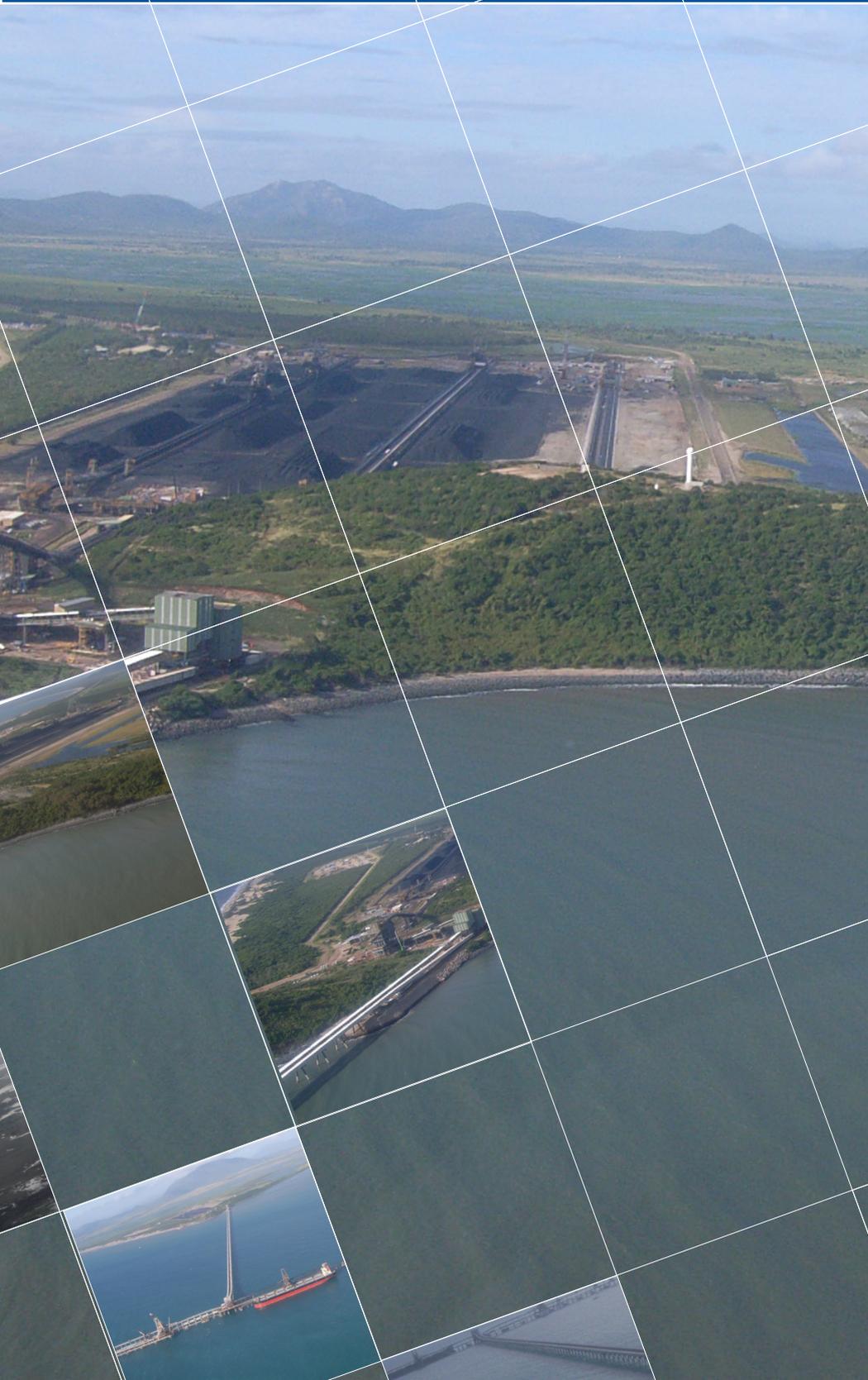


# Executive Summary





# Executive Summary

This Environmental Impact Statement (EIS) provides an assessment of impacts arising from the Abbot Point Coal Terminal 0 Project (the Project; EPBC 2011/6194) at the Port of Abbot Point, Queensland (refer to Figure E0-1). The objective of the EIS is to ensure that all impacts, both direct and indirect to the natural, social and economic environments are examined, avoided or mitigated. This EIS aims to be a self-contained document which provides comprehensive information and definitive statements on strategies, commitments, measures, actions and monitoring programs to the Commonwealth Government and public that the Project proponent, Adani Abbot Point Terminal Pty Ltd (Adani) will undertake. This EIS seeks for all potentially adverse impacts to be avoided or mitigated and also identifies positive impacts that may arise as a result of the Project.

The EIS was developed by Adani in accordance with the Commonwealth Department of Sustainability, Environment, Water, Population and Communities (SEWPaC) EIS Guidelines which have been published for the Project. The EIS Guidelines were prepared and published under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

On 13 December 2011, the Commonwealth Minister determined that the Project was a controlled action. The Minister acknowledged that the Project had the potential to impact on matters of National Environmental Significance (MNES) and required an assessment of the Project by EIS under the provisions of the EPBC Act. Controlling provisions for the Project include:

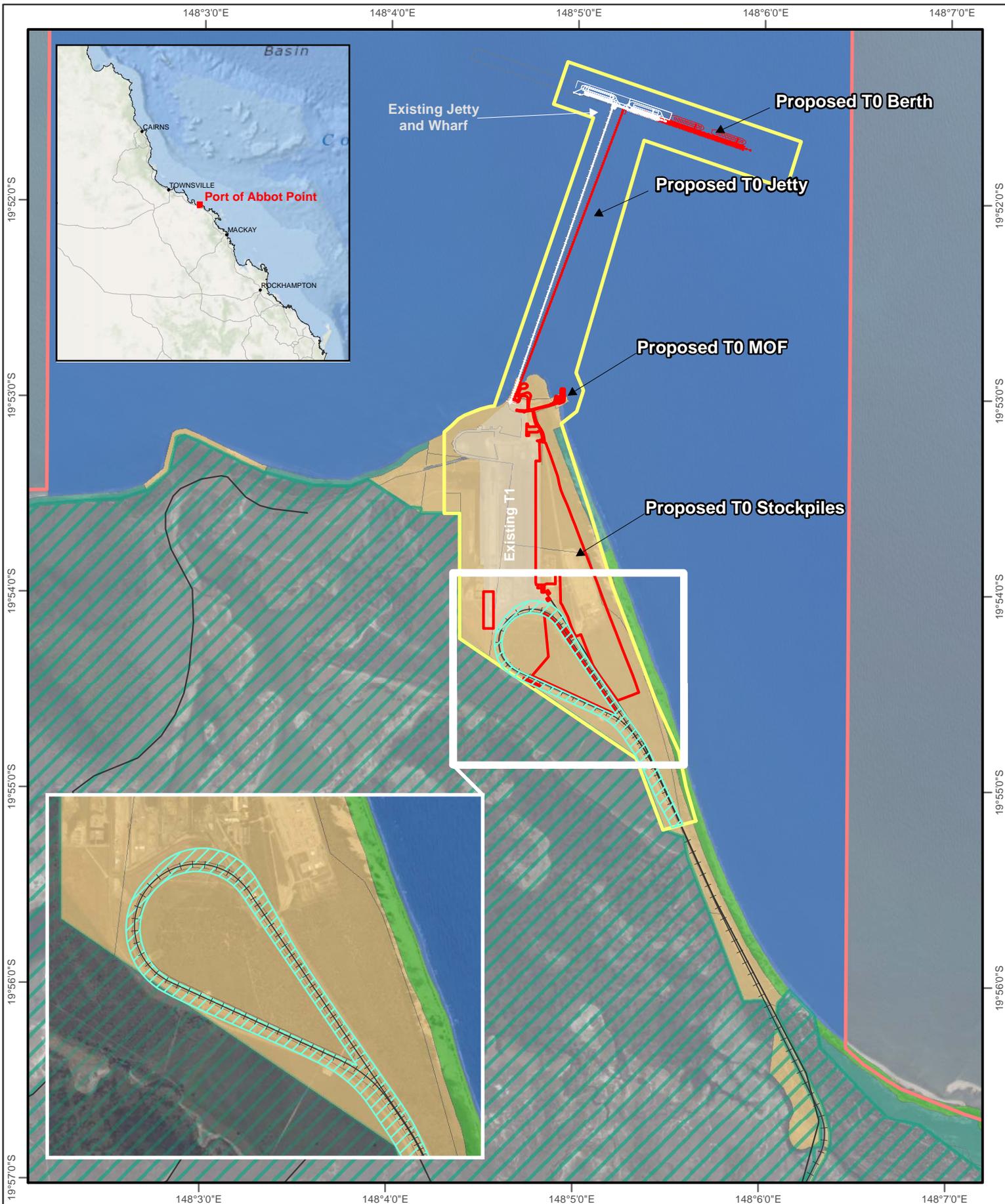
- World Heritage properties (sections 12 and 15A);
- National Heritage places (15B and 15C);
- Listed threatened species and communities (sections 18 and 18A);
- Listed migratory species (sections 20 and 20A);
- Commonwealth marine areas (sections 23 and 24A); and
- Great Barrier Reef Marine Park (Sections 24B and 24C).

A separate, voluntary cumulative impact assessment (Abbot Point CIA) was prepared and published by the four proponents at the Port of Abbot Point – Adani, BHP Billiton, GVK Hancock and the North Queensland Bulk Ports Corporation (NQBP). The parties collaborated to inform an innovative approach towards the assessment of the cumulative nature of impacts at the Port from their projects.

The EIS is consistent with the findings of the Abbot Point CIA and presents Adani's individual environmental assessment of impacts from the Project as well as proposed measures to avoid, manage, mitigate and offset residual impacts.

The Project has incorporated the principles of ecologically sustainable development through:

- A decision-making approach that recognises the importance of sensitive environmental areas and biodiversity values in proximity to the Project and has avoided, wherever possible, direct impacts to these areas;
- Considering the long-term nature of the Project and its relationship with the surrounding environment, local communities and the region; and



**Abbot Point Coal Terminal 0 (T0) Project**  
**Figure E1-1 Location of Abbot Point and Proposed Terminal 0 (T0) Project**

**Legend**

- |                                 |   |
|---------------------------------|---|
| — Road                          | <b>Abbot Point Land Use Plan 2010 Land Use Designations</b> |
| ++ Existing Rail                | Environmental Buffer  |
| ▨ APSDA Boundary                | Offshore Port Infrastructure                                |
| ▨ Project Area                  | Port Handling Activities                                    |
| ▨ GBRMP Boundary                | Port Related and Support Industry                           |
| ▨ Proposed Common Rail Corridor | Special Management  |



**DISCLAIMER**  
 CDM Smith has endeavoured to ensure accuracy and completeness of the data. CDM Smith assumes no legal liability or responsibility for any decisions or actions resulting from the information contained within this map.  
 Data source:  
 Roads by Geoscience Australia; Terminal data by Adani; Aerial Image by NQBP, DERM, 2010.



- Contributing to and accepting the key outcomes and findings from the Abbot Point CIA, namely that development at the Port can occur in a manner that can sustain biodiversity values and deliver conservation objectives.

Following is a brief description of the important findings from the EIS for consideration by the public, government decision-makers and other interested stakeholders.

## E1.1 Background and Need

The Port of Abbot Point is located approximately 25 km north-west of Bowen and is Australia's most northerly coal port (see Figure E0-2). It is one of the few locations on Queensland's eastern coastline where there is deep water (over 15 m) access for bulk carrier ships close to shore. The Port is of strategic importance to both the Commonwealth and the State of Queensland, presenting a critical link between proposed new projects in the Bowen and Galilee Basins and the ability to efficiently export materials to overseas customers. The Port has been in operation since 1984, transporting coal from mines located in the Bowen Basin through the Abbot Point coal export Terminal 1 (T1) facility.

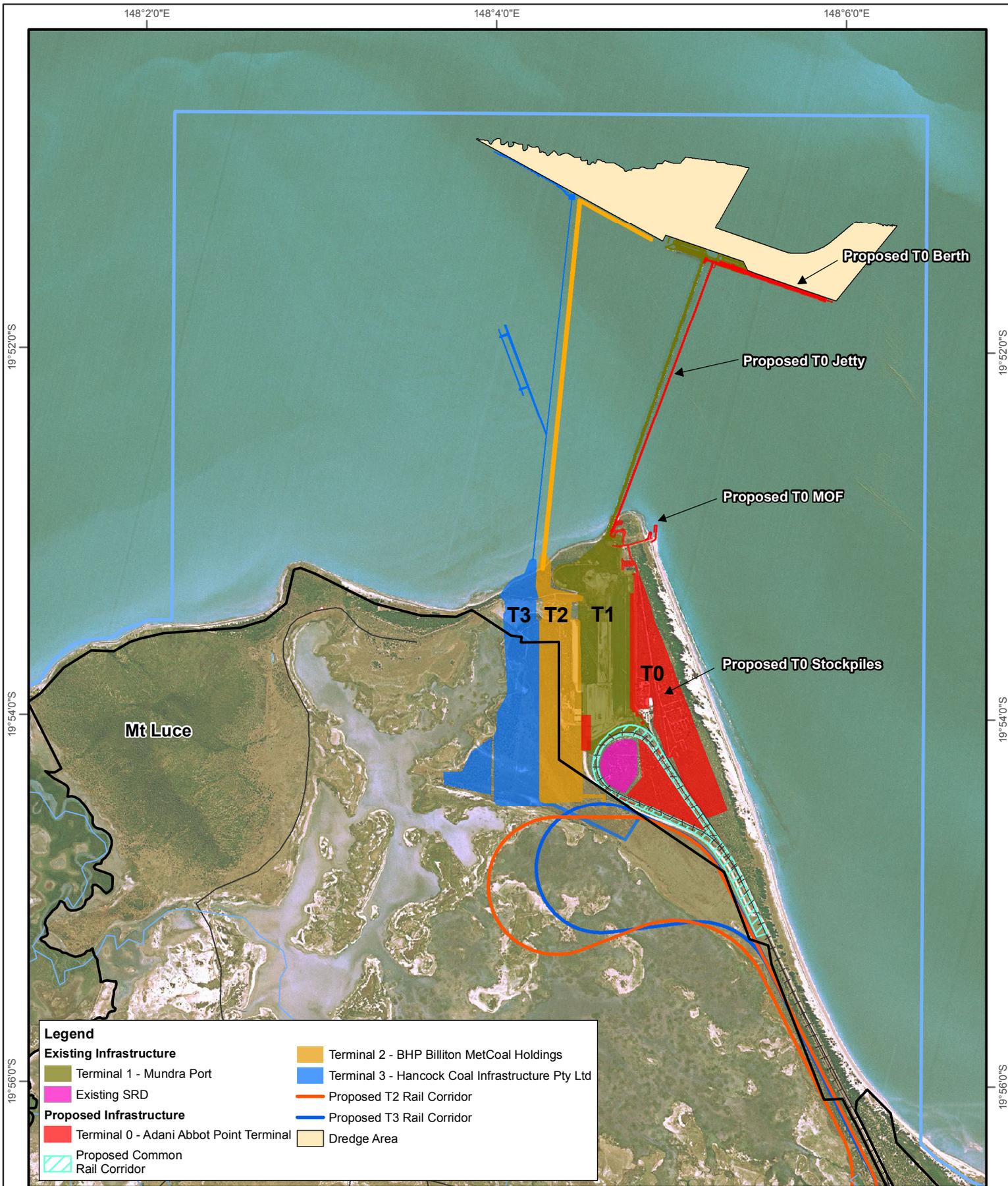
The ongoing global growth and demand for coal coupled with the development of coal mines in the Bowen and Galilee Basins has necessitated planning for additional coal export infrastructure from Abbot Point to accommodate production and supply rates. Accordingly, a number of coal export and infrastructure related developments are proposed to occur at the Port of Abbot Point, in the vicinity of the Project (Figure E0-2). Projects relevant to this EIS include:

- Hancock Coal Infrastructure Terminal 3 (T3) (EPBC 2008/4468);
- Carmichael Coal Mine and Rail Project (EPBC 2010/5736);
- BHP Billiton MetCoal Holdings Terminal 2 (T2) (EPBC 2011/6185);
- NQBP Abbot Point T0, T2 and T3 Capital Dredging (EPBC 2011/6213); and
- Waratah Coal Abbot Point Coal Terminal (EPBC 2012/6250).

It is important to note that at the time of the Draft EIS submission (and Final EIS), the Waratah Coal Abbot Point Coal Terminal project only had its final Guidelines published; no EIS or supporting documentation was available for public viewing. Therefore, no speculative information about this project has been included in this EIS. Further, Adani have recently progressed a standard gauge rail project proposal to provide an alternative to existing narrow gauge options. The North Galilee Basin Rail (NGBR) project was declared a coordinated project by the Queensland State Coordinator-General on 14<sup>th</sup> June 2013 (by gazette notice) and will undergo a separate environmental assessment and approvals process (EPBC 2013/6885), but could provide a mechanism for transportation of coal from the Galilee Basin to the Project, should it be approved and proceed. Accordingly, the NGBR project was not considered in this EIS.

The above detailed projects include a range of port, transport and service infrastructure with the primary aim of facilitating industrial development and expanded coal export capacity at the Port of Abbot Point. In addition to the Project, the T2, T3 and Capital Dredging projects were included in the Abbot Point CIA assessment. The CIA considers the potential for cumulative impacts of development at Abbot Point and proposes measures to avoid, mitigate, manage and offset impacts in a coordinated manner. The CIA was a voluntary initiative undertaken by four proponents at Abbot Point, namely the Adani Abbot Point Terminal (Adani), BHP Billiton, GVK Hancock and North Queensland Bulk Ports Corporation (NQBP).

Up to five major thermal coal developments are proposed for the regions south-west and north-west of Alpha in the Galilee Basin, including Adani's Carmichael Coal Mine and Rail project (EPBC 2010/5736). These developments include new railways and expanded port infrastructure at the Port of Abbot Point and Dudgeon Point (EPBC 2012/6240), at the Port of Hay Point, on the Central Queensland coast. The development of the Galilee Basin will require significant investment from proponents to support the establishment of new infrastructure necessary to mine, transport and then export the coal.



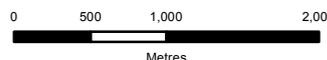
**Legend**

<b>Existing Infrastructure</b>	Terminal 1 - Mundra Port	Terminal 2 - BHP Billiton MetCoal Holdings
Existing SRD	Terminal 3 - Hancock Coal Infrastructure Pty Ltd	Proposed T2 Rail Corridor
<b>Proposed Infrastructure</b>	Terminal 0 - Adani Abbot Point Terminal	Proposed T3 Rail Corridor
Proposed Common Rail Corridor	Dredge Area	

**Abbot Point Coal Terminal 0 (T0) Project  
Figure E1-2 Related Projects**

**Legend**

— Road	□ APSDA Boundary
++ Existing Rail	□ GBRMP Boundary
— Watercourse	



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 Data source:  
 Roads by Geoscience Australia; Terminal data by Adani and GHD;  
 Aerial Image by BingMaps, 2011; All other data by DERM, 2010.



Adani is an internationally-experienced port owner and operator with major infrastructure investments in Australia and India. Adani became established in Australia in mid-2010 and is developing its proposed Carmichael Coal Mine project in parallel with the current Project. A subsidiary of Adani is the lessee (99 year lease) of the existing T1 facility (Abbot Point Coal Terminal) at the Port of Abbot Point, comprising coal handling and stockpile areas, a rail inloading facility, a single trestle jetty and a conveyor, which is connected to a berth and shiploader 2.75 km offshore. Coal is brought to the T1 facility by rail from the Newlands, Collinsville and Sonoma mines as well as small volumes from mines on the Goonyella system.

The Carmichael Coal Mine and Rail project will link to the Central Queensland Integrated Rail Project (Adani Mining Pty Ltd 2010) and ultimately, to the Port of Abbot Point. Adani proposes to develop the Project:

- Accommodate own coal extraction and shipping needs;
- Meet the demands of other coal projects in Queensland; and
- Meet coal demands on a global scale.

## E1.2 The Project

The Project will provide new coal export facilities for the receiving, stockpiling and export of up to 70 million tonnes per annum (Mtpa) of coal. The Project will generally be situated immediately east of the existing T1 facility, on Strategic Port Land (SPL) under the authority of NQBP and in accordance with the *Port of Abbot Point Land Use Plan 2010*.

The Project area is generally adjacent to and to the east of the Abbot Point State Development Area (APSDA) and is in proximity to the Caley Valley Wetland (Wetland) but does not overlap directly with it. Some temporary works, such as a construction accommodation camp and material storage/laydown areas, may be located on land within the APSDA or existing locations. The rail alignment is yet to be finalised in relation to the margin of the APSDA. All development within the APSDA will be assessed against the *Development Scheme for the Abbot Point State Development Area 2008*. The offshore component of the Project is located within the Port of Abbot Point Limits, which sits within the Great Barrier Reef World Heritage Area (GBRWHA) but outside the Great Barrier Reef Marine Park (GBRMP) boundary.

Key considerations during the design of the onshore and offshore aspects of the Project included the following:

- Ensuring that the development meets all required health and safety needs of construction and operation staff;
- Avoiding or minimising the potential negative impacts associated with the Project development on environmental and social receptors, particularly MNES;
- Incorporation of projected climate change scenarios (based on current scientific understanding) into the design of all relevant infrastructure components of the Project;
- Developing infrastructure that will provide a reliable and economically viable mode for the export of product coal from the Port of Abbot Point to meet market demand; and
- Ensuring all Commonwealth and State legislative requirements are met in full.

The Project will be developed for operation over two phases - Phase 1 and 2. Development will occur over a five to six year period corresponding to production outputs at the Carmichael Coal Mine. The Project will allow for an initial throughput of up to 35 Mtpa and maximum throughput of 70 Mtpa, allowing for other sources of coal to be incorporated into the Project's capacity.

Phase 1 of the Project is proposed to be constructed by the end of 2015 to early 2016 to align with the first available coal shipments from the Carmichael Coal Mine project. Phase 1 will comprise:

- An upgrade of the existing Material Offloading Facility (MOF) infrastructure to accommodate logistics vessels for the delivery of materials and modular infrastructure during construction. The MOF is required for all phases of the Project. Moorings will be required for marine plant using the MOF and the Project generally. Moorings will be located near the site and at previously approved locations where possible;
- Earthworks and contribution of fill material to support rail loops and infrastructure within the rail corridor;
- One common concrete dump-station vault (designed to house two unloading trains) and an inloading conveyor stream to the coal stockyard;
- Earthworks and contribution of fill material to support development of the stockyard supporting one bund with two stockpile rows and two stacker/reclaimers;
- Inloading and outloading stream of conveyors, stacker/reclaimers, transfer towers, surge bin, sample plant and shiploader;
- Construction of associated infrastructure where required, including workshop and, administration facilities, sewerage treatment plant and amenities block;
- Construction of an offshore trestle jetty supporting the outloading conveyor and wharf access road; and
- Construction of one wharf supporting a shiploader, with associated mooring dolphins.

Phase 2 of the Project will increase the capacity by an additional 35 Mtpa with a maximum target capacity of 70 Mtpa and will comprise:

- The development of the second inloading conveyor stream (to expand the dump-station facility) to the coal stockyard. Depending on the rail corridor configuration, a second dump-station may be required with associated inloading facilities;
- Earthworks and contribution of stockyard fill material to support two additional bunds with two stockpile rows and two stacker/reclaimers on each bund;
- One outloading stream of conveyor, transfer towers, surge bin, sample plant and shiploader; and
- The construction of a second wharf structure.

Construction of Phase 1 and 2 infrastructure may overlap, depending on productivity rates at the Carmichael Coal Mine, other coal export requirements, availability of labour and resources and productivity of construction for Phase 1 works. A summary of the anticipated construction programme for Phase 1 is provided in Table E1-1. The scheduling represented in the Table is the indicative schedule for the purposes of the EIS and is based on the anticipated commencement and

ramp-up of the Carmichael Coal Mine. Changes to the schedule of the Carmichael Coal Mine would be likely to have a consequential impact on the timing of the port development.

It is important to note that dredging of berth and apron areas to support the Project, is subject to existing approvals processes being managed by NQBP on behalf of proponents developing the T0, T2 and T3 projects (refer to Abbot Point T0, T2 and T3 Capital Dredging Project (EPBC 2011/6213)).

Minor dredging works will be required at the common user MOF. NQBP currently holds approval for maintenance dredging activities for Abbot Point. To the extent that the dredging required for this facility exceeds that approval, it will be undertaken under a separate approval with NQBP as the proponent.

Beneficial re-use of material onshore is only possible when the characteristics of the dredged material are suitable for the intended use and the volumes of material are manageable. Unlike materials in areas further offshore, it is expected that the inshore material dredged from the MOF will primarily be sand, although this requires confirmation, and that being the case is likely suitable for use as a base for stockpile areas. If testing establishes that the material is suitable and the volume of material is manageable within site limitations, the dredged material will be pumped to a lined bunded area at the proposed stockpile locations. Here the dredged sand will settle out, and after sufficient retention time the return seawater will be released in the existing MOF area. Following return of the all seawater from the pond, the dredged sand will remain to form part of the base for the coal stockpile. If some or all of the material is determined to be unsuitable or the volume exceeds site capacity, it will be disposed of in accordance with any relevant approval or license conditions.

**Table E1-1 Project construction indicative timeframes**

Phase	Description	Timing
<b>Phase 1</b>		
Early works	Establish laydowns, earthworks, site facilities, MOF works	Q2 2013 - Q4 2013
Offshore	Offshore construction of trestle jetty, berth and mooring dolphins	Q3 2013 - Q3 2015
Onshore	Onshore material handling construction including stacker/reclaimers, dump-station, inloading conveyor stream and associated infrastructure. Construct rail loops	Q2 2014 - Q1 2015
Major Equipment	Stacker Reclaimers	Q3 2015 - Q4 2015
	Deliver and commission shiploader	Q2 2015 - Q4 2015
<b>Phase 2</b>		
Early works	Establish laydowns, earthworks, working stockpiles and site facilities	Q3 2015 - Q3 2017
Offshore	Offshore construction of berth and mooring dolphins	Q3 2015 - Q3 2017
Onshore	Onshore material handling construction including stacker/reclaimers and second inloading conveyor stream to expand the dump-station facility	Q3 2016 - Q3 2018
Major Equipment	Stacker/reclaimers	Q3 2017 - Q1 2019
	Deliver and commission shiploader	Q3 2017 - Q1 2019

When complete, coal will be delivered by possibly both standard and narrow gauge rail wagons and received through underground dump-stations by bottom discharge. Coal from the dump-stations will be conveyed to the stockyard by inloading conveyors and stockpiled using stacker/reclaimers. Coal stockpiles will be reclaimed and conveyed through the outloading conveyors along the wharf to the ship loaders for loading of the coal transport vessels.

The Project will be decommissioned in accordance with legislative requirements and NQBP specification as the landowner and Port Authority. Decommissioning of the Project may be

contemporaneous with the decommissioning of the proposed Adani Carmichael Coal Mine. Draft decommissioning plans will be prepared through the life of the Project to inform decommissioning cost estimates at that time as required by the Port Authority. Prior to the completion of operations, a more specific decommissioning plan will be developed to deal with rehabilitation of the Project area in accordance with relevant Commonwealth and State approvals and legislation.

## E1.3 Alternatives

During the preliminary planning stage of the Project, Adani considered a number of locations for development of a deep-water coal export terminal close to an existing rail network that could efficiently export coal from the Carmichael Coal Mine. Options such as the Port of Brisbane were ruled out quickly because of the distance of the Port to the Carmichael Coal Mine and lack of rail or stockpile capacity. The decision to proceed with the Project at the Port of Abbot Point was influenced by the ability to develop a standalone option adjacent to the T1 facility that could accommodate additional stockpile capacity. In addition, the relative proximity of the Port to the source mine(s) and separation from residential communities, made the Port of Abbot Point an ideal location to enable storage and export of coal to occur whilst minimising the potential for adverse community and environmental impacts.

The Port of Abbot Point has three features, which constrain its development:

- The T1 facility occupies land directly to the south of Bald Hill. The Project is proposed to occur directly to the east of the T1 facility within the remaining SPL. To the west of the T1 facility the proposed T2 and T3 projects will be within the APSDA and utilising coastal land at Abbot Point not otherwise requiring significant reclamation. Generally, Abbot Point is bounded by sea to the north and east, and by the Caley Valley Wetland to the west. Abbot Beach defines the eastern boundary of Abbot Point and supports a narrow dunal vegetation system defined as a Threatened Ecology Community (TEC);
- Rail and road access to Abbot Point is via a narrow strip of land along Abbot Point Road. The natural “pinch point” will be further constrained by the development of proposed projects at Abbot Point that will require additional rail, water and power infrastructure; and
- Offshore, the presence of Clark Shoal west of the existing T1 jetty and berths limits the presence of suitable deep water (not requiring significant dredging) to the north-eastern portion of the Port Limits of the Port of Abbot Point. The two existing T1 berths and proposed two berths each for T2 and T3 effectively occupy the deep water to the west of T1 whereas the two berths for the Project are to the east of T1 berths.

Adani is proposing the most efficient use of land available at Abbot Point without impacting operations at the T1 facility while limiting the impact upon the natural environment. The efficient design of the Project footprint within the remaining SPL will not impede the operation of the T1 facility or any future proposed development within the adjacent APSDA as:

- The Project jetty and berths are located to the east of the existing T1 berth;
- The Project stockyards are to the east of the APSDA and T1 facility and north of the T1 rail loop; and
- The Project rail corridor is aligned with the existing T1 rail loop and corridor.

In summary, the Project footprint will be located immediately adjacent and to the east of the existing T1 facilities (within approximately 100 m). The design for the Project has maximised use

of the natural and infrastructure features (both existing and proposed) of the remaining SPL at Abbot Point and will achieve the objectives of the *Port of Abbot Point Land Use Plan 2010* by improving the functionality and capacity of the Port. All infrastructure proposed for the Project is in accordance with the Port Handling and Offshore Port Infrastructure designations outlined in the *Port of Abbot Point Land Use Plan 2010*.

### E1.3.1 Design Considerations

The engineering design for the Project was developed to specifically minimise the spatial footprint and subsequent construction and operational requirements within the land for the coal stockyard. The location of marine structures was determined directly by the proposed stockpile configuration in the stockyard and for the purposes of this EIS, no feasible alternatives were identified.

The EIS details the principles Adani has incorporated into the design of the Project to avoid significant impacts on MNES and other efforts Adani has implemented in the design process to mitigate impacts on the existing T1 facility. These principles relate to a number of desired operational and conservation outcomes/criteria for the Project, including:

- Ability to maximise terminal storage capacity;
- Relative cost of onshore works;
- Size of construction yards and ability to include areas (such as material laydowns) that were used through construction of the previous T1 expansion (X50) to minimise the land area required for the Project;
- Avoid direct impacts on the Threatened Ecological Community (TEC) located adjacent to Abbot Beach;
- Avoid direct or indirect (where possible) impacts to the Wetland;
- Level of interaction and co-location with existing T1 support buildings and structures;
- Avoid operational constraints to the T1 facility; and
- Interface with existing operation of the T1 facility.

The Project represents the optimal solution considering the criteria above. Any alternative design or configuration of the stockpiles for the Project would increase the spatial footprint and construction requirements, resulting in an inferior outcome.

## E1.4 Existing Environment

### E1.4.1 General

The existing environment at the Port of Abbot is characterised by the current Port operations as well as offshore marine areas, the Wetland and grazing land. Within the terrestrial environment, remnant native vegetation and regrowth is located between the Project footprint (as the area of direct disturbance) and the foreshore, and within wetland areas adjoining the GBRWHA. The marine component of the SPL borders the GBRMP and is within the GBRWHA. The footprint of works in the marine environment constitutes the immediate area required for piling of the jetty and wharf structures as well as the area to be reclaimed for the MOF expansion.

#### E1.4.1.1 Climate and Geography

Abbot Point is located within the dry tropic region of the central coast of Queensland. The region has a distinct wet season (December to March) during the hot, humid summer and a dry season (July to October) during the cooler winter. The wet season of 2012 was atypical. Tropical cyclones primarily occur in the northern part of Queensland between November and April.

The geography and topography at Abbot Point is typified by marginal coastal sand dunes and quaternary coastal mud flats lying at elevations below 5 m Australian Height Datum (AHD) and abrupt granitic hills. Mount Luce and Mount Roundback represent the most significant peaks in the area reaching elevations of approximately 315 m AHD and 728 m AHD, respectively. The Project area and footprint is bordered to the east by Abbot Beach.

#### **E1.4.1.2 Economic and Social Matters**

There is no permanent residential population at Abbot Point, due mainly to the industrial nature of the Port operation. The Bowen township is the closest residential hub to the Project and is approximately 25 km south east of Abbot Point. The town has historically supported the local agricultural, forestry and fisheries sectors that have historically provided the key business markets in Bowen.

Bowen is an established seaside town with a strong sense of community and a range of social and community infrastructure. The community of Bowen experiences fluctuations in its population as a result of seasonal agricultural workers and has provided a residential base in proximity to the Project since the T1 coal terminal commenced operation in 1984. The population of Bowen is currently 15,017 people and projected to increase to 22,194 people by 2031 at a rate of 2.1% per annum. Economic growth is likely to be driven by the mining sector in the region, with a continued decline in the agriculture, forestry and fishing sector.

Abbot Point was occupied by Indigenous people for many generations until early last century. Indigenous use of the Abbot Point area has continued with contemporary land and recreational uses such as fishing and camping. The Juru People maintain a strong cultural connection to Abbot Point, with sites of cultural importance located in proximity to the Project on Abbot Beach, but not within the Project area. Refer to Section 3.19.3 for further information regarding the cultural heritage survey undertaken as part of the Project.

With mining growth to continue in the region, Whitsunday Regional Council (WRC), local business and community stakeholders have identified a preference to house workers within the local communities. Stakeholders have demonstrated a capacity and willingness to accommodate a growing resident population in the Bowen township and identified that this model incorporates greater benefits for the local community in terms of a strengthened local economy, improved social outcomes and ongoing sustainability and population stability. Adani will work with WRC to seek mutually beneficial outcomes including minimising housing pressures to towns such as Bowen, particularly through the construction of the Project which will require specific accommodation requirements.

### **E1.4.2 Listed Threatened Species and Communities and Migratory Species**

#### **E1.4.2.1 Terrestrial Ecology**

The Project area is approximately 142.25 ha in size, though a lesser area will be occupied by physical infrastructure required for the Project.

The Project area contains several vegetation communities most of which have been impacted by previous agricultural and industrial land uses. Vegetation adjacent to the Project includes a Beach Scrub community (RE 11.2.3) listed as a TEC under the EPBC Act (Semi-evergreen Vine Thicket of the Brigalow Belt Bioregion). This community is generally in good condition and is located adjacent to the eastern edge of the Project footprint, but separated by an existing access road. Under EHP RE mapping, there was 28 ha of this community in the Project area, located on the coastal dune ridges in two sections. On-site investigation identified discrepancies in the mapped boundaries of these two polygons. For the northern area field survey results indicate that RE 11.2.3 is generally located further to the east of that currently displayed on RE mapping. The variation in mapping is in excess of 60 m in some locations and on average approximately 40 m east of the mapped vegetation community. However it is noted that toward the south of this area RE 11.2.3 extends into an area mapped as non-remnant. The revised mapping reduces the total area of RE 11.2.3 within the Project area by approximately 8 ha to 20 ha. A PMAV was lodged with EHP to revise the mapped extent within the Project area, and accepted and certified on 12 April 2013.

No conservation significant flora species were identified on the site, though three have potential to occur based on the available habitat on the site: *Bonamia dietrichiana* (Near Threatened – *Nature Conservation Act 1992* (NC Act)), *Croton magneticus* (Vulnerable – EPBC Act) and *Leucopogon cuspidatus* (previously Vulnerable – EPBC Act). Rubber Vine (*Cryptostegia grandiflora*) is a Weed of National Significance and was common in patches in much of the area.

Habitat values for fauna vary across the Project area and reflect different levels of historical disturbance. A significant portion of the Project area east of the T1 facility is heavily disturbed with a compacted substrate. The resident fauna observed at the Project is generally typical of the region. No conservation significant fauna were observed in the Project area during site surveys, although two species were observed along Abbot Beach: Beach Stone-curlew (*Esacus neglectus*) (Vulnerable - NC Act) and Green Turtle (Vulnerable; Migratory – EPBC Act). There may be limited habitat for Koala (*Phascolarctos cinereus*) (Vulnerable – EPBC Act) at the proposed laydown area on Abbot Point Road. The southern subspecies of Squatter Pigeon (*Geophaps scripta scripta*) listed as Vulnerable (EPBC Act) was also recorded in the general area, with five individuals recorded in the Phase 2 laydown area and one individual on Abbot Point Road in February 2013. Striped-tailed Delma (Vulnerable – NC Act), was considered likely to occur in the Project area, however two surveys (September 2012 and February 2013) did not identify any individuals.

#### **E1.4.2.2 Marine Ecology**

The Project's marine infrastructure impact area has been conservatively estimated to impact a maximum of 15 ha of marine habitat within the Project area. The direct impact/footprint of the Project on the marine environment however (defined as the area specifically and directly occupied by marine infrastructure) will be 1,300 m<sup>2</sup> or 0.13 ha.

The marine environment in the Project area is typified by soft sediments, variable water depths and the presence of commonly occurring seagrasses and algae communities. Surface sediments are primarily composed of sand and do not support extensive or diverse marine macroinvertebrate communities.

Benthic flora and fauna communities within the Project area are patchily distributed throughout the soft sediment substrate and are present at low densities. Historically, the most significant seagrass meadows are concentrated to the south-east and to the north-west of the Project area (eg Edgumbe Bay and Upstart Bay respectively). However, these areas have been significantly impacted by recent cyclonic and flood events resulting in significantly reduced seagrass density throughout the Project area and surrounding waters. Megafauna including Dugong (*Dugong*

*dugon*), Humpback Whales (*Megaptera novaeangliae*), dolphins and marine turtles have all been sighted within the Port of Abbot Point and surrounding waters. Two species of marine turtle are known to nest in low densities on Abbot Beach, Green Turtle (*Chelonia mydas*) and Flatback Turtle (*Natator depressus*).

Despite 28 years of operational shipping, no marine fauna pests listed under the EPBC Act are known to occur within the Port of Abbot Point.

#### **E1.4.2.3 Caley Valley Wetland**

The Wetland is located west of the Project area and forms the dominant hydrological feature of the area. The Wetland has been listed as a Nationally Important Wetland under the Commonwealth Directory of Important Wetlands. During the wet season, it can cover an area of approximately 5,150 ha. During drier months however, it retreats to a small lake (Lake Caley) and can become completely dry during drought. The current 2012 wet season was unusually wet for the Wetland.

In 2012, the Wetland supported a substantial number of wetland birds following late summer rains. Three comprehensive surveys were carried out in 2012 including counts of over 21,000 birds in March and over 40,000 birds in June. Altogether, 63 species of wetland/shorebirds were recorded. This included species counts that recognise the area as a habitat of national importance (under EPBC Act Guidelines) for the following species listed as Migratory shorebirds (EPBC Act): Sharp-tailed Sandpiper (*Calidris acuminata*); Red-necked Stint (*Calidris ruficollis*); and Latham's Snipe (*Gallinago hardwickii*). The Wetland held an ecologically significant population (>1%) of Eastern Great Egret (*Ardea modesta*) (Migratory – EPBC Act) at the time of the surveys. In addition, 24 Australian Painted Snipe (*Rostratula australis*) (Endangered Migratory – EPBC Act) were recorded in June 2012 including evidence of breeding (juveniles present). This represents 2.3% of the estimated total Australian population and may indicate the importance of the site for wintering and breeding for the species.

#### **E1.4.3 World and National Heritage, Commonwealth Marine Area, Great Barrier Reef Marine Park**

The Great Barrier Reef is listed under the EPBC Act as a World Heritage Area and a National Heritage Place; and as a Marine Park under the *Great Barrier Reef Marine Park Act 1975* (GBRMP Act). The boundaries and heritage values of the GBRWHA are the same as those for the National Heritage Place, and as such, the EPBC Act controlling provisions of the World and National Heritage are addressed together under the banner of World Heritage. There are no other WHA or NHP that are relevant to the Project.

As a WHA, the GBRWHA is recognised under the *World Heritage Convention* as having Outstanding Universal Value (OUV). The concept of OUV is defined in the *Operational Guidelines for the Implementation of the World Heritage Convention* as “cultural and/or natural significance which is so exceptional as to transcend national business boundaries and to be of common importance for present and future generations of all humanity.”

The GBRWHA is listed for its natural heritage, including geological phenomena, ecological and biological processes, aesthetics and natural beauty, and biological diversity that includes threatened species. The CIA identified a conservation objective with the aim of ensuring no loss in OUV or decline in integrity of features for which it was listed. The WH attributes relevant to the Project include aesthetics, migratory shorebirds and marine fauna.

For the purposes of the EIS, Commonwealth Marine Areas (CMA) and the GBRMP were addressed together because of the alignment in environmental values between the two; the majority of the

GBRMP is within the boundaries of CMA; common marine environmental values; and direct applicability of potential shipping impacts.

## E1.5 Consultation

The EIS provides an assessment of Indigenous cultural heritage issues and proposes a management approach to minimise potential development impacts on indigenous heritage in the Project area. Adani and the Juru people have negotiated, agreed and signed both a Cultural Heritage Management Plan and an Indigenous Land Use Agreement that has identified, addressed and put in place agreed methodologies for identifying and preserving significant cultural heritage sites and areas. The ILUA was authorised on 6 May 2013, and is due to be registered by November 2013. Consultation with the local Indigenous groups will remain a priority over the duration of the Project development, construction and operation.

Consultation about the Project has included advertisements in State or local newspapers, development of fact sheets, web-site and 1800 phone number for the project, and stakeholder information sessions. The latter provided a forum for presentations to government stakeholders about the Project and discussions on aspects of it that should be addressed in the EIS. Consultation relating to the formal stages of the EIS process was conducted in accordance with the EPBC Act.

Adani understands that NQBP is planning to facilitate ongoing consultation with the commercial fishing industry in relation to managing the impacts of port development at Abbot Point. Any impacts to the commercial fishing industry would derive from the overall port development rather than any one particular proposal. Adani recognises that taking a port-wide approach to addressing concerns raised by fishers across current (and future) projects at the Port of Abbot Point is appropriate. Adani is committed to participating as considered appropriate in consultation with NQBP and other port development proponents.

## E1.6 Relevant Impacts

The area including and beyond the Project area has been surveyed and researched extensively over the last 30 years. In many instances, research has been conducted to evaluate impacts for projects of similar nature or greater extent. As such, an in-depth desktop assessment, in addition to a range of on-site fieldworks and sampling, was able to provide sufficient scientific rigour to identify all potential impacts and necessary mitigation measures for the Project.

In addition to the EIS Guidelines, the assessment of the Project has been conducted in accordance with a number of relevant policies, controls and agreements, at international, Commonwealth and State level. These include, but are not limited to:

- International agreements and conventions relating to pollution, wild animals and birds, cultural and natural heritage, and climate change;
- Commonwealth policies relating to biodiversity conservation, oceans, waste and native vegetation;
- Commonwealth legislation and regulations relating to relevant aspects of the Project, such as Native Title, energy, the GBR, maritime safety and heritage; and
- Queensland legislation addressing, but not limited to, planning, transport infrastructure, vegetation, environmental and coastal protection, water, water recycling and reduction, nature conservation, marine parks, lands, fisheries, buildings, workplace health and safety, cultural heritage and fisheries.

### E1.6.1.1 Economic and Social Matters

The Project is anticipated to positively impact the local and regional economy as a result of increased employment and investment. It is anticipated that the construction stage of the Project will employ up to 500 workers, while peak operational employment would be in the order of 200-250 workers (at a full 70 Mtpa throughput). During operations, the Project will expand the permanent working population within Bowen and the wider area and therefore economic benefits will be concentrated in these regions.

Further, the Project will provide economic growth to the Bowen and the wider Whitsunday region from direct inputs. The financial value of the Project is expected to generate between AU \$1.4 billion and AU \$2.8 billion per annum in Gross Regional Product (GRP) based on the projected export of thermal coal. It will also provide opportunities for local suppliers to support the construction and operation of the terminal, rail and jetty components of the Project. The economic growth in the Bowen region will peak during the construction phase then stabilise during the operational phase.

A number of potentially negative impacts may also be expected, including:

- Increased labour costs throughout the area;
- Local and regional infrastructure pressures; and
- Property market inflation.

## E1.6.1 Listed Threatened Species and Communities and Migratory Species

It is not anticipated that the Project will have significant direct impacts on the terrestrial or marine environment in the Project area due to the impacts being either temporal in nature and/or insignificant over the long term on MNES. The existing marine infrastructure associated with the T1 coal terminal has not been shown to have had a significant impact on coastal processes within the Port of Abbot Point. The trestle for the Project is not expected to have any significant impact on coastal processes and only minor localised impacts will result from the expansion of the MOF.

### E1.6.1.1 Terrestrial Ecology

The revised maximum extent for proposed clearing of remnant vegetation and high-value regrowth within the Project area is 67 ha. The Project may require the clearing of up to 47 ha of *Corymbia/Melaleuca* woodland (RE 11.2.5) which is listed as Least Concern under the VM Act. In addition, 19 ha of Least Concern High Value Regrowth and 1 ha of Of Concern High Value Regrowth may also need to be cleared for the Project. Following a comprehensive design process to limit the size of the Project footprint, the confirmed TEC will be avoided entirely and measures such as weed monitoring and control will be employed to maintain and improve the health of the TEC. Further, the configuration of coal stockpiles has increased the buffer distance between the stockyard and the TEC, maintaining the location of an existing services road.

Prior to construction, vegetation in the laydown area on Abbot Point Road will be inspected for Koala habitat suitability and to inform the layout design to avoid clearing of suitable habitat for the species.

Suitable habitat for Striped-tailed Delma may be cleared (woodland adjacent to the TEC). In order to understand the habitat potential for Striped-tail Delma and *Croton magneticus* and *Leucopogon*

*cuspidatus*, Adani undertook further survey work in the Project area in February 2013. Targeted surveys for these species did not locate any individuals within the Project area. It is noted that on 15 May 2013, the EPBC Act listings changed for the Striped-tailed Delma and *Leucopogon cuspidatus* (both now unlisted).

#### **E1.6.2.2 Marine Ecology**

The construction and/or operation works associated with the marine infrastructure components of the Project are not anticipated to significantly and/or permanently impact the benthic and marine fauna communities of the Project area. The marine environment at the Port of Abbot Point is not characterised as having unique or particularly high value ecological areas in comparison to surrounding areas. Recent studies conducted within the Project area have illustrated that the benthic community directly under the offshore component is of comparatively low quality habitat. The most significant impacts associated with the marine environment from the Project development will result from lighting during the construction and use of the MOF and underwater noise.

The Project will increase the artificial lighting on Abbot Beach, and in the marine area of the MOF by approximately 0.2 ha and 0.4 ha, respectively, and in conjunction with other proposed developments for the Port may result in light spill and sky glow within the marine environment. A range of mitigation measures have been developed (associated with lighting wavelength and light shielding) which will minimise the impacts of lighting on marine and terrestrial species.

Adani will develop a turtle monitoring program to monitor potential impacts to marine turtles during nesting season based on the assumption that Abbot Beach is used by turtles in significant numbers so as to be called a population. Noise impacts will primarily be associated with the construction of the Project. As with lighting, a range of mitigation measures have been devised to reduce the magnitude of the impact of underwater noise during construction, thereby warning species that they should not utilise the Project area during piling.

The predicted increase in shipping within the GBRMP and waters surrounding the Port of Abbot Point will potentially increase the risks of shipping related marine incidents to MNES and the potential for invasive pest species to enter the area. However, the Abbot Point CIA suggests that based on the current and future management plans, any impact is unlikely. A range of mitigation measures have been developed to ensure any impacts are mitigated. Further, Adani is in the unique situation of being both the terminal and vessel operator and can therefore ensure best practice maritime, quarantine and pilotage strategies are in place. It is therefore not anticipated that shipping resulting from the Project will adversely impact the region.

#### **E1.6.2.3 Caley Valley Wetland**

Based on the full operational capacity of the water system, the frequency of discharge of the Project will be less than the current discharge frequency of the existing regime, thereby reducing impact on either the hydrology or water quality of the Wetland. The modelling indicates that at full operational capacity, the water management system can tolerate 1.5 times the average annual rainfall without the need to discharge from the T1 sediment ponds.

The Project has developed a comprehensive water management strategy. The sediment pond(s) for Phase 2 of the Project are being designed to hold flood events similar to that observed in 2012 without the need to release water in normal circumstances and thus will also reduce the frequency of ongoing releases from the T1 coal Terminal's primary and secondary sediment ponds. Current operations were not found to have resulted in any significant negative impacts to the wetland.

However, if there are unplanned discharges during extreme rainfall events, it is not expected that there would be any adverse effect on the ecological, chemical and physical condition of the wetland (refer to section 3.10.5). This is due to the ongoing management and treatment of water in the sediment ponds

The Project is not anticipated to cause any direct light spill or noise impacts to the Wetland and as such, is unlikely to impact on Migratory bird species using this area.

### **E1.6.2 World and National Heritage, Commonwealth Marine Area, Great Barrier Reef Marine Park**

The EIS found that it is unlikely there will be any loss in OUV or decline in integrity of the GBRWHA as a result of the Project. There are a range of proposed avoidance, mitigation, management and offset measures that will ensure that the conservation objectives for the Project will be achieved. These include conservation objectives for the key natural heritage attributes (migratory shorebirds and marine mammals). Additionally, the protection and management of the GBRWHA will not be affected negatively as a result of the Project.

There will be no direct impact on the GBRMP and CMA from construction and operation of offshore components of the Project due to the location of the marine park and CMA boundaries. Indirect impacts to the marine environment may result from the underwater noise from piling, shipping and anchorage; however these impacts are expected to be minimal with appropriate mitigation. A suite of mitigation and management measures to be implemented to address impacts to other marine MNES (e.g. turtles and dolphins) will also be of benefit to the GBRMP and CMA. It is considered that the Project will not result in any significant long-term adverse impacts to the GBRMP and CMA in the vicinity of the Project.

## E1.7 Environmental Management

### E1.7.1 Avoidance, Safeguards and Mitigation

#### E1.7.1.1 Economic and Social Matters

In regards to potential adverse economic impacts, programs will be developed to employ the local workforce, including providing the skills to re-enter the workforce or 'up-skill' by developing customised training programs. In response to possible housing pressures and shortages, and in consultation with the WRC, workers' accommodation will preferentially be provided on or near the Project (such as at Merinda); through a workers accommodation camp or employ other forms of accommodation or rental property, such as from providers of commercial tourism accommodation.

#### E1.7.1.2 Terrestrial Ecology

The Project's terrestrial footprint has been designed to minimise the amount of remnant vegetation and/or habitat that will be cleared or impacted for construction and operations. Approximately 67 ha of State-assessable vegetation will be subject to pre-clearing checks by a qualified fauna ecologist with a focus on MNES flora and fauna and identifying nest/roost sites. A qualified fauna spotter will be present during all vegetation clearing to rescue and relocate resident fauna.

Through a comprehensive design assessment for the Project there will be no clearing or direct impact to the TEC and it is unlikely that any residual indirect impacts will occur following mitigation. Further, there will be no direct or indirect impacts to terrestrial MNES as a result of the Project.

Offsetting the remnant vegetation to be cleared for the Project will be managed through State-based processes.

#### E1.7.1.3 Marine Ecology

The Project's marine area of disturbance and its construction have been designed to minimise the impact on marine habitat and species. The trestle jetty structure and associated berths constitute the most significant development within the marine environment and will be constructed solely on piled structures. Development of the MOF will be an expansion of an existing structure thereby reducing overall impacts if a completely new structure had otherwise been proposed.

The EIS identified that the Project will have no significant impact on hydrodynamics, waves and sediment transportation and therefore mitigation measures for coastal processes are considered unnecessary. In regards to the broader marine environment, the EIS concluded that a range of mitigation measures should be developed to reduce underwater noise and lighting impacts during the construction and operation stages, these include:

- Gradual or soft start procedure to warn marine fauna of piling activities;
- Minimising simultaneous pile driving and the operation of multiple pile driving plants;
- Installation of underwater noise loggers for the initial 30 day piling period to validate the noise model and confirm the appropriate exclusion zone distance;

- Cessation of piling when relevant marine fauna species (cetaceans) are observed within the zones of estimated physiological impact;
- Only essential lighting will be included and intense lights or clusters of lights will be avoided;
- Lighting design will comply with best available technology and include light shrouding techniques;
- Luminaries will be mounted low in the vertical plane and use the lowest intensity required for the task;
- Long wavelength lights will be utilised wherever possible; and
- No white lights that emit ultraviolet light will be used, strong blue or green spectral elements will also be limited.

The Project is within an area of seagrass with approximately 10% coverage. Of this, approximately 206 m<sup>2</sup> of this seagrass will be reclaimed through piling activities required to support the trestle jetty and wharf. Further, moorings for marine vessels and plant required during construction will be restricted to identified 'no impact' areas outside of the known mapped areas for the seagrass beds. It is important to note that this marine plant community is adapted to dynamic conditions and will recover following disturbance, as indicated as a result of recent storm and flooding events. The local communities were heavily impacted in recent floods, but have started recovering. This community is unlikely to require an offset; however it may be considered as a contribution by the Project to marine conservation efforts undertaken by all proponents at the Port of Abbot Point.

Adani will undertake monitoring of the turtle nesting locations and behaviours on Abbot Beach. The study anticipates that following mitigation and management measures, there will be very low light disturbance to the marine environments and the impacts will be within tolerable and manageable levels.

The EIS determined that the management and mitigation of risk associated with shipping within the GBRMP can be developed, implemented and administered at an industry level or by appropriate State agencies. Adani's unique position of directly controlling the majority of vessels associated with the Project will ensure that all vessels are compliant with biosecurity, pilotage and safety systems within the GBRMP. Further, Adani can ensure that all vessel pilots are trained to the highest standards, mitigating the risk of human error. As such it is not expected that shipping associated with the Project will result in significant impacts to MNES in the area.

#### **E1.7.1.4 Caley Valley Wetland**

Adani has developed a comprehensive water management strategy for the Project. Based on the full operational capacity of the water system, the frequency of discharge of the Project will be less than the current discharge frequency of the existing regime, thereby reducing impact on either the hydrology or water quality of the Wetland. The modelling indicates that at full operational capacity, the water management system can tolerate 1.5 times the average rainfall without the need to discharge to the T1 sediment ponds.

The EIS identified that through the efficient design, integration and treatment processes of the sediment ponds will minimise the potential for adverse impacts on the Wetland, the potential for impact is expected to be very low. Although potential impacts on wetland bird populations have been identified, the likelihood of these impacts is very rare, and effects are minor from a hydrological perspective. Nevertheless, avoidance, safeguards and mitigation measures have been provided for the Project and include:

- Further development of water balance models;
- Development of a range of water related management plans;
- Avoiding unplanned water discharge events; and
- Widespread use of stormwater management infrastructure and erosion control management techniques during construction.

### **E1.7.2 Environmental Management Plans**

Adani will implement a Project-wide management program led by a comprehensive Environmental Management Plan (EMP). This program is in addition to commitments and mitigation strategies made by Adani and other proponents who participated in the Abbot Point CIA.

The EMP has been prepared as part of this EIS and establishes the framework for management of Project activities. Construction Environmental Management Plans (CEMPs) and Operational Environmental Management Plans (OEMPs) will be developed prior to the activities commencing, and once detailed design information is complete.

The EMP details management measures to be adopted to address impacts during the construction and operation of the Project. Importantly, the EMP focuses on measures to manage MNES and includes terrestrial flora and fauna, marine ecology, aquatic ecology, water management, land, cultural heritage, waste management, noise and vibration, air quality and greenhouse gases.

In particular, measures to minimise impacts on threatened species, TEC, listed migratory species, the Wetland and marine species have been included throughout the management plans in the EMP. Particular attention has also been given to potential impacts on the environment and listed values of the GBRWHA, GBRMP and CMA. Other specific environmental aspects of the Project such as climate change, hazard and risk, health and safety, emergency response and visual amenity, will be addressed in the more detailed CEMPs and OEMPs developed once the Project has commenced.

Specific EMPs will be developed for the Project and include:

- Stormwater Management Plan;
- Construction Groundwater Management Plan;
- Erosion and Sediment Control Plan;
- Shoreline Erosion Management Plan;
- Feral Animal and Weed Management Plan;
- Aquatic Ecology Management Plan;
- Waste Management Plan;
- Road Use Management Plan;
- Shipping Management Plan;
- Biodiversity Offsets Plan;
- Cultural Heritage Management Plan;

- Infrastructure Management Plan; and
- Emergency Response Plan.

The objective of these management plans is to holistically link management across a range of separate Project commitments to coordinate, manage, monitor and minimise potential impacts on the surrounding environment including MNES.

## E1.8 Conclusion

The Project considered and achieved a range of desired operation and conservation outcomes that have avoided direct impacts to the TEC, Wetland and marine and terrestrial environments.

Implementation of stated mitigation measures will ensure that the Project results in no significant indirect impacts to MNES including the GBRWHA, listed and migratory species. As a result, there are few residual impacts that will require offsetting.

Throughout the EIS, conservation objectives have been identified that aim to maintain and/or enhance the conservation value of MNES and other environmental values at the Port of Abbot Point. This is fundamental to the environmental management approach and commitment of Adani to maintaining the ecological value of the Project area. The Project in many instances, will result in positive impacts including –

- Local and regional economic benefits (increased employment and local capital injection);
- Better management of pest and weeds within the Project area;
- Significantly reducing water discharges into the Wetland as a result of improved water management systems; and
- Increased understanding of local turtle populations through the proposed turtle monitoring program.

Adani has conducted a rigorous assessment of the potential areas of impact on MNES, including increases in light, noise and vibration pollution on the GBRWHA; and marine and terrestrial habitats adjacent to and within the Project area which provide habitat for listed threatened and migratory species under the EPBC Act. The assessment concluded that, in conjunction with the overarching mitigation strategies and outcomes from the Abbot Point CIA, the Project could occur in a manner that demonstrates the principles of ecological sustainable development and will deliver the applicable conservation objectives for MNES.

## E1.9 Adani Environmental Record

Adani has not been subject to any proceedings under a Commonwealth, State or Territory law for the protection of the environment or the conservation and sustainable use of natural resources. Adani's Environment and Sustainability Policy is included in the EIS Appendices at Volume 1: Appendix C1 Adani Environment and Sustainability Policy.

