfate Soil Technical Manual – Legislation and Policy Guide (version 2.2).

Discussion of field investigations undertaken to date, and results obtained, are provided in *Volume 5, Chapter 4*.

Ongoing Groundwater Investigation to Support Development of Final ASSMP

Determination of the depth and chemical parameters of groundwater in the area of the proposed LNG Plant is ongoing. In order to provide data to inform the final ASSMP, installation of 15 groundwater monitoring wells has been commissioned, with field parameters to be measured including pH, electrical conductivity (EC), temperature, turbidity and standing water levels.

The influence of tidal fluctuations on groundwater levels will be determined using pressure transducers and loggers fitted to the wells. The data will be used to identify fluctuations in groundwater levels and potential temporal variations in flow direction.

Monthly sampling will be conducted with samples to be analysed for:

- Total Ca, Mg, Fe, Mn and Al;
- Dissolved Ca, Mg, Fe, Mn and Al;
- Carbonate and bicarbonate;
- Chloride, sulfate, bromide, fluoride, nitrate and nitrite;
- Ammonia;
- Total petroleum hydrocarbons (diesel and gas range organics);
- Total dissolved solids (TDS);
- Total organic carbon (TOC);
- Odour (H₂S);
- Silica; and
- Dissolved metals (Sb, As, Be, B, Cd, Cr, Co, Cu, Li, Pb, Hg, Mo, Ni, P, K, Se, Ag, Na, Sr, Ti, V, Zn).

GENERAL MANAGEMENT STRATEGIES

Avoidance – where possible, areas < 5m AHD where PASS has been identified will be avoided. Ongoing detailed engineering design will include consideration for minimisation of excavation or placement of fill on areas < 5m AHD in which PASS has been identified;

Disturbance – In areas where disturbance of PASS or ASS cannot be avoided, monitoring of groundwater and regular soil field testing (pHF and pHFOX) will be conducted to identify whether there is potential for acid generation. Should acid generation be identified, further sampling will be conducted to determine appropriate liming rates to ensure effective neutralisation;

A regime of groundwater investigation, monitoring and modelling will be used to provide data on groundwater elevation and chemistry during pre-construction and construction phases (see above for further detail on pre-construction groundwater monitoring);

ASS Stockpile Areas

- Stockpile areas for storage of ASS material will be designed and installed to meet the following QASSIT criteria:
 - designated area(s) will be located a minimum of 30 metres from the nearest surface water course;
 - area(s) will be designed to ensure hydraulic isolation is achieved
-

Acid Sulfate Soils (ASS) Management Plan

through the use of an effective impermeable barrier determined in consultation with DERM;

- areas will be designed to collectively contain the maximum volume of material to be stored and treated during construction works;
- leachate/runoff collection drain(s) will be incorporated into the design with the capacity to contain a 1 year (24 hour) ARI event;
- leachate / runoff from the collection drain(s) will be treated and neutralised prior to release to achieve the required pH of between 6.5 and 8.5;
- the stockpile area and bunds will be inspected at the end of each stockpiling event and following rainfall events to ensure the integrity and impermeable liner has not been compromised; and
- provision will be made for a dedicated storage area for sufficient amount of fine agricultural lime (aglime) to be used for neutralisation of ASS and for contingencies.

The ASS treatment area and treated material will be maintained in a slightly moist condition.

Leachate Runoff

- Leachate and runoff from excavation areas containing PASS or ASS, ASS stockpiling, and treatment areas will be captured and contained in-situ or directed to leachate treatment ponds for treatment prior to release off site. Treatment and neutralisation will be undertaken using dissolved aglime slurry, hydrated lime, quicklime or other suitable reagent, with the liming rate determined following initial measurement of field pH and subsequent monitoring of in-situ pH. Release of leachate/runoff will occur when the pH of the leachate/runoff has stabilised at a pH between 6.5 and 8.5 for a period of 24 hours.
- If hydrated lime or quicklime is the preferred option for neutralisation, stringent controls will be implemented to ensure that overdosing does not occur which may result in the pH of the leachate increasing above pH 8.5, requiring treatment and management of alkalinity. Appropriate training of personnel for the handling and storage of the materials will be implemented.
- The use of coarse limestone lining of the drainage, leachate and release water courses will be considered as a safety precaution.

Leachate Control Devices

- Release control devices will be installed at the release points for treatment pond. These will remain closed at all times except during scheduled release events. Release events will be scheduled when the pH of the water within the treatment pond(s) has attained a steady pH of between 6.5 and 8.5.
- If the pH of the release water falls outside the specified pH range of 6.5 to 8.5, the control device will remain closed and the release event postponed until such time as the pH has been adjusted and stabilised to the acceptable range.
- The condition of the control devices will be checked regularly to ensure integrity, and rectified immediately to reduce the potential for failure and uncontrolled release of leachate.

Monitoring and auditing Soil Sampling & Validation

A soils validation sampling and analytical program in areas of potential ASS will be implemented, including as a minimum the following analytical data:

- Field characterisation;
 - Field screening (pHF and pHFOX); and
-

Acid Sulfate Soils (ASS) Management Plan

- SPOCAS and/or chromium suite analysis of selected samples to be conducted by a NATA accredited laboratory.

Material that has undergone validation sampling and analysis will be held on-site in a designated area until the receipt of analytical results.

Leachate Monitoring

A monitoring and reporting program for leachate and runoff will be developed prior to the commencement of works. The program will address requirements specified in the QASSIT guidelines:

- Leachate/runoff in excavation voids in areas of PASS will be tested prior to release off-site. Leachate released will comply with the specifications for release, (pH has stabilised at a level between pH 6.5 to 8.5 for a period of at least 24 hours prior to release);
- Field sampling of leachate/runoff treated in-situ (if any) within excavation voids will be conducted daily. Field pH results will be recorded and the data used to determine the application rate neutralisation reagent prior to release off-site or to leachate treatment ponds;
- An incident reporting procedure will be developed and implemented to ensure that any spills or unscheduled discharges are recorded, investigated and treated in a timely and effective manner; and
- Contingency measures will be developed to address spills or unscheduled releases, if and when they occur, in a timely manner and to eliminate the risk of recurrence.

**Reporting and Decommissioning
corrective
action**

Decommissioning of the ASS stockpiling areas, treatment pads, leachate/runoff ponds and associated discharge channels following completion of the site works, will be undertaken in a staged approach. The issues to be addressed during the staged approach will include:

- Neutralisation of bunding materials and underlying materials as determined through validation sampling of the areas. The rate of sampling will be determined in consultation with DERM;
 - In-situ neutralisation and discharge of residual leachate in drains from ASS stockpile areas, treatment pads areas and leachate treatment ponds, following stabilisation at pH between 6.5 and 8.5 for a period of 24 hours;
 - Reinstatement of the ASS leachate treatment pond area(s) following validation sampling to determine if liming is required to complete neutralisation. Backfilling may incorporate material from treatment and stockpile areas which have been validated as ASS-free material;
 - ASS treatment pad area(s) will not be decommissioned prior to the decommissioning of ASS stockpile areas, as there may be a requirement for further treatment of residues and/or sludges from the leachate treatment drains and pond areas;
 - Reinstatement of the ASS stockpiling and treatment areas will be undertaken following validation sampling to determine if liming is required to complete neutralisation;
 - At each stage of the decommissioning program, areas to be remediated shall be sampled, with soils and sediments analysed to determine the remaining acid-generating capacity; and
 - Prior to a site being decommissioned as effectively remediated and able to be used for other purposes or revegetation, a final round of sampling shall be undertaken and decommissioning will be only be confirmed following receipt and review of analytical results from the laboratory.
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Acid Sulfate Soils (ASS) Management Plan

Closure Reporting

Following decommissioning of the ASS stockpile and treatment pad(s) and leachate treatment area(s), a closure report will be submitted for regulatory approval.

2.1.11**Soil Contamination**

Soil Contamination Management Plan

Operational policy	No contamination of soils arising from Project activities. To manage any pre-existing contaminated soils such that extent of contamination is not exacerbated by Project activities.
Performance criteria	<ul style="list-style-type: none"> LNG Facility site not added to Queensland Contaminated Land Register (CLR). No release of hazardous substance or dangerous goods to soil. Identify all pre-existing contaminated soils likely to be impacted by Project activities. Where pre-existing contaminated soils are identified, and disturbance by Project activities is unavoidable, develop and implement appropriate management strategies.
Implementation strategy	<ul style="list-style-type: none"> Chemicals and fuels will be stored in accordance with AS 1940-2004: <i>The storage and handling of flammable and combustible liquids</i>, AS 3780-1994: <i>The storage and handling of corrosive substances</i>, and AS/NZS 4452:1997: <i>The storage and handling of toxic substances</i> (or as amended). Vehicle maintenance and washdown areas, waste storage areas, and other areas as appropriate will be designed in accordance with appropriate Australian standards. Spill control kits will be provided on construction sites. Staff training will be carried out for awareness in spill prevention and response. Installation of oil/water separators in bunded areas If soil contamination is identified, the area of contamination will be contained (as much as practicable) and an investigation as to cause undertaken. Contaminated soils arising from Project activities will be remediated. Validation sampling of any remediated area will be used to establish the site as “clean” in line with the relevant EPA Contaminated Land and National Environment Protection Measure (NEPM) Guidelines, or as otherwise directed by appropriate authorities. Wastes will be classified, transported and disposed of in accordance with <i>Queensland Environmental Protection (Waste Management) Policy 2000</i> and <i>Environmental Protection (Waste Management) Regulation 2000</i>.
Monitoring and auditing	<ul style="list-style-type: none"> The integrity of storage facilities for hazardous materials and wastes and bunded areas will be routinely inspected.
Reporting and corrective action	<ul style="list-style-type: none"> Non-compliance and reported incidents will be investigated and closed out. QGC and EPC contractor will maintain records of complaints received and corrective actions undertaken to prevent recurrence.

2.1.12

Terrestrial Ecology**Terrestrial Ecology Management Plan**

Operational policy	To minimise impacts on abundance and distribution of flora and fauna as a result of Project activities.
Performance criteria	<ul style="list-style-type: none"> • No unauthorised clearing of native vegetation. • Permits and approvals in place for any unavoidable disturbance of endangered, vulnerable and rare (EVR) flora and fauna species. • No introduction of declared pests as a result of Project activities. • Develop and implement an environmental offsets strategy.
Implementation strategy	<p>The following strategies will be implemented to minimise potential impacts on flora:</p> <ul style="list-style-type: none"> • Clearing will be undertaken within the LNG Facility boundary across the entire plant footprint, in areas where disposal of topsoil or other site strip material will be undertaken, for construction of sediment and control structures, and for fire breaks, access roads, and fence lines. Clearing outside these areas will be kept to the minimum practicable. • Clearing of native vegetation will be monitored by appropriately qualified personnel. • Vehicle access to sensitive areas, specifically saltmarsh, mudflats, mangroves and riparian zones will be restricted to the minimum practicable. • Movement of vehicles outside the LNG plant footprint will be restricted to designated access tracks and roads, except as required for construction purposes. • Where clearing of vegetation is unavoidable, consideration will be given (where practicable) to establishing environmental offsets. • Quarantine measures will be implemented to prevent introduction of weeds and other exotic species to Curtis Island (refer <i>Section 2.1.5</i>). Vehicles and equipment will be certified as weed free prior to their initial commencement of works on Curtis Island. <p>Reptile and Amphibians:</p> <ul style="list-style-type: none"> • Preclearance surveys to assess and potentially relocate animals (as appropriate) inhabiting the construction area prior to vegetation clearance • Ecologists (or other appropriate specialist animal handlers) will be utilised during tree felling to safely remove frogs, snakes (and other animals) inhabiting trees, as appropriate. <p>Birds:</p> <ul style="list-style-type: none"> • Protect recorded roost and nest sites of Powerful Owl and Barking Owl within the LNG site boundary but outside the LNG plant footprint, where practicable. <p>Mammals:</p> <ul style="list-style-type: none"> • Where possible, large hollow-bearing trees (HBT) outside the LNG plant footprint but within the LNG Facility site boundary will be retained. • Protocols for HBT removal aiming to minimise or avoid injury

Terrestrial Ecology Management Plan

to arboreal fauna will be developed prior to construction.

- A site induction presentation and tool box meeting will be implemented during construction to ensure all personnel are educated on the measures to protect native fauna.

Monitoring and auditing

- Clearance of native vegetation will be monitored by appropriately qualified personnel
- Regular visual inspections of identified weeds and pest species will be conducted.

Reporting and corrective action

- Non-compliance and reported incidents will be investigated and closed out.
 - QGC and EPC contractor will maintain records of complaints received and corrective actions undertaken to prevent recurrence.
-

2.1.13
Marine Ecology

Marine Ecology Management Plan

Operational policy

To minimise impacts on abundance and distribution of marine flora and fauna as a result of Project activities.

Performance criteria

- No unauthorised disturbance to or removal of marine plants.
- Minimise as much as practicable disturbance to marine fauna.

Implementation strategy

The following strategies will be implemented to minimise potential impacts on marine ecology:

- Design infrastructure and apply construction methods to minimise direct footprint on marine habitat as much as practicable.
 - All Project vessels will abide by Port of Gladstone vessel speed restrictions and exclusion zones.
 - Construction activities in marine areas (for example, dredging, HDD, pile driving) will be undertaken in as short a time frame as practicable to minimise disturbance. The requirement for an exclusion zone for marine mammals during percussive piling activities may be evaluated when more information on construction methods is available.
 - External lighting will be located as necessary to comply with occupational health and safety (OHS) requirements while minimising where practicable light spill into marine environment.
 - Solid wastes will be controlled on site and removed for disposal by a licenced contractor.
 - Project vessels will have a Ship Board Oil Pollution Emergency Plan (SOPEP) (or equivalent) and carry an oil pollution kit.
 - During dredging activities, monitoring of turbidity and total suspended solids will be carried out, with appropriate contingency measures if required. These could include:
 - suspending or relocating dredging works until tidal/winds conditions are more favourable
 - where practicable, installation of silt curtains or similar measures that help reduce turbidity from dredging/spoil placement operations.
-

Marine Ecology Management Plan

- Food scraps and other putrescible wastes from vessels will be disposed of in accordance with *MARPOL 73/78 Annex V (International Convention for the Prevention of Pollution From Ships, [Garbage])*.
- Oily water separators on all vessels will collect cooking oils and greases for on-shore disposal.
- Management of effluent from the LNG Facility as per 2.2.19 *Effluent Disposal*.

Monitoring and auditing

- Regular inspections will be carried out for general leaks and spills on all vessels, plant and equipment and corrective action taken.
- A comprehensive regional ecosystem and marine plant offset strategy will be developed, addressing mangroves disturbed as a result of Project construction activities.

Reporting and Corrective Action

- Non-compliance and reported incidents will be investigated and closed out.
 - QGC and EPC contractor will maintain records of complaints received and corrective actions undertaken to prevent recurrence.
-

2.1.14

Mosquito and Biting Midge Management

Mosquito and Biting Midge Management Plan

Operational policy

To undertake Project activities such that potential health impacts on Project personnel and nearby sensitive receptors arising from mosquitoes and biting midges are minimised.

Performance criteria

Minimise potential mosquito and biting midge breeding sites resulting from Project activities.

Implementation strategy

- An assessment of the LNG Component area will be undertaken prior to works and on an ongoing informal basis to identify potential breeding sites.
- Potential breeding sites created by construction activities, such as potholes, depressions and wheel ruts, to be filled as soon as practicable to prevent ponding.
- The creation of sandy inter-tidal beach habitats will be avoided (through appropriate design of intertidal structures, as these are suitable habitats for biting midges. Other designs such as rock walls or pebble beaches will be considered, if required.
- Drainage systems for stormwater, irrigation and sewage effluent will be designed to minimise mosquito and midge breeding.
- Construction camp facilities will be fitted with protective barriers, such as fly screens and air-conditioning.
- Insect repellent will be made available to site personnel as required.
- Any required specific area control plans based on assessment of potential breeding sites will conform to the *Environmental Protection Agency Mosquito Management Code of Practice for Queensland*.

Monitoring and auditing

- Areas of ponding and pooled water that cannot be easily removed or backfilled will be inspected regularly for presence of larvae by the environmental representative.
 - Inspections of potential breeding grounds will be undertaken
-

Mosquito and Biting Midge Management Plan

	<p>following rain.</p> <ul style="list-style-type: none"> The Mosquito and Biting Midge Management plan will be reviewed periodically to ensure continuous improvement of the program.
Reporting and corrective action	<p>QGC and EPC contractor will maintain records of medical treatment of Project personnel required arising from mosquito borne disease or biting midge activity..</p> <p>Where breeding sites are identified, the following corrective action will be taken:</p> <ul style="list-style-type: none"> investigate reasons behind the increase employees will be re-trained in mitigation measures work policies and procedures will be reviewed to improve the management system.

2.1.15 Eastern Red Fire Ant Management

Eastern Red Fire Ant Management Plan

Operational policy	To prevent spread or introduction of Eastern Red Fire Ant (EFRA) as a result of Project activities.
Performance criteria	No evidence of ERFA on Project sites
Implementation strategy	<ul style="list-style-type: none"> Imported fill and landscaping materials sourced from the vicinity of Fire Ant Restricted Areas will be accompanied by a movement certificate / declaration form provided by the EPC Contractor or their sub-contractor(s). Movements of vehicles from a restricted area will follow Department of Employment, Economic Development and Innovation (DEEDI) requirements, such as inspection and wash-down. Construction site personnel will be briefed on fire ant identification and management through site environmental or toolbox meeting.
Monitoring and auditing	Construction site personnel will be briefed on fire ant identification and management through site environmental or toolbox meeting.
Reporting and corrective action	<p>Any fire ants identified on site will be reported to DEEDI by QGC.</p> <p>Should fire ants be identified on site the following actions will be undertaken:</p> <ul style="list-style-type: none"> An investigation will be undertaken to identify the reasons behind any non-compliance Employees will be re-trained as appropriate. Work policies and procedures will be reviewed to improve the system.

2.1.16 Marine Fuel and Oil Spill

Marine Fuel and Oil Spill Management Plan

Operational policy	To protect marine environment by prevention or mitigation of fuel or oil spills to the marine environment.
Performance criteria	Compliance with local and international regulations based on the International Convention for Prevention of Pollution from ships, known as MARPOL.

Marine Fuel and Oil Spill Management Plan

Implementation strategy	<p>The following strategies will be implemented to minimise potential impacts on marine ecology:</p> <ul style="list-style-type: none"> • The EPC contractor will create a detailed Construction and Operation Fuel/Oil Spill Avoidance and Response Plan (or equivalent) prior to commencement of construction, which will interface with the National Oil Response Plan as well as Gladstone Port Corporation (GPC) requirements and mitigation measures. • Evaluate the potential activities that pose risk for spills/leaks and obtain adequate response materials and equipment prior to hazardous substances arriving on site. • Each vessel to carry an Oil Pollution Response kit. Spill kits will also be located at the LNG Facility in areas at risk of release of hazardous substances to the marine environment. • Fuel and chemical storage areas, as well as refuelling areas, will be adequately banded to ensure no oil is discharged to the marine environment. • Fuel and other hydrocarbon storage, handling, operational and distribution areas will be subject to regular inspections to identify and respond to leaks. • All pollution prevention plans for the Port of Gladstone and other relevant regulations will be adhered to by all Project vessels. • Procedures for safe refuelling and fuel transfer will be implemented and all appropriate staff trained in these procedures. • An Emergency Response Crew, made up of personnel working at each designated refuelling location, will be trained to use spills kits and address spills/leaks that may occur in their designated areas. • Each vessel will have its own Ship Board Oil Pollution Emergency Plan (SOPEP) and an activity-specific Oil Pollution Contingency Plan.
Monitoring and auditing	<ul style="list-style-type: none"> • Routine inspections will check for deterioration and leaks, as well as unsecured containers in all oil/fuel storage areas. • Routine inspections to identify spills and leaks will be undertaken on all vessels used during construction and operations. • Regular audits and reviews will be undertaken and recommendations and corrective actions implemented.
Reporting and corrective action	<ul style="list-style-type: none"> • In the event of an oil spill, the Regional Harbour Master will be notified immediately. The Regional Harbour Master will direct response as required.

2.1.17

Waste Management

Waste Management Plan

Operational policy	<p>To minimise waste generation and maximise reuse and recycling of construction waste products.</p> <p>To dispose of waste in an appropriate manner.</p>
Performance criteria	<ul style="list-style-type: none"> • No contamination of soil, air or water as a result of inappropriate waste management. • Develop and implement a plan for waste minimisation and management.

Waste Management Plan

- All waste disposal to be carried out by a licensed waste contractor.
- Waste management practices to not result in loss of health to personnel or sensitive receptors.

Implementation strategy

- Waste will be managed in accordance with the requirements of the *Environmental Protection (Waste Management) Policy (EPP Waste) 2000* and the *Environmental Protection (Waste Management) Regulation 2000*.

Solid waste

- A program will be implemented to reduce the amount of waste generated during construction. This waste-minimisation program will systematically assess opportunities for reduction at source, reuse and recycling as well as recovery of materials or conversion of waste into useable materials.
- A Construction Waste Management Plan will be developed and implemented defining the approved methods for the handling, storage and disposal of all waste.
- All non-hazardous solid wastes will be segregated at source into recyclable and non-recyclable wastes, and stored in clearly marked, covered bins to prevent contamination of the various waste streams and wind-generated pollution. Waste will then be transported to a licenced recycling or waste disposal facility.

Wastewater

- Segregated and/or treated wastewater will be made available for lower grade use (e.g. irrigation).
- All wastewater, except for uncontaminated rainwater, will be assessed or treated prior to discharge or reuse.

Hazardous waste

- The creation of hazardous wastes during construction will be reduced via the tendering and contracting process wherever practicable. In all situations, non-hazardous materials that serve the same purpose and are as cost effective as hazardous materials will be given preference.
- All hazardous waste material generated will be segregated from other waste streams, clearly labelled and appropriately stored. Handling and disposal will be undertaken by a licenced contractor.
- Recyclable hazardous wastes, such as batteries, will be stored separately to facilitate easier retrieval for recycling. Handling and disposal will be undertaken by a licenced contractor.

Cleared Timber (Vegetation waste)

A range of options are being assessed for management of cleared timber and vegetation. These include the following, with a combination of these to be used as appropriate:

- mulching or chipping of leaves, branches and small timber on site and, where appropriate, use for site stabilisation, stormwater management and erosion control. Any excess mulch be placed in the spoil disposal areas.
 - making merchantable timber available to the local Gladstone community where there is a tangible volumetric request, with timber transported to the mainland on truck via Auckland Point. This will only occur on an as-needed or demand basis.
 - timber unsuitable for milling or which exceeds the local capacity for timber use disposed of at the municipal waste
-

Waste Management Plan

	<p>disposal facility as green waste for mulching subject to agreement on volumes and the resulting costs associated with hauling, handling and with any landfill operators; and on capacities being available within the Curtis Island located soils disposal areas where this materials could also be handled.</p> <ul style="list-style-type: none"> clearing, grubbing and controlled burning of timber on site followed by disposal of the ash mixed in the soils stock pile areas at the site. clearing, grubbing and shredding of timber and co-disposal with site strip material in the spoil disposal areas.
Monitoring and auditing	<ul style="list-style-type: none"> Compliance with waste management plans will be audited regularly. Housekeeping checks will occur to ensure waste is being stored correctly and that there is no littering. The quality characteristics of treated effluent (if discharged to land) will be monitored in accordance with DERM regulations.
Reporting and corrective action	<ul style="list-style-type: none"> Non-compliance and reported incidents will be investigated and closed out. QGC and EPC contractor will maintain records of complaints received and corrective actions undertaken to prevent recurrence.

2.1.18***Mulch Stockpile*****Mulch Stockpile Management Plan**

Operational policy	To mitigate the risk of spontaneous combustion of mulch stockpiles on-site.
Performance criteria	No combustion of mulch stockpiles across the site.
Implementation strategy	<ul style="list-style-type: none"> Mulch stockpiles to be no wider than 10 m or higher than 2 m. Typically, the stockpiles will be no longer than 200 m. Stockpiles will be turned every two weeks for the first two months, then an assessment made to determine an appropriate turning regime. If the temperature of the stockpile exceeds 60°C, the stockpile will be turned.
Monitoring and auditing	Mulch stockpiles will be monitored weekly for the first two months, and then an appropriate monitoring frequency will be determined.
Reporting and corrective action	<ul style="list-style-type: none"> Non-compliance and reported incidents will be investigated and closed out. <p>Any mulch generated fires will be logged. Management measures will be reassessed following any fires and updated as appropriate.</p>

2.1.19***Effluent Disposal*****Effluent Disposal Management Plan**

Operational policy	To release treated effluent and manage sewage sludge without causing environmental harm.
Performance criteria	<ul style="list-style-type: none"> Treated effluent meets quality requirements of design parameters. All sewage sludge is disposed at an appropriate sewerage disposal facility.

Effluent Disposal Management Plan

Implementation strategy	<ul style="list-style-type: none"> Liquid effluent will be treated and discharged (refer <i>Volume 2 Chapter 9</i>) and solids removed from site for disposal in Gladstone.
Monitoring and auditing	<ul style="list-style-type: none"> The sewage treatment plant (STP) facilities will be monitored to ensure there is no leakage.
Reporting and corrective action	<ul style="list-style-type: none"> Non-compliance and reported incidents will be investigated and closed out. QGC and EPC contractor will maintain records of complaints received and corrective actions undertaken to prevent recurrence.

2.1.20

Fire Management

Bushfire Management Plan

Operational policy	<ul style="list-style-type: none"> To prevent the initiation of bushfires as a result of Project activities. To protect Project personnel and key Project infrastructure from bushfire impacts.
Performance criteria	<ul style="list-style-type: none"> Develop and implement an Emergency Response Plan that includes fire management. No unplanned and uncontrolled bushfires caused by Project activities. Consultation with all relevant fire management authorities.
Implementation strategy	<p>The following strategies will be implemented during the construction phase to achieve the objectives of the Bushfire EMP:</p> <ul style="list-style-type: none"> A fire buffer will be created around moderate to high bushfire hazard areas as outlined in <i>Volume 5 Chapter 18</i>. Any land within 100 m of an area identified as having a high bushfire hazard classification should be included in the high bushfire hazard area. Any land within 50 m of an area identified as having a medium bushfire hazard classification should be included in the medium bushfire hazard area. Safety buffer areas on the boundary between high and medium bushfire hazard areas should be included in the high bushfire hazard area. <p>Two key considerations in building in high or medium hazard areas are:</p> <ul style="list-style-type: none"> avoiding higher risk situations, particularly locations with a combination of slope and certain aspects maximising the setbacks from hazardous vegetation. <p>Setbacks from hazardous vegetation</p> <ul style="list-style-type: none"> Infrastructure personnel work areas will be setback from surrounding hazardous vegetation by a minimum of 37.5 m. Within this setback area, fuel will be managed by thinning of vegetation and mechanical clearing to reduce the potential for bushfire impacting the development. A fuel-free zone will be located adjacent to the development and should include a perimeter road for the purposes of fire fighting access.

Bushfire Management Plan

- Materials used to construct structures within 100 m of vegetation will comply with *Australian Standard 3959 - 2009 Construction of Buildings in Bushfire-prone Area*.
- Water access and storage will be capable of dealing with a worst-case scenario.
- Fuel management zones will be incorporated into the development to reduce the risk from high risk vegetation areas upslope of the plant.

Monitoring and auditing

- Bushfire Management Plan to be reviewed at least annually or following a fire event.
- All fire events outside the LNG plant footprint will be reported.

Reporting and corrective action

- Extinguish fire if safe to do so.
 - Notify fire brigade and implement evacuation procedure if appropriate.
 - Review Bushfire Management Plan following fire events.
-

2.1.21***Incidents and Complaints***

All environmental incidents, near-misses and hazards will be reported via the Synergi incident reporting system in accordance with the relevant BG Group standard for incident reporting. Complaints will be handled by the Land Access and Communications teams in the first instance, who will liaise with the complainant(s), the Environment Team and the Environmental Manager for effective resolution. It will be the Environmental Manager's responsibility to ensure that all complaints are addressed and closed off.

Incidents and Complaints Management Plan

Operational policy

To have a process whereby all complaints can be lodged and responded to in an appropriate manner.

Performance criteria

- Record all complaints and responses in an incidents and complaints register.
- Respond appropriately to all incidents and complaints.

Implementation strategy

All incidents and complaints will be documented in an incidents/complaints register. The complaints form will document at least the following information:

- time, date and nature of complaint
- type of communication (telephone, letter, email, visit)
- name, contact address and contact number of complainant (if provided)
- description of response and investigation undertaken as a result of the complaint
- any action taken and personnel investigating complaint.

Each complaint will be investigated as soon as practicable and, where appropriate, corrective action taken to remedy the cause of the complaint.

Monitoring and auditing

The complaints register will be maintained to ensure all complaints are resolved.

Reporting and corrective action

All complaints and incidents are to be reported. Should further incidents occur or complaints be received in relation to previous occurrences, appropriate corrective actions will be undertaken.

2.1.22 *Environmental Induction and Training*

Environmental Induction/Environmental Training Management Plan	
Operational policy	To ensure that all Project personnel, including contractors, comply with the environmental requirements of all tasks.
Performance criteria	<ul style="list-style-type: none"> All personnel undergo site inductions and, where necessary, additional training, that address environmental requirements of Project activities. Full compliance with induction and training procedures.
Implementation strategy	<ul style="list-style-type: none"> All site personnel to undergo an induction that provides an overview of key site environmental requirements. Additional training to be provided for personnel undertaken tasks with specific environmental requirements (e.g., vegetation clearing) to ensure awareness of environmental sensitivities and applicable EMPs.
Monitoring and auditing	A site induction register will be maintained.
Reporting and corrective action	Should a staff member not be adequately trained or inducted, training activities will be undertaken as necessary.

2.1.23 *Emergency response for environmental incidents*

Emergency response for environmental incidents	
Operational policy	To ensure that Project personnel can respond effectively and efficiently in the event of an environmental incident to ensure no long-term adverse impacts on health, safety or the environment.
Performance criteria	<ul style="list-style-type: none"> Any emergency response addressed in accordance with the QGC Emergency Management Plan. Nil government notices.
Implementation strategy	<ul style="list-style-type: none"> Site induction to include emergency response procedures. Site emergency response plan(s) will be developed addressing (but not limited to): <ul style="list-style-type: none"> medical emergency major accident fire major spill or chemical release weather or seismic event civil disobedience marine transportation emergency. Additional training to be provided for personnel specific emergency response accountabilities.
Monitoring and auditing	A site induction register will be maintained.
Reporting and corrective action	In the event of a staff member not being adequately trained or inducted, training activities will be undertaken as necessary.

2.1.24 *Dangerous Goods and Hazardous Substances*

Dangerous Goods and Hazardous Substances	
Operational policy	To protect Project personnel, the public and the environment from harm due to the transport, storage or use of dangerous goods or hazardous substances.

Dangerous Goods and Hazardous Substances

Performance criteria	<ul style="list-style-type: none"> No unplanned release of dangerous goods or hazardous substances. All transport, storage and handling of dangerous goods or hazardous substances is performed in accordance with applicable legislation, guidelines and standards.
Implementation strategy	<p>Transport, storage and handling of chemicals and dangerous goods will be undertaken in accordance with relevant Australian standards and guidelines:</p> <ul style="list-style-type: none"> <i>AS 1940-2004: The storage and handling of flammable and combustible liquids, AS 3780-1994: The storage and handling of corrosive substances, and AS/NZS 4452:1997: The storage and handling of toxic substances</i> (or as amended). <i>Dangerous Goods Safety Management Act 2001</i> (Qld) and <i>Dangerous Goods Safety Management Regulation 2001</i> (Qld) (and associated guidelines). Material safety data sheets (MSDS) for all chemicals to be used will be required on site before delivery of the goods is accepted. MSDS will be kept with the goods, provided to the users of dangerous goods and kept with the HSSE managers.
Monitoring and auditing	Audits and inspections of chemical and dangerous goods storage areas will be undertaken periodically to ensure compliance with guidelines.
Reporting and corrective action	<ul style="list-style-type: none"> Audits and inspections of chemical and dangerous goods storage areas will be logged. Spills or releases will be logged as incidents and appropriate corrective action undertaken.

2.1.25***Decommissioning***

QGC will negotiate with relevant stakeholders, such as the Department of Infrastructure and Planning (DIP) as the regulator of the Gladstone State Development Area (GSDA) and Gladstone Ports Corporation (GPC), to determine which, if any, items of infrastructure are to remain for subsequent users of the site. Decommissioning in general will be undertaken as follows:

Decommissioning

Operational policy	<p>To decommission Project facilities such that they do not present an ongoing environmental risk.</p> <p>To plan for decommissioning in consultation with relevant stakeholders.</p>
Performance criteria	Develop and implement, in consultation with stakeholders, a detailed decommissioning plan for all facilities prior to the end of their useful life.
Implementation strategy	<ul style="list-style-type: none"> Return of the Auckland Point staging area to GPC control at completion of lease. Decommissioning and remediation of infrastructure in this area is subject to negotiation and commercial agreements with GPC. Removal of buildings and associated infrastructure not required for ongoing operations at the LNG Facility site.

Decommissioning	<p>Construction camp footings and foundations will be removed and the area ripped and landscaped for erosion control. While landscaping will involve some revegetation, in general much of this area will be retained as open space and/or hardstand area to continue to provide bushfire buffer between the northern side of the site and the process trains, and to allow ongoing laydown areas for major site maintenance works.</p> <ul style="list-style-type: none"> • Appropriate site investigation for contaminated land (if deemed necessary) will be undertaken in accordance with the requirements of the <i>Draft Guidelines for the Assessment and Management of Contaminated Land in Queensland (May 1998)</i> (as amended or updated, or as per equivalent guidelines or legislation at the time or as directed by the appropriate regulator).
Monitoring and auditing	Effectiveness of rehabilitation and remediation works (if required) will be assessed.
Reporting and corrective action	Records and results of rehabilitation and remediation work undertaken will be maintained.

2.2 OPERATIONAL ENVIRONMENTAL MANAGEMENT PLANS

2.2.1 Noise and Vibration

Noise and Vibration Management Plan	
Operational policy	To operate in a manner that minimises the impact of noise and vibrations on surrounding residences and industry.
Performance criteria	<p>No exceedence of Project specific noise criteria at sensitive receptors.</p> <p>No noise-related complaints received from residents and landholders.</p> <p>Consultation with potentially affected sensitive receptors.</p>
Implementation strategy	<p>The following tasks and actions will be implemented during the operational phase of the LNG Component to achieve the objectives of the noise EMP:</p> <ul style="list-style-type: none"> • noise monitoring will be undertaken during start-up of the plant and during early operational stages to validate modelled noise levels at noise sensitive receptors. • significant variation between modelled results and monitored results will be assessed and mitigation measures developed as appropriate. • vehicles transporting equipment to and from site will be kept in good repair, including mufflers and equipment covers.
Monitoring and auditing	<ul style="list-style-type: none"> • All complaints relating to noise and vibration will be recorded on the Complaints register and all complaints will be responded to.
Reporting and corrective action	<ul style="list-style-type: none"> • Non-compliance and reported incidents will be closed out. • A record will be maintained of all complaints received and corrective actions undertaken to prevent recurrence.

2.2.2

Traffic/Transport

Traffic/Transport Management Plan	
Operational policy	To minimise as much as practicable potential impacts associated with traffic generated by the Project.
Performance criteria	Minimal traffic-related complaints and incidents.
Implementation strategy	<ul style="list-style-type: none"> The following strategies will be implemented to minimise potential impacts on traffic and transport: Heavy vehicles articles to avoid built up and residential areas where possible Movement of vehicles carrying large loads and Dangerous Goods will be managed in accordance with guidelines, regulations and permits.
Monitoring and auditing	<ul style="list-style-type: none"> The number of incidents or complaints received in relation to Project traffic will be monitored. All incidents will be investigated and all complaints responded to.
Reporting and corrective action	<ul style="list-style-type: none"> Non compliance and reported incidents will be investigated and closed out. A record will be maintained of all complaints received and corrective actions undertaken to prevent recurrence.

2.2.3

Shipping Transport

Shipping Transport Management Plan	
Operational policy	To minimise any potential impacts associated with shipping traffic generated by operation of the LNG Facility.
Performance criteria	Minimal traffic-related complaints and incidents.
Implementation strategy	<p>The following strategies will be implemented to minimise potential impacts on shipping in the Port of Gladstone:</p> <ul style="list-style-type: none"> A 250m safety zone (preliminary and to be refined in consultation with Gladstone Regional Harbour Master) will be applied from the manifold at the LNG berth, and potentially within the shipping channel / swing basin (subject to consultation with the Harbour Master) to exclude small boats and uncontrolled ignition sources during cargo operations. As most LNG vessels are approximately 50 m across the beam, this zone will be in the order of 200 m from the side of the LNG ship. Buoys will be deployed to demarcate this area and restricted zones will be shown on navigation charts as appropriate. While the berth is unoccupied, a nominal 50m safety zone will be applied to exclude small boats and uncontrolled ignition sources (subject to ongoing risk assessment and consultation with Gladstone Regional Harbour Master). QCG will work with and enter into appropriate commercial / contractual arrangements with the tug contractor and in consultation with GPC to ensure that adequate tug capacity is provided. Training of pilots through the use of shipping simulation, in cooperation with the Gladstone Regional Harbour Master, will be ongoing and as required throughout the life of the Project. Once the existing pilots are trained for LNG ship handling, new pilots will be trained according to the requirements of Maritime Safety Queensland (MSQ). It is expected that new pilots will become familiar with vessels that regularly call at the port.

Shipping Transport Management Plan

	<p>Navigation requirements will include:</p> <ul style="list-style-type: none"> • An indicative upper limit on wind speed of 30 knots (still to be finalised) will apply to pilot boarding and berthing operations within the Port of Gladstone. • Transit of Gladstone harbour and berthing are intended be undertaken in daylight for up to the first six months of operations, in order to ensure that pilots are familiar with LNG vessels and ship captains are familiar with the harbour. After six months 24 hr access through Gladstone Harbour to the berth is anticipated. • Visibility controls on harbour transit and berthing will be as specified by the Gladstone Regional Harbour Master.
Monitoring and auditing	<ul style="list-style-type: none"> • The number of incidents or complaints received in relation to Project shipping traffic will be monitored. All incidents will be investigated and all complaints responded to.
Reporting and corrective action	<ul style="list-style-type: none"> • Non-compliance and reported incidents will be investigated and closed out. • A record will be maintained of all complaints received and corrective actions undertaken to prevent recurrence.

2.2.4

Visual Amenity

Visual Amenity Management Plan

Operational policy	To minimise any potential impacts on visual amenity associated with the LNG Facility.
Performance criteria	Respond to all complaints regarding visual amenity.
Implementation strategy	<p>The following strategies will be implemented to minimise potential impacts on visual amenity:</p> <ul style="list-style-type: none"> • Provide visual screening and minimise the disruption of natural shoreline vegetation through the retention of as much mangrove habitat as possible. • Once the LNG Facility is fully operational, mangroves will be allowed to re-establish along the shoreline where this does not impede operations. • Vegetation will be retained on adjoining ridges and hills (outside the LNG plant footprint but within the LNG Facility site boundary) as far as possible, to screen the LNG Facility from viewing locations to the south east.
Monitoring and auditing	<ul style="list-style-type: none"> • The number of incidents or complaints received in relation to visual amenity will be monitored. All incidents will be investigated and all complaints responded to.
Reporting and corrective action	<ul style="list-style-type: none"> • Non-compliance and reported incidents will be investigated and closed out. • A record will be maintained of all complaints received and corrective actions undertaken to prevent recurrence.

2.2.5

Lighting

Lighting Management Plan

Operational policy	To reduce as much as practicable lighting impacts on sensitive receptors.
Performance criteria	Respond to all complaints on lighting.
Implementation strategy	The following strategies will be implemented to minimise potential lighting impacts:

Lighting Management Plan

- Detailed lighting design for the LNG Facility developed and installed in the most conservative manner consistent with the safety of the plant operators, always keeping in mind the requirements to minimise light spill outside the LNG Facility boundary as much as practicable.
- Floodlights on the jetty will be aimed so as to not be a blinding hindrance to the captain as he lands a vessel, while still providing adequate illumination at the dolphins and at the loading arms.
- Also, egress illumination energized from the plant emergency bus will be provided so as to leave no space where persons are stationed to be in total darkness, so that the persons can egress in safety.
- Where possible, lighting will not be installed where it can be avoided. For example, almost no perimeter fence illumination will be installed, with use of infrared-sensing cameras and motion detection software resident in the security system computer instead.

Monitoring and auditing • The number of incidents or complaints received in relation to visual amenity will be monitored. All incidents will be investigated and all complaints responded to.

Reporting and corrective action • Non-compliance and reported incidents will be investigated and closed out.
 • A record will be maintained of all complaints received and corrective actions undertaken to prevent recurrence.

2.2.6 Weeds and Pests

Weed and Pest Management Plan

Operational policy To prevent spread or introduction of pest and weed species as a result of Project activities.

Performance criteria • No increase in abundance or distribution of weed and pest species as a result of Project activities.

Implementation strategy The following strategies will be implemented to aid in reducing the spread of weeds and pests:

- All vehicles and plant will require certification that they are weed free prior to their initial commencement of works on Curtis Island.
- Vermin control for the LNG Facility will be undertaken, as required, by an appropriately licensed pest controller.

Monitoring and auditing • Regular visual inspections of identified weeds and pest species will be conducted.

Reporting and corrective action • Non-compliance and reported incidents will be investigated and closed out.
 • A record will be maintained of all complaints received and corrective actions undertaken to prevent recurrence.

2.2.7 Air Quality Management Plan

Air Quality and Dust Management Plan

Operational policy To undertake site operations in a manner that minimises impacts on ambient air quality.

Air Quality and Dust Management Plan

Performance criteria	<ul style="list-style-type: none"> • No exceedence of Project derived air quality criteria at sensitive receptors. • Respond to all complaints on air quality.
Implementation strategy	<p>A range of management / mitigation measures that have been incorporated into the LNG Facility to address potential air quality issues, based on assessment of a range of potential technologies for key emissions sources as part of the internal QGC Best Available Techniques (BAT) assessment. Key outcomes include:</p> <ul style="list-style-type: none"> • Adoption of waste heat recovery (WHR) to reduce requirement for use of fuel gas burners associated with the dehydration and mercury removal components of the LNG process (CO₂ reduction). • A variety of refrigeration compressor drivers were considered for the Project, with aero-derivative LM2500+G4s with Dry Low Emissions (DLE) selected in a 2x2x2 configuration for each LNG process train. Design NO_x emissions from this configuration of LM2500+G4s + DLE are as low as or lower than any of the other options considered in detail (although electric motor drives were rejected during the concept assessment and not considered in detail due being unproven technology for use in this environment). Thermal efficiency was as great as or greater than any other option considered, with greater thermal efficiency indicating lower rates of greenhouse gas emissions arising from operation of the compression drivers. • Optimisation of power generation, with a range of turbine configurations assessed for 1, 2 and 3 train operation. Aero-derivative LM2500+G4s with DLE were selected for power generation, with 2 operating + 1 spare (for 2 Train operation). For the third train it is assumed that Inlet Air Chilling (IAC) has been applied (see below), allowing two operating LM2500+G4 units to run all three trains. • Inlet air chilling (IAC) on the main refrigeration turbines optimises the efficiency of the turbines over a range of ambient temperatures and humidity improving annual LNG production. The use of IAC can provide additional power per Train to the liquefaction Refrigeration Compressors on a warm day for an investment of less power to the IAC utility plant. IAC provides an operational benefit for upstream operations, as it can provide a stable feed demand throughout daily temperature swings, thus improving the efficiency of upstream operations by reducing personnel and transportation resources through steady operations rather than continually cycling the production flow rates.
Monitoring and auditing	An air monitoring plan will be developed as part of Environmental Licencing of the Facility.
Reporting and corrective action	<ul style="list-style-type: none"> • Records of monitoring results will be maintained by the Operations Environmental Manager. • All incidents will be reported to the Operations Environmental Manager. Incidents will be investigated and closed out. • A record will be maintained of all complaints received and corrective actions undertaken to prevent recurrence.

2.2.8

Groundwater Quality Management Plan

Groundwater Quality Management Plan	
Operational policy	To protect existing groundwater resource quality.
Performance criteria	<ul style="list-style-type: none"> Groundwater quality will not be impacted as a result of operations at the LNG Facility. Spill containment facilities constructed in accordance with AS 1940 (2004) and AS 3780 (1994).
Implementation strategy	<ul style="list-style-type: none"> The LNG Facility does not propose to abstract groundwater during the operations. Chemicals and fuels stored in accordance with AS 1940-2004: <i>The storage and handling of flammable and combustible liquids</i>, AS 3780-1994: <i>The storage and handling of corrosive substances</i>, and AS/NZS 4452:1997: <i>The storage and handling of toxic substances</i> (or as amended). Vehicle maintenance and washdown areas, process areas, waste storage areas, and other areas as appropriate will be designed in accordance with appropriate Australian standards. Spill control kits will be provided on all sites.
Monitoring and auditing	<ul style="list-style-type: none"> The integrity of storage facilities for hazardous materials and wastes and bunded areas will be routinely inspected. An appropriate groundwater monitoring program will be developed in consultation with DERM.
Reporting and corrective action	<ul style="list-style-type: none"> Non-compliance and reported incidents will be investigated and closed out. All observed spill or leaks will be contained and remediated. Storage/handling non-compliance will be rectified immediately. Contain and remediate or dispose of contaminated material/contaminants. Investigate and implement measures to prevent recurrence.

2.2.9

Surface Water Quality Management

Surface Water Quality Management Plan	
Operational policy	To minimise the potential impacts associated with erosion and prevent the release of contaminants that may adversely affect downstream surface water quality.
Performance criteria	<ul style="list-style-type: none"> No release of contaminants to surface waters outside the Facility boundary. No failures of sediment and erosion control techniques leading to unacceptable sediment release.
Implementation strategy	<p>The following strategies will be implemented to help reduce impacts on surface water quality:</p> <ul style="list-style-type: none"> Site drainage works will include permanent stormwater drainage channels with capacity to convey storms with up to 1 in 25 year Average Recurrence Interval (ARI). Clean stormwater run-off from uncontaminated parts of the site will be routed to two sedimentation ponds. Excess stormwater (overflow from the ponds) will be discharged as

Surface Water Quality Management Plan

	<p>a sheet flow to Gladstone Harbour.</p> <ul style="list-style-type: none"> • Sewage will be treated via an extended aeration-activated sludge sewage treatment plant. Treated wastewater is further processed through tertiary filters and stored before it is pumped to an irrigation system. • Rejects (brine stream) from seawater desalination system will be routed to an outfall to the harbour. • Processed wastewater and potentially contaminated stormwater run-off from the Facility process areas will be routed to the Corrugated Plate Interceptor (CPI) separator via process area spill containment sump and various stormwater lift stations for treatment. CPI effluent will be further treated in a dissolved air flotation unit and a tertiary filter and then routed to the irrigation system. Excess water will be routed to the sedimentation ponds. • Staff training will be carried out for awareness in spill prevention and response. • Sewage will undergo secondary treatment on site. • Contaminated soils (if identified) will be stockpiled in an appropriately lined area on-site prior remediation or disposal. • Preferentially reuse or recycle surface water (e.g. in fire water systems if quality is appropriate) captured through the stormwater drainage system in retention ponds, thereby minimising the impact by reducing discharges to the environment. • Off-site removal of contaminants not deemed acceptable for marine discharge.
Monitoring and auditing	Visual inspections will be undertaken to assess the integrity of diversion bunds, drains and storage facilities on an as-needs basis.
Reporting and corrective action	<ul style="list-style-type: none"> • Non-compliance and reported incidents reported will be investigated and closed out. • The Operations Environment Manager will maintain records of all complaints and incidents and corrective actions undertaken to prevent recurrence. • Degradation to sediment control structures or stormwater control devices will be made good.

2.2.10

Soil Contamination

Soil Contamination Management Plan

Operational policy	<ul style="list-style-type: none"> • No contamination of soils arising from Project activities • To manage any pre-existing contaminated soils such that extent of contamination is not exacerbated by Project activities.
Performance criteria	<ul style="list-style-type: none"> • LNG Facility site not added to Queensland Contaminated Land Register (CLR). • No release of hazardous substance or dangerous goods to soil. • Identify all pre-existing contaminated soils likely to be impacted by Project activities. • Where pre-existing contaminated soils are identified, and disturbance by Project activities is unavoidable, develop and implement appropriate management strategies.

Soil Contamination Management Plan

Implementation Strategy	<ul style="list-style-type: none"> Chemicals and fuels will be stored in accordance with AS 1940-2004: <i>The storage and handling of flammable and combustible liquids</i>, AS 3780-1994: <i>The storage and handling of corrosive substances</i>, and AS/NZS 4452:1997: <i>The storage and handling of toxic substances</i> (or as amended). Vehicle maintenance and washdown areas, waste storage areas, and other areas as appropriate will be designed in accordance with appropriate Australian standards. Spill control kits will be provided on all construction sites. Staff training will be carried out for awareness in spill prevention and response. Installation of oil/water separators in bunded areas. If soil contamination is identified, the area of contamination will be contained (as much as practicable) and an investigation as to cause undertaken. Contaminated soils arising from Project activities will be remediated. Validation sampling of any remediated area will be used to establish the site as “clean” in line with the relevant EPA Contaminated Land and National Environment Protection Measure (NEPM) Guidelines, or as otherwise directed by appropriate authorities. Wastes will be classified, transported and disposed of in accordance with Queensland <i>Environmental Protection (Waste Management) Policy 2000</i> and <i>Environmental Protection (Waste Management) Regulation 2000</i>.
Monitoring and auditing	The integrity of storage facilities for hazardous materials and wastes and bunded areas will be routinely inspected.
Reporting and corrective action	<ul style="list-style-type: none"> Non-compliance and reported incidents will be investigated and closed out. The Operations Environment Manager will maintain records of all incidents and corrective actions undertaken to prevent recurrence.

2.2.11

Terrestrial Ecology

Terrestrial Ecology Management Plan

Operational policy	To minimise impacts on abundance and distribution of flora and fauna as a result of Project activities.
Performance criteria	<ul style="list-style-type: none"> No unauthorised clearing of native vegetation. Permits and approvals in place for any unavoidable disturbance of Endangered, Vulnerable and Rare (EVR) flora and fauna species. No introduction of declared pests as a result of Project activities. Develop and implement an environmental offsets strategy.
Implementation strategy	<p>The following strategies will be implemented to minimise potential impacts on flora:</p> <ul style="list-style-type: none"> Negligible clearing of vegetation will be undertaken during the Operations phase. Vehicle access to sensitive areas, specifically saltmarsh, mudflats, mangroves and riparian zones will be restricted to the minimum practicable.

Terrestrial Ecology Management Plan

	<ul style="list-style-type: none"> • Movement of vehicles outside the LNG plant footprint will be restricted to designated access tracks and roads, except as required for construction purposes • Quarantine measures will be implemented to prevent introduction of weeds and other exotic species to Curtis Island (refer <i>Section 2.1.5</i>). Vehicles and equipment will be certified as weed free prior to their initial commencement of works on Curtis Island.
Monitoring and auditing	Any clearance of native vegetation will be monitored by appropriately qualified personnel
Reporting and corrective action	Incidents will be investigated and closed out.

2.2.12

Marine Ecology

Marine Ecology Management Plan

Operational policy	To minimise impacts on abundance and distribution of marine flora and fauna as a result of Project activities.
Performance criteria	<ul style="list-style-type: none"> • No unauthorised disturbance to or removal of marine plants. • Minimise as much as practicable disturbance to marine fauna.
Implementation strategy	<p>The following strategies will be implemented to minimise potential impacts on marine ecology:</p> <ul style="list-style-type: none"> • Design infrastructure and apply construction methods to minimise direct footprint on marine habitat as much as practicable. • All Project vessels will abide by Port of Gladstone vessel speed restrictions and exclusion zones. • External lighting will be located as necessary to comply with occupational health and safety (OHS) requirements while minimising where practicable light spill into marine environment. • Solid wastes will be controlled on site and removed for disposal by a licenced contractor. • Project vessels will have a Ship Board Oil Pollution Emergency Plan (SOPEP) (or equivalent) and carry an oil pollution kit. • Food scraps and other putrescible wastes from vessels will be disposed of in accordance with <i>MARPOL 73/78 Annex V (International Convention for the Prevention of Pollution from Ships, [Garbage])</i>. • Oily water separators on all vessels will collect cooking oils and greases for on-shore disposal. • The sewage and sullage and desalination brine effluent streams will be pre-mixed and discharged via a common outlet on the Materials Offloading Facility (MOF). The diffuser discharge point will be designed and located to maximise mixing and dilution of the wastewater being discharged through the marine outfall.
Monitoring and auditing	<ul style="list-style-type: none"> • Regular inspections will be carried out for general leaks and spills on all vessels, plant and equipment and corrective action taken.

Marine Ecology Management Plan

- A comprehensive regional ecosystem and marine plant offset strategy will be developed, addressing mangroves disturbed as a result of Project activities.

Reporting and Corrective Action

- Non- compliance and reported incidents will be investigated and closed out.
- The Operations Environment Manager will maintain records of all complaints received and corrective actions undertaken to prevent recurrence.

2.2.13

Mosquito and Biting Midge Management

Mosquito and Biting Midge Management Plan

Operational policy

To undertake Project activities such that potential health impacts on Project personnel and nearby sensitive receptors arising from mosquitoes and biting midges are minimised.

Performance criteria

- Minimise potential mosquito and biting midge breeding sites resulting from Project activities.

Implementation strategy

- Potential breeding sites to be filled as soon as practicable to prevent ponding.
- Drainage systems for stormwater, irrigation and sewage effluent will be maintained to minimise mosquito and midge breeding.
- Insect repellent will be made available to site personnel as required.
- Any required specific area control plans based on assessment of potential breeding sites will conform to the *Environmental Protection Agency Mosquito Management Code of Practice for Queensland*.

Monitoring and auditing

- Areas where ponds form or pooled water occurs that cannot be easily removed or backfilled will be inspected regularly for presence of larvae by the environmental representative.
- Inspections of potential breeding grounds will be undertaken following rain.
- The Mosquito and Biting Midge Management Plan will be reviewed periodically to ensure continuous improvement of the program.

Reporting and corrective action

Records of any medical treatment of Project personnel required arising from mosquito borne disease or biting midge activity will be maintained by the Operations Environmental Manager.

Where breeding sites are identified, the following corrective action will be taken:

- investigate reasons behind the increase
- employees will be re-trained in mitigation measures
- work policies and procedures will be reviewed to improve the management system.

2.2.14

Marine Fuel and Oil Spill

Marine Fuel and Oil Spill Management Plan	
Operational policy	To protect marine environment by prevention or mitigation of fuel or oil spills to the marine environment.
Performance criteria	Compliance with local and international regulations based on the International Convention for Prevention of Pollution from ships, known as MARPOL.
Implementation strategy	<p>The following strategies will be implemented to minimise potential impacts on marine ecology:</p> <ul style="list-style-type: none"> • Project vessel will carry an oil pollution response kit. Spill kits will also be located at the LNG Facility in areas at risk of release of hazardous substances to the marine environment. • Fuel and other hydrocarbon storage, handling, operational and distribution areas will be subject to regular inspections to identify and respond to leaks. • All pollution prevention plans for the Port of Gladstone and other relevant regulations will be adhered to by all Project vessels. • Procedures for safe refuelling and fuel transfer will be implemented and all appropriate staff trained in these procedures. • An Emergency Response Crew, made up of personnel working at each designated refuelling location, will be trained to use spills kits and address spills/leaks that may occur in designated areas. • Each vessel will have its own Ship Board Oil Pollution Emergency Plan (SOPEP) and an Activity-specific Oil Pollution Contingency Plan.
Monitoring and auditing	<ul style="list-style-type: none"> • Routine inspections will check for deterioration and leaks, as well as unsecured containers in all oil/fuel storage areas. • Routine inspections to identify spills and leaks will be undertaken on all vessels used during construction and operations. • Regular audits and reviews will be undertaken and recommendations and corrective actions implemented.
Reporting and corrective action	<ul style="list-style-type: none"> • In the event of an oil spill, the Gladstone Regional Harbour Master will be notified immediately. The Harbour Master will direct response as required.

2.2.15

Waste Management

Waste Management Plan	
Operational policy	<ul style="list-style-type: none"> • To minimise waste generation and maximise reuse and recycling of construction waste products. • To dispose of waste in an appropriate manner.
Performance criteria	<ul style="list-style-type: none"> • No contamination of soil, air or water as a result of inappropriate waste management. • Develop and implement a plan for waste minimisation and management. • All waste disposal to be carried out by a licensed waste contractor.

Waste Management Plan

- Waste management practices to not result in loss of health to personnel or sensitive receptors.
-

Implementation strategy Waste will be managed in accordance with the requirements of the *Environmental Protection (Waste Management) Policy (EPP Waste) 2000* and the *Environmental Protection (Waste Management) Regulation 2000*.

Solid waste

- A program will be implemented to reduce the amount of wastes generated during LNG Facility operation. The waste-minimisation program will systematically assess opportunities for reduction at source, reuse, recycling, and recovery of materials or conversion of waste into useable materials. The role of an on-site Waste Management Supervisor will be outlined and assigned within the program.
- An operations Waste Management Plan will be developed and implemented defining the appropriate methods for handling, storage, and disposal of all waste.
- All non-hazardous solid wastes will be segregated at the source into recyclable and non-recyclable wastes and stored in clearly marked, covered bins to prevent contamination of the various waste streams and to prevent wind-generated pollution. Waste will then be transported to a licenced recycling or waste disposal facility.
- Solid waste streams will be stored in designated areas or skips as they are generated. Storage areas will be clearly marked and skips will be protected against the elements.

Wastewater

- Wastewater generation will be minimised by efficient use of raw water – comprehensive water management schemes will be devised for operations.
- Segregated and/or treated wastewater will be made available for lower grade use (e.g. for irrigation).
- All wastewater, except for uncontaminated rainwater, will be treated or quality assessed before discharge or reuse.

Hazardous waste

- All hazardous waste materials will be segregated from other waste streams, clearly labelled and appropriately stored. Handling and disposal will be undertaken by a licenced contractor.
-

Monitoring and auditing

- Compliance with waste-management plans will be audited regularly.
- Housekeeping checks to ensure waste is being stored correctly and that no littering is occurring.
- The quality characteristics of treated effluent (if discharged to land) will be monitored in accordance with the environmental authority conditions.

Reporting and corrective action

- Non-compliance and reported incidents will be investigated and closed out.
- The Operations Environment Manager will maintain records of all incidents and non-compliance, and corrective actions undertaken to prevent recurrence.

2.2.16

Effluent Disposal

Effluent Disposal Management Plan	
Operational policy	To release treated effluent and manage sewage sludge without causing environmental harm.
Performance criteria	Treated effluent meets quality requirements of design parameters. All sewage sludge is disposed at an appropriate sewerage disposal facility.
Implementation strategy	<ul style="list-style-type: none"> Liquid effluent will be treated and discharged (refer <i>Volume 2 Chapter 9</i>) and solids removed from site for disposal in Gladstone.
Monitoring and auditing	<ul style="list-style-type: none"> The sewage treatment plant (STP) facilities will be monitored to ensure there is no leakage.
Reporting and corrective action	<ul style="list-style-type: none"> Non-compliance and reported incidents will be investigated and closed out. The Operations Environment Manager will maintain records of all non-compliance, and corrective actions undertaken to prevent recurrence.

2.2.17

Fire Management

Bushfire Management Plan	
Operational policy	<ul style="list-style-type: none"> To prevent the initiation of bushfires as a result of Project activities. To protect Project personnel and key Project infrastructure from bushfire impacts.
Performance criteria	<ul style="list-style-type: none"> Develop and implement an Emergency Response Plan that includes fire management. No unplanned and uncontrolled bushfires caused by Project activities. Consultation with all relevant fire management authorities.
Implementation strategy	<p>The following strategies will be implemented during the construction phase to achieve the objectives of the Bushfire EMP:</p> <ul style="list-style-type: none"> A fire buffer will be created around moderate to high bushfire hazard areas as outlined in <i>Volume 5, Chapter 18</i>. Any land within 100 m of an area identified as having a high bushfire hazard classification should be included in the high bushfire hazard area. Any land within 50 m of an area identified as having a medium bushfire hazard classification should be included in the medium bushfire hazard area. Safety buffer areas on the boundary between high and medium bushfire hazard areas should be included in the high bushfire hazard area. <p>Setbacks from hazardous vegetation</p> <ul style="list-style-type: none"> Infrastructure will be setback from surrounding hazardous vegetation by a minimum of 37.5 m. Within this setback area, fuel will be managed by thinning of vegetation and mechanical clearing to reduce the potential for bushfire impacting the development.

Bushfire Management Plan	
	<ul style="list-style-type: none"> • A fuel-free zone will be located adjacent to the LNG plant and should include a perimeter road for the purposes of fire fighting access. • Materials used to construct structures within 100 m of vegetation will comply with <i>Australian Standard 3959 - 2009 Construction of Buildings in Bushfire-prone Area</i>.
Monitoring and auditing	<ul style="list-style-type: none"> • Bushfire Management Plan to be reviewed at least annually or following a fire event. • All fire events outside the LNG plant footprint will be reported.
Reporting and corrective action	<ul style="list-style-type: none"> • Extinguish fire if safe to do so. • Notify fire brigade and implement evacuation procedure if appropriate. • Review Bushfire Management Plan following fire events.

2.2.18

Incidents and Complaints

All environmental incidents, near-misses and hazards will be reported via the Synergi incident reporting system in accordance with the BG Group standard for incident reporting. Complaints will be handled by the Land Access and Communications teams in the first instance, who will liaise with the complainant(s), the Environment Team and the Environmental Manager for effective resolution. It will be the Environmental Manager’s responsibility to ensure that all complaints are addressed and closed off.

Incidents and Complaints Management Plan	
Operational policy	To have a process whereby all complaints can be lodged and responded to in an appropriate manner.
Performance criteria	Record all complaints and responses in an incidents and complaints register. Respond appropriately to all incidents and complaints.
Implementation strategy	All incidents and complaints will be documented in an incidents/complaints register. The complaints form will document at least the following information: <ul style="list-style-type: none"> • time, date and nature of complaint • type of communication (telephone, letter, email, visit) • name, contact address and contact number of complainant (if provided) • description of response and investigation undertaken as a result of the complaint • any action taken and personnel investigating complaint. Each complaint will be investigated as soon as practicable and, where appropriate, corrective action taken to remedy the cause of the complaint.
Monitoring and auditing	The complaints register will be maintained to ensure all complaints are resolved.
Reporting and corrective action	All complaints and incidents are to be reported. Should further incidents occur or complaints be received in relation to previous occurrences, appropriate corrective actions will be undertaken.

2.2.19 *Environmental Induction and Training*

Environmental Induction/Environmental Training Management Plan	
Operational policy	To ensure that all Project personnel, including contractors, comply with the environmental requirements of all tasks.
Performance criteria	All personnel undergo site inductions and, where necessary, additional training, that address environmental requirements of Project activities. Full compliance with induction and training procedures.
Implementation strategy	<ul style="list-style-type: none"> All site personnel to undergo an induction that provides an overview of key site environmental requirements Additional training to be provided for personnel undertaken tasks with specific environmental requirements to ensure awareness of environmental sensitivities and applicable EMPs
Monitoring and auditing	A site induction register will be maintained
Reporting and corrective action	In the event of a staff member not being adequately trained or inducted, training activities will be undertaken as necessary.

2.2.20 *Emergency response for environmental incidents*

Emergency response for environmental incidents	
Operational policy	To ensure that Project personnel can respond effectively and efficiently in the event of an environmental incident to ensure no long-term adverse impacts on health, safety or the environment.
Performance criteria	<ul style="list-style-type: none"> Any emergency response addressed in accordance with the QGC Emergency Management Plan. Nil government notices.
Implementation strategy	<p>BG's Standard for Crisis Management requires that a Local Incident Management Plan (LIMP) be prepared for each asset. Such plans will be prepared for each asset component of the project. The plan will include information on:</p> <ul style="list-style-type: none"> The organisation for incident management of the asset; The process for identifying incidents; The procedure for notifying incidents; The procedure for escalation, if necessary; The procedure for activation of the incident management organisation; Tools for the management of an incident; and Roles and responsibilities of incident management teams. <p>Other implementation strategies include:</p> <ul style="list-style-type: none"> Site induction to include emergency response procedures. Site emergency response plan(s) will be developed addressing (but not limited to): <ul style="list-style-type: none"> medical emergency major accident fire major spill or chemical release weather or seismic event civil disobedience marine transportation emergency.

Emergency response for environmental incidents

Additional training to be provided for personnel specific emergency response accountabilities.

Monitoring and auditing

A site induction register will be maintained.

Reporting and corrective action

Where a staff member is not adequately trained or inducted, training activities will be undertaken as necessary.

2.2.21

Dangerous Goods and Hazardous Substances

Dangerous Goods and Hazardous Substances

Operational policy

To protect Project personnel, the public and the environment from harm due to the transport, storage or use of dangerous goods or hazardous substances.

Performance criteria

No unplanned release of dangerous goods or hazardous substances.

All transport, storage and handling of dangerous goods or hazardous substances is performed in accordance with applicable legislation, guidelines and standards.

Implementation strategy

Following substantial completion of detailed design, QGC will notify the HICB (the Hazardous Industries and Chemical Branch (of Workplace Health and Safety Queensland) in regard to the LNG Facility being a large dangerous goods location and a potential Major Hazard Facility (MHF). MHF classification is dependent on the types and quantities of dangerous goods to be stored and/or used at the liquefaction plant and other factors such as the proximity to other industrial activities in the area. QGC anticipate that the Facility will be declared a major hazard facility for the lifecycle of the Project in accordance with HICB guidelines.

Transport, storage and handling of chemicals and dangerous goods will be undertaken in accordance with relevant Australian standards and guidelines:

- AS 1940-2004: *The storage and handling of flammable and combustible liquids*, AS 3780-1994: *The storage and handling of corrosive substances*, and AS/NZS 4452:1997: *The storage and handling of toxic substances* (or as amended).
- *Dangerous Goods Safety Management Act 2001* and *Dangerous Goods Safety Management Regulation 2001* (and associated guidelines)

Material Safety Data Sheets (MSDS) for all chemicals to be used will be required on site before delivery of the goods is accepted. MSDS will be kept with the goods, provided to the users of dangerous goods and kept with the HSSE managers.

Monitoring and auditing

Audits and inspections of chemical and dangerous goods storage areas will be undertaken periodically to ensure compliance with guidelines.

Reporting and corrective action

Audits and inspections of chemical and dangerous goods storage areas will be logged.

Spills or releases will be logged as incidents and appropriate corrective action undertaken.

3

DECOMMISSIONING PHASE

3.1

DECOMMISSIONING

Detailed planning for decommissioning will commence no later than five years prior to the scheduled end of project life at the LNG Facility. QGC will negotiate with relevant stakeholders, such as the Department of Infrastructure and Planning (DIP) as the regulator of the Gladstone State Development Area (GSDA), to determine which, if any, items of infrastructure are to remain for subsequent users of the site. Decommissioning in general will be undertaken as described below:

Decommissioning	
Operational policy	<ul style="list-style-type: none"> To decommission Project facilities such that they do not present an ongoing environmental risk. To plan for decommissioning in consultation with relevant stakeholders.
Performance criteria	Develop and implement, in consultation with stakeholders, a detailed decommissioning plan for all facilities prior to the end of their useful life.
Implementation strategy	<p>Detailed planning for decommissioning will commence no later than five years prior to the scheduled end of the LNG Facility's life as refined during the life of the QCLNG Project. A range of factors will impinge on decommissioning methodology, including:</p> <ul style="list-style-type: none"> available technology the prevailing legal and regulatory regime social and political conditions affecting the subsequent land use of the LNG Facility site economic conditions that may impact on the extent to which plant and equipment will be reused or recycled. <p>Decommissioning of the LNG Facility, taking these factors into account, is described below in conceptual terms.</p> <p>Removal of Plant and Equipment</p> <ul style="list-style-type: none"> Negotiations will be entered with relevant stakeholders, and in particular the DIP (or applicable subsequent regulator) as the regulator of the GSDA, to determine whether any items of infrastructure are to remain for subsequent users of the site. Unless directed otherwise by regulators, all plant and equipment on the LNG Facility site, including LNG trains, tanks, jetty, and supporting infrastructure will be removed. Process chemicals, desiccant, oils and refrigeration liquids will be drained or recycled into site storage or appropriate containers for eventual safe removal from site and disposal, as required by the designated regulatory acts and authorities. LNG Facility equipment and piping will be purged of hydrocarbons and either sold for reuse or scrap, or disposed of in accordance with regulatory requirements applicable at the time. Removal of plant and equipment will be undertaken in accordance with any relevant provisions of the <i>Dangerous Goods Safety Management Act 2001</i> (Qld) as amended (or equivalent legislation as applicable at the time).

Decommissioning

- Tanks will be demolished and removed as scrap unless there is some commercial value in their retention or resale.
- Buildings will be removed and sold for reuse, recycling, or disposed of in accordance with regulatory requirements applicable at the time. Footings and foundations may be removed, although deep footings (including piles) may remain in situ.
- Where hardstand areas are not to be retained, those including internal roads will be ripped and revegetated.
- Where sediment ponds are not to remain, ponds will be drained, backfilled and revegetated.

Contaminated Land

- It is anticipated that the LNG Facility will be listed on the *Queensland Environmental Management Register (EMR)* as having been used for notifiable activities under Schedule 2 of the *Environmental Protection Act 1994* (Queensland). In the event that removal from the EMR and/or Contaminated Land Register (CLR) is required (subject to negotiation with regulators and dependant upon proposed subsequent land use), appropriate site investigation will be undertaken in accordance with the requirements of the *Draft Guidelines for the Assessment and Management of Contaminated Land in Queensland* (May 1998) (as amended or updated, or as per equivalent guidelines or legislation at the time or as directed by the appropriate regulator).
- The need for specific-site investigations, including the nature and extent of investigations and any remediation and validation works required, will be subject to details of site history over the Project life and to applicable regulations and guidelines at the time of decommissioning.

Rehabilitation

- Rehabilitation will be subject to the proposed use of the site subsequent to decommissioning of the LNG Facility.

Monitoring and auditing	Monitoring and auditing requirements will be subject to the proposed use of the site subsequent to decommissioning of the LNG Facility and to requirements of regulators at the time.
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Reporting and corrective action	Reporting and corrective action requirements will be subject to the proposed use of the site subsequent to decommissioning of the LNG Facility and to requirements of regulators at the time.
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