Ecologically sustainable development H

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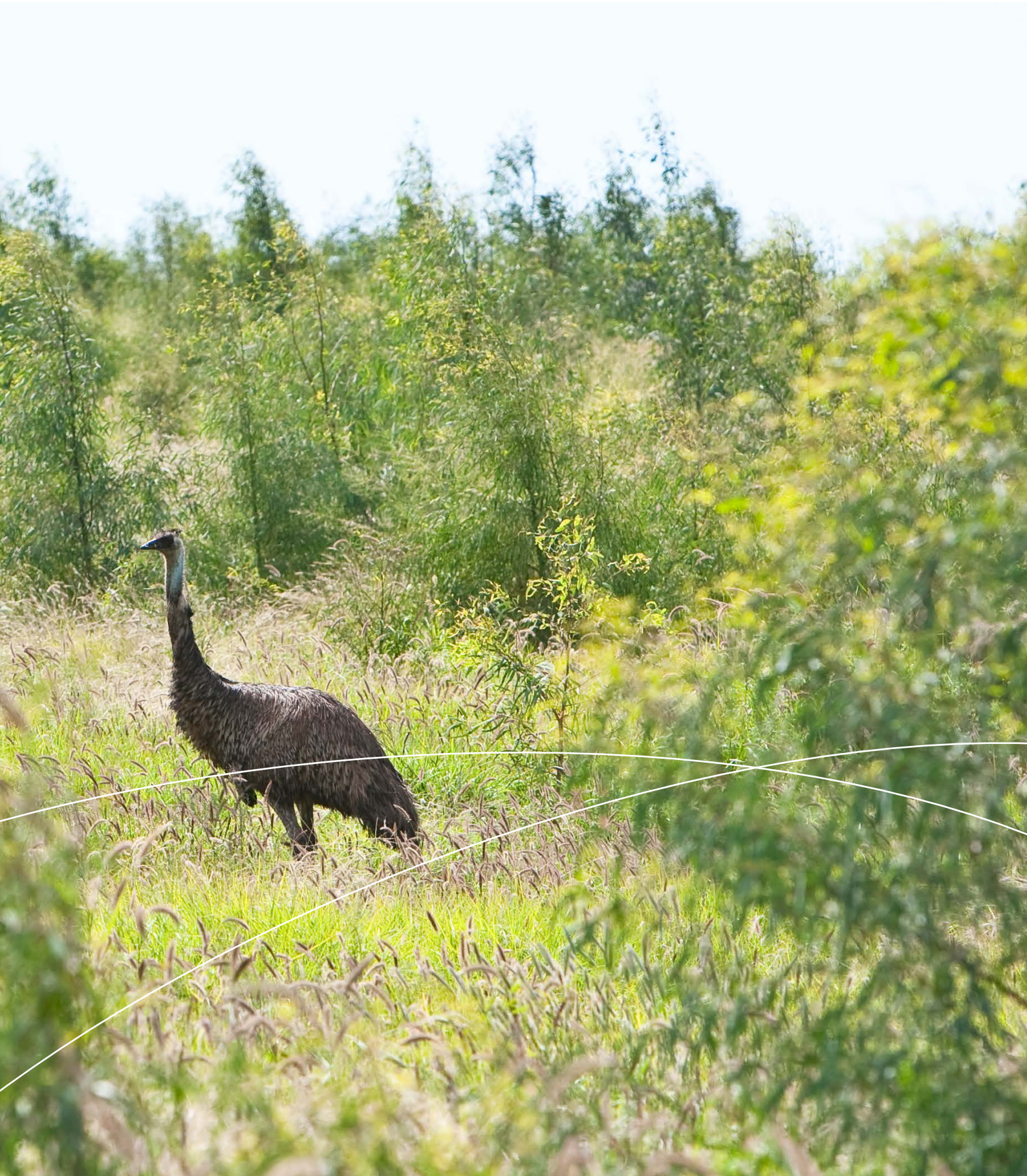

Santos
GLNG Project

Gas Field Development Project Environmental Impact Statement

Appendix H: Ecologically sustainable development

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H Ecologically sustainable development

The Gas Field Development Project (GFD Project) conforms to the objectives for 'sustainable development' through project planning, assessment of potential impacts, and proposed avoidance, mitigation and management measures.

This report has been prepared to address section 9 of the *Terms of reference* (ToR) *for an environmental impact statement* (EIS) issued March 2013. Consistent with the other sections, the index to locate where each ToR requirement is met within this EIS is included in Appendix B: Terms of reference cross-reference.

H.1 Background

Over the last three decades, there has been increasing global awareness of the concept of sustainable development. Initiatives have been developed at a global and national level and these are described below.

H.1.1 Global

Following the 1972 *Declaration of the United Nations Conference on the Human Environment* (also known as the Stockholm Declaration) and the *1980 World Conservation Strategy of the International Union for the Conservation of Nature*, the United Nations became more conscious of the significance of the impact of development on the environment. There was increasing concern that continuing economic growth could not be sustained. It was recognised that a worldwide change in attitude was essential to create balance between economic growth, social development and the protection of the environment.

In 1983, the World Commission on Environment and Development was established as an organisation independent of the United Nations, with the purpose of focusing on environmental and development problems and their solutions. In 1987, the Commission published *Our Common Future* (also known as the Brundtland Report), stating that environmental problems are a global concern and that it would be in the interest of every nation to develop policies for sustainable development. The report provides the most widely recognised definition of sustainable development as:

> *Development that meets the needs of the present without compromising the ability of future generations to meet their own needs (World Commission on Environment and Development, 1987).*

H.1.2 National

In recognition of the importance of sustainable development, the Commonwealth Government developed the *National Strategy for Ecologically Sustainable Development* (Ecologically Sustainable Development Steering Committee [ESDSC], 1992). This was adopted by all levels of Australian Government in 1992 as part of Agenda 21 and outlines the Commonwealth Government's understanding and approach to sustainable development.

The Strategy (ESDSC, 1992) defines ecologically sustainable development as:

> *Using, conserving and enhancing the community's resources so that ecological processes, on which life depends, are maintained, and the total quality of life, now and in the future, can be increased.*

The *National Strategy for Ecologically Sustainable Development* provides a strategic framework for governments to direct policy and decision making towards ecologically sustainable development. The goal of the Strategy (ESDSC, 1992) is:

> *Development that improves the total quality of life, both now and in the future, in a way that maintains the ecological processes on which life depends.*

The Strategy (ESDSC, 1992) also recognises that private business plays a key role in promoting ecologically sustainable development:

> *Private enterprise in Australia has a critical role to play in supporting the concept of ecologically sustainable development while taking decisions and actions which are aimed at helping to achieve the goal of this Strategy. Many have already been active participants in the ecologically sustainable development process, including taking significant individual steps to ensure that Australia's economy and production base are based on an ecologically sustainable footing.*

The Strategy relies on various initiatives to implement its requirements including numerous strategies such as those for greenhouse response, conservation of biological diversity, and waste minimisation and recycling. As discussed in this EIS (Section 16: Greenhouse gases, Section 18: Terrestrial ecology and Section 12: Waste), the GFD Project has planning and design criteria and mitigation measures that will ensure compliance with the Strategy objectives. By following an ecologically sustainable path of development, the likelihood of serious environmental impacts arising from economic activity should be able to be reduced.

To demonstrate that sustainable development aspects have been considered and incorporated during the scoping and planning of the GFD Project, this section provides a description of the core objectives and guiding principles of the *National Strategy for Ecologically Sustainable Development* (ESDSC, 1992) and the GFD Project's conformance in sections H.3.1 and H.3.2.

H.2 Regulatory context

The principles of ecologically sustainable development are incorporated into Commonwealth and State legislation, including the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act), the *Environmental Protection Act 1994* (Qld) (EP Act) and the *Sustainable Planning Act 2009* (Qld) (SP Act).

H.2.1 Environment Protection and Biodiversity Conservation Act 1999

The EPBC Act provides for the protection of the environment, especially matters of national environmental significance, and the promotion of matters of ecologically sustainable development at a Commonwealth level. Section 3A of the EPBC Act states:

> *The following principles are **principles of ecologically sustainable development:***
>
> a. *Decision-making processes should effectively integrate both long-term and short-term economic, environmental and social considerations that are equitable.*
> b. *If there are threats of serious or irreversible environmental damage, scientific uncertainty should not be used as a reason for postponing measures to prevent environmental degradation.*
> c. *The principle of inter-generational equity is considered such that the present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations.*
> d. *The conservation of biological diversity and ecological integrity should be a fundamental consideration in decision making.*
> e. *Improved valuation, pricing and incentive mechanisms should be promoted.*

H.2.2 Environmental Protection Act 1994

Similarly, the object of the EP Act is:

> *To protect Queensland's environment while allowing for development that improves the total quality of life, both now and in the future, in a way that maintains the ecological processes on which life depends (**ecologically sustainable development**).*

The object of the EP Act is to be achieved in the following manner:

1. *The protection of Queensland's environment is to be achieved by an integrated management program that is consistent with ecologically sustainable development.*
2. *The program is cyclical and involves the following phases—*
    a. *Phase 1—establishing the state of the environment and defining environmental objectives*
    b. *Phase 2—developing effective environmental strategies*
    c. *Phase 3—implementing environmental strategies and integrating them into efficient resource management*
    d. *Phase 4—ensuring accountability of environmental strategies.*

H.2.3 Sustainable Planning Act 2009

The SP Act seeks to achieve ecologically sustainable development by managing planning and development processes in a coordinated and integrated manner. The SP Act provides the overarching framework for Queensland's planning and development assessment system.

The purpose of the SP Act is to achieve ecological sustainability by -

a. *Managing the process by which development takes place, including ensuring the process is accountable, effective and efficient and delivers sustainable outcomes; and*
b. *Managing the effects of development on the environment, including managing the use of premises; and*
c. *Continuing the coordination and integration of planning at the local, regional and State levels.*

In accordance with Schedule 4 of the *Sustainable Planning Regulation 2009* (Qld), aspects of development for petroleum activities and those activities covered by authorities issued under the EP Act, the *Petroleum and Gas (Production and Safety) Act 2004* (Qld) and the *Petroleum Act 1923* (Qld) are classified as development that 'cannot be declared to be assessable development under a planning scheme, temporary local planning instrument, preliminary approval to which section 242 of the SP Act applies or master plan'. Therefore, GFD Project infrastructure or development activity proposed within petroleum leases will be exempt from the assessment provisions of the SP Act, in the majority of cases. For example, permanent camps are specifically excluded as a petroleum activity under the petroleum legislation and therefore require approval under the SP Act.

There may be instances where GFD Project infrastructure is proposed outside petroleum leases. Or there may be instances where activities other than petroleum activities, are being undertaken within tenure boundaries. In both such instances, the provisions of the SP Act may apply and compliance with the relevant regulatory provisions, plans and policies will be required. Where the provisions of the SP Act apply, it is likely that the relevant local government will be the assessing authority for development applications, with State Government departments acting as referral agencies where triggered.

H.2.3.1 State Planning Policy

The single State Planning Policy (SPP), which came into effect on 2 December 2013, is a policy prepared under the SP Act that identifies the State interests that local authorities must take into account when preparing or amending local planning schemes and in assessing development applications. It also includes matters that the Queensland Government must consider before designating land for community infrastructure and in preparing regional plans.

The SPP identifies the following State interests in environment and heritage applicable to the GFD Project:

- Biodiversity
- Cultural heritage
- Water quality.

As none of the local government planning schemes applicable to the GFD Project area have as yet integrated the requirements of the SPP, the interim development assessment provisions of the SPP may be relevant to the components of the GFD Project that are located outside of a petroleum lease.

H.3 Compliance with Australia's core objectives and guiding principles

H.3.1 Core objectives

The core objectives of the *National Strategy for Ecologically Sustainable Development* (ESDSC, 1992) are:

- To enhance individual and community wellbeing and welfare by following a path of economic development that safeguards the welfare of future generations
- To provide for equity within and between generations
- To protect biological diversity and maintain essential ecological processes and life-support systems.

To achieve these core objectives, Santos GLNG is proposing an incremental approach to development of the GFD Project by expanding the GLNG Project in a way that balances the cumulative impacts (both beneficial and adverse) from a life-of-project perspective and implements strategies focused on avoidance, management and mitigation (including rehabilitation of disturbance).

The 2009 EIS indicated that the 2,650 production wells would not be enough to support the gas supply needs for the approved three-train liquid natural gas (LNG) facility and that Santos GLNG would seek approval for additional production wells at a later stage. As part of the GFD Project EIS, Santos GLNG is applying for up to an additional 6,100 production wells across four gas fields to provide for this additional demand.

With the experience Santos GLNG has already accumulated in developing the existing gas fields, as well as understanding of the resource and environmental values, Santos GLNG is proposing to advance the development of additional areas, wells and facilities (as well as decommission and rehabilitate unneeded infrastructure) over the more than 30 years of the project. This development, operation, decommissioning and rehabilitation will be undertaken in a progressive approach ensuring the safe and sustainable development of Queensland's energy resources and the delivery of secure, reliable, clean energy to current and future consumers.

The final number, size and location of the infrastructure components will be determined progressively over the life of the GFD Project and will be influenced by the location, size and quality of the gas resources identified through ongoing field development planning processes. Where practicable, the GFD Project will use existing or already approved infrastructure (e.g. accommodation camps, gas compression and water management facilities) from the GLNG Project or other separately approved developments. The GFD Project may also involve sourcing gas from third-party suppliers, as well as the sharing or co-location of gas field and associated facilities with third parties. In this way, the development of the GFD Project will consider the scale, intensity, duration and frequency of the potential impacts and possible synergies with existing facilities and other parties to provide a project that balances environmental integrity, social development and economic development.

The assessment of environmental, social and economic impacts in this EIS has been based on the predicted impacts at the project scale using a maximum development scenario (minimal use of existing infrastructure). These potential impacts are well understood, given the experience of the GLNG Project, and are based on the GFD Project's conceptual field development schedule and field development process. The field development planning and development process has also enabled estimation of the GFD Project's likely maximum disturbance footprint and informed the project description (EIS Section 4: Project description).

The exploration, appraisal and development of the gas fields is conducted in a systematic manner designed to enable effective site reconnaisance and planning. The GFD Project Environmental protocol for constraints planning and field development (the Constraints protocol) details the process that Santos GLNG uses to identify, assess and manage the risk of potential adverse impacts to the environment during field planning and development. This process has been successfully used for the approved GLNG Project, which increases the certainty of GFD Project environmental outcomes. The general principles of the Constraints protocol, in order of preference, are to:

- Avoid — avoid direct and indirect impacts
- Minimise — minimise potential impacts
- Mitigate — implement mitigation measures to manage the risk adverse impacts
- Remediate and rehabilitate — actively remediate and rehabilitate impacted areas
- Offset — offset residual adverse impacts in accordance with regulatory requirements.

Constraints analysis increases certainty about potential impacts by identifying those areas that are not amenable to development, or if they were to be developed, how development should proceed. This occurs by identifying the constraints to development that exist within the GFD Project area and the environmental management controls to be applied to project activities in these constrained areas. In this way, Santos GLNG can optimise environmental outcomes by avoiding sensitive receptors wherever practicable. Where avoidance is not practicable, Santos GLNG will use a range of management and mitigation measures. This hierarchy will be maintained throughout all phases of the GFD Project, providing multiple opportunities for refinement of scope and execution.

This EIS assessment has used the GFD Project information derived from the above approach to identify the GFD Project area's environmental values assess the relevant impacts, and develop effective mitigation and management measures. These measures can provide stakeholders with a heightened level of confidence, as they are based on those currently in place for the approved GLNG Project.

The post-EIS field development process is a continuation of the field planning process and will be ongoing throughout the life of the GFD Project. The field development process will inform the GFD Project's design, together with a range of other factors including technical feasibility, cost and risk as required by standards applicable to the design, construction, operations, decommissioning and rehabilitation of gas developments. This information will be used to support the subsequent approvals process such as environmental authority application and the plan of operations.

Through training of personnel, environmental auditing and the development of contingency plans to be implemented in the case of an emergency, Santos GLNG will be able to respond and monitor the effectiveness of these measures.

H.3.2 Principles of ecologically sustainable development

There are five key principles of ecologically sustainable development outlined in section 3A of the EPBC Act that are relevant to the GFD Project:

- Principle of integration
- Precautionary principle
- Inter-generational and intra-generational equity
- Conservation of biological diversity and ecological integrity
- Improvement of valuation, pricing and incentive mechanisms.

A description of each of the key principles of ecologically sustainable development and the GFD Project's compliance is provided below.

H.3.2.1 Principle of integration

The principle of integration requires the effective integration of long- and short-term, economic, environmental, social and equitable considerations in decision making. This may include consideration of ecosystems, people, communities, natural and physical resources, the qualities and characteristics of locations, places and areas, and the social, economic and cultural aspects of these things in the present and future.

In the course of preparing this EIS, Santos GLNG examined the potential short-term and long-term environmental, social, cultural and economic impacts of the GFD Project. The potential impacts of the GFD Project on these values have been assessed by technical specialists having a detailed understanding of the existing environment and past experience with similar projects in the region. The outcomes of each of these studies, the residual impacts and the avoidance, mitigation and management measures are summarised in the relevant sections of the EIS.

H.3.2.2 Precautionary principle

Environmental assessment involves predicting what the environmental outcomes of a development are likely to be. The precautionary principle reinforces the need to take risk and uncertainty into account. This includes taking into consideration the potential risk of a lack of scientific certainty in environmental outcomes in proactively implementing mitigation measures and should not be used as a reason for postponing a mitigation measure to prevent impact on the environment where there are threats of serious or irreversible environmental damage.

An extensive range of measures has been adopted during the planning and design phases of the GFD Project to minimise the potential for serious and/or irreversible damage to the environment. They include the implementation of numerous environmental management plans whose efficacy has been confirmed by their successful application to the approved GLNG Project.

The EIS is precautionary in nature as it has used a conservative approach by assuming the maximum development scenario (worst case) and a further conservative approach to numerical modelling. Mitigation and management measures have been adopted that have been shown through the experience of the GLNG Project and the impact assessment process reported in the EIS to be effective in managing the risk of adverse impacts environmental values in accordance with regulatory approvals.

The risks and uncertainty associated with the GFD Project have been taken into account by using an objective and comprehensive impact assessment methodology which included:

- A significance-based approach which assessed the vulnerability of relevant environmental values. The significance of an impact was assessed by considering the vulnerability or sensitivity of the environmental value and the magnitude of the impact before and after the application of mitigation and management measures
- A risk-based approach which was applied to evaluate risks, including those that posed known or uncertain threats to the environment. A qualitative risk assessment was used to assess the likelihood of harm to the environment from construction, operations and decommissioning activities, and the consequence of those impacts on the environment. A quantitative risk assessment was used to evaluate aspects of the hazards and risks associated with the proposed development
- A compliance approach, which assesses whether or not the GFD Project complies with quantified guidelines set out in environmental protection policies and other regulatory documents developed to protect environmental values. The guidelines include an implicit assessment of the vulnerability of the environmental value through the setting of limits or thresholds. Limits and thresholds set out in the guidelines are based on established scientific knowledge and societal aspirations relating, in most instances, to the quality of life. These assessments used modelling to increase the certainty of the predicted outcomes.

H.3.2.3 Inter- and intra-generational equity

Inter-generational equity is the concept that the present generation should ensure the quality of life, and health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations. Intra-generational equity applies the same concept to people within the same generation, no matter their location or social background.

The concept of inter-generational equity has been addressed through:

- Assessment of the likely social impacts of the GFD Project (see Section 21: Social)
- Design and implementation of monitoring initiatives and management measures, where required, to minimise potential construction, operation and decommissioning impacts of the GFD Project on affected aspects of the environment, including land, water, air, flora and fauna (see Section 8: Land use and tenure, Section 9: Land resources, Section 13: Surface water, Section 14: Groundwater, Section 15: Air quality, Section 16: Greenhouse gases, Section 18: Terrestrial ecology and Section 19: Aquatic ecology of the EIS). These measures aim to mitigate risks of environmental impacts in order to:
  - Ensure biodiversity and ecological integrity are not compromised by the GFD Project
  - Retain options for future generations with respect to the use of natural resources.
- Responding to concerns expressed by the community during stakeholder consultation as part of the GFD project alternative selection process (see Section 21: Social and Appendix D: Consultation report)
- Undertaking investigation and assessment of heritage values represented in the GFD Project area, and adopting strategies to minimise impacts on Indigenous and non-indigenous cultural heritage places where required (see Section 20: Cultural heritage)

- Implementation of responsible waste management strategies to promote safety and mitigate the risks of environmental impact on natural resources (see Section 12: Waste)
- Designing GFD Project rehabilitation programs to ensure that the land is suitable for its intended future land use (see Section 25: Decommissioning and rehabilitation).

The EIS has identified a variety of material benefits to current and future generations that are likely to come about as a result of the GFD Project. These include:

- Assist in meeting the increasing global demand for more carbon-efficient energy supplies through production of methane i.e. a low carbon intensity transitional energy source that facilitates an opportunity for future generations to ensure that clean energy sources can be developed to the point where they are comparably efficient and cost effective.
- Enhance the economic and employment benefits to the region, State and nation (see Section 22: Economics), including:
  - Increase economic output by up to $2.9 billion regionally and $3.6 billion at the State level
  - Creation of up to 4,621 full-time equivalent jobs in the Queensland economy over the life of the GFD Project
  - Flow-on or indirect economic benefits such as growth in service industries
  - Up-skilling of workers following training and development opportunities
  - Expansion of Queensland's export industry.
- Support State and Commonwealth policy directives, including the safe and sustainable development of Queensland's energy resources and the delivery of secure, reliable, clean energy to consumers.

H.3.2.4 Conservation of biological diversity and ecological integrity

Biological diversity, or biodiversity, is considered to be the number, relative abundance and genetic diversity of organisms from habitats (including terrestrial, marine and other aquatic ecosystems, and the ecological complexes of which they are a part) and includes diversity within species and between species, as well as diversity of ecosystems.

Ecological integrity is generally referred to as the self-sustaining nature of a natural ecosystem, including ecological processes and biological communities. For the purposes of the EIS, ecological integrity is considered in terms of ecological health.

The maintenance of ecologically sustainable development requires that the preservation of biological diversity and ecological integrity be considered in the decision-making process of a project.

In accordance with ecologically sustainable development principles, the GFD Project addresses the conservation of biodiversity and ecological integrity by proposing a comprehensive environmental management framework designed to conserve ecological values and long term-species diversity as far as practicable. This goal will remain at the forefront of Santos GLNG's decision making and actions in the construction, operation and decommissioning and rehabilitation phases of the GFD Project.

Santos GLNG's awareness of the need to conserve biological diversity and ecological integrity as far as practicable is evidenced by:

- The GFD Project infrastructure will be designed to avoid or minimise impacts on the existing environment where practicable.
- The implementation of operating procedures, including site selection protocols to
  - Identify the potential for disturbance of new ground and selection of well leases and associated infrastructure to avoid disturbance to endangered, vulnerable and rare and threatened species as far as practicable
  - Minimise fragmentation and habitat disturbance of protected species
- The implementation of proven operating systems and pollution control measures.

The potential for environmental impact will be minimised through training of personnel, environmental auditing and the development of contingency plans that would be implemented in the case of an emergency.

H.3.2.5 Improved valuation, pricing and incentive mechanisms

This principle requires that environmental factors be included in the valuation of assets and services. This may include concepts such as:

- Those who generate pollution and waste should bear the cost of containment, avoidance or abatement i.e. polluter pays
- Users of goods and services should pay prices based on the full life cycle costs of providing the goods and services, including the use of natural resources and assets and the ultimate disposal of waste
- Environmental goals should be established and pursued in the most cost effective way via incentive mechanisms that enable those best placed to maximise benefits or minimise costs to develop their own solutions and responses to environmental problems.

This principle reflects the idea that if the real value of natural resources is incorporated into the cost of using those resources, it is more likely that resources will be used in a sustainable manner, adequately managed, and not wasted.

One of the most common broad underlying goals or concepts of sustainability is economic efficiency, including improved valuation of the environment. Resources should be carefully managed to maximise the welfare of society, both now and for future generations. Consideration of economic efficiency, with improved valuation of the environment and carbon emissions, aims to overcome the underpricing of natural resources and has the effect of integrating economic and environmental considerations in decision making, as required by ecologically sustainable development.

The EIS has identified environmental values for each aspect of the GFD Project, which can be referred to as the 'value of the natural resources'. The development of policy instruments associated with pricing and the incentive mechanisms for the pursuit of ecologically sustainable development are the responsibility of governments and their departments. The content of the EIS will, wherever applicable, inform governments in the development of policy that is applicable to the aspects of the GFD Project.

H.4 Santos GLNG's commitment to sustainable development

For Santos GLNG, sustainability means supplying energy for the future, and doing business in a way that improves outcomes for shareholders, employees, business partners and the communities in which it operates.

Santos GLNG does this by adopting a comprehensive set of corporate criteria beyond traditional economic measures that assess the full impact of GFD Project activities and enables better business decisions through a deeper understanding of their impacts.

Santos GLNG assumes a corporate sustainability vision, which is built upon three key themes:

- Understanding stakeholder expectations
- Driving sustainability performance in existing operations
- Integrating sustainability into the company's transformational LNG portfolio.

Sustainability is explicit in Santos GLNG's vision and provides a framework that links financial and operating targets with responsibilities to other stakeholders. This vision is clearly stated in the corporate sustainability report for 2013:

Our vision is to be a leading oil and gas exploration and production company in Australia and Asia. To achieve this we have integrated the principles of sustainability into the way we do business.

The sustainability report details its approach to sustainability and its performance across a comprehensive suite of indicators indexed against the Global Reporting Initiative G3.1 Sustainability Reporting Guidelines (2011).

Through its development of the GLNG Project, Santos GLNG has demonstrated, and will continue to demonstrate, a firm commitment to the principles of ecologically sustainable development recognisable in the existing environmental initiatives.

The corporate sustainability framework identifies 24 sustainability indicators grouped by environment, community, our people and economic (listed in Table H-1), which are taken into account to ensure that the concept of sustainability is adequately addressed in the context of the GFD Project.

Table H-1 Corporate sustainability indicators

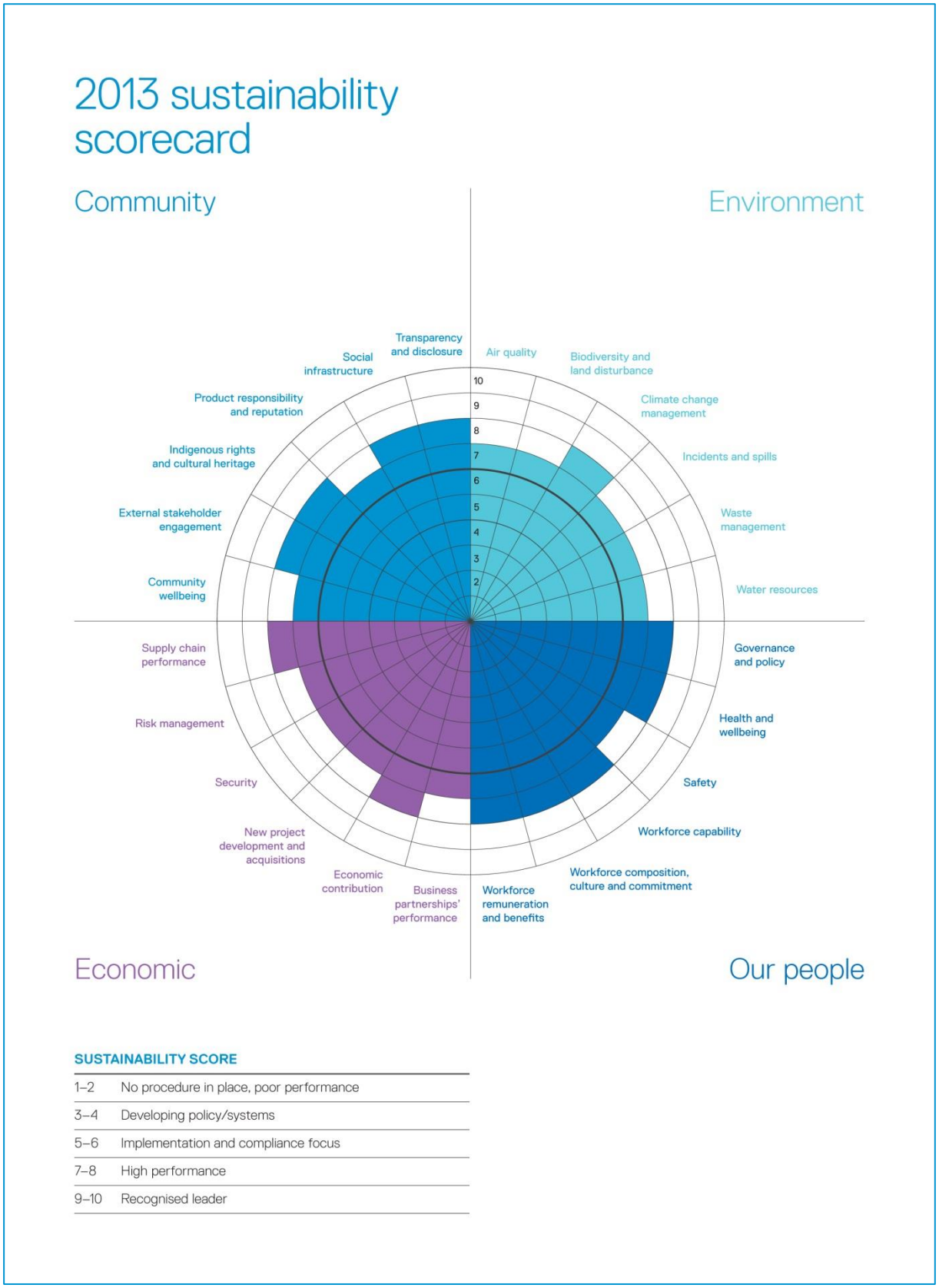
Environment	Community	Our people	Economic
Air quality	Community wellbeing	Governance and policy	Business partnerships performance
Biodiversity and land disturbance	External stakeholder engagement	Health and wellbeing	Economic contribution
Climate change management	Indigenous rights and cultural heritage	Safety	New project development
Incidents and spills	Product responsibility and reputation	Workforce capability	Security
Waste management	Social infrastructure	Workforce composition, culture and commitment	Risk management
Water resources	Transparency and disclosure	Workforce remuneration and benefits	Supply chain performance

The corporate sustainability framework is used to assess company-wide sustainability performance on an annual basis. The assessment uses a scorecard of sustainability performance, which assesses the performance of the 24 sustainability indicators on a ten-point scale. This scorecard assessment is carried out annually and is independently audited. Results are reported to the company's board and published in the annual sustainability report.

The goal for the GFD Project is a “high performance” rating according to the scorecard for sustainability indicators, which implies that the issue is well understood and implementation of the solution is supported across the GFD Project.

The sustainability performance of the GFD Project will be incorporated into the annual corporate sustainability scorecard report. The 2013 sustainability scorecard is presented in Figure H-1.

Figure H-1 2013 sustainability scorecard



H.5 GFD Project sustainability initiatives

The GFD Project incorporates a variety of initiatives developed to satisfy the Santos GLNG corporate sustainability indicators. Key initiatives have been provided for environment, community and economy and are provided below. References are also given to the relevant sections of the EIS where the beneficial and adverse impacts of the GFD Project are discussed, taking into consideration environmental integrity, social development and economic development as appropriate.

H.5.1 Environmental Initiatives

The environmental initiatives undertaken by the GFD Project are summarised in Table H-2 below.

Table H-2 Environmental initiatives

Indicators	Initiatives	EIS section
Air quality	The GFD Project will implement an environmental management plan, which includes mitigation measures such as operational controls for dust minimisation and emissions management of gases such as NO_x and SO_x.	Appendix Y: Draft environmental management plan
Biodiversity and land disturbance	The Environmental protocol for constraints planning and field development (the Constraints protocol) applies the following management principles: • Avoidance — avoiding direct and indirect impacts to environmentally sensitive areas • Minimisation — minimise potential impact on environmentally sensitive areas • Mitigation — implement mitigation and management measures to minimise cumulative adverse impacts • Remediation and rehabilitation — actively remediate and rehabilitate impacted areas to promote and maintain long-term recovery of environmentally sensitive areas • Offset – offset residual adverse impacts in accordance with regulatory requirements.	Section 5: Assessment framework Section 18 and Appendix R: Terrestrial ecology Section 19 and Appendix S: Aquatic ecology Appendix U: Matters of national environmental significance
	Valuable agricultural land within the GFD Project area will be protected through the provisions of the Central Queensland and Darling Downs regional plans, which together apply to the entire GFD Project area. Santos GLNG will manage residual impacts on agricultural land uses through the implementation of relevant management plans including the Land access and landholder engagement strategy and the Constraints protocol.	Section 8 and Appendix J: Land use and tenure Section 9 and Appendix K: Land resources Appendix Y-B: Environmental protocol for constraints planning and field development

Indicators	Initiatives	EIS section
Climate change management	Natural gas is a lower carbon intensity energy source and fossil fuel alternative for both the domestic and international markets. Santos GLNG adopts the corporate climate change policy, which reflects a commitment to energy efficiency and reducing emissions across its operations, including the GFD Project. This includes commitments to reduce the carbon intensity of its products, use energy efficiently, minimise flaring and venting of gas, and understand, manage and monitor climate change risks. The key climate change issues for the GFD Project are primarily associated with increased extreme storm events, extreme heat related risks and drier conditions. Santos GLNG is committed to the following actions to mitigate the effects of climate change on the GFD Project: • Drought adaptation measures will aim to maximise use of coal seam water for construction and operations and minimise in-field demand for other water resources • Extreme heat adaptation measures will aim to ensure ongoing operational flexibility and management during extreme temperature events • Extreme storm events adaptation measures will aim to incorporate seasonal and weather forecasts for planning GFD Project activities and emergency response.	Section 16: Greenhouse gases Section 7 and Appendix I: Climate and climate change
Incidents and spills	The GFD Project will implement a range of management plans designed to minimise potential impacts from hazardous activities, including: • Environmental protocol for constraints planning and field development • Chemical and fuel management plan • Hydraulic fracture risk assessment • Contingency plan for emergency environmental incidents • Emergency response plan.	Section 24 and Appendix X: Preliminary hazard and risk Appendix Y-D: Contingency plan for emergency environmental incidents
Waste management	Waste will be managed in line with the waste management hierarchy of waste avoidance, reduction, reuse, recycling, recovery, treatment and disposal, in accordance with the *Waste Reduction and Recycling Act 2011* (Qld). In this way, the GFD Project will aim to: • Minimise waste volumes and the risk of causing harm to the environment • Maximise operational efficiency and environmental performance.	Section 12: Waste Appendix Y-L: Waste management plan
Water resources	The GFD Project will implement a range of management plans designed to protect the environmental values of receiving waters, including: • Environmental protocol for constraints planning and field development • Water resource management plan • Erosion and sediment control management plan • Land release management plan • Hydraulic fracture risk assessment.	Section 13 and Appendix N: Surface water Section 14 and Appendix O: Groundwater
	The GFD Project will include the provision of its water supply requirements in a safe and reliable manner. The use of coal seam water will be prioritised to meet the GFD Project's demands. Water from local water bores or surface water will only be used where there are no other feasible options.	Section 4: Project description

Indicators	Initiatives	EIS section
	The GFD Project will continue implementation of the existing strategy developed for the GLNG Project to manage coal seam water in accordance with regulatory requirements, to provide opportunity for beneficial use of coal seam water (where practicable) and to minimise environmental impacts. Potential beneficial use options include: • GFD Project use • Industrial supply • Agricultural use • Provision to third parties (e.g. irrigation) • Discharge to surface water for substitution of water allocation, uptake by downstream water users or augmenting environmental flows • Impact mitigation of other groundwater users via managed aquifer recharge or substitution of water allocation from groundwater user(s).	Section 13 and Appendix N: Surface water Section 14 and Appendix O: Groundwater

H.5.2 Community initiatives

The community initiatives undertaken by the GFD Project are summarised in Table H-3 below.

Table H-3 Community initiatives

Indicators	Initiatives	EIS section
Community wellbeing	Where there is a potential for the GFD Project to impact on community and urban infrastructure that makes a community 'liveable' (e.g. adequate accommodation, provision of community services, protection of residential amenity, etc.), Santos GLNG has committed to a range of measures to mitigate and manage those impacts. This will be achieved through compliance with Queensland resources and energy sector code of practice for local content (2013) and implementation of relevant management plans, including the GFD Project's Social impact management plan (SIMP), which includes action plans on the following key areas, as agreed with the Coordinated Project Delivery Division of the Coordinator-General's office: • Community safety • Social • Community wellbeing and • Local industry participation and training	Section 8 and Appendix J: Land use and tenure Section 21 and Appendix V: Social
External stakeholder engagement	To effectively facilitate early engagement with landholders and stakeholders, the GFD Project will implement the Environmental protocol for constraints planning and field development.	Appendix Y-B: Environmental protocol for constraints planning and field development

Indicators	Initiatives	EIS section
Indigenous rights and cultural heritage	The GFD Project supports cultural heritage through the implementation of the environment, health and safety management system standard EHS11 Cultural heritage. EHS11 establishes a cultural heritage management system that manages risk and ensures compliance with legislative requirements related to Santos GLNG's operations and agreements with Aboriginal stakeholders, in a manner that is comprehensive, documented and auditable. Cultural heritage clearances are the primary tool to prevent damage to cultural heritage and serve multiple purposes including: • Managing risk of damage to cultural heritage • Providing a procedural framework to meet the requirements of Indigenous and non-Indigenous cultural heritage legislation and cultural heritage management plans • Maintaining a central electronic register of procedural and compliance information for each clearance • Ensuring all follow-up compliance actions are tracked and completed. In addition, the SIMP includes an action plan on Aboriginal engagement and participation, as agreed with the Coordinated Project Delivery Division of the Coordinator-General's office.	Section 20 and Appendix T: Cultural heritage
Social infrastructure	Santos GLNG will limit its impact on the availability, supply and diversity of housing by providing accommodation facilities for both its construction and operations workforce. Santos GLNG has committed to a range of measures to mitigate and manage impacts on housing through the implementation of its SIMP and associated action plans and the Integrated project housing strategy.	Section 21 and Appendix V: Social Section 22 and Appendix W: Economics
	The GFD Project will undertake road impact assessments to identify necessary road mitigation or improvement requirements and by implementing a range of management plans designed to enable the safe and efficient movement of project traffic on public roads, including: • Road use management plan • Social impact management plan and associated action plans.	Section 11 and Appendix M: Traffic and transport

H.5.3 Economic initiatives

The GFD Project will generate significant economic growth and support for the construction sector. Its direct and flow-on economic benefits will result from:

- Capital investment in upstream gas production, processing facilities and other supporting infrastructure
- Export revenues generated from additional LNG production
- Additional employment
- Increased fiscal receipts to the Queensland and Commonwealth Governments in the form of taxes and royalties
- The GFD Project will have a significant positive impact on the regional, State and national economies. Santos GLNG will work with government, industry and the community to maximise the economic benefits including compliance with the Queensland resources and energy sector code of practice for local content (2013) and implementation of the SIMP and its associated action plans including:
  - Workforce management action plan
  - Housing and accommodation action plan.

Further details can be found in Section 21 and Appendix V: Social and Section 22 and Appendix W: Economics.

H.6 Conclusion

The core objectives and principles for ecologically sustainable development have been incorporated into the planning and design of the GFD Project. During its construction, operation and decommissioning these principles will be applied through the commitments and mitigation measures detailed within the EIS.

H.7 References

Global Reporting Initiative 2013. G4 Sustainability Reporting Guidelines. Available online in 2 parts at: https://www.globalreporting.org/resourcelibrary/GRIG4-Part1-Reporting-Principles-and-Standard-Disclosures.pdf

https://www.globalreporting.org/resourcelibrary/GRIG4-Part2-Implementation-Manual.pdf

IPIECA 2010. Oil and Gas Industry Guidance on Voluntary Sustainability Reporting.

1972 Declaration of the United Nations Conference on the Human Environment (also known as the Stockholm Declaration)

1980 World Conservation Strategy of the International Union for the Conservation of Nature

World Commission on Environment and Development 1987 Our Common Future (also known as the Brundtland Report)

National Strategy for Ecologically Sustainable Development (Ecologically Sustainable Development Steering Committee [ESDSC], 1992)