Australian Government

Department of the Environment

Referral of proposed action

What is a referral?

The *Environment Protection and Biodiversity Conservation Act 1999* (the EPBC Act) provides for the protection of the environment, especially matters of national environmental significance (NES). Under the EPBC Act, a person must not take an action that has, will have, or is likely to have a significant impact on any of the matters of NES without approval from the Australian Government Environment Minister or the Minister's delegate. (Further references to 'the Minister' in this form include references to the Minister's delegate.) To obtain approval from the Environment Minister, a proposed action should be referred. The purpose of a referral is to obtain a decision on whether your proposed action will need formal assessment and approval under the EPBC Act.

Your referral will be the principal basis for the Minister's decision as to whether approval is necessary and, if so, the type of assessment that will be undertaken. These decisions are made within 20 business days, provided sufficient information is provided in the referral.

Who can make a referral?

Referrals may be made by or on behalf of a person proposing to take an action, the Commonwealth or a Commonwealth agency, a state or territory government, or agency, provided that the relevant government or agency has administrative responsibilities relating to the action.

When do I need to make a referral?

A referral must be made for actions that are likely to have a significant impact on the following matters protected by Part 3 of the EPBC Act:

- World Heritage properties (sections 12 and 15A)
- National Heritage places (sections 15B and 15C)
- Wetlands of international importance (sections 16 and 17B)
- Listed threatened species and communities (sections 18 and 18A)
- Listed migratory species (sections 20 and 20A)
- Protection of the environment from nuclear actions (sections 21 and 22A)
- Commonwealth marine environment (sections 23 and 24A)
- Great Barrier Reef Marine Park (sections 24B and 24C)
- A water resource, in relation to coal seam gas development and large coal mining development (sections 24D and 24E)
- The environment, if the action involves Commonwealth land (sections 26 and 27A), including:
    - actions that are likely to have a significant impact on the environment of Commonwealth land (even if taken outside Commonwealth land);
    - actions taken on Commonwealth land that may have a significant impact on the environment generally;
- The environment, if the action is taken by the Commonwealth (section 28)
- Commonwealth Heritage places outside the Australian jurisdiction (sections 27B and 27C)

You may still make a referral if you believe your action is not going to have a significant impact, or if you are unsure. This will provide a greater level of certainty that Commonwealth assessment requirements have been met.

To help you decide whether or not your proposed action requires approval (and therefore, if you should make a referral), the following guidance is available from the Department's website:

- the Policy Statement titled Significant Impact Guidelines 1.1 – Matters of National Environmental Significance. Additional sectoral guidelines are also available.

- the Policy Statement titled Significant Impact Guidelines 1.2 - Actions on, or impacting upon, Commonwealth land, and actions by Commonwealth agencies.
- the Policy Statement titled Significant Impact Guidelines: Coal seam gas and large coal mining developments—Impacts on water resources.
- the interactive map tool (enter a location to obtain a report on what matters of NES may occur in that location).

Can I refer part of a larger action?

In certain circumstances, **the Minister may not accept a referral for an action that is a component of a larger action and may request the person proposing to take the action to refer the larger action for consideration under the EPBC Act (Section 74A, EPBC Act).** If you wish to make a referral for a staged or component referral, read 'Fact Sheet 6 Staged Developments/Split Referrals' and contact the Referrals Gateway (1800 803 772).

Do I need a permit?

Some activities may also require a permit under other sections of the EPBC Act or another law of the Commonwealth. Information is available on the Department's web site.

Is your action in the Great Barrier Reef Marine Park?

If your action is in the Great Barrier Reef Marine Park it may require permission under the *Great Barrier Reef Marine Park Act 1975* (GBRMP Act). If a permission is required, referral of the action under the EPBC Act is deemed to be an application under the GBRMP Act (see section 37AB, GBRMP Act). This referral will be forwarded to the Great Barrier Reef Marine Park Authority (the Authority) for the Authority to commence its permit processes as required under the Great Barrier Reef Marine Park Regulations 1983. If a permission is not required under the GBRMP Act, no approval under the EPBC Act is required (see section 43, EPBC Act). The Authority can provide advice on relevant permission requirements applying to activities in the Marine Park.

The Authority is responsible for assessing applications for permissions under the GBRMP Act, GBRMP Regulations and Zoning Plan. Where assessment and approval is also required under the EPBC Act, a single integrated assessment for the purposes of both Acts will apply in most cases. Further information on environmental approval requirements applying to actions in the Great Barrier Reef Marine Park is available from http://www.gbrmpa.gov.au/ or by contacting GBRMPA's Environmental Assessment and Management Section on (07) 4750 0700.

The Authority may require a permit application assessment fee to be paid in relation to the assessment of applications for permissions required under the GBRMP Act, even if the permission is made as a referral under the EPBC Act. Further information on this is available from the Authority:

Great Barrier Reef Marine Park Authority

2-68 Flinders Street PO Box 1379
Townsville QLD 4810
AUSTRALIA

Phone: + 61 7 4750 0700
Fax: + 61 7 4772 6093

www.gbrmpa.gov.au

What information do I need to provide?

Completing all parts of this form will ensure that you submit the required information and will also assist the Department to process your referral efficiently. If a section of the referral document is not applicable to your proposal enter N/A.

You can complete your referral by entering your information into this Word file.

Instructions

Instructions are provided in blue text throughout the form.

Attachments/supporting information

The referral form should contain sufficient information to provide an adequate basis for a decision on the likely impacts of the proposed action. You should also provide supporting documentation, such as environmental reports or surveys, as attachments.

Coloured maps, figures or photographs to help explain the project and its location should also be submitted with your referral. Aerial photographs, in particular, can provide a useful perspective and context. Figures should be good quality as they may be scanned and viewed electronically as black and white documents. Maps should be of a scale that clearly shows the location of the proposed action and any environmental aspects of interest.

Please ensure any attachments are below three megabytes (3mb) as they will be published on the Department's website for public comment. To minimise file size, enclose maps and figures as separate files if necessary. If unsure, contact the Referrals Gateway (email address below) for advice. Attachments larger than three megabytes (3mb) may delay processing of your referral.

Note: the Minister may decide not to publish information that the Minister is satisfied is commercial-in-confidence.

How do I pay for my referral?

From 1 October 2014 the Australian Government commenced cost recovery arrangements for environmental assessments and some strategic assessments under the EPBC Act. If an action is referred on or after 1 October 2014, then cost recovery will apply to both the referral and any assessment activities undertaken. Further information regarding cost recovery can be found on the Department's website.

Payment of the referral fee can be made using one of the following methods:

- **EFT Payments can be made to:**

  BSB: 092-009
  Bank Account No. 115859
  Amount: $7352
  Account Name: Department of the Environment.
  Bank: Reserve Bank of Australia
  Bank Address: 20-22 London Circuit Canberra ACT 2601
  Description: The reference number provided (see note below)

- **Cheque** - Payable to "Department of the Environment". Include the reference number provided (see note below), and if posted, address:

  The Referrals Gateway
  Environment Assessment Branch
  Department of the Environment
  GPO Box 787
  Canberra ACT 2601

- **Credit Card**

  Please contact the Collector of Public Money (CPM) directly (call (02) 6274 2930 or 6274 20260 and provide the reference number (see note below).

Note: in order to receive a reference number, submit your referral and the Referrals Gateway will email you the reference number.

How do I submit a referral?

Referrals may be submitted by mail or email.

Mail to:

Referrals Gateway
Environment Assessment Branch
Department of Environment
GPO Box 787
CANBERRA ACT 2601

- If submitting via mail, electronic copies of documentation (on CD/DVD or by email) are required.

Email to: epbc.referrals@environment.gov.au

- Clearly mark the email as a 'Referral under the EPBC Act'.
- Attach the referral as a Microsoft Word file and, if possible, a PDF file.
- **Follow up with a mailed hardcopy including copies of any attachments or supporting reports.**

What happens next?

Following receipt of a valid referral (containing all required information) you will be advised of the next steps in the process, and the referral and attachments will be published on the Department's web site for public comment.

The Department will write to you within 20 business days to advise you of the outcome of your referral and whether or not formal assessment and approval under the EPBC Act is required. There are a number of possible decisions regarding your referral:

The proposed action is NOT LIKELY to have a significant impact and does NOT NEED approval

No further consideration is required under the environmental assessment provisions of the EPBC Act and the action can proceed (subject to any other Commonwealth, state or local government requirements).

The proposed action is NOT LIKELY to have a significant impact IF undertaken in a particular manner

The action can proceed if undertaken in a particular manner (subject to any other Commonwealth, state or local government requirements). The particular manner in which you must carry out the action will be identified as part of the final decision. You must report your compliance with the particular manner to the Department.

The proposed action is LIKELY to have a significant impact and does NEED approval

If the action is likely to have a significant impact a decision will be made that it is a *controlled action*. The particular matters upon which the action may have a significant impact (such as World Heritage values or threatened species) are known as the *controlling provisions*.

The controlled action is subject to a public assessment process before a final decision can be made about whether to approve it. The assessment approach will usually be decided at the same time as the controlled action decision. (Further information about the levels of assessment and basis for deciding the approach are available on the Department's web site.)

The proposed action would have UNACCEPTABLE impacts and CANNOT proceed

The Minister may decide, on the basis of the information in the referral, that a referred action would have clearly unacceptable impacts on a protected matter and cannot proceed.

Compliance audits

If a decision is made to approve a project, the Department may audit it at any time to ensure that it is completed in accordance with the approval decision or the information provided in the referral. If the project changes, such that the likelihood of significant impacts could vary, you should write to the Department to advise of the changes. If your project is in the Great Barrier Reef Marine Park and a decision is made to approve it, the Authority may also audit it. (See "*Is your action in the Great Barrier Reef Marine Park,"* p.2, for more details).

For more information

- call the Department of the Environment Community Information Unit on 1800 803 772 or
- visit the web site http://www.environment.gov.au/topics/about-us/legislation/environment-protection-and-biodiversity-conservation-act-1999

All the information you need to make a referral, including documents referenced in this form, can be accessed from the above web site.

Referral of proposed action

Project title: Gold Coast Light Rail Stage 2

Acronyms

Acronym	Definition
AASS	Actual acid sulfate soil
ABS	Australian Bureau of Statistics
AEP	Annual Exceedance Probability
ASRIS	Australian Soil Resource Information System
AHD	Australian Height Datum
ARI	Average Recurrence Interval
CAMBA	China-Australia Migratory Bird Agreement
CCTV	Closed circuit television
CDIMP	Concept Design Impact Management Plan
CEMP	Construction Environmental Management Plan
CGC	City of Gold Coast
DATSIP	Department of Aboriginal and Torres Strait Islander Partnerships
DIWA	Directory of Important Wetlands
DSI	Detailed Site Investigation
DN	Diameter nominal
EIA	Environmental impact assessment
EP Act	*Environmental Protection Act 1994*
GBRMP	Great Barrier Reef Marine Park
GCLR	Gold Coast Light Rail
GCLR Stage 2	Gold Coast Light Rail Stage 2
GCRT	Gold Coast Rapid Transit
GCUH	Gold Coast University Hospital
GCW	Gold Coast Water
ha	Hectares
IRTC	Intra-Regional Transport Corridor
JAMBA	Japan-Australia Migratory Bird Agreement
km	Kilometres
LP Act	*Land Protection (Pest and Stock Route Management) Act 2002*
m	metres
PASS	Potential acid sulfate soil
PSI	Preliminary Site Investigation
PUP	Public utility providers
QR	Queensland Rail

Acronym	Definition
RE	Regional Ecosystem
ROKAMBA	Republic of Korea-Australia Migratory Bird Agreement
SASR	Strategic Assessment of Service Requirement
SAT	Spot Assessment Technique (in reference to Koala habitat utilisation surveys)
SSMP	Significant Species Management Plan
TEC	Threatened ecological community under the provisions of the EPBC Act
TMR	Queensland Government Department of Transport and Main Roads
TSSC	Threatened Species Scientific Committee
WoNS	Weeds of National Significance
WSUD	Water Sensitive Urban Design

Glossary of terms

Term	Definition
Annual Exceedance Probability	The likelihood of occurrence of a flood of given size or larger occurring in any one year. AEP is expressed as a percentage (%) and may be expressed as the reciprocal of ARI (Average Recurrence Interval). For example, if a peak flood discharge of 500 m3/s has an AEP of 5%, it means that there is a 5% risk (ie, a risk of one-in-20) of a peak flood discharge of 500 m3/s or larger occurring in any one year (see also Average Recurrence Interval).
At-grade	On the same level
Average Recurrence Interval	The likelihood of occurrence, expressed in terms of the long-term average number of years, between flood events as large as or larger than the design flood event. For example, floods with a discharge as large as or larger than the 100-year ARI flood will occur on average once every 100-years. ARI is related to AEP and Odds of Flooding as follows: ARI in years equals the reciprocal of AEP expressed in terms of chance. For example, a 1% AEP flood has a chance of occurrence in any year of 0.01, and an associated ARI of 100 years. The Odds of Flooding are equal to the ARI in years. Therefore the 100 year ARI flood is also the 100:1 flood (see also Annual Exceedance Probability)
Ballasted track	Light rail track is formed upon a trackbed. It is packed between, below, and around the sleepers/ties. It is used to bear the load from the light rail ties, to facilitate drainage of water, and also to control vegetation growth that may interfere with the track structure.
Detailed Design	The phase of detailed engineering and procurement. This phase builds on the already developed Reference Design to further elaborate each aspect of the project by complete description through solid modelling, drawings and specifications.
Non-remnant vegetation	Vegetation which is disturbed in terms of height or cover of the species characteristic of a community (or Regional Ecosystem in the Queensland Government framework). Typically the vegetation has a canopy height less than 70% or a height of less than 50% characteristic of the community's undisturbed canopy (for woody vegetation). For non-woody communities, the time since cultivation and the species composition of the area are used to determine non-remnant status.
Permeable and non-permeable barriers	Permeable barriers to fauna movement are defined as infrastructure which fauna can move across/through but fauna are either slowed or at risk (eg non-fauna proof fences, roads, heavy rail lines etc). Non-permeable barriers are defined as barriers where movement of fauna through/across is considered highly unlikely or not possible (eg 1.2 m high concrete barriers along road medians, fauna-proof fencing, barbed wire fences).
Plinth track	A plinth track is a light rail formation that features a track slab with upright stands or plinths on which the light rail is situated. This type of track is ballastless and does not require sleepers. Plinth track design can be implemented for elevated tracks, on structures, and for tunnels or viaducts.
Project contractor	The contractor responsible for construction works associated with the project on behalf of TMR.
Project footprint	The area within which all project activities, that have the potential to alter the area and/or surrounding environs, will be undertaken. Will not include activities such as minor accommodation works (eg fence replacement, minor utility works etc).

Term	Definition
Reference Design	The initial design undertaken by Aurecon for the project, as commissioned by TMR. The Reference Design identifies a preferred infrastructure configuration for GCLR Stage 2 and forms part of the Business Case for the project. The Reference Design has been utilised to assess the engineering requirements and potential environmental impacts for the Environmental Assessment Report prepared for the project.
Regional Ecosystem Mapping or Regulated Vegetation Management Map	Regional ecosystems were originally defined by Sattler and Williams (1999) as vegetation communities in a bioregion that are consistently associated with a particular combination of geology, landform and soil. Descriptions presented in Sattler and Williams (1999) were derived from a broad range of existing information sources including land system, vegetation and geology mapping and reports. The Queensland Herbarium has developed and maintains a Regional Ecosystem Description Database that accompanies the legislated Regulated Vegetation Management Mapping for Queensland. This mapping shows the extent of remnant and regrowth vegetation across Queensland, as well as areas of non-remnant vegetation, plantations and waterbodies.
Remnant vegetation	Woody vegetation is mapped as remnant where the dominant canopy has greater than 70% of the height and greater than 50% of the cover relative to the undisturbed height and cover of that stratum and is dominated by species characteristic of the vegetation's undisturbed canopy. Refer also to Non-remnant vegetation.
Wildlife Online Database	This is a database developed and maintained by the Queensland Government Department of Environment and Heritage Protection. The database allows you to return a list of species recorded for a specific area or coordinate location. The database contains records of wildlife sightings and listing of plants, mammals, birds, amphibians, reptiles, freshwater fish, sharks, rays, and priority invertebrates (eg butterflies) in Queensland. This database is continually updated using specimen collection data, research data, literature records and permit returns from a range of Government Departments and external organisations. The data entered into the database is vetted to ensure the quality of records incorporated.

1 Summary of proposed action

NOTE: You must also attach a map/plan(s) and associated geographic information system (GIS) vector (shapefile) dataset showing the location and approximate boundaries of the area in which the project is to occur. Maps in A4 size are preferred. You must also attach a map(s)/plan(s) showing the location and boundaries of the project area in respect to any features identified in 3.1 & 3.2, as well as the extent of any freehold, leasehold or other tenure identified in 3.3(i).

1.1 **Short description**

Use 2 or 3 sentences to uniquely identify the proposed action and its location.

The Gold Coast Light Rail (GCLR) Stage 2 (GCLR Stage 2) project will form an integral part of the Gold Coast light rail public transport system for residents and visitors to the Gold Coast. The ultimate GCLR network is planned to extend from the heavy rail network at Helensvale, connecting all of the key activity centres along the coastal strip to the Gold Coast Airport at Coolangatta. GCLR Stage 2 will form the connection between the Helensvale heavy rail station and the existing GCLR Stage 1 alignment which extends from the Gold Coast University Hospital (GCUH) to Broadbeach. Stage 1 transported more than 6.5 million passengers in the first year of operation (refer to Figure 1.1, Attachment 1). The GCLR Stage 2 project includes the following:

The GCLR Stage 2 project includes the following:

- 7.3 km of dual track light rail alignment connecting the existing light rail system at the GCUH to the Helensvale heavy rail station
- Three light rail stations at Parkwood East, Parkwood and Helensvale
- Two bridge structures: crossing Biggera Creek (160 m length) and Coombabah Creek (100 m length)
- New park 'n' ride facility at Parkwood providing 1000 car parks
- Expansion of existing park 'n' ride facility at Helensvale heavy rail station providing an additional 400 car parks
- At-grade crossings at Olsen Avenue/Parklands Drive intersection and Smith Street/Napper Road intersection

There is currently a Reference Design for the project, with Detailed Design to follow. It is not expected that the final design and construction of GCLR Stage 2 will be significantly different in nature or extent to the Reference Design. As such, the Reference Design has been utilised for the purposes of referring the project and potential environmental impacts associated with GCLR Stage 2.

1.2 **Latitude and longitude**

Latitude and longitude details are used to accurately map the boundary of the proposed action. If these coordinates are inaccurate or insufficient it may delay the processing of your referral.

Location	Latitude			Longitude		
	Degrees	**Minutes**	**Seconds**	**Degrees**	**Minutes**	**Seconds**
GCUH Connection	-27°	57'	38.472"S	153°	22′	50.146″E
Olsen Avenue/ Parkwood Drive Intersection	-27°	57'	34.265"S	153°	22'	42.961"E
Parkwood East Station	-27°	57'	46.446"S	153°	21'	49.633"E
Parkwood park 'n' ride	-27°	57'	11.729"S	153°	20'	48.4"E
Parkwood Station	-27°	57'	6.699"S	153°	20'	50.149"E
Helensvale Station	-27°	55'	31.067"S	153°	20'	23.088"E
Key Turning Points on the Alignment						
1	-27°	57'	38.221" S	153°	22′	49.673" E
2	-27°	57'	36.615" S	153°	22′	47.773" E
3	-27°	57'	34.696" S	153°	22′	44.428" E
4	-27°	57'	41.81" S	153°	22′	35.59" E
5	-27°	57'	48.02" S	153°	22′	30.183" E
6	-27°	57'	50.256" S	153°	22′	19.07" E
7	-27°	57'	41.702" S	153°	21′	17.773" E
8	-27°	57'	26.103" S	153°	21′	1.404" E
9	-27°	57'	6.699" S	153°	20′	49.398" E
10	-27°	57'	4.255" S	153°	20′	46.356" E
11	-27°	56′	59.157″ S	153°	20′	43.731" E
12	-27°	56′	32.744″ S	153°	20′	34.396" E
13	-27°	56′	17.84″ S	153°	20′	27.441" E
14	-27°	56′	42.808″ S	153°	20′	20.81" E
15	-27°	56′	39.831″ S	153°	20′	20.446" E

The Interactive Mapping Tool may provide assistance in determining the coordinates for your project area.

If the area is less than 5 hectares, provide the location as a single pair of latitude and longitude references. If the area is greater than 5 hectares, provide bounding location points.

There should be no more than 50 sets of bounding location coordinate points per proposal area.

Bounding location coordinate points should be provided sequentially in either a clockwise or anticlockwise direction.

If the proposed action is linear (eg. a road or pipeline), provide coordinates for each turning point.

Also attach the associated GIS-compliant file that delineates the proposed referral area. If the area is less than 5 hectares, please provide the location as a point layer. If greater than 5 hectares, please provide a polygon layer. If the proposed action is linear (eg. a road or pipline) please provide a polyline layer (refer to GIS data supply guidelines at Attachment A).

Do not use AMG coordinates.

1.3 **Locality and property description**

Provide a brief physical description of the property on which the proposed action will take place and the project location (eg. proximity to major towns, or for off-shore projects, shortest distance to mainland).

The project is located alongside and within existing road and rail transport corridors between the GCUH and Helensvale heavy rail station, as shown in Figure 1.2 (Attachment 2).
The project alignment extends from the existing light rail terminus at the GCUH station, then crosses the Olsen Avenue/Parklands Drive intersection at-grade and continues southward parallel to Olsen Avenue where it meets Smith Street Motorway and crosses Biggera Creek on structure.

The alignment then continues westward, parallel to the Smith Street Motorway, with the proposed Parkwood East Station situated near Faldo Court to provide access to the local walk-up catchment within Parkwood. The alignment continues along Smith Street Motorway and turns northwards along Smith Street. The proposed Parkwood Station and 1000 space park 'n' ride is located at the intersection of Smith Street and Napper Road. The alignment continues in a north/north-west in the preserved corridor for the Intra-Regional Transport Corridor (IRTC), spanning Coombabah Creek, to the Helensvale heavy rail station and adjacent to the existing heavy rail line.

It is proposed that a heavy rail/light rail interchange will be constructed at the Helensvale station to allow seamless integration between light and heavy rail operations. An additional 400 space park 'n' ride will be constructed at Helensvale to expand the current capacity of the existing park 'n' ride facility.

1.4	**Size of the development footprint or work area (hectares)**	The construction footprint associated with GCLR Stage 2 has been calculated using the area shown in Figure 1.1 (Attachment 1). The project footprint is approximately 44.59 ha. It is estimated that 12.22 ha of remnant vegetation will be cleared (27.41% of the total project footprint), and approximately 17.95 ha of non-remnant vegetation (including both native and non-native vegetation) (40.25% of the total project footprint). The area of existing cleared or maintained areas within the project footprint is approximately 14.42 ha (32.34% of the total project footprint).
1.5	**Street address of the site**	Not applicable

1.6 **Lot description**

Describe the lot numbers and title description, if known.

The GCLR Stage 2 project footprint intersects (partial and full intersections) with approximately 41 properties (as identified in Figure 1.3 and Table 3.A in Attachment 3). The majority of the lots intersected are lots reserved for future transport infrastructure, including the IRTC.

The preferred alignment will directly impact on 10 residential dwellings (nine privately-owned and one owned by the Queensland Government) and a portion of one privately owned, vacant future subdivision lot.

Lot on plan descriptions for impacts on residential dwellings associated with GCLR Stage 2

Lot on plan description	Tenure type	Resumption type
1BUP103953	Freehold	Full resumption
2BUP103953	Freehold	Full resumption
1RP888103	Freehold	Full resumption
365RP818968	Freehold	Partial resumption
364RP818968	Freehold	Partial resumption
815RP845626	Freehold	Full resumption
903RP845626	Freehold	Full resumption
814RP845626	Freehold	Full resumption
114RP885918	Freehold – Department of Housing and Public Works	Partial resumption
113RP885918	Freehold	Partial resumption
15RP882829	Freehold	Partial resumption

1.7 **Local Government Area and Council contact (if known)**

If the project is subject to local government planning approval, provide the name of the relevant council contact officer.

The project footprint is located within the City of Gold Coast (CGC) Local Government Area. GCLR Stage 1 was exempt from local government assessment under the planning scheme under schedule 4, table 5 of the Sustainable Planning Regulation 2009 and it is expected that a similar exemption will be put in place for GCLR Stage 2.

1.8 **Time frame**

Specify the time frame in which the action will be taken including the estimated start date of construction/operation.

Construction is proposed to be completed in early 2018.

1.9	**Alternatives to proposed action** Were any feasible alternatives to taking the proposed action (including not taking the action) considered but are not proposed?		No
		✓	Yes, you must also complete section 2.2
1.10	**Alternative time frames etc** Does the proposed action include alternative time frames, locations or activities?	✓	No
			Yes, you must also complete Section 2.3. For each alternative, location, time frame, or activity identified, you must also complete details in Sections 1.2-1.9, 2.4-2.7 and 3.3 (where relevant).
1.11	**State assessment** Is the action subject to a state or territory environmental impact assessment?	✓	No
			Yes, you must also complete Section 2.5

1.12	**Component of larger action** Is the proposed action a component of a larger action?	✓	No
			Yes, you must also complete Section 2.7
1.13	**Related actions/proposals** Is the proposed action related to other actions or proposals in the region (if known)?		No
		✓	Yes, provide details: • GCLR Stage 1 -Existing, operational light rail • Gold Coast 2018 Commonwealth Games - GCLR Stage 2 required to facilitate passenger movement during Games
1.14	**Australian Government funding** Has the person proposing to take the action received any Australian Government grant funding to undertake this project?	✓	No The proposed action has not received grant funding from the Australian Government. Australian Government funding is currently under negotiation between Queensland Government and the Commonwealth. The CGC has already publicly committed to an initial $10 million to the GCLR Stage 2 project.
			Yes, provide details:
1.15	**Great Barrier Reef Marine Park** Is the proposed action inside the Great Barrier Reef Marine Park?	✓	No
			Yes, you must also complete Section 3.1 (h), 3.2 (e)

2 Detailed description of proposed action

NOTE: It is important that the description is complete and includes all components and activities associated with the action. If certain related components are not intended to be included within the scope of the referral, this should be clearly explained in section 2.7.

2.1 Description of proposed action

This should be a detailed description outlining all activities and aspects of the proposed action and should reference figures and/or attachments, as appropriate.

GCLR Stage 2 will support the existing public transport network to deliver efficient and rapid transport for the Gold Coast 2018 Commonwealth Games. To meet the Commonwealth Games timeframes the project will need to be completed by early 2018. Furthermore, the Gold Coast population is projected to increase to 800,000 people by 2031 (ABS 2012), making it one of the fastest growing cities in Australia. GCLR Stage 2 will provide a reliable and efficient mode of transport (as an alternative to cars) to meet future public transport patronage demands on the Gold Coast.

- GCLR Stage 2 is the proposed second stage of a world class public transport system for residents and visitors to the Gold Coast
- The Queensland Government has announced the preferred alignment for Stage 2, connecting the Helensvale heavy rail station to the existing and operational GCLR Stage 1 station at the GCUH, via an alignment adjacent to the Smith Street Motorway (refer to Figure 1.1, Attachment 1)
- GCLR Stage 2 is critical infrastructure required to support the Commonwealth Games transport task
- When complete, GCLR Stage 2 will provide a vital connection linking train (heavy rail) to tram (light rail)

The GCLR Stage 2 will comprise:

- 7.3 km of dual ballast track light rail, connecting the existing light rail system at the GCUH to the Helensvale heavy rail station
- Three light rail stations at Parkwood East, Parkwood and Helensvale
- Two bridge structures: crossing Biggera Creek (160 m length) and Coombabah Creek (100 m length)
- New park 'n' ride facility at Parkwood providing 1000 car parks
- Expansion of existing park 'n' ride facility at Helensvale heavy rail station providing an additional 400 car parks
- At-grade crossings at Olsen Avenue/Parklands Drive intersection and Smith Street/Napper Road intersection
- Minor expansion of the existing GCLR Stage 1 depot to accommodate additional fleet for Stage 2 operations

Key features of GCLR Stage 2 are summarised below.

Interface with GCLR Stage 1: at the Gold Coast University Hospital Station

Northern termination: at Helensvale Heavy Rail station

Alignment length: 7.3 km, from GCUH to Helensvale heavy rail station

Cross Section: Dual track

Track: ballast track with embedded track at stations and across intersections. Plinth track over structures

Running time: 11 minutes (approximately)

Key traffic interactions: two at-grade signalised intersections, one at Olsen Avenue and another at Napper Road

Property requirements: six full and five partial resumptions of residential properties

Stations: three stations at Parkwood East, Parkwood and Helensvale, with provision for two additional future stations

Structures: bridge at Biggera Creek – 160 m, bridge at Coombabah Creek – 100 m

Parking provision: 1,000 space park 'n ride at Parkwood, 400 space park 'n' ride at Helensvale

Active transport provision: shared path included adjacent to the track along Smith Street Motorway, new at-grade pedestrian crossings at the stations and across the intersection of Smith Street and Napper Road

Maintenance access provision: maintenance access track to be provided adjacent the light rail near Olsen Avenue and adjacent to the Queensland Rail corridor. Maintenance access to use the shared path along Smith Street Motorway. Smith Street maintenance access is from the adjacent roadway

Noise walls: included along Smith Street Motorway and along light rail/Shared path boundary along Smith Street Motorway portion

Street lighting: to be reinstated, no additional to be provided

Earthworks: generally matches Smith Street Motorway formation, embankment along Olsen Avenue to achieve flood immunity, Smith Street generally matches existing road formation level, northern most section generally matches Queensland Rail formation level to achieve flood immunity and utilise existing infrastructure (under 2 existing bridges)

Vehicles: three additional light rail vehicles

Sub-stations: three, depending upon final power study assessment

Service hours:

- Mon- Fri – 5.00 am to 12.00 am (servicing last train Helensvale 12.07 am)
- Sat –Sun – 5.30 am to 1.30 am (servicing last train Helensvale 1.37 am)

Light rail formation

The majority of the GCLR Stage 2 alignment will be a ballasted track with a ballast height of 200 mm and a formation capping layer of 200 mm thickness under the ballast. Plinth track solutions will be constructed for the Biggera and Coombabah Creek bridges, which feature a track slab with upstands (plinths) and a standard vignole rail (not grooved).

The sleepers will be 2500 mm long, high profile concrete sleepers which are precast for 1:40 rail inclination. It is anticipated the sleepers are to be installed at a nominal spacing of 700 mm or 720 mm. However, sleeper spacing may be reduced to 650 mm for a 20 m section either side of road crossings and sections of track slab layout to provide transition in track stiffness.

Light rail corridor

Generally, the width of the light rail corridor would consist of the following, as shown in Figure 2.1:

- 8 m width to contain two light rail tracks and trackform
- Minimum 1 m outside the track corridor for the inclusion of light rail infrastructure and to provide a position of safety in confined locations
- A 4 m wide light rail maintenance access road where the maintenance access road is specified. The light rail maintenance access road is proposed to be located at either existing surface level or embankment level depending on the alignment location
- Varying embankment batters of 1:2 and 1:1 where geotextile reinforced slopes are specified. Varying cut batters of 1:2 and 1:1.5. Where soil nails are specified batters may stand up to 10:1 where specified
- 5 m clear width between the toe of embankment batters and fencing to allow for potential longitudinal drainage requirements and potential future design stages. Where land constraints exist, the fencing in the Reference Design is located at the toe of the batter.

In the vicinity of Coombabah and Biggera Creeks, the corridor formation width has been minimised to minimise impacts on the environmental values of the creek and surrounding catchment and to minimise impacts on the hydraulic capacity/efficiency of the creek and surrounds.

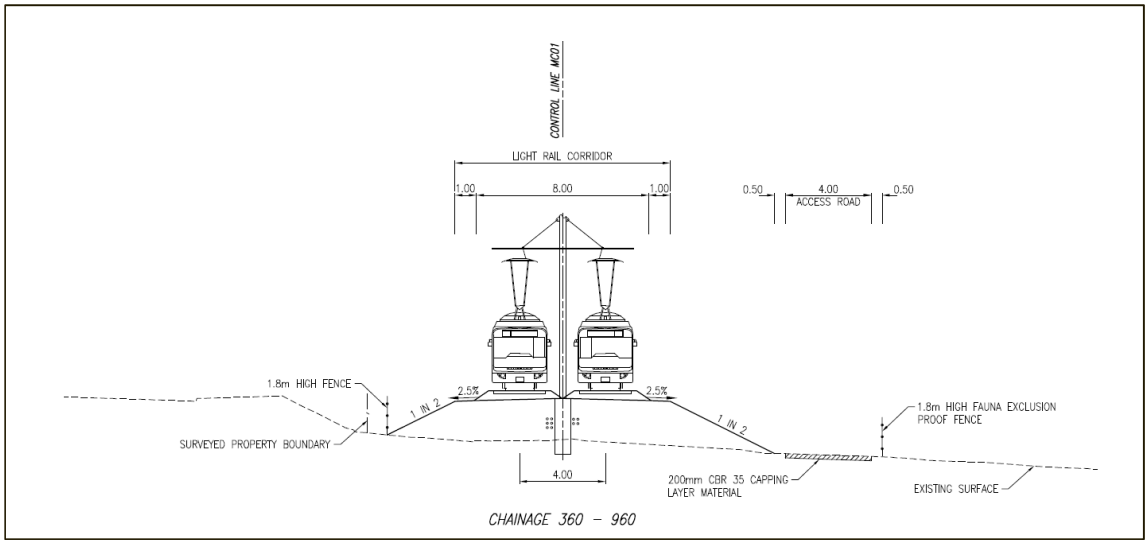


Figure 2.1 Typical GCLR Stage 2 Corridor Cross-section including access road and fauna exclusion fencing

Construction activities

The project predominantly encompasses a linear corridor. Limited state land and areas with significant environmental value limit the opportunity for potential construction compounds adjacent to the alignment. As part of the GCLR Stage 2 Reference Design, a detailed discussion regarding construction site locations has been undertaken.

The state has limited sites which could be provided to the Project contractor for use as a construction compound. Three potential sites adjacent the alignment could be utilised by the GCLR Stage 2 contractor which include:

- Proposed Parkwood and Helensvale park 'n' ride facilities
- Queensland Department of Transport and Main Roads (TMR) land between GCUH and Olsen Avenue

- Future IRTC corridor to the east of proposed light rail corridor

The Project contractor may require additional construction compounds or site areas especially for the Smith Street and Olsen Avenue works to enable multiple construction faces of work and to complete construction works in the required timeframe (ie for the Gold Coast 2018 Commonwealth Games). Other potential locations could include existing cleared/maintained CGC land.

It is noted that construction compounds could be located away from the project alignment, but that construction vehicle access will be assessed to minimise impacts to local residents and the local road network. Land made available to the Project contractor could also be located away from the GCLR Stage 2 Reference Design alignment. Following discussions with CGC, it is noted that land located at Lot 3 on SP238802 (access from Pacific Springs Drive, Pimpama, QLD 4209) was made available as part of the Stage 1 construction. This site is approximately 20 km from Helensvale and could be used for a set down or as a staging location. Further investigation will be undertaken in the detailed design phase to determine whether this land can be made available to the GCLR Stage 2 project.

Overhead traction

Overhead systems are proposed to be similar to those installed as part of the Stage 1 system, which is currently operational.

Trackside communication

For the purposes of this Reference Design, communications infrastructure requirements are deemed to be very similar to the communications infrastructure provided in GCLR Stage 1.

It would be advantageous to maintain the standards and equipment used in the current communications systems in GCLR Stage 1 for the extension to Helensvale. Simple extension of services using the same equipment would minimise training for maintainers and the amount of spares required to be held. However, any issues with the current design or new requirements should be addressed prior to detail design.

Points for each specific system are listed below:

- It is assumed that the fibre optic network could be easily extended from GCUH to Helensvale, along the new combined services route. There is an existing TMR fibre in the area along Smith Street Motorway and along the Pacific Motorway. This path may be used as a diverse return path to back up the new fibre along the combined services route. It is assumed the combined services route would run between the two new tracks. The same or similar network devices could be used along the extension with minimal impact to the original network design. TMR may wish to use the new light rail fibre as a backup route for their road systems along Smith Street in particular.
- It is assumed that the radio system would support enough new base stations to extend coverage along the new rail alignment (estimated at around five new base stations). The radio could be extended by putting a new antenna onto the existing tower near the university, a new tower at a high point around the Smith Street, Pacific Motorway junction and a new tower near the Helensvale station.
- It is assumed that all the existing systems have enough capacity to cater for new field devices. That is, that there is plenty of storage available on the closed circuit television (CCTV) servers, that the phone system can support extra help phones, the passenger information and public address systems can support the new stations, the overall control system can be extended to include the new devices, that the radio system core can support new base stations.

Public utilities

Existing public utility providers (PUP) and services identified along the project corridor are summarised in the table below.

Table 2.1 Existing PUP service providers within proximity to the project

Service Provider	Utility Type
City of Gold Coast: Gold Coast Water (GCW)	Water, Sewer
CGC	Stormwater, Traffic Signals
Energex	Electrical Infrastructure
APA Group	Gas
Telstra	Telecommunications Infrastructure
AArnet	
Optus	
Uecomm	
AAPT	
Nextgen	
PIPE Networks (telecommunications)	
TMR	ITS infrastructure, Traffic Signals, Stormwater

A utility services investigation was undertaken for the Reference Design report. Utility service conflicts have also been reviewed with respect to constructability and included in the Reference Design Report. A summary of the utility services constructability findings is included below.

Two significant PUP assets identified which would require detailed planning, design and construction procedures to mitigate potential constructability issues include the large diameter nominal (DN) 750 water main located along Smith Street Motorway and the DN150 high pressure steel gas main located at the proposed Parkwood park 'n' ride facility. The project team identified that there may be constructability issues with respect to construction activities and staging requirements when undertaking the water main relocation works, including issues such as shutdown periods and tie in requirements. The relocation of the gas main would require extensive coordination with APA Group during design and construction of the gas main to mitigate constructability issues.

Property impacts

One of the key requirements of the GCLR Stage 2 Reference Design was to minimise and negate impacts to private property as far as practicable and to ensure that any potential impacts were thoroughly considered. Where impacts to private property were identified, they were reviewed and evaluated to understand the potential benefits and impacts of acquiring the land in consideration of the viable alternatives. Property impacts may be required however to:

- Mitigate construction impacts to private property and the wider community during construction
- Provide better access, amenity, and connection of GCLR Stage 2 to the surrounding passenger catchment
- Not preclude the future provision of State planning projects including the IRTC and future Queensland Rail (QR) quad track works

Details of recommended land requirement, including private and state land, is indicated on the Property Impact Plans included within the Reference Design drawing package. The preferred alignment will directly impact on 10 residential dwellings (nine privately-owned and one owned by the Queensland Government) and a portion of one privately owned, vacant future subdivision lot.

Stations

Detailed assessments of the design approach and station designs for GCLR Stage 2 has been undertaken as part of the Reference Design phase. An overview of the station function and general design is provided below.

The approach to station design for GCLR Stage 2 has been heavily influenced by the design of the Stage 1 stations (now complete and operational) with respect to materials used, finishes and shelter structures, to maintain a consistent "system" approach to the station design. The exception is Helensvale where a hybrid design approach is proposed in recognition of the intermodal nature of the station and its interface with the existing heavy rail station.

Three stations are proposed as part of the GCLR Stage 2, as illustrated in Figure 1.1 (Attachment 1), with the function of each station being:

- Parkwood East – local catchment station (refer to Figure 2.2)
- Parkwood – district station and major park 'n' ride (refer to Figure 2.3)
- Helensvale – regional inter-modal station (refer to Figure 2.4)

Parkwood and Parkwood East are dedicated light rail stops, with Helensvale station providing the interface between heavy and light rail.

Figure 2.2 Parkwood East Station conceptual perspective view from the east

Figure 2.3 Parkwood Station conceptual perspective view from the north (Napper Road)

Figure 2.4 Helensvale Light Rail/Heavy Rail Station conceptual perspective, as viewed from the south-east

Structures

GCLR Stage 2 will include the construction of light rail on two longer structures:

- Biggera Creek bridge crossing approximately 160 m length
- Coombabah Creek bridge crossing approximately 100 m length

These two structures will be piled crossings which span over the waterways, with no piers to be located within the bed of either Biggera or Coombabah Creeks. To minimise impacts on the values of Biggera and Coombabah Creeks, both structures will be constructed from land with no construction works required to be undertaken from within the waterbody.

The structures to be constructed as part of the proposed GCLR Stage 2 project are described in the table below.

Table 2.2 Structures and works required as part of GCLR Stage 2

Location	Length	Crossing type	Structure type	Description of works
Biggera Creek	160 m	Waterway	Span bridge	Construction new of bridge
Coombabah Creek	100 m	Waterway	Span bridge	Construction of new bridge adjacent to existing heavy rail bridge
Culvert	Approximately 30 m	Fauna and drainage – below formation	Reinforced concrete box culvert, with a 1.2 m high by 1.2 m wide cell exclusively for fauna movement	Construction of fauna movement culvert under light rail alignment in vicinity of Napper Road and drainage requirements

General arrangement cross-sections of the two creek crossings are shown in Figures 2.5 and 2.6 below.

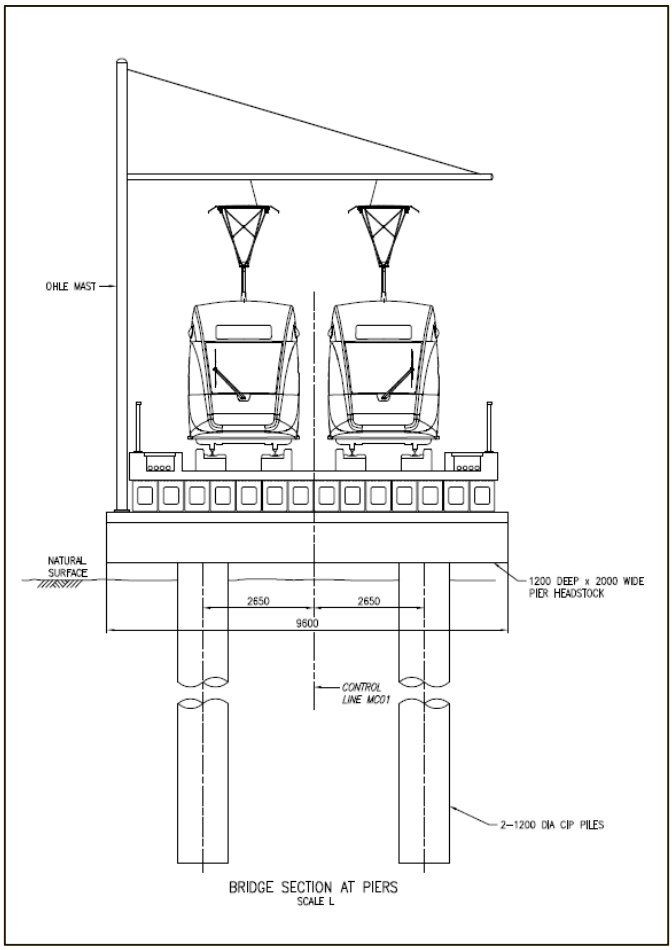


Figure 2.5 General cross-section view of the Biggera Creek Bridge Crossing

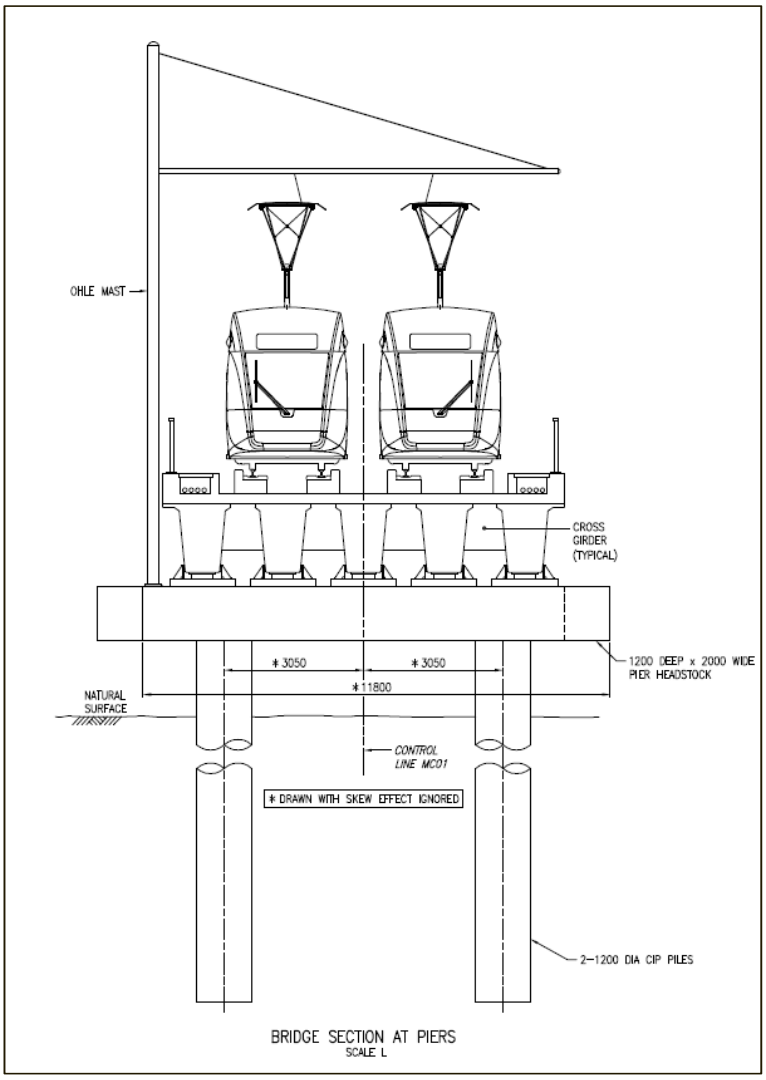


Figure 2.6 General cross-section view of the Coombabah Creek Bridge Crossing

Park 'n' ride facilities

Two park 'n' ride facilities are proposed (refer to Figure 1.1, Attachment 1):

- 1000 space park 'n' ride at Parkwood: Park 'n' ride car parking for 1000 cars is to be developed diagonally across from the Parkwood station on the western side of Smith Street, with access through Napper Road; and
- 400 space park 'n' ride at Helensvale: New park 'n' ride provisions are proposed for this location, raising the existing Helensvale Station capacity provision from 800 to 1200 with 400 new spaces added to the east.

Road design

Olsen Avenue and Parklands Drive Intersection

The preferred design of Olsen Avenue and Parklands Drive intersection includes an at-grade light rail crossing. Existing road lanes, medians and kerbs would require modification to allow the light rail at-grade crossing with appropriate traffic signal control. The design includes a staged pedestrian crossing of Olsen Avenue northern and southern approaches requiring reconfiguration of the existing road cross section.

Smith Street and Napper Road Intersection

The preferred design of Napper Road and Smith Street intersection includes an at-grade light rail crossing. Existing road lanes, medians and kerbs require modification to allow provision of the light rail at-grade crossing. The project has also identified that future planning provisions at Napper Road and Smith Street would be considered as part of the GCLR Stage 2 design. As such, the GCLR Stage 2 project ensures that the reconstruction of the Napper Road and Smith Street intersection and the light rail at grade crossing allowed provisions for the future interim IRTC connection cross section.

2.2 Alternatives to taking the proposed action

This should be a detailed description outlining any feasible alternatives to taking the proposed action (including not taking the action) that were considered but are not proposed (note, this is distinct from any proposed alternatives relating to location, time frames, or activities – see section 2.3).

The 2010 GCLR business case identified two corridor options to connect the light and heavy rail systems:

- H1: Alignment north along Olsen Avenue via Harbour Town Shopping Centre and west on the Gold Coast Highway to Helensvale Station
- H2: Alignment west along Smith Street to the heavy rail corridor, continuing north parallel to the Gold Coast rail line to Helensvale Station

The 2012 CGC Transport Strategy and 2013 Connecting Heavy Rail & Light Rail Study identified an alternative corridor option to connect the light and heavy rail systems:

- P1: Alignment west along Smith Street to a new heavy rail station at Parkwood.

The business case for GCLR Stage 2 has been undertaken in accordance with the Queensland Government Value-for-Money Framework. Through this process, the Strategic Assessment of Service Requirement (SASR) and the Preliminary Evaluation of options determined H2 as being the preferred alignment. H2 most effectively integrates the public transport systems, connects activity centres, minimises environmental impacts and provides the greatest potential for value uplift.

2.3 Alternative locations, time frames or activities that form part of the referred action

If you have identified that the proposed action includes alternative time frames, locations or activities (in section 1.10) you must complete this section. Describe any alternatives related to the physical location of the action, time frames within which the action is to be taken and alternative methods or activities for undertaking the action. For each alternative location, time frame or activity identified, you must also complete (where relevant) the details in sections 1.2-1.9, 2.4-2.7, 3.3 and 4. Please note, if the action that you propose to take is determined to be a controlled action, any alternative locations, time frames or activities that are identified here may be subject to environmental assessment and a decision on whether to approve the alternative.

Not applicable

2.4 Context, planning framework and state/local government requirements

Explain the context in which the action is proposed, including any relevant planning framework at the state and/or local government level (e.g. within scope of a management plan, planning initiative or policy framework). Describe any Commonwealth or state legislation or policies under which approvals are required or will be considered against.

In gaining approvals to undertake works for GCLR Stage 2, TMR is required to give due consideration to the likely environmental impacts of the project under a number of Commonwealth, state and local government laws, guidelines and policies.

The primary legislative act that determines TMR's roles and responsibilities with respect to environmental management in Queensland is the Environmental Protection Act 1994 (EP Act). Under the EP Act, section 319 imposes a general 'duty of care' (or 'general environmental duty'), which specifies that a person must not undertake any activity that may harm the environment without

taking reasonable and practical measures to prevent or minimise harm. The tables below outline the legislation, standards, guidelines and policies of potential relevance to the project.
A complete approvals schedule is provided in Appendix A of the GCLR Stage 2 Environmental Assessment Report (EAR) (refer to Attachment 4, specifically Section 2 and Appendix A of the EAR).

Table 2.3 Legislation of potential relevance to the GCLR Stage 2 project

Issue	Legislation
Air quality	*Environmental Protection Act 1994 (Qld)* *Environmental Protection (Air) Policy 2008 (Qld)*
Cultural heritage and Native Title	*Aboriginal and Torres Strait Islander Heritage Protection Act 1984 (Cth)* *Australian Heritage Council Act 2003 (Cth)* *Native Title Act 1993 (Cth)* *Native Title (Queensland) Act 1993 (Qld)* *Aboriginal Cultural Heritage Act 2003 (Qld)* *Queensland Heritage Act 1992 (Qld)*
Flora and fauna	*Environment Protection and Biodiversity Conservation Act 1999 (Cth)* *Nature Conservation Act 1992 (Qld)* *Fisheries Act 1994 (Qld)* *Land Protection (Pest and Stock Route Management) Act 2002 (Qld)* *Vegetation Management Act 1999 (Qld)* *Coastal Protection and Management Act 1995 (Qld)* *Plant Protection Act 1989 (Qld)* *Plant Protection Regulation 2002 (Qld)* *City of Gold Coast Local Law No. 6 – Vegetation Management* *Electrical Safety Act 2002 (Qld) (in relation to vegetation management issues)*
Noise and vibration	*Environmental Protection Act 1994 (Qld)* *Environmental Protection (Noise) Policy 2008 (Qld)* *Explosives Act 1999 (Qld)*
Planning and social environment	*Sustainable Planning Act 2009 (Qld)* *Sustainable Planning Regulation 2009 (Qld)* *Transport Infrastructure Act 1994 (Qld)* *Transport Planning and Coordination Act 1994 (Qld)* *State Development and Public Works Organisation Act 1971 (Qld)* *Acquisition of Land Act 1967 (Qld)* *Land Act 1994 (Qld)* *Local Government Act 2009 (Qld)* *Building Act 1975 (Qld)* *Building Regulation 2006 (Qld)* *Plumbing and Drainage Act 2002 (Qld)* *Standard Plumbing and Drainage Regulation 2003 (Qld)* *Gold Coast Planning Scheme (Our Living City) 2003*
Soil	*Environmental Protection Act 1994 (Qld)* *Soil Conservation Act 1986 (Qld)*
Waste management	*Environmental Protection Act 1994 (Qld)* *Environmental Protection (Waste Management) Policy 2000 (Qld)*
Water quality	*Water Act 2000 (Qld)* *Environmental Protection Act 1994 (Qld)* *Environmental Protection (Water) Policy 2009 (Qld)* *City of Gold Coast Local Law No. 17 – Maintenance of works in waterway areas 2013*

Table 2.4 Standards and guidelines of potential relevance to the GCLR Stage 2 project

Issue	Standards and guidelines
Air quality	National Environment Protection (Ambient Air Quality) Measure National Environment Protection (Air Toxics) Measure AS 3580.10.1-1991 Methods for Sampling and Analysis of Ambient Air, Method 10.1 Determination of Particulate Matter – Deposited Matter – Gravimetric Method National Environmental Protection (Air Toxics) Measure 2004 (NEPM (Air Toxics)) (DoE, Commonwealth Government, 2004)
Cultural heritage and Native Title	Aboriginal Cultural Heritage Act 2003 Duty of Care Guidelines (Department of Aboriginal and Torres Strait Islander and Multicultural Affairs (DATSIMA), Queensland Government, 2004)
Flora and fauna	DAFF 2013, WWBW01-P3: Culvert crossings (April 2013) DAFF 2013, WWBWO2: Temporary waterway barrier works (April 2013) DEHP (2014) Queensland Environmental Offsets Policy (July 2014, version 1.0) DERM (2009) South East Queensland Koala Conservation State Planning Regulatory Provision (SPRP) DERM (2009) State Planning Policy 2/10: Koala Conservation in South East Queensland (SPP) DEHP State Government Supported Community infrastructure Koala Conservation Policy (July 2014) DERM (Nov 2009) Regional Vegetation Management Code for South East Queensland Bioregion Version 2 *Environment Protection Biodiversity Conservation Act* (EPBC Act) environmental offsets policy (Department of the Environment (DoE), Commonwealth Government, 2012) Fauna Sensitive Road Design volume 1 and 2 (TMR, Queensland Government, 2000 and 2010) Fish Habitat Management Operational Policy (FHMOP 005.2) Marine Fish Habitat Offset Policy (Department of Agriculture, Fisheries and Forestry (DAFF), Queensland Government, 2012) Koala Sensitive Road Design Guideline (DEHP, Queensland Government, 2012) Offsets for Net Gain of Koala Habitat in South East Queensland Policy (DEHP, Queensland Government, 2010) Policy for Vegetation Management Offsets (DEHP, Queensland Government, 2008) Queensland Biodiversity Offset Policy (DEHP, Queensland Government, January 2014) QPIF (2009) Waterway Barrier Works Development Approvals, Fish Habitat Management Operational Policy South East Queensland Koala Conservation State Planning Regulatory Provisions (Koala SPRP) (Department of Environment and Resource Management (DERM – former), now Department of Environment and Heritage Protection (DEHP), Queensland Government, 2010) State Planning Policy (DSDIP, Queensland Government, 2013) Transport Noise Management Code of Practice Volume 1 – Road Traffic Noise (TMR, November 2013) TMR (2000) Fauna Sensitive Road Design to consider relevant requirements of the design manual in the context of rail infrastructure

Issue	Standards and guidelines
Noise and vibration	AS 1055.1/2: Acoustics - Description and management of environmental noise AS/NZS 2107:2000: Acoustics – Recommended design sound levels and reverberation times for building interiors AS 2436: Guide to noise control on construction, maintenance and demolition sites AS 2670.2-1990 Evaluation of human exposure to whole-body vibration – Continuous and shock-induced vibration in buildings (1 to 80 Hz) AS 2670.4-2001: Evaluation of human exposure to whole-body vibration – Guidelines for the evaluation of the effects of vibration and rotational motion on passenger and crew comfort in fixed-guideway transport systems AS 2702: Acoustics - methods for the measurement of road traffic noise AS 3671: Acoustics - Road traffic noise intrusion - Building siting and construction Assessing vibration: a technical guideline 2006 (Department of Environment and Climate Change (DECC), New South Wales Government) BS6472-1992: Evaluation of human exposure to vibration in buildings (1 Hz to 80 Hz) BS7385-1993: Evaluation and measurement for vibrations in buildings – part 2 guide to damage levels from ground-borne vibration BS7385-2:1993 Evaluation and measurement of vibration in buildings. Guide to damage levels from groundborne vibrations Code of Practice - Railway Noise Management (Environmental Management Standard, EMS/STD/46/004) EPA (2000) Noise Measurement Manual DEHP (2013) State Planning Policy - state interest guideline: Emissions and hazardous activities (July 2014) German Standard DIN4150, Part-1986: Structural vibration in buildings: effects on structures
Planning and social environment	AS 1428.1:2009 Design for access and mobility – General requirements for access – New building work AS 1428.2-1992 Design for access and mobility – Enhanced and additional requirements – Buildings and facilities Connecting SEQ 2031: An Integrated Regional Transport Plan for South East Queensland (Connecting SEQ) (TMR, Queensland Government, 2011) Crime Prevention Through Environmental Design (CPTED) Guidelines for Queensland (Queensland Government 2007) Gold Coast City Transport Strategy 2031 (CGC 2012) Road Drainage Design Manual (RDDM): A Guide to the Planning, Design, Operation and Maintenance of Road Drainage Infrastructure, 2nd edition (TMR, Queensland Government 2010) Road Landscape Manual: A Guide to the Planning, Design, Operation and Maintenance of Road Landscape Infrastructure, 2nd edition (TMR, Queensland Government, 2013) Queensland Urban Drainage Manual (QUDM) (DNRW, Queensland Government, 2007) South East Queensland Principal Cycle Network Plan (TMR, Queensland Government, November 2007) South East Queensland Regional Plan 2009 – 2013 (SEQRP) (DIP, Queensland Government, 2009)

Issue	Standards and guidelines
Soil	Best Practice Erosion and Sediment Control (International Erosion Control Association, November 2008) Environmental Management Register (EMR) and Contaminated Land Register (CLR) (DEHP, Queensland Government, n.d.) Guideline for Contaminated Land Professionals (DEHP, Queensland Government, 2012) Guidelines for the Sampling and Analysis of Lowland Acid Sulfate Soils (ASS) in Queensland 1998 (Ahern, CR, Ahern, MR & Powell, B., DNR, Queensland Government, October 1998) Institution of Engineers Australia, QLD Division (1996) Soil erosion and sediment control – engineering guidelines for Queensland construction sites National Environmental Protection (Assessment of Site Contamination) Measure 1999 (2013 amendment) (NEPM Site Contamination) (DoE, Commonwealth Government, 2013) QASSIT (1998) Guidelines for sampling and analysis of lowland Acid Sulphate Soils in Queensland, Queensland Acid Sulphate Soils Investigation Team Queensland Acid Sulfate Soils Technical Manual: Soil Management Guidelines, version 3.8 (Dear, SE, Moore, NG, Dobos, SK, Watling, KM & Ahern, CR., (DNRM, Queensland Government, 2002) DEHP (2014) Contaminated land assessment guideline QLD Department of Local Government and Planning/Department of Natural Resources and Mines (2002) State Planning Policy 2/02 - Planning and Managing Development involving Acid Sulphate Soils
Waste management	AS 121 6: Class labels for dangerous goods AS 1678: Emergency procedure guide - transport AS 1940: The storage and handling of flammable and combustible liquids AS 2187: Explosives- Storage, transport and use AS 2809: Road tank vehicles for dangerous goods AS 2931 : Selection and use of emergency procedure guides for the transport of dangerous goods AS 3780: The storage and handling of corrosive substances DERM (2010) State Planning Policy 5/10 Air, Noise and Hazardous Materials
Water quality	ANZECC (2000) Australian and New Zealand Guidelines for Fresh and Marine Water Quality Australian Rainfall and Runoff (Institution of Engineers, Australia, 1987) Broadwater environmental values and water quality objectives: basin no. 146 (part), including Biggera and Loders Creeks, the Broadwater and all creeks of the Broadwater catchment and Runaway Bay (DEHP, Queensland Government, 2010) Coomera River environmental values and water quality objectives: basin no. 146 (part), including all tributaries of the Coomera River (DEHP, Queensland Government, 2010) DERM (2010) State Planning Policy 4/10 Healthy Waterways Environmental Protection (Water) Policy 2009 EPA (1999) Water Quality Sampling Manual SEQ Healthy Waterways Partnership (2006) Water Sensitive Urban Design - Technical Design Guidelines for South East Queensland Queensland Water Quality Guidelines 2009 (DEHP, Queensland Government, 2009) Urban Stormwater – Queensland Best Practice Environmental Management Guidelines 2009 (EPA, January 2009)
Environmental Management	AS/NZS ISO 14000 Basic set: 2007: Environmental Management Basic Set Environmental Processes Manual (TMR, Queensland Government, August 2013)

2.5 Environmental impact assessments under Commonwealth, state or territory legislation

If you have identified that the proposed action will be or has been subject to a state or territory environmental impact statement (in section 1.11) you must complete this section. Describe any environmental assessment of the relevant impacts of the project that has been, is being, or will be carried out under state or territory legislation. Specify the type and nature of the assessment, the relevant legislation and the current status of any assessments or approvals. Where possible, provide contact details for the state/territory assessment contact officer.

Describe or summarise any public consultation undertaken, or to be undertaken, during the assessment. Attach copies of relevant assessment documentation and outcomes of public consultations (if available).

The proposed action is not a Coordinated Project under the *State Development and Public Works Organisation Act 1971* (SDPWOA) and does not trigger requirements for the preparation of an Environmental Impact Statement (EIS) under the Queensland legislation. An Environmental Management Plan (EMP) will be developed by the construction contractor following project award.

The internal environmental assessment has been undertaken through the development of an EAR (refer to Attachment 4) pursuant to the TMR *Environmental Processes Manual*.

2.6 Public consultation (including with Indigenous stakeholders)

Your referral must include a description of any public consultation that has been, or is being, undertaken. Where Indigenous stakeholders are likely to be affected by your proposed action, your referral should describe any consultations undertaken with Indigenous stakeholders. Identify the relevant stakeholders and the status of consultations at the time of the referral. Where appropriate include copies of documents recording the outcomes of any consultations.

Potentially impacted property owners have been involved in ongoing consultative processes as have local and state government departments. Indigenous stakeholders have also been involved though consultation and engagement with the Gold Coast Native Title Group (Jabree Limited). Initial project description and an initial site visit has been undertaken with further surveys and management plans to be undertaken and developed as part of the pre-construction planning.

2.7 A staged development or component of a larger project

If you have identified that the proposed action is a component of a larger action (in section 1.12) you must complete this section. Provide information about the larger action and details of any interdependency between the stages/components and the larger action. You may also provide justification as to why you believe it is reasonable for the referred action to be considered separately from the larger proposal (eg. the referred action is 'stand-alone' and viable in its own right, there are separate responsibilities for component actions or approvals have been split in a similar way at the state or local government levels).

Not applicable

3 Description of environment & likely impacts

3.1 Matters of national environmental significance

Describe the affected area and the likely impacts of the proposal, emphasising the relevant matters protected by the EPBC Act. Refer to relevant maps as appropriate. The interactive map tool can help determine whether matters of national environmental significance or other matters protected by the EPBC Act are likely to occur in your area of interest.

Your assessment of likely impacts should refer to the following resources (available from the Department's web site):

- specific values of individual World Heritage properties and National Heritage places and the ecological character of Ramsar wetlands;
- profiles of relevant species/communities (where available), that will assist in the identification of whether there is likely to be a significant impact on them if the proposal proceeds;
- *Significant Impact Guidelines 1.1 – Matters of National Environmental Significance*; and
- associated sectoral and species policy statements available on the web site, as relevant.

Your assessment of likely impacts should consider whether a bioregional plan is relevant to your proposal. The Minister has prepared four marine bioregional plans (MBP) in accordance with section 176. It is likely that the MBP's will be more commonly relevant where listed threatened species, listed migratory species or a Commonwealth marine area is considered.

Note that even if your proposal will not be taken in a World Heritage area, Ramsar wetland, Commonwealth marine area, the Great Barrier Reef Marine Park or on Commonwealth land, it could still impact upon these areas (for example, through downstream impacts). Consideration of likely impacts should include both direct and indirect impacts.

In order to assess the likelihood of occurrence of matters of national environmental significance (MNES), the results of the EPBC Act Protected Matters Search Tool (PMST) Report has been supplemented with field investigations and review of database searches, mapping (eg vegetation and habitat mapping) and available literature (eg fauna monitoring data from the Smith Street Upgrade Project, Parkwood).

Potential impacts on MNES associated with the construction and operation of the project were investigated using both desktop and field methodologies. A detailed description of the assessment methodologies, results and MNES impact assessment are provided in the *Ecology Technical Report* (refer to Attachment 4, specifically Appendix B of the EAR). The following sections of this referral document provide a summary of the potential impacts on MNES.

An initial PMST Report was accessed on the 19 February 2014, including the project footprint and a 10 km buffer, to inform field surveys (refer to Attachment 4). A follow-up PMST Report (also including a 10 km buffer) was accessed on the 19 August 2015 to account for revisions of the legislative status of MNES, or the revision of the extents of MNES within the region (refer to Attachment 5). The likelihood of occurrence assessments were also revisited in August 2015, based on the updated PMST Report and the results of field investigations. For the purposes of this referral, the most current PMST Report and Likelihood of occurrence assessments have been utilised (refer to Attachment 5).

3.1 (a) World Heritage Properties

Description

The PMST Report created on 19 August 2015 did not identify any World Heritage Properties within 10 km of the proposed GCLR Stage 2 alignment (DoE 2015a).

Nature and extent of likely impact

Address any impacts on the World Heritage values of any World Heritage property.

It is unlikely the proposed project will have an impact on National Heritage Places.

3.1 (b) National Heritage Places

Description

The PMST Report created on 19 August 2015 did not identify any National Heritage Places within 10 km of the proposed GCLR Stage 2 alignment (DoE 2015a).

Nature and extent of likely impact

Address any impacts on the National Heritage values of any National Heritage place.

It is unlikely the proposed project will have an impact on National Heritage Places.

3.1 (c) Wetlands of International Importance (declared Ramsar wetlands)

Description

The proposed project is situated adjacent to/outside of the south-western extent of the Moreton Bay Ramsar Wetland (refer to Figure 3.1, Attachment 6). The Ramsar Wetland mapping adjacent to the project footprint is associated with Coombabah Creek and tributaries, which flow into Lake Coombabah located approximately 1.5 km north-east of the proposed Helensvale light rail station.

Though the proposed project is not located within the Moreton Bay Ramsar Wetland boundary, potential indirect impacts on the Ramsar wetland are considered and assessed in this section.

The Moreton Bay Ramsar Wetland comprises approximately 113,314 hectares (ha) containing a range of important values for which it is listed as a wetland of international importance, including:

- It represents one of the largest estuarine bays in Australia which is enclosed by a barrier island of vegetated sand dunes
- It provides natural protection from oceanic swells which in turn provides habitat for wetland development
- Supports a significant number of vulnerable green and hawksbill turtles, endangered loggerhead turtles and is ranked among the top ten dugong habitats in Queensland
- Supports a significant diversity of species assemblages (plant and animal) including marine invertebrates, shorebirds (including significant population of migratory birds such as Eastern curlews and the Grey-tailed tattler), algae, mangroves, and seagrass (DoE 2015b).

The aquatic values within the project footprint, situated upstream of the Ramsar Wetland boundary, are described in the *Ecology Technical Report* (Attachment 4, specifically Appendix B of the EAR), and a summary of the environment and potential impacts is provided below.

The photographs in Figure 3.2 illustrate the environment situated at the proposed crossing location for GCLR Stage 2.

Figure 3.2 Vegetation at Coombabah Creek proposed crossing and the existing heavy rail piled crossings immediately upstream of the proposed crossing location

The proposed crossing location at Coombabah Creek is mapped as 'Least concern' Regional Ecosystem (RE) 12.1.3, that is 'Mangrove shrubland to low closed forest on marine clay plains and estuaries'. Field investigations confirmed the Queensland Government's RE mapping within the area, with the riparian zone defined by closed mangrove forest dominated by River mangrove (*Aegiceras corniculatum*) with Grey mangrove (*Avicennia marina* var. *australasica*) also present. The canopy stratum had an average height of 3 m and approximate vegetative cover of 70%. *Acrostichum speciosum* (Mangrove fern) occurred within the shrub stratum, with an approximate height of 1 m and vegetative cover of 10%.

There were no areas of saltmarsh vegetation and limited areas of exposed mud present within project footprint at Coombabah Creek. Subsequently there is limited potential for foraging habitat for migratory birds which may utilise this area of Coombabah Creek.

The water quality appeared to be in good condition with a number of fish easily observed within the Creek at the time of the field assessment. There were no oil sheens or floating algae recorded within the water column at the time of assessment. A range of aquatic habitat was also recorded at the proposed crossing location, including deep riffles, pools, overhanging vegetation and stable banks with no evidence of erosion or bank failure.

Previous studies

Previous studies of the aquatic values of Coombabah Creek in areas directly adjacent to the proposed crossing classify the aquatic habitat in this section of the Creek as being in moderate condition overall,

though it is noted that the dissolved oxygen content in the water was low (FRC 2014, completed for the duplication of heavy rail between Coomera and Helensvale, Reference number 2014/7392).

This study also concluded that no aquatic species listed under the EPBC Act (ie threatened species or migratory/marine) were considered highly likely to occur within the area and that may be potentially impacted by duplication of the heavy rail line (FRC 2014). No significant impacts on aquatic MNES were identified for the duplication of the rail line (FRC 2014).

Nature and extent of likely impact

Address any impacts on the ecological character of any Ramsar wetlands.

Potential indirect impacts associated with construction and operation of the project at Coombabah Creek are not expected to have significant impacts on the ecological character of the Moreton Bay Ramsar Wetland located downstream of the project corridor. The Coombabah Creek crossing has been designed to span the watercourse to avoid direct impacts on the instream values and hydrological regime of the creek and downstream environs. Potential impacts are expected to be restricted to areas in the immediate vicinity of the crossing location, which is located within the existing IRTC and directly adjacent to the existing heavy rail crossings of the Creek.

The potential indirect impacts to the Moreton Bay Ramsar Wetland during construction and operation include:

- Increase in turbidity, sedimentation and smothering during construction
- Nutrient enrichment and disturbance of contaminated sediments during construction
- Acid sulfate run-off from disturbed acid sulfate soils during construction
- Spills of hydrocarbons and other contaminants
- Shading
- Increased noise levels
- Spread of weeds and pests into directly adjacent areas

The majority of the potential impacts listed above will be predominantly associated with the construction phase of the project, and will therefore be temporary. Furthermore, the potential impacts are expected to be restricted to terrestrial areas in the immediate vicinity of the crossing point and are therefore unlikely to have a significant impact on the ecological character of the downstream Moreton Bay Ramsar Wetland. Implementation of mitigation measures during the construction and operation phases will further minimise the extent and nature of the potential impacts listed above (refer to Section 4).

The *Significant Impact Criteria* for Ramsar Wetlands are addressed in the table below (DoE 2013).

Table 3.1 Significant impacts assessment for wetlands of international importance

Significant impact criterion	Assessment of potential impacts on Moreton Bay Ramsar Wetland
Areas of wetland being destroyed or substantially modified	**Unlikely** The proposed crossing of Coombabah Creek is situated upstream of the mapped south-western boundary of the Moreton Bay Ramsar Wetland. The project will therefore not result in the direct destruction of a Ramsar Wetland The proposed bridge crossing will span the creek and will not require any temporary works or permanent structures within the bed/water of Coombabah Creek. No substantial changes in flows, instream habitat or morphology are expected as a result of the project The risks associated with erosion/sedimentation and the disturbance of acid sulfate soils impacting on the Ramsar Wetland site are considered low where appropriate mitigation measures are implemented as per the construction EMP
A substantial and measurable change in the hydrological regime of the wetland, for example, a substantial change to the volume, timing, duration and frequency of ground and surface water flows to and within the wetland	**Unlikely** The proposed crossing will be a piled bridge and no piles or permanent structures will be located within the bed of Coombabah Creek. The crossing will be constructed from land, as such, there will be no requirement to divert or obstruct flows within Coombabah Creek The crossing is situated directly adjacent to two existing piled heavy rail bridges which do not appear to be impacting on the flow of water into the Ramsar Wetland downstream (FRC 2014). Therefore, the proposed crossing is unlikely to have an adverse impact on the hydrological regime of the Moreton Bay Ramsar Wetland
The habitat or lifecycle of native species, including invertebrate fauna and fish species, dependent upon the wetland being seriously affected	**Unlikely** Construction of the crossing at Coombabah Creek may result in short-term changes in turbidity levels, nutrient enrichment and inflows to Coombabah Creek. This may impact on invertebrate fauna and fish species in the immediate vicinity of the crossing location, and it is unlikely that impacts would affect the ecological character of Moreton Bay Ramsar Wetland. Where appropriate mitigation measures are implemented, potential impacts are expected to be minimal and limited to the construction phase of the project. Impacts on the habitat or lifecycle of native species during operation of the project are unlikely
A substantial and measurable change in the water quality of the wetland – for example, a substantial change in the level of salinity, pollutants, or nutrients in the wetland, or water temperature which may adversely impact on biodiversity, ecological integrity, social amenity or human health, or	**Unlikely** Provided appropriate mitigation measures are implemented during the construction phase, any potential changes to water quality of Coombabah Creek and the downstream Moreton Bay Ramsar Wetland are expected to be minor. Spills of contaminants and/or the introduction of pollutants into Coombabah Creek are considered unlikely where appropriate mitigation measures are implemented
An invasive species that is harmful to the ecological character of the wetland being established (or an existing invasive species being spread) in the wetland	**Unlikely** The proposed crossing location is situated within an area of existing disturbance (adjacent to existing heavy rail crossings and golf course). Though the canopy is predominantly native flora species, the understorey contains a range of invasive flora species including Lantana (*Lantana camara*) which dominates the width of the project corridor in some locations adjacent to Coombabah Creek. Though clearing of vegetation within the corridor may potentially increase edge effects in adjacent areas, it is not expected that this would result in the spread or introduction of weed species into the Ramsar Wetland located downstream No construction works will be undertaken within the watercourse (ie within the water) and it is highly unlikely that the project will result in the establishment or spread of an invasive aquatic flora or fauna species Provided appropriate weed and pest management measures are implemented during the construction and operation phases, the project is unlikely to have an impact on the ecological character of the Moreton Bay Ramsar Wetland

3.1 (d) Listed threatened species and ecological communities

Description

Threatened species

Ecological assessments (desktop and field) have been conducted within and directly adjacent to the project footprint by Aurecon in 2014 and 2015 for the GCLR Stage 2 project. The full ecological reports including the PMST survey methods, results of desktop and field assessments and recommendations for the project are provided in Appendices A and B.

The purpose of these ecological assessments was to identify the key ecological values and constraints within the project footprint, including identifying, mapping and assessing the condition of potential or confirmed habitat for threatened species listed under the EPBC Act.

The following sections summarises the findings of the ecological assessments undertaken within the project footprint as they pertain to MNES. Detailed information is also provided within the attached ecological assessment reports, including information on flora and fauna species protected under the state legislation and the local government planning framework.

An initial PMST Report was accessed on the 19 February 2014, including the project footprint and a 10 km buffer, to inform field surveys (refer to Attachment 4, specifically Appendix B of the EAR). A follow-up PMST Report (also including a 10 km buffer) was accessed on the 19 August 2015 to account for revisions of the legislative status of MNES, or the revision of the extents of MNES within the region (refer to Attachment 5). The likelihood of occurrence assessments were also revisited in August 2015, based on the updated PMST Report and the results of field investigations. For the purposes of this referral, the most current PMST Report and Likelihood of occurrence assessments have been utilised (refer to Attachment 5).

Description of the environment

The PMST Report identified a total of 82 threatened species as potentially occurring within the project footprint (28 plants, 28 birds,1 fish, 11 mammals, 9 reptiles, 1 insect and 4 shark species) (refer Attachment 5).

Of the species identified during the desktop assessment, 13 EPBC Act listed species were considered moderately likely or known to occur within the area based on habitat associations and the RE communities mapped within the project footprint. A complete 'likelihood of occurrence' assessment is provided in Attachment 5. The sections below focus on those ***MNES species confirmed or likely to occur within the project footprint.***

The field assessments undertaken to date identified 2 MNES species as occurring within the project footprint, and potential habitat for an additional 1 MNES, as outlined in the table below and shown in Figure 3.3 (Attachment 7).

Table 3.2 MNES species and/or habitat located within or directly adjacent to the project footprint

Species	EPBC Act Status	Confirmed observations	Potential/confirmed habitat
Koala (*Phascolarctos cinereus*)	Vulnerable	**Two direct observations** from within/directly adjacent to the project footprint, at: ■ Chainage 2850 within the narrow corridor of vegetation between Smith Street Motorway and houses on James Cagney Close ■ Adjacent to the footprint at Chainage 5250, in open woodland approximately 370 m south of Coombabah Creek	Koala Spot Assessment Technique (SAT) along length of the alignment with activity levels ranging from low to high (refer to Figure 3.4, Attachment 8) Lower activity levels were typical in the south-east of the investigation area, whereas medium to high activity levels were commonly recorded in the west and north of the project footprint Potential Koala movement corridors and barriers to movement are shown in Figure 3.5 (Attachment 9)
Grey-headed Flying-fox (*Pteropus poliocephalus*)	Vulnerable	■ Observed overflying the project footprint ■ **No breeding camps identified** within the project footprint	Potential foraging habitat within/adjacent to the project footprint at: ■ Chainage 5400 to 5600 on the southern side of Coombabah Creek ■ Chainage 400 to 1000 adjacent to Olsen Avenue and the Smith Street Motorway
Australasian Bittern (*Botaurus poiciloptilus*)	Endangered	■ **No confirmed observations** within project footprint ■ No records from Queensland Wildlife Online database	Small areas of potential habitat identified between Chainage 6800 and 7200 within and directly adjacent to the project footprint Potential habitat is situated within the IRTC and directly adjacent to the existing heavy rail line

Results of Koala surveys

Two Koalas were observed within the GCLR Stage 2 alignment during field investigations conducted by Aurecon in March 2014 (refer to Figure 3.3 for locations, Attachment 7). Both individuals were observed to be healthy, adult Koalas. One individual was observed on the 4 March 2014 during the day within vegetation directly adjacent to the Smith Street Motorway. The second individual was observed on the 6 March 2014 at night during a spotlighting session near Coombabah Creek.

Spot Assessment Technique (SAT) surveys conducted within the GCLR Stage 2 alignment indicated Koala use along the length of the project alignment, with utilisation rates ranging from low through to high. SPOT assessments conducted within the proposed Parkwood park 'n' ride facility, adjacent to the Smith Street Motorway, indicate a high use of the area by Koalas.

Based on the results of the SAT, the project footprint is considered likely to represent a dispersal corridor for the species through an otherwise fragmented and highly urbanised environment. The potential movement corridors and barriers to movement were assessed during field survey and are shown on Figure 3.5 (Attachment 9). The assessment of potential movements of Koalas throughout the local region indicated that while it is likely that Koalas move throughout the area, there are significant barriers to movement (both permeable and non-permeable) along the length of the project corridor including:

- Major roads such as the Smith Street and the Smith Street Motorway and associated 1.2 m concrete median barriers separating in and outbound lanes
- The existing Gold Coast heavy rail line and associated fencing, some of which is Koala-proof fencing

- Noise walls on the Motorway and the heavy rail line to screen adjacent houses from traffic/rail noise

Results of Koala Habitat Assessment Tool

The *Draft EPBC Act Referral Guidelines for the Koala* (2014) provides a Koala Habitat Assessment Tool to assist proponents in identifying whether a projects impact area contains habitat critical to the survival of the Koala. *This assessment tool has been completed for the whole of the GCLR Stage 2 project footprint, with the results provided in the table below*, with the complete assessment provided in Appendix B of the EAR (refer to Attachment 4).

The results of the Koala Habitat Assessment Tool indicates the *project footprint contains habitat critical to the survival of the Koala, with a total score of 6* (ie scores of 5 or more indicate the presence of habitat critical to survival of the Koala). This habitat assessment score will be utilised in the assessment against the Significant Impact Guidelines in the following sections of this referral.

Table 3.3 Koala Habitat Assessment Tool

Attribute	Score	Coastal	Comments
Koala occurrence	**+2 (high)**	**Evidence of one or more Koalas within the last 2 years**	■ Queensland Wildlife Online database results returned 177 records of Koalas within a 10 km buffer ■ Two direct observations during field surveys ■ Average SAT activity levels across whole of project footprint was 28.15% (medium-normal use)
	+1 (medium)	Evidence of one or more Koalas within 5 km of the edge of the impact area within the last 5 years	-
	0 (low)	None of the above	-
Vegetation composition	**+2 (high)**	**Has forest or woodland with 2 or more known Koala food tree species in the canopy**	■ Field surveys identified habitat trees along the length of the Project footprint with more than 2 species of known Koala food trees
	+1 (medium)	Has forest or woodland with only 1 species of known Koala food tree present in the canopy	-
	0 (low)	None of the above	-
Habitat connectivity	+2 (high)	Area is part of a contiguous landscape ≥ 500 ha	-
	+1 (medium)	Area is part of a contiguous landscape < 500 ha, but ≥ 300 ha	-
	0 (low)	**None of the above**	■ The Project footprint is situated within a highly fragmented landscape where habitat linkages are limited and/or barriers to movement are present

Attribute	Score	Coastal	Comments
Key existing threats	+2 (low)	Little or no evidence of Koala mortality from vehicle strike or dog attack at present in areas that score 1 or 2 for koala occurrence	-
	+1 (medium)	**Evidence of infrequent or irregular Koala mortality from vehicle strike or dog attack at present in areas that score 1 or 2 for Koala occurrence**	▪ Australian Koala Foundation mapping identified a mortality adjacent to the Project footprint on the Smith Street Motorway from 2011 ▪ Dog scats were identified at multiple locations along the alignment, associated with housing developments directly adjacent to the GCLR Stage 2 project footprint
	0 (high)	Evidence of frequent or regular Koala mortality from vehicle strike or dog attack in the study area at present, or Areas which score 0 for Koala occurrence and have a significant dog or vehicle threat present	-
Recovery value	+2 (high)	Habitat is likely to be important for achieving the interim recovery objectives for the relevant context, as outlined in Table 1	-
	+1 (medium)	**Uncertainty exists as to whether the habitat is important for achieving the interim recovery objectives for the relevant context, as outlined in Table 1**	▪ At a broader spatial scale, the habitat forms part of a semi-contiguous range system and, although it is surrounded by barriers, there is the potential that the patch could serve as an important corridor or stepping stone between the larger woodland areas to the north-east and south-west if habitat linkages were established
	0 (low)	Habitat is unlikely to be important for achieving the interim recovery objectives for the relevant context, as outlined in Table 1	-
Total score		**6 – Contains habitat critical to the survival of the Koala**	

Results of the Grey-headed Flying Fox habitat assessment

The Grey-headed flying-fox (*Pteropus poliocephalus*) was observed flying over the project footprint during the ecological field investigations conducted by Aurecon in March 2014. No Grey-headed Flying-fox breeding camps were identified within the project footprint. It is considered likely that this species would utilise vegetation communities within the Project footprint as foraging resources.

Areas of suitable foraging resources within the project footprint were mapped during field surveys conducted by Aurecon in August 2014 (refer to Figure 3.3, Attachment 7). These areas of suitable foraging resources contained species such as *Melaleuca quinquenervia* (Broad-leaved Paperbark) and other flowering species of the Myrtaceae family (eg plants belonging to the following genera: *Eucalyptus*, *Corymbia* and *Angophora*).

Results of the Australasian Bittern habitat assessment

The Australasian Bittern (*Botaurus poiciloptilus*) was not recorded during field surveys, however potentially suitable habitat was identified within the project footprint. These areas of potential habitat were mapped by Aurecon during field surveys in August 2015 (refer to Figure 3.3, Attachment 7).

Areas of potential habitat are located in the northern section of the project footprint, between the proposed Helensvale station and Coombabah Creek, associated with small wetland areas with a dense cover of vegetation including sedges, rushes and reeds. The potential habitat areas are adjacent to the existing heavy rail alignment and are situated within an otherwise developed landscape, surrounded by road, rail and existing development (eg Helensvale Westfield Shopping Centre and the Gold Coast Country Club).

These areas of potential habitat are currently subject to a range of threats to the species, including: adverse impacts on water quality as a result of run-off; presence of known predators such as foxes (*Vulpes vulpes*) and cats (*Felis catus*); and habitat modification as a result of the proliferation of invasive species such as the smothering legume *Ipomoea indica* (Blue Morning Glory) and other weed species. These areas are **not** considered to be high-quality habitat for the Australasian Bittern

Ecological communities

The desktop assessment identified the potential occurrence of three threatened ecological community (TEC) listed under the provisions of the EPBC Act, namely:

- Lowland Rainforest of Subtropical Australia
- Subtropical and Temperate Coastal Saltmarsh
- White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland

Following review of the existing desktop information and vegetation community mapping, it was determined that only the Subtropical and Temperate Coastal Saltmarsh TEC had the potential to occur within or directly adjacent to the Project footprint. An area mapped as RE12.1.2 (Saltpan vegetation including grassland and herbland on marine clay plains, listed in the Conservation Advice as potentially analogous to the TEC [TSSC 2013]) situated adjacent to the project footprint at Coombabah Creek was targeted during field assessments to confirm the presence/absence of the coastal saltmarsh TEC.

Field survey undertaken by Aurecon in 2014 and 2015 confirmed that these areas did not contain species characteristic of the TEC, nor did it contain the common families or dominant genera outlined in the Conservation Advice for the community. The area was consistent with RE 12.1.1, not RE 12.1.2, with the dominant species recorded being Grey mangrove (*Avicennia marina* var. *australasica*), River mangrove (*Aegiceras corniculatum*), Mangrove fern (*Acrostichum speciosum*) and Swamp She-oak (*Casuarina glauca*).

The GCLR Stage 2 project is not likely to have adverse impacts on any threatened ecological communities listed under the provisions of the EPBC Act.

Nature and extent of likely impact

Address any impacts on the members of any listened threatened species (except a conservation dependent species) or any threatened ecological community, or their habitat.

The nature and extent of the likely impacts to listed threatened species and ecological communities was assessed by Aurecon and is provided in the Ecological Technical Report (refer to Attachment 4, specifically Appendix B within the EAR). This section summarises the findings of these assessments and addresses the relevant Significant Impact Guideline criteria (2013).

Koala

Vegetation clearing works associated with the project have the potential to reduce the area of occupancy of resident Koalas due to the removal of habitat. The project footprint is situated in a highly fragmented landscape where areas of remaining vegetation provide dispersal habitat and movement corridors. The clearing of vegetation and the construction of the light rail alignment has the potential to remove/bisect potential movement corridors and to introduce barriers to Koala movement (ie permeable barriers such as the light rail alignment, and non-permeable barriers such as noise walls).

The nature of project works is unlikely to introduce disease that may cause species decline or stress resident Koalas to the extent which would increase vulnerability to diseases which may be previously established in the population. Project vegetation clearing works will be managed through the implementation of a Significant Species Management Plan (SSMP) to ensure any stress and risk to Koalas present within the area is reduced.

Assessment of the project against the criteria outlined in the EPBC Act Referral Guidelines for the vulnerable koala (combined populations of Queensland, New South Wales and the Australian Capital) (DoE 2014) is provided in the table below.

Table 3.4 Significant impact assessment for the Koala based on the EPBC Act Referral Guidelines for the vulnerable koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) (DoE 2014)

Impact criterion	Assessment of potential impacts on the Koala
Could your impact area contain habitat critical to the survival of the Koala?	**Yes** Although potential habitat is highly fragmented and urbanised, the results of Koala Habitat Assessment Tool identify the project footprint as habitat critical to the survival of the Koala with a total score of 6.
Will your action adversely affect habitat critical to the survival of the Koala?	**Yes** Vegetation within the project footprint will be cleared resulting in the clearing of 12.22 ha of remnant vegetation and the loss of 17.95 ha of other non-remnant vegetation (including non-native vegetation and regrowth)
Could your action interfere substantially with the recovery of the Koala?	**Unlikely provided mitigation measures are implemented** Without mitigation measures in place, there is potential for an increase in Koala fatalities due to vehicle strike (ie light rail vehicles) and the potential to create a barrier (albeit a permeable barrier) to movement of the Koala. However, provided mitigation measures are implemented, it is unlikely that the project would result in multiple, ongoing mortalities or would create a barrier that would result in long-term reduction of the genetic fitness or access to habitat critical to the survival of the Koala. Such mitigation measures include: ■ Maintaining key movement corridors by avoiding the creation of additional non-permeable barriers (ie detailed design which is sensitive to existing movement corridors) ■ Utilising Koala-proof fencing and Koala-friendly culvert designs to direct Koala movement away from areas where there is a high risk of vehicle strike

Based on the EPBC Act Referral Guidelines for the vulnerable koala (combined populations of Queensland, New South Wales and the Australian Capital) (DoE 2014), the project is considered to have a significant impact on the Koala on the basis that it will adversely affect habitat critical to the survival of the Koala.

To avoid and mitigate impacts on the Koala and its habitat, the project will develop and implement a SSMP which contains specific mitigation measures to avoid adverse impacts, particularly in relation to the creation of movement barriers and vehicle strike. These mitigation measures are discussed in detail in Section 4 and in the SSMP provided in Attachment 10.

Grey-headed Flying-fox

The project is likely to result in the reduction of potential foraging habitat due to clearing of vegetation within the project footprint. The extent of potential foraging habitat that will be cleared is approximately 2.48 ha. The Grey-headed Flying-fox has the capacity to forage over a large area, and given the presence and large extent of suitable foraging resources in the surrounding area, this is not expected to have a significant impact on the species.

The project will not have direct impacts on a known camp or roost site, with the nearest known camp located approximately 2 km to the east of the project footprint on Loders Creek, Southport.

The SPRAT Profile for the Grey-headed Flying-fox states that there are no separate or distinct populations of this species due to the constant genetic exchange and movement between camps throughout their entire geographic range (DoE 2015c). Therefore, for the purposes of the assessment of potential impacts against the *Significant Impact Guidelines 1.1* (DoE 2013), an important population (or sub-population) is taken to mean Grey-headed Flying-foxes from camps situated on the south-east coast, as records from the Draft National Recovery Plan (NSW DECCW 2010) show almost a continual occupation of these camps throughout the year (ie limited or no seasonal migration away from camps). This definition of an important (sub)population is utilised in the assessment presented in the table below.

Table 0.1 Significant impact assessment for the Grey-headed Flying-fox

Impact criterion	Assessment of potential impacts on the Grey-headed Flying Fox
Lead to a long-term decrease in the size of an important population	**Unlikely** The loss of small areas of potential foraging habitat will be removed from the project footprint, however this is not expected to result in the decrease in population size Large areas of potential foraging habitat persist in surrounding areas, including the Coombabah Lake Conservation Park and Nerang Forest Reserve
Reduce the area of occupancy of an important population	**Unlikely** This species is highly mobile and the clearing of potential foraging resources will not affect the occupancy of an important population as there are large extents of suitable foraging habitat in the surrounding areas
Fragment an existing important population into two or more populations	**Unlikely** The project will not result in the creation of barriers that will fragment populations of this species
Adversely affect habitat critical to the survival of a species	**Unlikely** Grey-headed Flying-foxes require a continuous sequence of productive foraging habitats, migration corridors and stop-over habitats, and suitable roosting habitats The project will not impact on roosting habitat for this species. The loss of potential foraging habitat within the project footprint does not constitute a significant impact on foraging resources, migration corridors or stop-over habitats due to the extent of habitat in surrounding areas and the relatively small area of clearing of potential habitat (ie 2.48 ha, or 5.56% of the project footprint)

Impact criterion	Assessment of potential impacts on the Grey-headed Flying Fox
Disrupt the breeding cycle of an important population	**Unlikely** The nearest known roosting site for the Grey-headed Flying-fox is more than 2 km to the east of the project footprint on Loders Creek, where the most recent survey records from the National Flying-fox Monitoring Viewer indicate between 1-500 Grey-headed Flying-foxes were recorded in 2014 Noise associated with construction/operation of the project will not impact on known roost sites which are more than 2 km away. Suitable foraging resources are available in surrounding areas, and the loss of potential foraging habitat is not expected to impact on the breeding cycle of the species
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	**Unlikely** Impacts on potential foraging habitat will be limited to the project footprint, and the overall loss of potential habitat is considered low given the habitat available in the surrounding area. The project is not expected to result in the decline of the species Overhead powerlines associated with the project will be consistent with those for Stage 1, which has recorded no interface issues with flying-foxes or bat species. They will be below tree canopy level and are not expected to impact on this species
Result in invasive species that are harmful to the species becoming established in the species' habitat	**Unlikely** The project is not expected to introduce invasive species that would result in harm to this species
Introduce disease that may cause the species to decline	**Unlikely** The project is not expected to introduce any diseases that may affect the species
Interfere substantially with the recovery of the species	**Unlikely** The project will not result in impacts that will interfere with the recovery of the species

Australasian Bittern

The total area of potential habitat identified within the project footprint is 0.81 ha (1.81% of the total area of the project footprint). The Australasian Bittern was not recorded from the project footprint during field surveys conducted by Aurecon in 2014 and 2015. Furthermore, the Queensland Wildlife Online Database search did not return records for this species within a 10 km radius of the project footprint. Previous studies conducted by Planit (2014) for the duplication of the Gold Coast heavy rail line from Coomera to Helensvale (EPBC Act Referral Reference number 2014/7392) (at the northern end of the project footprint and in close proximity to the potential habitat in the GCLR Stage 2 footprint) did not record this species in the area. Though this species has not been recorded, it is a difficult species to detect (eg camouflaged plumage and dense vegetation may obstruct visibility in areas of suitable habitat). The precautionary principle has therefore been applied here, with an assessment of the potential impacts on areas of 'potential habitat' despite the lack of records to support the area as being 'utilised habitat'.

The extent of potential habitat to be cleared from within the project footprint (0.81 ha) is relatively low in context of the surrounding areas of potential habitat. Furthermore, the quality of this habitat is currently subject to existing threats associated with surrounding land uses (eg reduction of water quality due to run-off, modification of vegetation composition as a result of invasive weed species) and is therefore not considered to be an area of important habitat.

Assessment of potential impacts against the *Significant Impact Guidelines 1.1* (DoE 2013) for the Australasian Bittern is provided in the table below.

Table 3.6 Significant impact assessment for the Australasian Bittern

Impact criterion	Assessment of potential impacts on the Australasian Bittern
Lead to a long-term decrease in the size of a population	**Unlikely** The area of potential habitat within the project footprint is 0.81 ha and is currently subject to existing known threats to the species. It is not expected that the loss of potential habitat associated with the project would result in a decrease in the population Impacts on the species would be further mitigated through the implementation of a SSMP which included mitigation measures specific to clearing within potential habitat for the Australasian Bittern (eg pre-clearing searches for the species, sequential clearing of vegetation to allow the species to move safely from the area)
Reduce the area of occupancy of the species	**Unlikely** As mentioned above, the potential habitat within the project footprint is limited in area and survey undertaken to date has not identified this species as being present. It is unlikely that the project will reduce the occupancy of this species
Fragment an existing population into two or more populations	**Unlikely** The construction and operation of the project will not result in the establishment of barriers that would fragment populations of this highly mobile species
Adversely affect habitat critical to the survival of a species	**Unlikely** The potential habitat within the project footprint is not expected to represent critical habitat as it is subject to a range of known threats to the species
Disrupt the breeding cycle of a population	**Unlikely** Little is known of the reproductive cycle of this species, however, the species is capable of moving between habitats as suitability changes (as outlined in the species' Listing Advice [TSSC 2011]) Furthermore, a SSMP will be implemented during construction which would detail specific management measures should an animal breeding place be identified within the project footprint. A suitably qualified and licensed fauna spotter catcher would be required to manage the breeding place in accordance with the Queensland legislative requirements
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	**Unlikely** Refer to previous comments regarding extent and quality of habitat within the project footprint
Result in invasive species that are harmful to the species becoming established in the species' habitat	**Unlikely** It is highly likely that species such as foxes and cats are already prevalent within the surrounding area, and the project would therefore not result in their introduction or establishment Pest and weed management measures implemented during construction and operation will mitigate the potential for the project to result in an increase of invasive species
Introduce disease that may cause the species to decline	**Unlikely** There are no recorded diseases that currently threaten this species
Interfere with the recovery of the species	**Unlikely** It is not likely that the project will interfere with the recovery of the species as the project footprint does not provide large areas of suitable habitat, is not likely to result in long-term declines in population and potential risks associated with the project construction and operation will be managed in accordance with an SSMP

3.1 (e) Listed migratory species

Description

A total of 77 migratory species (18 migratory marine birds, 19 migratory marine species, 6 migratory terrestrial species, 34 migratory wetland species) protected under the provisions of the EPBC Act were identified from database searches as potentially occurring in and/or adjacent to the project footprint (refer to Attachment 5).

Aurecon completed an assessment of the likelihood of occurrence of each of these species based on available desktop information and field surveys undertaken in 2014 and 2015 (refer to Attachment 5). This assessment was completed for the project footprint and identified

- 3 listed migratory species known to occur
- 11 listed migratory species with a moderate likelihood of occurrence

Of these species, all 13 are bird species and there is 1 mammal with a moderate likelihood of occurrence (Indo-Pacific Humpback Dolphin [*Sousa chinensis*]).

Nature and extent of likely impact

Address any impacts on the members of any listed migratory species, or their habitat.

The potential impacts on listed migratory species was assessed for those species known to occur, or with a moderate likelihood of occurrence, within the project footprint. An assessment of the significance of the project was undertaken in consideration of the *Significant Impact Guidelines 1.1* (DoE 2013), which determine that an action is likely to have a significant impact on a migratory species if there is a real chance or possibility that it will:

- Substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important habitat for a migratory species
- Result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species, or
- Seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species.

The assessment of the likelihood of occurrence and significant impacts for the 14 listed migratory species is provided in the table below.

The project is not likely to have a significant impact on any of the listed migratory species likely to occur within the project footprint. Any potential impacts will be mitigated through the implementation of mitigation measures as outlined in Section 4 and presented in the SSMP (refer to Attachment 10).

Table 3.7 Likelihood of occurrence and impact assessment for listed Migratory species

Species	EPBC Act Status	Likelihood of occurrence	Significant Impact Assessment
Anthochaera Phrygia (Regent honeyeater)	Endangered Migratory (JAMBA [listed as *Xanthomyza phrygia]*)	**Moderate** Suitable habitat for the species may be present within the project footprint area, in areas of Eucalyptus and Melaleuca woodlands	**Significant impact unlikely** This species was not confirmed during field surveys in 2014 or 2015 within the project footprint. Wildlife Online database did not return any records for this species from within a 10 km buffer of the project footprint The project will result in the loss of 12.22 ha of remnant vegetation, though expansive areas of potentially suitable habitat for this highly mobile species is present in the surrounding areas (eg Nerang Forest Reserve)
Haliaeetus leucogaster (White-bellied sea eagle)	Migratory (CAMBA, JAMBA)	**Moderate** Suitable habitat for the species may be present within the project footprint, in particular in environments surrounding Coombabah Creek	**Significant impact unlikely** Potential habitat for this species is common in the local region in association creeks, rivers and estuaries. The species was not observed during field surveys and no roosting trees were recorded The spanned bridge design at Coombabah Creek will reduce the potential impacts on suitable habitat for this species. Furthermore, the project footprint is situated within an area of existing disturbance at Coombabah Creek (ie existing heavy rail bridge)
Hirundapus caudacutus (White-throated needletail)	Migratory (CAMBA, JAMBA, ROKAMBA)	**High/Known** The species was identified within the investigation area As the species is an aerial feeder and does not breed in Australia it is not likely to land within the investigation area	**Significant impact unlikely** The White-throated needletail is an aerial feeding species and a non-breeding migrant to Australia. Subsequently the nature of the project works is not likely to disrupt the life cycle of the species or substantially modify areas of important habitat for this species
Merops ornatus (Rainbow bee-eater)	Migratory (JAMBA)	**High/Known** The species was identified within the investigation area The species is an aerial feeder. The Rainbow bee-eater constructs nests in soft, loamy soil on flat ground or banks. Suitable breeding habitat is likely to be present within the investigation area. Note that should areas of soft soil become exposed (ie during construction), suitable breeding habitat would be created for the species	**Significant impact unlikely** The Rainbow bee-eater is an aerial feeding species. As such, the nature of the project works is not anticipated to disrupt the feeding behaviour of the species. Potential breeding habitat is likely to occur within the project footprint, however appropriate management measures (refer to Section 4) will avoid any potential impacts on breeding habitat or the lifecycle of this species (eg pre-clearance checks conducted by a suitably qualified person)

Species	EPBC Act Status	Likelihood of occurrence	Significant Impact Assessment
Monarcha melanopsis (Black-faced monarch)	Migratory (Bonn)	**Moderate** Suitable habitat for the species may be present within the investigation area, in particular in environments surrounding Coombabah Creek	**Significant impact unlikely** Though not recorded during field surveys, this species has been recorded in the area (Wildlife Online records). The loss of potential habitat within the project footprint is considered to be minor and is not considered to have a significant impact on the lifecycle of this highly mobile species
Monarcha trivirgatus (Spectacled monarch)	Migratory (Bonn)	**Moderate** Suitable habitat for the species may be present within the investigation area, in particular in environments surrounding Coombabah Creek	**Significant impact unlikely** As above
Myiagra cyanoleuca (Satin flycatcher)	Migratory (Bonn)	**Moderate** Suitable habitat for the species may be present within the investigation area, in particular in environments surrounding Coombabah Creek	**Significant impact unlikely** As above
Rhipidura rufifrons (Rufous fantail)	Migratory (Bonn)	**Moderate** Suitable habitat for the species may be present at the area of Melaleuca woodland/wetland at the southern extent of the investigation area and in environments surrounding Coombabah Creek	**Significant impact unlikely** As above
Ardea alba (Great egret)	Migratory (CAMBA, JAMBA)	**Moderate** Suitable foraging habitat for the species may be present at Coombabah Creek, wetland areas at the intersection of Napper Road and Smith Street and near the proposed Helensvale Station	**Significant impact unlikely** This species is common throughout the surrounding area and is likely to utilise habitat within the project footprint. The loss of suitable habitat within the project footprint is not considered to be significant given the extent of remaining habitat within the surrounding area No roosting sites were recorded within the project footprint
Ardea ibis (Cattle egret)	Migratory (CAMBA, JAMBA)	**High/Known** Recorded foraging within modified wetland areas near proposed Helensvale Station. Suitable foraging habitat for the species may be present at the wetland area at the intersection of Napper Road and Smith Street The banks of Coombabah Creek which occur inside the investigation area do not support sufficient areas of exposed banks to facility foraging activities	**Significant impact unlikely** As above

Species	EPBC Act Status	Likelihood of occurrence	Significant Impact Assessment
Tringa glareola (Wood Sandpiper)	Migratory (Bonn, CAMBA, JAMBA, ROKAMBA)	**Moderate** Suitable habitat for the species may be present at the wetland area at the intersection of Napper Road and Smith Street The banks of Coombabah Creek which occur inside the investigation area do not support sufficient areas of exposed banks to facility foraging activities	**Significant impact unlikely** Expansive and known habitat for this species and other wader birds is known from the lower estuarine zone of the Coombabah Wetlands, further to the east of the project footprint No breeding grounds are known from the project footprint
Tringa stagnatilis (Marsh Sandpiper)	Migratory (Bonn, CAMBA, JAMBA, ROKAMBA)	**Moderate** Suitable habitat for the species may be present at the wetland area at the intersection of Napper Road and Smith Street. The banks of Coombabah Creek which occur inside the investigation area do not support sufficient areas of exposed banks to facility foraging activities	**Significant impact unlikely** As above
Sousa chinensis (Indo-Pacific Humpback Dolphin)	Migratory (Bonn)	**Moderate** Suitable habitat may be present within the area at Coombabah Creek	**Significant impact unlikely** This species was not recorded during field surveys, though has been recorded within the region and may feed in or traverse Coombabah Creek The spanned bridge design at Coombabah Creek will avoid direct impacts on suitable habitat for this species. Potential impacts as a result of the project are expected to be minor and will be managed through the implementation of appropriate erosion and sediment control measures during construction near Coombabah Creek
Apus pacificus (Fork-tailed swift)	Listed Marine and Migratory species (CAMBA, JAMBA, ROKAMBA)	**Moderate** The species may fly over the investigation area however as the Fork-tailed swift is an aerial species, it is not considered likely to land within the area	**Significant impact unlikely** This species was not recorded during field surveys, but has been recorded within 10 km of the project footprint (Queensland Wildlife Online database) Whilst potential aerial foraging habitat is present above the project footprint, breeding grounds are considered to be absent

3.1 (f) Commonwealth marine area

(If the action is in the Commonwealth marine area, complete 3.2(c) instead. This section is for actions taken outside the Commonwealth marine area that may have impacts on that area.)

Description

The PMST Report created on 19 August 2015 did not identify any Commonwealth Marine Areas within 10 km of the proposed GCLR Stage 2 alignment (DoE 2015a).

Nature and extent of likely impact

Address any impacts on any part of the environment in the Commonwealth marine area.

It is unlikely the proposed project will have an impact on Commonwealth Marine Areas.

3.1 (g) Commonwealth land

(If the action is on Commonwealth land, complete 3.2(d) instead. This section is for actions taken outside Commonwealth land that may have impacts on that land.)

Description

If the action will affect Commonwealth land also describe the more general environment. The Policy Statement titled *Significant Impact Guidelines 1.2 - Actions on, or impacting upon, Commonwealth land, and actions by Commonwealth agencies* provides further details on the type of information needed. If applicable, identify any potential impacts from actions taken outside the Australian jurisdiction on the environment in a Commonwealth Heritage Place overseas.

The PMST Report created on 19 August 2015 identified two areas of Commonwealth land within a 10 km buffer of the proposed alignment (DoE 2015a):

- Defence – Southport Training Depot
- Defence – Training Ship Tyalgum

These two areas are situated on the Nerang River, approximately 2.5 km from the proposed GCLR Stage 2 alignment.

Nature and extent of likely impact

Address any impacts on any part of the environment in the Commonwealth land. Your assessment of impacts should refer to the *Significant Impact Guidelines 1.2 - Actions on, or impacting upon, Commonwealth land, and actions by Commonwealth agencies* and specifically address impacts on:

- ecosystems and their constituent parts, including people and communities;
- natural and physical resources;
- the qualities and characteristics of locations, places and areas;
- the heritage values of places; and
- the social, economic and cultural aspects of the above things.

The project **will not be undertaken on, or impact upon, Commonwealth land**. Furthermore, the project will have a net positive impact on the local community through provision of improved transport infrastructure servicing the region, as well as providing better connection and integration of the existing public transport network for the Gold Coast 2018 Commonwealth Games.

3.1 (h) The Great Barrier Reef Marine Park

Description

The PMST Report created on 19 August 2015 did not identify the Great Barrier Reef Marine Park (GBRMP) as occurring within 10 km of the proposed GCLR Stage 2 alignment. The southern boundary of the GBRMP is situated more than 390 km north of the proposed alignment.

Nature and extent of likely impact

Address any impacts on any part of the environment of the Great Barrier Reef Marine Park.

Note: If your action occurs in the Great Barrier Reef Marine Park you may also require permission under the *Great Barrier Reef Marine Park Act 1975* (GBRMP Act). If so, section 37AB of the GBRMP Act provides that your referral under the EPBC Act is deemed to be an application under the GBRMP Act and Regulations for necessary permissions and a single integrated process will generally apply. Further information is available at www.gbrmpa.gov.au

It is highly unlikely that the proposed project will impact on the GBRMP.

3.1 (i) A water resource, in relation to coal seam gas development and large coal mining development

Description

If the action is a coal seam gas development or large coal mining development that has, or is likely to have, a significant impact on water resources, the draft *Policy Statement Significant Impact Guidelines: Coal seam gas and large coal mining developments—Impacts on water resources* provides further details on the type of information needed.

The proposed project has no relation to coal seam gas development or coal mining development.

Nature and extent of likely impact

Address any impacts on water resources. Your assessment of impacts should refer to the draft *Significant Impact Guidelines: Coal seam gas and large coal mining developments—Impacts on water resources*.

The proposed project will result in no impacts associated with coal seam gas development or coal mining development.

3.2 Nuclear actions, actions taken by the Commonwealth (or Commonwealth agency), actions taken in a Commonwealth marine area, actions taken on Commonwealth land, or actions taken in the Great Barrier Reef Marine Park

You must describe the nature and extent of likely impacts (both direct & indirect) on the whole environment if your project:

- is a nuclear action;
- will be taken by the Commonwealth or a Commonwealth agency;
- will be taken in a Commonwealth marine area;
- will be taken on Commonwealth land; or
- will be taken in the Great Barrier Reef marine Park.

Your assessment of impacts should refer to the *Significant Impact Guidelines 1.2 - Actions on, or impacting upon, Commonwealth land, and actions by Commonwealth agencies* and specifically address impacts on:

- ecosystems and their constituent parts, including people and communities;
- natural and physical resources;
- the qualities and characteristics of locations, places and areas;
- the heritage values of places; and
- the social, economic and cultural aspects of the above things.

3.2 (a)	**Is the proposed action a nuclear action?**	✓	No
			Yes (provide details below)

If yes, nature & extent of likely impact on the whole environment

Not applicable

3.2 (b)	**Is the proposed action to be taken by the Commonwealth or a Commonwealth agency?**	✓	No
			Yes (provide details below)

If yes, nature & extent of likely impact on the whole environment

Not applicable

3.2 (c)	**Is the proposed action to be taken in a Commonwealth marine area?**	✓	No
			Yes (provide details below)

If yes, nature & extent of likely impact on the whole environment (in addition to 3.1(f))

Not applicable

3.2 (d)	**Is the proposed action to be taken on Commonwealth land?**	✓	No
			Yes (provide details below)

If yes, nature & extent of likely impact on the whole environment (in addition to 3.1(g))

Not applicable

3.2 (e)	**Is the proposed action to be taken in the Great Barrier Reef Marine Park?**	✓	No
			Yes (provide details below)

If yes, nature & extent of likely impact on the whole environment (in addition to 3.1(h))

Not applicable

3.3 Other important features of the environment

Provide a description of the project area and the affected area, including information about the following features (where relevant to the project area and/or affected area, and to the extent not otherwise addressed above). If at Section 2.3 you identified any alternative locations, time frames or activities for your proposed action, you must complete each of the details below (where relevant) for each alternative identified.

3.3 (a) Flora and fauna

The terrestrial and aquatic ecological investigation reports in Attachment 4 (specifically, within Appendix B of the EAR) provide detailed information on the flora and fauna values present within the project footprint.

3.3 (b) Hydrology, including water flows

The proposed GCLR Stage 2 crosses Coombabah Creek and the upper reaches of Biggera Creek.

As part of the Reference Design development, the risk associated with flooding was evaluated and incorporated into the design, including evaluation of local and regional statutory impact requirements.

Hydrologic and hydraulic modelling was undertaken during the Reference Design phase to:

- Determine the existing flood conditions
- Inform the design of flood immunity requirements
- Determine the proposed flood conditions associated with the design options

- Determine controls of hydraulic impacts

The Reference Design seeks to provide a standard flood immunity for the rail, while ensuring that the community will not be negatively affected by the project through altered flood conditions. The quantitative design criteria used for the Reference Design are based on the criteria adopted and implemented for GCLR Stage 1, which reflect industry standards and has been discussed and agreed to during the Reference Design process by both TMR and CGC.

The investigations confirmed the ability of the proposed GCLR Stage 2 Reference Design to meet the expected performances at a conceptual level. In particular, the proposed GCLR Stage 2 Reference Design achieves a minimum of 50 year Average Recurrence Interval (ARI) flood immunity along the entire route and the infrastructure would not generate any actionable hydraulic impacts to any existing private and commercial properties for flood events up to and including the 1% Annual Exceedance Probability (AEP) flood.

The investigations highlighted that, whilst the Coombabah Creek crossing could be managed with a conventional bridge crossing to span the creek and fauna movement corridors, similar to the existing bridge along the South Coast Rail line, a site specific design including substantial flood mitigation is required for the Biggera Creek crossing. The design is complicated by the effects of encroachment from the light rail embankment into the Biggera Creek floodplain, and the interaction with the Smith Street/Olsen Avenue Interchange Upgrade project, which affects the project's flood reference conditions.

It is predicted that the simple extension of the existing Biggera Creek culverts would reduce the flood immunity of the Smith Street Motorway, however without creating actionable impacts on existing private or commercial properties. Further investigation in the next stage will need to verify there are no impacts with additional modelling and property surveys. Maintaining the existing flood immunity of the Smith Street Motorway would require the construction of part of the light rail on structure. The length of the structure is dependent on the final design of the Smith Street/Olsen Avenue Interchange Upgrade and the extent of mitigation it provides. The GCLR Stage 2 Reference Design is based on achieving no reduction in the Smith Street flood immunity compared to the unmitigated Smith Street/Olsen Avenue Interchange Upgrade conditions.

Whilst the hydrologic and hydraulic investigation methodologies follow industry standards, it is expected that they will require further developments at detailed design to integrate the updated design conditions and the additional information that will be provided at the time. The integration of more comprehensive and up to date base information will allow improved accuracy and design optimisation. However, it is not expected that the increased accuracy will affect the Reference Design's main conclusions regarding the number and scale of cross-drainage structures. Similarly, it is expected that the ability of GCLR Stage 2 to control its hydraulic impacts will be confirmed.

3.3 (c) Soil and Vegetation characteristics

A review of existing geotechnical investigation information and relevant geotechnical design information for projects on or near the GCLR Stage 2 alignment. This review has been the basis for developing the geotechnical model for this alignment. The soil, topography and geotechnical conditions of the project footprint are discussed in detail in Section 5 of the EAR (refer to Attachment 4).

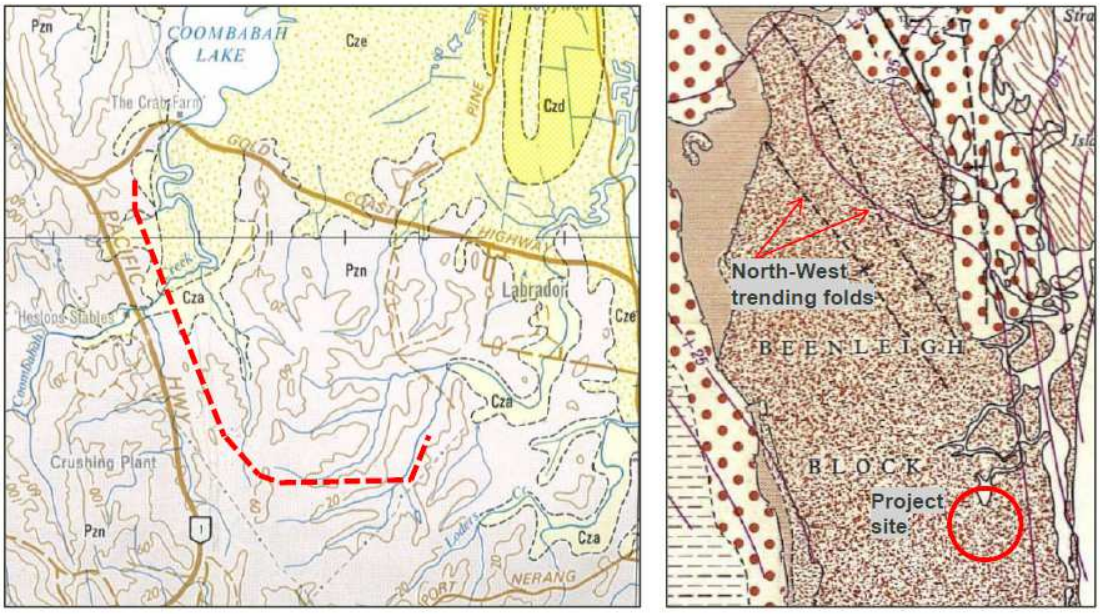
Regional geology

The geological map of the area, published by the Geological Survey of Queensland (1:100,000 series, Beenleigh) and the Queensland interactive resource tenure maps system, indicate that the project area is generally underlain by the Neranleigh-Fernvale Unit (refer to Figure 3.6). This unit is of

Devonian-Carboniferous age (approximately 380 million years old) and comprises greywacke, argillite, quartzite, chert, shale, sandstone and greenstone.

The rocks of the Neranleigh-Fernvale Unit have undergone low grade regional metamorphism. Consequentially, the original bedding and sedimentary structures are indistinct or else completely obscured by a passive foliation which has developed as a result of post-depositional deformation. As a result of the low grade metamorphism, this unit generally contains a deep weathering profile of low strength rock.

Quaternary aged alluvial deposits are present in and around the drainage lines present in the region. Recent Holocene epoch alluvial deposits can be found within the existing channels of the area. Figure 3.6 presents the regional geology.



Legend

Quaternary alluvial deposits (Pleistocene and Holocene epochs)	Cza	*Alluvium: mainly clay, silt, sand and gravel*
	Cze	*Estuarine deposits, mainly mud, silt, sand, clay, gravel with minor peat and coral debris*
Neranleigh-Fernvale Beds	Pzn	*Greywacke, argillite, quartzite, chert, shale, sandstone, greenstone*
GCLR – Stage 2 (H2) Alignment		

Figure 3.6 1:100,000 Beenleigh Geology Plan and 1:250,000 Ipswich to Brisbane solid geology plan

Soils

The Hydrosols and Kurosols mapped within the project area are generally located on coastal plains and have a high moisture and clay content (Alt, Jenkins & Lines-Kelly 2009). Based on this, they are highly unlikely to erode. However, acid scalds may be present in Hydrosols and can be subject to wind erosion if exposed.

Kurosols generally have a marked textural difference between the topsoil (usually a sandy loam) and the subsoil heavy clay). These soils are extremely erodible once vegetation is removed (Alt, Jenkins & Lines-Kelly 2009).

Further classification of soil types and profiles will need to be confirmed through additional investigations and ground truthing during the detailed design phase of the project to identify the risk of erosion resulting from the project when the infrastructure, design/construction requirements are further investigated and understood for specific areas and soil types along the alignment.
Existing soils and vegetation will be disturbed during the construction phase of the project resulting in exposure of unconsolidated soils and the elevated potential for erosion and sedimentation to occur. There is also the potential for erosion to occur during construction due to inappropriate temporary stockpiling of earth material if suitable site and soil type specific control measures are not implemented.

During operation, it is considered that there will be minimal impacts associated with erosion. Deep foundations are likely to be required for the bridge structure at Coombabah Creek. At the cutting at Smith Street Motorway, constructability issues, cost impacts and vibration impacts to surrounding properties were assessed and mitigations have been recommended including:

- At the Coombabah Creek crossing, ground improvement techniques such as preloading, and using high strength geotextile to prevent slope failure during construction are recommended. Once the embankment is built, it would be left in place (preloaded) for a period of three months to limit post-construction settlement
- At the cutting along Smith Street Motorway, a combination of rock bolts/dowels with shotcrete and mesh facing to prevent global and local failure mechanisms is recommended. Aurecon - SMEC also recommend a planned blasting programme, with the following factors to be considered/ implemented in future stages:
    - Community consultation and negotiation of a higher vibration limit for nearby structures
    - Pre and post blasting inspections of all structures that may be affected by vibrations due to blasting (approximately 200 m radius)
    - Traffic management (eg road closures) along Smith Street Motorway during blasting activities
    - Control blasting techniques (eg presplitting)
    - Fly rock control such as stemming, blast mats, retaining the residual soil and weathered rock in place
    - Continuous monitoring of all blasts in sensitive areas

Acid sulfate soils

A review of CGC's and Queensland Government's ASS mapping indicates a number of areas along the project area which may encounter actual ASS (AASS) and/or potential ASS (PASS). The project area intersects areas of "high probability", and "low probability" in close proximity to the Coombabah Creek area north to Helensvale Rail Station and "no known occurrence" for the remainder of the alignment (refer Figure 3.7, Attachment 11).

Two low lying sections on Coombabah Creek are mapped as undisturbed land highly likely to contain ASS. Other areas are mapped as having low or negligible probability of ASS. The underlying geology of the area is floodplain alluvium, tidal sand and mud flats and alluvium covered with saltmarsh and/or mangrove.

It should be noted that in the vicinity of the Smith Street and Olsen Avenue intersection, the topography within this area is approximately 15 m Australian Height Datum (AHD), meaning there is still the potential to encounter ASS.

At this stage of Reference Design, ASS investigations have been undertaken at a desktop level. As part of the detailed design phase of the project a detailed ASS investigation will be undertaken to characterise the underlying soils, develop appropriate mitigation measures (as required) and to prepare an ASS Management Plan for the project.

Contaminated land

Contaminants associated with the former Brisbane to Southport rail line and the current Gold Coast rail line (eg asbestos, herbicides, pesticides, heavy metals) are likely to be present in the vicinity of the proposed Parkwood park 'n' ride. Previous landfilling is also noted to occur to the west of Coombabah Creek within the golf course property. A 'Hazardous Contaminant' was noted from the Department of Environment and Heritage Protection (DEHP) Environmental Management Register (EMR) and Contaminated Land Register (CLR) on Lot 13 on SP139050 on Napper Road, Arundel. The nature of the hazardous contaminant was not able to be accurately identified during the initial investigations undertaken by GHD (2009).

It should be noted that there may be the potential to encounter contaminated land in the vicinity of the proposed Parkwood park 'n' ride facility given the current Gold Coast rail line and the previous Brisbane to Southport rail line both pass through this area along with other previous land disturbances such as gas pipelines etc. The European cultural heritage assessment undertaken for the Gold Coast Rapid Transit (GCRT) Concept Design Impact Management Plan (CDIMP) noted that the Brisbane to Southport rail line was completed in 1889 and closed in 1964. The report identified four locations in close proximity to or within the proposed alignment as having visible remnant material from the old rail line. These included ballast, timber posts, timber piers with bolts attached, an iron railway peg embedded in wood remnants and the possible site of a former railway station. These remnants of the previous rail infrastructure could indicate potential contamination of the soils based on previous infrastructure and rolling stock operating and maintenance practices.

The Non-indigenous/historical cultural heritage assessment also mentioned that landfilling was evident in association with the golf course to the west of Coombabah Creek and an estimated date was not given although it was after 1944 (as evidenced in an historical aerial photograph, dated 1944). Further desktop inspections noted that the commercial/industrial area located off Newheath Drive is relatively new and another commercial/industrial area is located directly south of Smith Street. No properties were identified at either area as being on the EMR and/or CLR with the properties present being a range of construction and engineering practices.

During the detailed design phase of the project, the following will be undertaken to identify the appropriate management of contaminated land:

- Revised EMR/CLR searches for all properties within the project area to be undertaken
- Undertake a Preliminary Site Investigation (PSI) to determine the likelihood of contaminants being present within the project footprint, following with a Detailed Site Investigation (DSI) where the results of the PSI indicate that contamination is present or is likely to be present
- Preparation of a Site Management Plan (contaminants to remain *in situ*) and/or Remediation Action Plan (where contaminants require specific remediation) where contamination is identified within the project footprint

3.3 (d) Outstanding natural features

The area situated between Chainage 5500 and 5900 is situated within the boundary of the Lake Coombabah wetlands (refer to Figure 3.1, Attachment 6), as mapped as within Directory of Important Wetlands (DIWA). Lake Coombabah and the estuarine reaches of creeks within the Lake Coombabah Wetland are protected as Ramsar wetlands, as shown in Figure 3.1 (Attachment 6). Section 3.1 provides further detail on the Moreton Bay Ramsar Wetland.

The values of the Lake Coombabah wetlands has been taken into consideration in the design and location of the bridge crossing at Coombabah Creek. The crossing at Coombabah Creek will avoid direct impacts on the bed and lower banks of the creek, with all temporary construction areas

situated on land to avoid direct impacts on water quality and sedimentation impacts. No permanent structures will be located within the bed of Coombabah Creek and no significant impacts on the creek morphology or in-stream habitat to occur as a result of the project.

The location of the alignment within the IRTC and directly adjacent to the existing Gold Coast heavy rail line/Smith Street Motorway, reduces the overall impacts associated with fragmentation of vegetated corridors within the region. Approximately 32.34% of the project footprint is currently cleared or significantly modified, with a further 40.25% represented by regrowth vegetation (including both native and non-native species).

Specific mitigation measures will be implemented during construction and operation to avoid/minimise potential impacts on the values of the Lake Coombabah Wetland (refer to Section 4).

3.3 (e) Remnant native vegetation

The Queensland Government RE mapping identifies seven vegetation community types as occurring within the project footprint as outlined in the table below. Further detail on the vegetation communities within the project footprint is provided in the *Ecology Technical Report* in Attachment 4 (specifically, refer to Appendix B of the EAR).

Table 0.2 Approximate areas of mapped regional ecosystem within the project footprint

Mapped Regional Ecosystem	RE status	RE description	Approximate area to be cleared
12.1.3	Least concern	Mangrove shrubland to low closed forest on marine clay plains and estuaries	648.22 m^2
12.3.5a	Least concern	Palustrine wetland (e.g. vegetated swamp). *Melaleuca quinquenervia*, *Casuarina glauca* +/- *Eucalyptus tereticornis* open forest. Occurs on lowest river terraces of Quaternary alluvial plains in coastal areas	1,193.34 m^2
12.3.11	Of concern	*Eucalyptus tereticornis* +/- *Eucalyptus siderophloia, Corymbia intermedia* open forest on alluvial plains usually near coast	5,716.30 m^2
12.3.5/12.3.11 (85/15)	Of concern	*Melaleuca quinquenervia* open forest on coastal alluvium / *Eucalyptus tereticornis* +/- *Eucalyptus siderophloia, Corymbia intermedia* open forest on alluvial plains usually near coast	29,467.67 m^2
12.11.5a	Least concern	*Eucalyptus tindaliae*, *E. carnea*, *Corymbia intermedia* woodland +/- *E. crebra, Corymbia citriodora subsp. variegata*, *Eucalyptus major, E. helidonica, Corymbia henryi, Angophora woodsiana, C. trachyphloia* (away from the coast) or *E. siderophloia, E. microcorys, E. racemosa subsp. racemosa, E. propinqua* (closer to the coast). Occurs on Palaeozoic and older moderately to strongly deformed and metamorphosed sediments and interbedded volcanics	25,244.35 m^2

Mapped Regional Ecosystem	RE status	RE description	Approximate area to be cleared
12.11.5a/12.11.5k (90/10)	Least concern	*Eucalyptus tindaliae*, *E. carnea*, *Corymbia intermedia* woodland +/- *E. crebra, Corymbia citriodora subsp. variegata*, *Eucalyptus major, E. helidonica, Corymbia henryi, Angophora woodsiana, C. trachyphloia* (away from the coast) or *E. siderophloia, E. microcorys, E. racemosa subsp. racemosa, E. propinqua* (closer to the coast). Occurs on Palaeozoic and older moderately to strongly deformed and metamorphosed sediments and interbedded volcanics *Corymbia citriodora subsp. variegata, Eucalyptus siderophloia, E. major* open forest on metamorphics +/- interbedded volcanics	28,638.19 m^2
12.11.23	Endangered	*Eucalyptus pilularis* open forest on coastal metamorphics and interbedded volcanics	31,294.13 m^2
Total mapped remnant vegetation			**122,202.20 m^2 (27.41% of the project footprint)**
Total non-remnant vegetation			179,468.53 m^2 (40.25% of the project footprint)
Total cleared or maintained areas			144, 223.44 m^2 (32.34% of the project footprint)

3.3 (f) Gradient (or depth range if action is to be taken in a marine area)

Levels at the proposed bridge and culvert locations associated with the proposed project are summarised in the table below.

Table 0.3 Levels at the proposed bridge and culvert locations

Crossing Location (Chainage km)	Waterway name	Structure type	Northern bank height (m) relative level (RL)	Southern bank height (m) relative level	Northern formation level (m) relative level	Southern formation level (m) relative level (RL)
0.925	Biggera Creek	Span Bridge	RL11.61	RL12.20	RL13.99	RL15.55
5.57	Coombabah Creek	Span Bridge	RL1.01	RL1.70	RL5.58	RL5.27
8.75	Tributary of Coombabah Creek	Culvert	RL1.80	RL2.10	RL3.70	RL3.70

3.3 (g) Current state of the environment

Include information about the extent of erosion, whether the area is infested with weeds or feral animals and whether the area is covered by native vegetation or crops.

The GCLR Stage 2 corridor is situated in a highly fragmented, urbanised environment where evidence of anthropogenic disturbances at varying scales of intensity is evident throughout the majority of the project footprint. Consequently the landscape has become highly attenuated and the area of contiguous vegetation has been reduced. Due to its dedication as a transport corridor, much of the project area supports a linear strip of vegetation surrounded by urban development. Some small nodes of remnant vegetation also remain. Anthropogenic disturbances within the project footprint

include historical clearing works, roads and access tracks, concrete pedestrian/bike tracks, dirt bike tracks, evidence of domestic animals including dogs and cats, weed invasion and the removal of understory vegetation likely to be associated with bushfire management.

The project footprint contains a range of native vegetation communities, cleared areas and areas of regrowth vegetation (including native and non-native vegetation), including:

- **12.22 ha of mapped remnant vegetation**
- **17.95 ha of non-remnant vegetation** (including previously disturbed areas of native and/or non-native species)
- **14.42 ha of cleared areas** (including existing infrastructure and maintained parks, road verges etc)

Eight declared flora species listed under the provisions of the *Land Protection (Pest and Stock Route Management) Act 2002* (LP Act) were recorded within the project footprint. Three of these species are also classified as Weeds of National Significance (WoNS), which were identified as the key management priority weed species for Australia based on their invasiveness, potential/current geographical spread, and potential impacts to industry, the environment or human health. These include:

- *Ambrosia artemisiifolia* (Annual ragweed) – Class 2
- *Asparagus africanus* (Asparagus fern) – Class 3 (**WoNS**)
- *Baccharis halimifolia* (Groundsel bush) – Class 2
- *Bryophyllum delagoense* (Mother of millions) – Class 2
- *Cinnamomum camphora* (Camphor laurel) – Class 3
- *Cryptostegia grandiflora* (Rubber vine) – Class 2 (**WoNS**)
- *Lantana camara* (Lantana) – Class 3 (**WoNS**)
- *Lantana montevidensis* (Creeping lantana) – Class 3
- *Sphagneticola trilobata* (Singapore daisy) – Class 3

Gambusia or Mosquitofish (*Gambusia spp.*), a declared noxious fish species, was recorded at a number of locations within the project footprint (largely associated with existing culverts and areas of poor water quality). This species is aggressive and highly successful, with a varied diet including native frogs eggs/tadpoles, insect larvae, plants, worms, small fishes. Evidence of pest fauna species declared under the LP Act was recorded during field surveys, including signs of:

- Cat (*Felis catus*) – Class 2
- Dog (*Canis familiaris*) – Class 2
- European rabbit (*Oryctolagus cuniculus*) – Class 2

Although the habitat integrity has been compromised in places due to anthropogenic disturbances and weed invasion, the overall habitat value of the project area could be assessed as high due to the context within the region and limited amount of remaining connectivity within the local environment. The project footprint contains the following habitat resources that could support a variety of fauna species including:

- Canopy cover suitable for shelter, foraging and perching
- Fissured tree bark
- Dense groundcover vegetation
- Woody debris (ie felled timber, including hollow-bearing logs and tree bark in groundcover)
- Leaf litter
- Dead stags and hollow bearing trees
- Watercourse habitat (Coombabah and Biggera Creeks)

Further information on the current state of the environment is provided in the *Ecology Technical Report* (refer to Attachment 4, specifically refer to Appendix B within the EAR).

3.3 (h) Commonwealth Heritage Places or other places recognised as having heritage values

Not applicable

3.3 (i) Indigenous heritage values

As advised by the Department of Aboriginal and Torres Strait Islander Partnerships (DATSIP), the relevant cultural heritage bodies for the project area are identified as Jabree Limited and Gold Coast Native Title Group.

A search of the DATSIP Cultural Heritage Database and Register revealed that a number of Aboriginal sites, areas and objects occur within close proximity to the project area. During project risk workshops, consideration was given to the locations of these sites to ensure that these sites were avoided during development of the Reference Design.

During the current design phase of the proposed project, the following measures are being implemented to avoid impacts on indigenous heritage values:

- Consultation with the relevant Aboriginal parties for the project area is to be undertaken by TMR South Coast Cultural Heritage Officer in partnership with the registered cultural heritage body (Gold Coast Native Title Group (Jabree) (eg site walkover, developing agreements between parties)
- Development and implementation of a Cultural Heritage Management Plan in accordance with the requirements of the *Aboriginal Cultural Heritage Act 2003*
- Consultation with CGC heritage planners regarding the actions and responsibilities for cultural heritage management within the project area

3.3 (j) Other important or unique values of the environment

Describe any other key features of the environment affected by, or in proximity to the proposed action (for example, any national parks, conservation reserves, wetlands of national significance etc).

Refer to detailed ecological report in Attachment 4 (specifically, Appendix B of the EAR).

3.3 (k) Tenure of the action area (eg freehold, leasehold)

The project footprint is predominantly freehold land, with a smaller proportion of lands lease, reserve (freeway or parks), and one State Land property (partially intersected).

3.3 (l) Existing land/marine uses of area

A desktop review identified the existing and future land uses located within the project area. The desktop assessment was undertaken using aerial photography and the CGC's Planning and Development Online (PD Online) tool.

The project area commences at Helensvale within the proposed IRTC and adjacent to the existing Gold Coast rail line. The alignment passes the Gold Coast Country Club, located to the east, and an industrial development borders the Pacific Motorway located to the west. Provision has been made for a future station in this area to serve these uses either side of the alignment.

A number of planned developments have received approval, according to the CGC's PD Online register, for a range of industrial and commercial uses and to further develop the Gold Coast Country Club (initial development applications refer to operational works for tree works – private).

The alignment crosses the intersection of Napper Road and Smith Street, with a station on the eastern side of Smith Street at Parkwood to serve the local residential catchment. A park 'n' ride facility is proposed on the western side of Smith Street to serve this station. This land is undeveloped and is zoned for Community Purposes under the planning scheme.

After Parkwood Station, the alignment travels south east and then east along Smith Street Motorway. The industrial area of Molendinar and the residential area of Parkwood are located on the southern and northern sides of Smith Street Motorway respectively. Parkwood comprises predominantly low density detached housing and some large lot housing at Uplands Drive and Woodlands Way. The industrial area of Molendinar continues alongside Smith Street Motorway towards Olsen Avenue. A station would be provided at Parkwood East to serve the local catchments.

3.3 (m) Any proposed land/marine uses of area

Helensvale is planned to develop into a key interchange of heavy rail, bus and light rail, supporting its role as a major activity centre and providing a significant Transit Oriented Development opportunity. The project would provide additional parking opportunities to cater for daily park 'n' ride demand as well as future Commonwealth Games/ major event parking at Helensvale and Parkwood stations.

The residential area of Parkwood to the north of the Smith Street Motorway, is currently developed as low density residential detached dwellings, while the Molendinar industrial area is located to the south of the Smith Street Motorway. It is considered these areas have limited redevelopment potential in the short term.

4 Environmental outcomes

Provide descriptions of the proposed environmental outcomes that will be achieved for matters of national environmental significance as a result of the proposed action. Include details of the baseline data upon which the outcomes are based, and the confidence about the likely achievement of the proposed outcomes. Where outcomes cannot be identified or committed to, provide explanatory details including any commitments to identify outcomes through an assessment process.

If a proposed action is determined to be a controlled action, the Department may request further details to enable application of the draft *Outcomes-based Conditions Policy 2015* and *Outcomes-based Conditions Guidance 2015* (http://www.environment.gov.au/epbc/consultation/policy-guidance-outcomes-based-conditions), including about environmental outcomes to be achieved, details of baseline data, milestones, performance criteria, and monitoring and adaptive management to ensure the achievement of outcomes. If this information is available at the time of referral it should be included.

General commitments to achieving environmental outcomes, particularly relating to beneficial impacts of the proposed action, CANNOT be taken into account in making the initial decision about whether the proposal is likely to have a significant impact on a matter protected under the EPBC Act. (But those commitments may be relevant at the later assessment and approval stages, including the appropriate level of assessment, and conditions of approval, if your proposal proceeds to these stages).

5 Measures to avoid or reduce impacts

Note: If you have identified alternatives in relation to location, time frames or activities for the proposed action at Section 2.3 you will need to complete this section in relation to each of the alternatives identified.

Provide a description of measures that will be implemented to avoid, reduce, manage or offset any relevant impacts of the action. Include, if appropriate, any relevant reports or technical advice relating to the feasibility and effectiveness of the proposed measures.

For any measures intended to avoid or mitigate significant impacts on matters protected under the EPBC Act, specify:
- what the measure is,
- how the measure is expected to be effective, and
- the time frame or workplan for the measure.

Examples of relevant measures to avoid or reduce impacts may include the timing of works, avoidance of important habitat, specific design measures, or adoption of specific work practices.

Provide information about the level of commitment by the person proposing to take the action to achieve the proposed environmental outcomes and implement the proposed mitigation measures. For example, if the measures are preliminary suggestions only that have not been fully researched, or are dependent on a third party's agreement (e.g. council or landowner), you should state that, that is the case.

Note, the Australian Government Environment Minister may decide that a proposed action is not likely to have significant impacts on a protected matter, as long as the action is taken in a particular manner (section 77A of the EPBC Act). The particular manner of taking the action may avoid or reduce certain impacts, in such a way that those impacts will not be 'significant'. More detail is provided on the Department's web site.

For the Minister to make such a decision (under section 77A), the proposed measures to avoid or reduce impacts must:
- clearly form part of the referred action (eg be identified in the referral and fall within the responsibility of the person proposing to take the action),
- be must be clear, unambiguous, and provide certainty in relation to reducing or avoiding impacts on the matters protected, and
- must be realistic and practical in terms of reporting, auditing and enforcement.

More general commitments (eg preparation of management plans or monitoring) and measures aimed at providing environmental offsets, compensation or off-site benefits CANNOT be taken into account in making the initial decision about whether the proposal is likely to have a significant impact on a matter protected under the EPBC Act. (But those commitments may be relevant at the later assessment and approval stages, including the appropriate level of assessment, if your proposal proceeds to these stages).

GCLR Stage 2 is currently at the Reference Design phase, with detailed design still to be completed.

The project's Reference Design has been informed by a number of detailed investigations undertaken during development of the EAR. The purposed of the EAR was to consider the environmental factors potentially impacts by the project, and to identify potential mitigation measures to be adopted into the Reference Design as well as subsequent phases of the project.

A number of detailed assessments and investigations were undertaken to inform the GCLR Stage 2 EAR and Reference Design, including:

- Terrestrial and aquatic flora/fauna desktop assessment and field surveys
- Land use and planning assessment
- Social impact assessment
- Soils and contaminated land desktop assessments
- Water and air quality assessments
- Noise and vibration desktop modelling
- Cultural heritage desktop assessment
- Landscape and visual amenity assessment
- Hydrologic and hydraulic assessments

Additional assessments and investigations will or are being undertaken as part of the detailed design phase of the project, as highlighted throughout the EAR (Attachment 4).

Design phase measures

Measures incorporated into the design based on the results of the assessments undertaken for the EAR are outlined in the table below.

Table 4.1 GCLR Stage 2 Design mitigation measures

Design aspect	Impact avoidance/reduction measures
Crossing of Coombabah Creek	▪ Reduction of standard corridor widths to reduce environmental impacts in vicinity of the Creek and inclusion of no go zones on design drawings ▪ Bridge design to span the watercourse, with no permanent structures (eg piers) situated within the watercourse to reduce potential impacts on: hydraulic regime; instream habitat for aquatic fauna; water quality at the crossing location and in sensitive environments located downstream (ie Ramsar Wetland) ▪ Design of the bridge structure to maintain current fauna movement corridors along Creek, including for the Koala movements (eg allows light penetration under the structure, embankment and stabilisation treatments to consider fauna species likely to utilise the area) ▪ Crossings designed as cast-in-place piles which reduces overall earth disturbance and reduces the risk of erosion and sedimentation and ASS leachates entering the Creek ▪ Inclusion of ground improvement and stabilisation recommendations in the design of fill embankments on alluvial material to prevent embankment failure, erosion and sedimentation impacts ▪ Design of a site-specific sediment run-off and drainage control to be designed during detailed design for the crossing

Design aspect	Impact avoidance/reduction measures
Crossing of Biggera Creek	■ Vegetation clearing to be minimised where possible and rehabilitated in the vicinity of the creek crossing ■ Design of bridge structure to maintain current fauna movement corridors along Creek, including for the Koala movements (eg allows light penetration under the structure, embankment and stabilisation treatments to consider fauna species likely to utilise the area) ■ Bridge designed to minimise the number of structures (eg piers) situated within the watercourse to reduce potential impacts on: hydraulic regime; instream habitat for aquatic fauna; water quality at the crossing location ■ Design of a site-specific sediment run-off and drainage control to be designed during detailed design for the crossing
Parkwood park 'n' ride	■ Provision of a 14 m-wide rehabilitated and replanted vegetation corridor to facilitate safe koala movements adjacent to the park 'n' ride facility and the existing heavy rail line, with an allowance for an additional 6 m of cleared/grassed area above the gas pipeline easement (ie for pipe integrity and safety) (20 m wide total corridor). ■ Installation of refuge poles and other fauna furniture to allow safe movement of Koalas through the 14 m rehabilitated habitat movement corridor. This will allow safe movement for Koalas through the corridor until such time that the replanted saplings have become established, non-juvenile Koala habitat trees. These refuge poles will enable Koalas to escape from potential threats such as dogs or foxes, and will be spaced and arranged in consultation with a suitably qualified ecologist ■ Fauna furniture (eg ladders, refuge poles) will be installed to facilitate the safe egress of Koalas out of the park 'n' ride facility, into adjacent vegetated areas (eg to mitigate potential threats from domestic dogs within the area). Design to utilise DEHP (2012) *Koala-sensitive Design Guidelines: A guide to koala-sensitive design measures for planning and development activities* for design and location of Koala furniture (in consultation with a suitably qualified person) ■ Use of Koala-proof fencing to direct movements around infrastructure to reduce the potential risks associated with vehicle strike and install Koala awareness signage placed at the park 'n' ride facility (eg at entrance and near Koala furniture installed along park 'n' ride fencing) ■ Clearing footprint designed to avoid fragmentation of remnant vegetation patch and to utilise existing disturbed areas where possible (ie along Smith Street Motorway)
General alignment	■ Fauna exclusion fencing to replicate existing fauna exclusion fencing and provision of one-way flap doors along Koala exclusion fencing to allow trapped fauna to escape (in consultation with a suitably qualified person) ■ Consideration of reduced light rail vehicle speeds during detailed design where determined appropriate ■ No use of barbed-wire fencing as it has the potential to injure wildlife such as bats and flying-foxes ■ Fauna movement dry-cell culvert located beneath light rail at Napper Road to maintain existing movement pathway for fauna ■ Culverts within or adjacent to fauna habitat to be dual purpose and provide dry passage ■ Design of access tracks to minimise impact on existing overland flows ■ Adoption of Water Sensitive Urban Design (WSUD) measures during detailed design. WSUD measures selected are to be in accordance with CGC's specifications detailed in *Section 13 – Water Sensitive Urban Design Guidelines* under the *Planning Scheme Policy 11: Land Development Guidelines*

Construction phase measures

The following tables outline the mitigation measures that will be implemented during the construction phase of the project, as relevant to the MNES species habitat. Each species/grouping is addressed within a separate table (and some mitigation measures will overlap). These measures are

included within the SSMP (refer to Attachment 10) and will be included within the CEMP developed by the project contractor following project award.

Table 4.2 GCLR Stage 2 Mitigation Measure Table Acronyms

Timing	**Pre C** **Pre Construction**	**PD** **project Duration**	**WR** **When required**
Responsibility	SM Site Manager	PE Project Engineer	HSER Environmental Representative
Monitoring format	PI Practical Implementation	CL Checklist	

Table 4.3 Koala mitigation measures for the construction phase of GCLR Stage 2

Management Measure ID	Control Activity	Timing	Responsibility	Monitoring and Reporting Compliance		
				Activity	Activity Timing	Activity Performed By
Site management						
1	Nominate a Suitably Qualified Person[1] to oversee the environmentally relevant tasks and activities. This may include (but not limited to) overseeing vegetation clearing, liaising with spotter/catcher contractors, reporting any environmentally relevant information to the appropriate regulatory authorities and ensuring conformance occurs for all environmental requirements documented in the EMP(C), Contractor's EMP and this SMP	Pre C	SM	PI	Pre C	SM
Vegetation Management						
2	No vegetation clearing is to take place without the appropriate vegetation clearing permits in place. Ensure that all the approval conditions have been addressed or adequate measures are included in the relevant management plans to address these conditions	PD	HSER/SM	PI/VI/CL	PD	SM/PE/HSER
3	The clearing of all areas will be restricted to the minimal area required to enable safe construction, operation and maintenance of the project infrastructure	PD	PE/SM	PI/CL	PD	SM
4	Ensure that vegetation clearing boundaries are established with appropriate signage at regular intervals and visible and physical markings. High visibility tape, barricade webbing or similar should be utilised. Ensure that all contractors are aware of these boundaries.	Pre C	HSER/SM	PI	WR	HSER
5	Where possible, minimise loss of canopy vegetation and works that will lead to the proliferation of weed species	PD	PE/SM	PI/CL	PD	SM
6	Where practical, maintenance works are to be carried out within designated areas or offices and away from sensitive environments such as REs, riparian vegetation and waterways	PD	PE/SM	PI/CL	PD	SM
7	No vegetation is to burned either as a form of removal or disposal	PD	PE/HSER	PI	PD	PE
8	Dust suppression techniques are to be adopted during construction to minimise smothering of native vegetation	PD	HSER/PE/SM	PI/CL	PD	SM
9	Weather permitting, rehabilitation of appropriate areas shall commence within four weeks from practical completion of construction. Revegetation shall be consistent with the plant density, floristic composition and distribution of the adjacent communities	WR	HSER	PI/CL	PD	HSER

[1] *suitably qualified and experienced* means a person with formal qualifications and/or experience in fauna identification and life ecology and environmental management.

Management Measure ID	Control Activity	Timing	Responsibility	Monitoring and Reporting Compliance		
				Activity	Activity Timing	Activity Performed By
Fauna Management						
10	Obtain all the appropriate approvals under local, State and Commonwealth legislation. This includes relevant approvals required to undertake site preparation and pre-clearing surveys and works. Ensure that all the approval conditions have been addressed or adequate measures are included in the relevant management plans to address these conditions	WR	HSER/PE/SM	PI/CL	PD	SM
11	All site personnel are to be made aware of local fauna that could occur on site and that all native fauna, including snakes, are protected. Fauna are only to be handled by suitably qualified personnel	PD	SM/HSER	PI/VI	Weekly	HSER
12	Discourage the feeding of wildlife by project personnel throughout the project area	PD	SM/HSER	PI/VI	Weekly	HSER
13	Consider mechanisms to facilitate fauna movement (ie culvert design and bridging)	Pre C	HSER/PE/SM	PI/CL	Pre C	PE
14	Where temporary fencing is required consideration will be given to fauna movement, current land uses and construction staff safety requirements	WR	HSER/PE/SM	PI/CL	WR	SM
15	Implement fauna escape devices where practical (such as planks within trenches or trench ramps designed with a 15 degree slope placed every 30 m along the trench) to enable fauna to exit hazardous areas within the construction site	PD	PE/HSER	Induction/ toolbox talks/VI	Weekly	PE
16	A certified fauna spotter/catcher (ie holding a Damage Mitigation Permit (Removal and Relocation of Wildlife) and/or Rehabilitation Permit issued by EHP) will be engaged to inspect the project area within 48 hours prior to vegetation clearing. The Contractor will give notice to the Principal prior to commencing any clearing within the project area. The fauna spotter/catcher will: • Identify and clearly mark and map all hollow bearing and potentially hollow bearing trees, as well as hollow logs, immediately prior to vegetation clearing. These will be retained wherever practicable. Identification of all habitat trees requiring specific management measures will occur prior to developing a clearing schedule for the project so that sufficient time is allowed for removal of hollow bearing trees • Clearly identify clearing boundaries. No clearing or disturbance is to occur outside these boundaries • Where practical, active breeding nests will be relocated prior to clearing • Identify infrastructure which are used by fauna (eg sheds may be used by some species for roosting)	Construction	HSER/SM	PI/CL	WR	HSER

Management Measure ID	Control Activity	Timing	Responsibility	Monitoring and Reporting Compliance		
				Activity	Activity Timing	Activity Performed By
17	Where practical a staged vegetation clearing programme (sequential clearing) will be undertaken to ensure any fauna species within the proposed disturbance area have sufficient time to vacate the clearing area without human intervention. Sequential clearing is especially important in areas where clearing totals 3ha or more. In such situations the clearing programme should ensure: • Clearing within an area of 6 ha or less does not exceed more than 50 % of the area in one stage • Clearing within an area of more than 6 ha does not exceed 3 ha or 3 % of the site (whichever is the greater) in one stage • At least one 12 hour period separates each stage of clearing • Where practical/possible the clearing plan is designed to ensure that staged clearing allows for appropriate habitat links to be maintained between the site and adjoining habitats • Vegetation containing a fauna species or vegetation which overlaps vegetation containing a fauna species is not cleared until that species is removed by the fauna spotter.	Construction	HSER/SM	PI/CL	WR	HSER
18	During construction works, a certified fauna spotter/catcher is to inspect trenches, culverts and other structures to determine whether there are any trapped or injured fauna species present and action as appropriate	WR	HSER	PI/CL	WR	HSER
19	Where practical, any fauna to be relocated will be moved to an area of similar habitat adjoining the project area. It is preferable that this site is regrowth habitat of similar vegetation characteristics in order to replicate habitat for displaced fauna. Suitable relocation areas will be identified prior to the commencement of clearing	Construction	HSER/SM	PI/CL	WR	HSER
20	The Principal will report any environmental incidents, including those which involve harm to native wildlife, to EHP within 24 hours of the incident occurring. The report will include details on the location and cause of the incident, extent of impact and corrective action taken	PD	SM	PI	PD	SM
21	In the event of injury to fauna, works in the area will cease immediately and not recommence until rescue actions have been undertaken and a review of appropriate management actions to ensure the risk of reoccurrence is minimised	WR	HSER/SM	PI/VI/CL	WR	HSER
22	Contact details for qualified animal carers and vets within the area to be outlined provided to relevant staff	WR	HSER/SM	PI/CL	WR	HSER
23	Where practical minimise night work to reduce impacts to nocturnal and diurnal species	WR	HSER/SM/PE	PI/CL	WR	SM

Management Measure ID	Control Activity	Timing	Responsibility	Monitoring and Reporting Compliance		
				Activity	Activity Timing	Activity Performed By
24	Project infrastructure lighting will be designed, with due consideration to safety, to have a minimal impact on surrounding habitats and fauna	WR	HSER/SM/PE	PI/CL	WR	PE
25	Periodic toolbox training to be provided to all construction personnel to present new information or reiterate information relating to management of fauna throughout construction	WR	HSER/SM	PI/CL	WR	HSER/SM
Koala management						
26	A Koala Management Plan should be developed for the project to define mitigation measures to be implemented during project design and works to minimise any adverse impacts to the species. This includes the provision of any fauna movement corridors and fauna exclusion fencing and the development of a management strategy should a Koala be encountered during Project works	Pre C	HSER	PI/CL	WR	HSER
27	In areas where the Koala is known or suspected to occur, each tree should be visually searched for Koalas prior to felling	WR	HSER/SM	VI/CL	WR	HSER
28	Any tree in which a Koala is present, and any tree with a crown overlapping that tree, is to be left standing until the Koala has vacated of its own accord	WR	HSER/SM	VI	WR	HSER
29	Felling of trees must not occur if the tree is occupied by a Koala	WR	HSER/SM	VI	WR	HSER
30	Due to the highly urbanised nature of the area and the limited quantity of available habitat, any Koala's identified within the project area should be caught by a suitably qualified person and relocated to a suitable location as defined by a suitably qualified person	WR	HSER	PI	WR	HSER
31	A follow-up inspection to be conducted after clearing to ensure no injured wildlife, including Koala's, are present	WR	HSER/SM	VI/CL	WR	HSER
32	Undertake all clearing activities in accordance with DERM's Ecoaccess Tree clearing and trimming - Koala spotter requirements with the DTMR Road Project Environmental Processes Manual (2004) and the conditions of the contract agreement, Project Koala Management Plan and any project Koala offset requirements	WR	HSER/SM	PI	WR	HSER
Vehicle movement						
33	Where practical use existing tracks. Design new access tracks (permanent and temporary) with the aim of minimising the loss and/or impact on existing vegetation communities.	PD	PE/HSER/SM	PI	PD	SM
34	Where practical access tracks will be constructed at least 10 m clear of waterways. Access tracks must not be constructed through vegetation not approved for clearing	Pre C	PE/HSER/SM	PI	WR	SM

Management Measure ID	Control Activity	Timing	Responsibility	Monitoring and Reporting Compliance		
				Activity	Activity Timing	Activity Performed By
35	All vehicle and pedestrian access will be restricted to the defined access tracks	PD	All Staff	PI/CL	PD	SM
36	Exclude parking of vehicles, storage of plant and equipment and stockpiling from the drip zones of trees (to avoid compaction)	PD	All Staff	PI/CL	PD	SM
37	Place appropriate signage in prominent positions within the project area to reduce speed, promote awareness and provide safety for fauna crossing or inhabiting the area	Pre C	PE/HSER/SM	PI	WR	SM
38	All contractors will be made aware of the risks associated with fauna and vehicle movement. This will be provided in a toolbox	PD	All Staff	PI/CL	PD	SM

Table 4.4 Grey-headed Flying-fox mitigation measures for the construction phase of GCLR Stage 2

Management Measure ID	Control Activity	Timing	Responsibility	Monitoring and Reporting Compliance		
				Activity	Activity Timing	Activity Performed By
Site management						
1	Nominate a Suitably Qualified Person[2] to oversee the environmentally relevant tasks and activities. This may include (but not limited to) overseeing vegetation clearing, liaising with spotter/catcher contractors, reporting any environmentally relevant information to the appropriate regulatory authorities and ensuring conformance occurs for all environmental requirements documented in the EMP(C), Contractor's EMP and this SMP	Pre C	SM	PI	Pre C	SM
Vegetation Management						
2	No vegetation clearing is to take place without the appropriate vegetation clearing permits in place. Ensure that all the approval conditions have been addressed or adequate measures are included in the relevant management plans to address these conditions	PD	HSER/SM	PI/VI/CL	PD	SM/PE/HSER
3	The clearing of all areas will be restricted to the minimal area required to enable safe construction, operation and maintenance of the project infrastructure	PD	PE/SM	PI/CL	PD	SM
4	Ensure that vegetation clearing boundaries are established with appropriate signage at regular intervals and visible and physical markings. High visibility tape, barricade webbing or similar should be utilised. Ensure that all contractors are aware of these boundaries.	Pre C	HSER/SM	PI	WR	HSER
5	Where possible, minimise loss of canopy vegetation and works that will lead to the proliferation of weed species	PD	PE/SM	PI/CL	PD	SM
6	Where practical, maintenance works are to be carried out within designated areas or offices and away from sensitive environments such as REs, riparian vegetation and waterways	PD	PE/SM	PI/CL	PD	SM
7	No vegetation is to burned either as a form of removal or disposal	PD	PE/HSER	PI	PD	PE
8	Dust suppression techniques are to be adopted during construction to minimise smothering of native vegetation	PD	HSER/PE/SM	PI/CL	PD	SM
9	Weather permitting, rehabilitation of appropriate areas shall commence within four weeks from practical completion of construction. Revegetation shall be consistent with the plant density, floristic composition and distribution of the adjacent communities	WR	HSER	PI/CL	PD	HSER

[2] *suitably qualified and experienced* means a person with formal qualifications and/or experience in fauna identification and life ecology and environmental management.

Management Measure ID	Control Activity	Timing	Responsibility	Monitoring and Reporting Compliance		
				Activity	Activity Timing	Activity Performed By
Fauna Management						
10	Obtain all the appropriate approvals under local, State and Commonwealth legislation. This includes relevant approvals required to undertake site preparation and pre-clearing surveys and works. Ensure that all the approval conditions have been addressed or adequate measures are included in the relevant management plans to address these conditions	WR	HSER/PE/SM	PI/CL	PD	SM
11	All site personnel are to be made aware of local fauna that could occur on site and that all native fauna, including snakes, are protected. Fauna are only to be handled by suitably qualified personnel	PD	SM/HSER	PI/VI	Weekly	HSER
12	Discourage the feeding of wildlife by project personnel throughout the project area	PD	SM/HSER	PI/VI	Weekly	HSER
13	Consider mechanisms to facilitate fauna movement (ie culvert design and bridging)	Pre C	HSER/PE/SM	PI/CL	Pre C	PE
14	Where temporary fencing is required consideration will be given to fauna movement, current land uses and construction staff safety requirements	WR	HSER/PE/SM	PI/CL	WR	SM
15	Implement fauna escape devices where practical (such as planks within trenches or trench ramps designed with a 15 degree slope placed every 30 m along the trench) to enable fauna to exit hazardous areas within the construction site	PD	PE/HSER	Induction/ toolbox talks/VI	Weekly	PE
16	A certified fauna spotter/catcher (ie holding a Damage Mitigation Permit (Removal and Relocation of Wildlife) and/or Rehabilitation Permit issued by EHP) will be engaged to inspect the project area within 48 hours prior to vegetation clearing. The Contractor will give notice to the Principal prior to commencing any clearing within the project area. The fauna spotter/catcher will: • Identify and clearly mark and map all hollow bearing and potentially hollow bearing trees, as well as hollow logs, immediately prior to vegetation clearing. These will be retained wherever practicable. Identification of all habitat trees requiring specific management measures will occur prior to developing a clearing schedule for the project so that sufficient time is allowed for removal of hollow bearing trees • Clearly identify clearing boundaries. No clearing or disturbance is to occur outside these boundaries • Where practical, active breeding nests will be relocated prior to clearing • Identify infrastructure which are used by fauna (eg sheds may be used by some species for roosting)	Construction	HSER/SM	PI/CL	WR	HSER

Management Measure ID	Control Activity	Timing	Responsibility	Monitoring and Reporting Compliance		
				Activity	Activity Timing	Activity Performed By
17	Ensure that all hollow bearing trees requiring removal have timber containing hollows removed by a qualified arborist and a certified spotter/catcher **prior** to the commencement of any clearing in order to safely remove any fauna species which might be located inside. Actions to be implemented include: • Hollows identified as containing fauna shall be plugged with a suitable material such as a towel, the section removed from the tree and gently lowered to the ground using ropes. Measures will be taken to avoid injuring animals. • Displaced fauna shall then be relocated (within their hollows) to a suitable, previously identified recipient site, provided the animal did not sustain any injuries. Any injured animals (native or introduced) are to be taken to receive veterinary attention immediately. Once recovered, animals will be relocated to an area of similar habitat adjoining the project area. • All removed hollows not containing fauna shall be reattached to suitable trees in suitable recipient sites or adjacent to the project area • In the case of the presence of other fauna species, the spotter/catcher will encourage the fauna to leave by reasonable means or capture and relocate it in the local environment prior to felling and trimming. If the spotter/catcher determines that a fauna species is present in a tree he/she will remove the animal prior to the felling of that tree or any tree of which the crown overlaps that tree. All members of staff have an obligation to report any fauna species seen in areas to be cleared to the fauna spotter/catcher prior to clearing • A method of removing the hollows will be implemented which ensures that hollows are gently lowered to the ground and the chance of fauna mortality is minimised.	Construction	HSER/SM	PI/CL	WR	HSER

Management Measure ID	Control Activity	Timing	Responsibility	Monitoring and Reporting Compliance		
				Activity	Activity Timing	Activity Performed By
18	Where practical a staged vegetation clearing programme (sequential clearing) will be undertaken to ensure any fauna species within the proposed disturbance area have sufficient time to vacate the clearing area without human intervention. Sequential clearing is especially important in areas where clearing totals 3ha or more. In such situations the clearing programme should ensure: • Clearing within an area of 6 ha or less does not exceed more than 50 % of the area in one stage • Clearing within an area of more than 6 ha does not exceed 3 ha or 3 % of the site (whichever is the greater) in one stage • At least one 12 hour period separates each stage of clearing • Where practical/possible the clearing plan is designed to ensure that staged clearing allows for appropriate habitat links to be maintained between the site and adjoining habitats • Vegetation containing a fauna species or vegetation which overlaps vegetation containing a fauna species is not cleared until that species is removed by the fauna spotter.	Construction	HSER/SM	PI/CL	WR	HSER
19	During construction works, a certified fauna spotter/catcher is to inspect trenches, culverts and other structures to determine whether there are any trapped or injured fauna species present and action as appropriate	WR	HSER	PI/CL	WR	HSER
20	Where practical, any fauna to be relocated will be moved to an area of similar habitat adjoining the project area. It is preferable that this site is regrowth habitat of similar vegetation characteristics in order to replicate habitat for displaced fauna. Suitable relocation areas will be identified prior to the commencement of clearing	Construction	HSER/SM	PI/CL	WR	HSER
21	The Principal will report any environmental incidents, including those which involve harm to native wildlife, to EHP within 24 hours of the incident occurring. The report will include details on the location and cause of the incident, extent of impact and corrective action taken	PD	SM	PI	PD	SM
22	In the event of injury to fauna, works in the area will cease immediately and not recommence until rescue actions have been undertaken and a review of appropriate management actions to ensure the risk of reoccurrence is minimised	WR	HSER/SM	PI/VI/CL	WR	HSER
23	Contact details for qualified animal carers and vets within the area to be outlined provided to relevant staff	WR	HSER/SM	PI/CL	WR	HSER
24	Where practical minimise night work to reduce impacts to nocturnal and diurnal species	WR	HSER/SM/PE	PI/CL	WR	SM

Management Measure ID	Control Activity	Timing	Responsibility	Monitoring and Reporting Compliance		
				Activity	Activity Timing	Activity Performed By
25	Project infrastructure lighting will be designed, with due consideration to safety, to have a minimal impact on surrounding habitats and fauna	WR	HSER/SM/PE	PI/CL	WR	PE
26	Periodic toolbox training to be provided to all construction personnel to present new information or reiterate information relating to management of fauna throughout construction	WR	HSER/SM	PI/CL	WR	HSER/SM

Table 4.5 Australasian Bittern and Migratory Species mitigation measures for the construction phase of GCLR Stage 2

Management Measure ID	Control Activity	Timing	Responsibility	Monitoring and Reporting Compliance		
				Activity	Activity Timing	Activity Performed By
Site management						
1	Nominate a Suitably Qualified Person[3] to oversee the environmentally relevant tasks and activities. This may include (but not limited to) overseeing vegetation clearing, liaising with spotter/catcher contractors, reporting any environmentally relevant information to the appropriate regulatory authorities and ensuring conformance occurs for all environmental requirements documented in the EMP(C), Contractor's EMP and this SMP	Pre C	SM	PI	Pre C	SM
Vegetation Management						
2	No vegetation clearing is to take place without the appropriate vegetation clearing permits in place. Ensure that all the approval conditions have been addressed or adequate measures are included in the relevant management plans to address these conditions	PD	HSER/SM	PI/VI/CL	PD	SM/PE/HSER
3	The clearing of all areas will be restricted to the minimal area required to enable safe construction, operation and maintenance of the project infrastructure	PD	PE/SM	PI/CL	PD	SM
4	Ensure that vegetation clearing boundaries are established with appropriate signage at regular intervals and visible and physical markings. High visibility tape, barricade webbing or similar should be utilised. Ensure that all contractors are aware of these boundaries.	Pre C	HSER/SM	PI	WR	HSER
5	Where possible, minimise loss of canopy vegetation and works that will lead to the proliferation of weed species	PD	PE/SM	PI/CL	PD	SM
6	Where practical, maintenance works are to be carried out within designated areas or offices and away from sensitive environments such as REs, riparian vegetation and waterways	PD	PE/SM	PI/CL	PD	SM
7	Where practical, maintenance works are to be carried out within designated areas or offices and away from sensitive environments such as REs, riparian vegetation and waterways	PD	PE/SM	PI/CL	PD	SM
8	No vegetation is to burned either as a form of removal or disposal	PD	PE/HSER	PI	PD	PE

[3] *suitably qualified and experienced* means a person with formal qualifications and/or experience in fauna identification and life ecology and environmental management.

Management Measure ID	Control Activity	Timing	Responsibility	Monitoring and Reporting Compliance		
				Activity	Activity Timing	Activity Performed By
9	Weather permitting, rehabilitation of appropriate areas shall commence within four weeks from practical completion of construction. Revegetation shall be consistent with the plant density, floristic composition and distribution of the adjacent communities	WR	HSER	PI/CL	PD	HSER
Fauna Management						
11	Obtain all the appropriate approvals under local, State and Commonwealth legislation. This includes relevant approvals required to undertake site preparation and pre-clearing surveys and works. Ensure that all the approval conditions have been addressed or adequate measures are included in the relevant management plans to address these conditions	WR	HSER/PE/SM	PI/CL	PD	SM
12	All site personnel are to be made aware of local fauna that could occur on site and that all native fauna, including snakes, are protected. Fauna are only to be handled by suitably qualified personnel	PD	SM/HSER	PI/VI	Weekly	HSER
13	Discourage the feeding of wildlife by project personnel throughout the project area	PD	SM/HSER	PI/VI	Weekly	HSER
14	Consider mechanisms to facilitate fauna movement (ie culvert design and bridging)	Pre C	HSER/PE/SM	PI/CL	Pre C	PE
15	Where temporary fencing is required consideration will be given to fauna movement, current land uses and construction staff safety requirements	WR	HSER/PE/SM	PI/CL	WR	SM
16	Implement fauna escape devices where practical (such as planks within trenches or trench ramps designed with a 15 degree slope placed every 30 m along the trench) to enable fauna to exit hazardous areas within the construction site	PD	PE/HSER	Induction/ toolbox talks/VI	Weekly	PE

Management Measure ID	Control Activity	Timing	Responsibility	Monitoring and Reporting Compliance		
				Activity	Activity Timing	Activity Performed By
17	A certified fauna spotter/catcher (ie holding a Damage Mitigation Permit (Removal and Relocation of Wildlife) and/or Rehabilitation Permit issued by EHP) will be engaged to inspect the project area within 48 hours prior to vegetation clearing. The Contractor will give notice to the Principal prior to commencing any clearing within the project area. The fauna spotter/catcher will: Identify and clearly mark and map all hollow bearing and potentially hollow bearing trees, as well as hollow logs, immediately prior to vegetation clearing. These will be retained wherever practicable. Identification of all habitat trees requiring specific management measures will occur prior to developing a clearing schedule for the project so that sufficient time is allowed for removal of hollow bearing trees Clearly identify clearing boundaries. No clearing or disturbance is to occur outside these boundaries Where practical, active breeding nests will be relocated prior to clearing Identify infrastructure which are used by fauna (eg sheds may be used by some species for roosting)	Construction	HSER/SM	PI/CL	WR	HSER

Management Measure ID	Control Activity	Timing	Responsibility	Monitoring and Reporting Compliance		
				Activity	Activity Timing	Activity Performed By
18	Ensure that all hollow bearing trees requiring removal have timber containing hollows removed by a qualified arborist and a certified spotter/catcher prior to the commencement of any clearing in order to safely remove any fauna species which might be located inside. Actions to be implemented include: Hollows identified as containing fauna shall be plugged with a suitable material such as a towel, the section removed from the tree and gently lowered to the ground using ropes. Measures will be taken to avoid injuring animals. Displaced fauna shall then be relocated (within their hollows) to a suitable, previously identified recipient site, provided the animal did not sustain any injuries. Any injured animals (native or introduced) are to be taken to receive veterinary attention immediately. Once recovered, animals will be relocated to an area of similar habitat adjoining the project area. All removed hollows not containing fauna shall be reattached to suitable trees in suitable recipient sites or adjacent to the project area In the case of the presence of other fauna species, the spotter/catcher will encourage the fauna to leave by reasonable means or capture and relocate it in the local environment prior to felling and trimming. If the spotter/catcher determines that a fauna species is present in a tree he/she will remove the animal prior to the felling of that tree or any tree of which the crown overlaps that tree. All members of staff have an obligation to report any fauna species seen in areas to be cleared to the fauna spotter/catcher prior to clearing A method of removing the hollows will be implemented which ensures that hollows are gently lowered to the ground and the chance of fauna mortality is minimised.	Construction	HSER/SM	PI/CL	WR	HSER

Management Measure ID	Control Activity	Timing	Responsibility	Monitoring and Reporting Compliance		
				Activity	Activity Timing	Activity Performed By
19	Where practical a staged vegetation clearing programme (sequential clearing) will be undertaken to ensure any fauna species within the proposed disturbance area have sufficient time to vacate the clearing area without human intervention. Sequential clearing is especially important in areas where clearing totals 3ha or more. In such situations the clearing programme should ensure: Clearing within an area of 6 ha or less does not exceed more than 50 % of the area in one stage Clearing within an area of more than 6 ha does not exceed 3 ha or 3 % of the site (whichever is the greater) in one stage At least one 12 hour period separates each stage of clearing Where practical/possible the clearing plan is designed to ensure that staged clearing allows for appropriate habitat links to be maintained between the site and adjoining habitats Vegetation containing a fauna species or vegetation which overlaps vegetation containing a fauna species is not cleared until that species is removed by the fauna spotter.	Construction	HSER/SM	PI/CL	WR	HSER
20	During construction works, a certified fauna spotter/catcher is to inspect trenches, culverts and other structures to determine whether there are any trapped or injured fauna species present and action as appropriate	WR	HSER	PI/CL	WR	HSER
21	Where practical, any fauna to be relocated will be moved to an area of similar habitat adjoining the project area. It is preferable that this site is regrowth habitat of similar vegetation characteristics in order to replicate habitat for displaced fauna. Suitable relocation areas will be identified prior to the commencement of clearing	Construction	HSER/SM	PI/CL	WR	HSER
22	The Principal will report any environmental incidents, including those which involve harm to native wildlife, to EHP within 24 hours of the incident occurring. The report will include details on the location and cause of the incident, extent of impact and corrective action taken	PD	SM	PI	PD	SM
23	In the event of injury to fauna, works in the area will cease immediately and not recommence until rescue actions have been undertaken and a review of appropriate management actions to ensure the risk of reoccurrence is minimised	WR	HSER/SM	PI/VI/CL	WR	HSER
24	Contact details for qualified animal carers and vets within the area to be outlined provided to relevant staff	WR	HSER/SM	PI/CL	WR	HSER

Management Measure ID	Control Activity	Timing	Responsibility	Monitoring and Reporting Compliance		
				Activity	Activity Timing	Activity Performed By
25	Where practical minimise night work to reduce impacts to nocturnal and diurnal species	WR	HSER/SM/PE	PI/CL	WR	SM
26	Project infrastructure lighting will be designed, with due consideration to safety, to have a minimal impact on surrounding habitats and fauna	WR	HSER/SM/PE	PI/CL	WR	PE
27	Periodic toolbox training to be provided to all construction personnel to present new information or reiterate information relating to management of fauna throughout construction	WR	HSER/SM	PI/CL	WR	HSER/SM
Vehicle movement						
28	Where practical use existing tracks. Design new access tracks (permanent and temporary) with the aim of minimising the loss and/or impact on existing vegetation communities.	PD	PE/HSER/SM	PI	PD	SM
29	Where practical access tracks will be constructed at least 10 m clear of waterways. Access tracks must not be constructed through vegetation not approved for clearing	Pre C	PE/HSER/SM	PI	WR	SM
30	All vehicle and pedestrian access will be restricted to the defined access tracks	PD	All Staff	PI/CL	PD	SM
31	Exclude parking of vehicles, storage of plant and equipment and stockpiling from the drip zones of trees (to avoid compaction)	PD	All Staff	PI/CL	PD	SM
32	Place appropriate signage in prominent positions within the project area to reduce speed, promote awareness and provide safety for fauna crossing or inhabiting the area	Pre C	PE/HSER/SM	PI	WR	SM
33	All contractors will be made aware of the risks associated with fauna and vehicle movement. This will be provided in a toolbox	PD	All Staff	PI/CL	PD	SM
Watercourses						
34	Where practical, utilise bridge structures rather than culverts to minimise the clearing of riparian vegetation, disruption to the creek channel and subsequent flow on effects downstream environments. This is particularly relevant to the vegetation within and along the high water bank of the Coombabah Creek. Any culverts within or adjacent to fauna habitat to be dual purpose and provide dry passage	WR	HSER/PE/SM	PI	WR	PE
35	Minimise the potential filling, draining or alteration of any waterway to that necessary for construction purposes only. These works are to be carried out in accordance with approval conditions only	PD	HSER/PE/SM	PI	PD	PE/SM

Management Measure ID	Control Activity	Timing	Responsibility	Monitoring and Reporting Compliance		
				Activity	Activity Timing	Activity Performed By
36	Minimise disturbance to wetlands, riparian vegetation and instream vegetation where practical to minimise impact on fauna connectivity and prevent bank erosion and excess sedimentation. Work within these areas to be in accordance with approval conditions only	PD	HSER/PE/SM	PI	PD	PE/SM
37	Minimise the change to the geomorphology of the watercourses to prevent scouring and changes to instream flows (eg culvert design)	PD	HSER/PE/SM	PI	PD	PE/SM
38	Location and design of fuel and chemical storage facilities to provide sufficient separation from and limited pathway to aquatic environments	PD	HSER/PE/SM	PI	PD	PE/SM
39	The bed and banks of the watercourses which are not permanently disturbed by the Project will be restored to preconstruction conditions ensuring bank stability and revegetation with native species.	PD	HSER/PE/SM	PI	PD	PE/SM
40	Where practical design access tracks to minimise impact on existing overland flows	PD	HSER/PE/SM	PI	PD	PE/SM
41	Minimise operation of heavy equipment within the riparian zone or adjacent to waterways	PD	All staff	PI/CL	PD	All staff
42	Implement procedures that will assist in the avoidance of material spills and for prompt clean up of any that occur	PD	HSER/SM	PI/CL	PD	HSER
43	Install erosion and sediment control measures, prior to construction and maintain during construction	PD	HSER/SM	PI/CL	PD	HSER
44	No filling, draining or alteration of any waterway is to occur, excluding that necessary for the development and for which the appropriate approvals have been obtained	PD	HSER/PE/SM	PI/CL	PD	SM
45	Culvert and other infrastructure should match the drainage lines morphology to minimise scouring and sedimentation	PD	HSER/PE/SM	PI	PD	PE/SM
46	Adopt weed management strategies which have a minimal impact on aquatic habitats (eg type herbicide used and application rate)	PD	HSER	PI/CL	PD	All staff

6 Conclusion on the likelihood of significant impacts

Identify whether or not you believe the action is a controlled action (ie. whether you think that significant impacts on the matters protected under Part 3 of the EPBC Act are likely) and the reasons why.

6.1 Do you THINK your proposed action is a controlled action?

✓	No, complete section 5.2
	Yes, complete section 5.3

6.2 Proposed action IS NOT a controlled action.

Specify the key reasons why you think the proposed action is NOT LIKELY to have significant impacts on a matter protected under the EPBC Act.

The proposed action is not likely to have a significant impact if undertaken in a particular manner, as is presented within this EPBC Act Referral, including both the design and construction mitigation measures outlined in Section 4.

This referral and the supporting information provide a comprehensive assessment of the environmental values within the area potentially affected by the project and potential impacts on MNES. Based on the terrestrial and aquatic ecological investigations prepared by Aurecon (2014, 2015, Attachment 4, specifically refer to Appendix B of the EAR) no significant impacts on any MNES are likely to occur with exception of the Koala. These assessments considered the Moreton Bay Ramsar Wetland, listed threatened species and ecological communities, and listed migratory species.

Significant impacts on MNES are not likely to occur, with the exception of the Koala. Impacts on the Koala have been avoided/adequately mitigated through the implementation of a range of design and construction mitigation measures as outlined in Section 4. A SSMP has been developed for the project, with mitigation measures to be implement as part of the overarching Construction Environmental Management Plan (CEMP). This CEMP will be developed by the construction contractor following project award.

It is considered that based on the implementation of the design and construction mitigation measures outlined within this referral and in the SSMP (Attachment 10), this project should be designated as 'not a controlled action'.

6.3 Proposed action IS a controlled action

Type 'x' in the box for the matter(s) protected under the EPBC Act that you think are likely to be significantly impacted. (The 'sections' identified below are the relevant sections of the EPBC Act.)

	Matters likely to be impacted
	World Heritage values (sections 12 and 15A)
	National Heritage places (sections 15B and 15C)
	Wetlands of international importance (sections 16 and 17B)
	Listed threatened species and communities (sections 18 and 18A)
	Listed migratory species (sections 20 and 20A)
	Protection of the environment from nuclear actions (sections 21 and 22A)
	Commonwealth marine environment (sections 23 and 24A)
	Great Barrier Reef Marine Park (sections 24B and 24C)

	A water resource, in relation to coal seam gas development and large coal mining development (sections 24D and 24E)
	Protection of the environment from actions involving Commonwealth land (sections 26 and 27A)
	Protection of the environment from Commonwealth actions (section 28)
	Commonwealth Heritage places overseas (sections 27B and 27C)

Specify the key reasons why you think the proposed action is likely to have a significant adverse impact on the matters identified above.

7 Environmental record of the responsible party

NOTE: If a decision is made that a proposal needs approval under the EPBC Act, the Environment Minister will also decide the assessment approach. The EPBC Regulations provide for the environmental history of the party proposing to take the action to be taken into account when deciding the assessment approach.

		Yes	No
7.1	**Does the party taking the action have a satisfactory record of responsible environmental management?** **Provide details** TMR is highly experienced in the planning, delivery and operation of major transport infrastructure, with an excellent track record in coordinating environmental assessments and delivering environmentally sensitive transport solutions, evidenced through recent major infrastructure projects including Smith Street Motorway Upgrade, Ipswich Motorway Upgrade, Eastern Busway, Northern Busway, and the Springfield and Moreton Bay Rail projects. The Proponent has completed an Environmental Management System which provides clear accountabilities and processes for environmental activities from infrastructure projects, business activities and facilities management. Environmental management is one of the four key objectives in the Department's current strategic plan.	✓	
7.2	**Has either (a) the party proposing to take the action, or (b) if a permit has been applied for in relation to the action, the person making the application - ever 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?** **If yes, provide details**		✓
7.3	**If the party taking the action is a corporation, will the action be taken in accordance with the corporation's environmental policy and planning framework?**	✓	

If yes, provide details of environmental policy and planning framework

TMR undertakes works in accordance with their *Environment and Heritage Policy and Manual* and *Environmental Processes Manual*, available to view on TMR website at http://www.tmr.qld.gov.au/business-industry/Technical-standards-publications/Environmental-processes-manual.aspx.

TMR's environmental objective is 'Environmental management to support environmental conservation'. TMR is committed to meeting this objective, as is demonstrated in the environmental policy. The environmental policy outlines how TMR will management impacts on natural, human and cultural environments by:

- Meeting the statutory obligations of all relevant environmental and heritage legislation as a minimum standard
- Considering the effects on stakeholders and long-term relationships when carrying out statutory obligations, and seeking feedback on our performance
- Acting as a good government agency and adopting a proactive approach to environmental and heritage management
- Improving awareness of environmental and heritage management processes, standards and responsibilities among Main Roads' employees and contractors
- Ensuring Main Roads approach to the management of environmental and heritage impacts embrace the hierarchy of "avoid, minimise and mitigate" in a financially feasible manner

Further information about the Proponent's Environmental Management Framework is available at http://www.tmr.qld.gov.au/Community-and-environment/Environmental-management.aspx

7.4 Has the party taking the action previously referred an action under the EPBC Act, or been responsible for undertaking an action referred under the EPBC Act? ✓

Provide name of proposal and EPBC reference number (if known)

The Department has previously referred a range of actions from across Queensland. In relation to the South Coast Region, the most recent referrals are listed in the table below.

Table 7.1 Department of Transport and Main Roads South Coast Region EPBC Act Referrals

Reference number	Title of Referral	Date
2012/6423	Upgrade the Smith Street Motorway and Interchange with Labrador – Carrara Road, Parkwood, Gold Coast	12 June 2012
2011/6157	Realignment of the Cunningham Highway, Clayton's Gully	25 October 2011
2010/5673	Safety Improvements on Beechmont Road	6 October 2010
2014/7392	TransLink/Transport – land/Coomera to Helensvale/QLD/Heavy Rail Duplication	2 December 2014

8 Information sources and attachments

(For the information provided above)

8.1 References

- List the references used in preparing the referral.
- Highlight documents that are available to the public, including web references if relevant.

Additional references are contained within the GCLR Stage 2 Environmental Assessment Report:

Alt, S, Jenkins, A & Lines-Kelly, R 2009, *Saving Soil – A landholder's guide to preventing and repairing soil erosion*, NSW Department of Primary Industries, Accessed: 11 March 2014, Available: http://www.dpi.nsw.gov.au/agriculture/resources/soils/erosion/saving-soil

Aurecon (2014), *Connecting Heavy-rail and Rapid Transit Study (CHARTS) – Options Assessment Report*, Revision 4, prepared for the City of Gold Coast, February 2014.

Australian Bureau of Statistics (ABS) (2012), *2011 Estimate Resident Population*, Available: www.abs.gov.au/census

City of Gold Coast (CGC) (2013), *Gold Coast City Transport Strategy 2031*, March 2013.

City of Gold Coast (CGC) (2007), *Planning Policy 11: Land Development Guidelines – Section 13 Water Sensitive Urban Design Guidelines*, Accessed: 27 March 2014, Available: http://www.goldcoast.qld.gov.au/gcplanningscheme_policies/attachments/policies/policy11/section_13_0_introduction_WSUD_guidelines.pdf

Department of Environment (DoE) (2013), *Matters of National Environmental Significance: Significant impact guidelines Version 1.1*, Accessed: September 2015, Available: http://www.environment.gov.au/system/files/resources/42f84df4-720b-4dcf-b262-48679a3aba58/files/nes-guidelines_1.pdf

Department of Environment (DoE) (2014), Draft EPBC Act referral guidelines for the vulnerable koala (combined populations of Queensland, New South Wales and the Australian Capital Territory), Accessed: September 2015, Available: http://www.environment.gov.au/resource/draft-koala-referral-guidelines

Department of the Environment (DoE) (2015a), *EPBC Act Protected Matters Report*, Accessed: 19 August 2015.

Department of the Environment (DoE) (2015b), *Australian Wetlands Database: Ramsar wetlands - Moreton Bay*, Accessed: 9 September 2015, Available: http://www.environment.gov.au/cgi-bin/wetlands/ramsardetails.pl?refcode=41

Department of the Environment (DoE) (2015c), Species Profile and Threats Database: Pteropus poliocephalus – Grey-headed Flying-fox, Accessed: 9 September, Available: http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=186

Department of Environment and Heritage Protection (DEHP), 2010, *Offsets for Net Gain of Koala Habitat in South East Queensland Policy*, Accessed: 11 March 2014, Available: https://www.ehp.qld.gov.au/wildlife/koalas/strategy/pdf/offset-netgain.pdf

Department of Environment and Heritage Protection (DEHP) 2010, *Urban Stormwater Quality Planning Guidelines 2010*, Accessed: 17 April 2014, Available: https://www.ehp.qld.gov.au/water/policy/urban_stormwater_planning_guidelines.html

Department of Environment and Heritage Protection (DEHP), 2012a, *State Government Supported Community Infrastructure: Koala Conservation Policy*, Accessed: 11 March 2014, Available: https://www.ehp.qld.gov.au/wildlife/koalas/legislation/pdf/comm-infrastructure.pdf

Department of Environment and Heritage Protection (DEHP) 2012b, *Koala-sensitive design guideline: a guide to koala-sensitive design measures for planning and development activities*, November 2012, Accessed: 18 March 2014, Available: http://www.ehp.qld.gov.au/wildlife/koalas/legislation/pdf/koala-sensitive-design-guideline.pdf

FRC (2014), Coomera to Helensvale Rail Duplication: Assessment of Potential Impacts to MNES Relevant to Aquatic Ecology, Draft Report Prepared for Hyder Consulting, September 2014.

NSW Department of Environment, Climate Change and Water (NSW DECCW) (2010), *Draft National Recovery Plan for the Grey-headed Flying-fox* Pteropus poliocephalus. [Online]. Prepared by Woodhead, A. & P. Eby. Sydney: NSW DECCW. Available from: http://www.environment.nsw.gov.au/resources/threatenedspecies/08214dnrpflyingfox.pdf.

Planit Consulting (2014), Terrestrial Flora and Fauna Assessment EPBCA Threatened Species: Coomera to Helensvale Rail Duplication, Report Prepared for Hyder Consulting, September 2014.

Threatened Species Scientific Committee (TSSC) (2011), *Commonwealth Listing Advice on* Botaurus poiciloptilus *(Australasian Bittern),* Accessed: 9 September 2015, Available: http://www.environment.gov.au/biodiversity/threatened/species/pubs/1001-listing-advice.pdf

Threatened Species Scientific Community (TSSC) (2013), *Commonwealth Conservation Advice for Subtropical and Temperate Coastal Saltmarsh*, Accessed: 9 September 2015, Available: http://www.environment.gov.au/biodiversity/threatened/communities/pubs/118-conservation-advice.pdf

TransLink, Gold Coast City Council and Queensland Transport (2008), *Gold Coast Rapid Transit: Draft Concept Design and Impact Management Plan*, October 2008.

8.2 Reliability and date of information

For information in section 3 specify:

- source of the information;
- how recent the information is;
- how the reliability of the information was tested; and
- any uncertainties in the information.

The information in Section 3 was obtained from the Department of the Environment Protected Matters Search Tool, which was accessed initially on 19 February 2014 and accessed again on 19 August 2015 to identify any additional MNES listed since the 2014 report.

The field and desktop assessments to inform the assessment of impacts on aquatic and terrestrial and aquatic ecology were completed in February-March 2014, with additional detailed ecological surveys to map areas of potential habitat and confirm the initial ecological assessment undertaken in August 2015.

The limitations and assumptions of the *Ecology Technical Report* are outlined in Section 4.2 of Attachment 4.

8.3 Attachments

Indicate the documents you have attached. All attachments must be less than three megabytes (3mb) so they can be published on the Department's website. Attachments larger than three megabytes (3mb) may delay the processing of your referral.

Attachment Number	Description of Attachment
1	**Figure 1.1** – Proposed Gold Coast Light Rail Stage 2 alignment and project footprint
2	**Figure 1.2** – Existing Intra-Regional Transport Corridor and Road Corridors associated with GCLR Stage 2

Attachment Number	Description of Attachment
3	**Figure 1.3** – Properties partially or wholly intersected by the project footprint and table of properties intersected
4	Gold Coast Light Rail Stage 2 Environmental Assessment Report
5	Protected Matters Search Tool Report and Likelihood of occurrence assessment table
6	**Figure 3.1** – Ramsar Wetland and Directory of Important Wetlands within proximity to the GCLR Stage 2 project footprint
7	**Figure 3.3** – EPBC Act listed species and potential habitat
8	**Figure 3.4** – Koala Spot Assessment Technique Results
9	**Figure 3.5** – Potential Koala movement corridors and barriers
10	Gold Coast Light Rail Stage 2 Significant Species Management Plan
11	**Figure 3.7** – ASRIS Acid Sulfate Soils Probability Mapping
12	**GIS file of the GCLR2 project footprint**

		✓ attached	Title of attachment(s)
You must attach	figures, maps or aerial photographs showing the project locality (section 1)	✓	Refer to table above for list of figures Attachment 12 contains the boundary of the referral area
	GIS file delineating the boundary of the referral area (section 1)		
	figures, maps or aerial photographs showing the location of the project in respect to any matters of national environmental significance or important features of the environments (section 3)	✓	Attachment 6, Figure 3.1 Attachment 7, Figure 3.3
If relevant, attach	copies of any state or local government approvals and consent conditions (section 2.5)		
	copies of any completed assessments to meet state or local government approvals and outcomes of public consultations, if available (section 2.6)		
	copies of any flora and fauna investigations and surveys (section 3)	✓	Attachment 4, GCLR Stage 2 Environmental Assessment Report
	technical reports relevant to the assessment of impacts on protected matters that support the arguments and conclusions in the referral (section 3 and 4)	✓	Refer above
	report(s) on any public consultations undertaken, including with Indigenous stakeholders (section 3)		

9 Contacts, signatures and declarations

NOTE: Providing false or misleading information is an offence punishable on conviction by imprisonment and fine (s 489, EPBC Act).

Under the EPBC Act a referral can only be made by:

- the person proposing to take the action (which can include a person acting on their behalf); or
- a Commonwealth, state or territory government, or agency that is aware of a proposal by a person to take an action, and that has administrative responsibilities relating to the action[4].

Project title:

9.1 Person proposing to take action

This is the individual, government agency or company that will be principally responsible for, or who will carry out, the proposed action.

If the proposed action will be taken under a contract or other arrangement, this is:

- the person for whose benefit the action will be taken; or
- the person who procured the contract or other arrangement and who will have principal control and responsibility for the taking of the proposed action.

If the proposed action requires a permit under the Great Barrier Reef Marine Park Act[5], this is the person requiring the grant of a GBRMP permission.

The Minister may also request relevant additional information from this person.

If further assessment and approval for the action is required, any approval which may be granted will be issued to the person proposing to take the action. This person will be responsible for complying with any conditions attached to the approval.

If the Minister decides that further assessment and approval is required, the Minister must designate a person as a proponent of the action. The proponent is responsible for meeting the requirements of the EPBC Act during the assessment process. The proponent will generally be the person proposing to take the action[6].

1. Name and Title:	Peter Papantoniou
2. Organisation (if applicable):	Department of Transport and Main Roads
3. EPBC Referral Number (if known):	
4: ACN / ABN (if applicable):	39 407 690 291
5. Postal address	GPO Box 1549, Brisbane Qld 4001
6. Telephone:	07 3306 7305
7. Email:	Peter.a.papantoniou@tmr.qld.gov.au
8. Name of designated proponent (if not the	

[4] If the proposed action is to be taken by a Commonwealth, state or territory government or agency, section 8.1 of this form should be completed. However, if the government or agency is aware of, and has administrative responsibilities relating to, a proposed action that is to be taken by another person which has not otherwise been referred, please contact the Referrals Gateway (1800 803 772) to obtain an alternative contacts, signatures and declarations page.

[5] If your referred action, or a component of it, is to be taken in the Great Barrier Reef Marine Park the Minister is required to provide a copy of your referral to the Great Barrier Reef Marine Park Authority (GBRMPA) (see section 73A, EPBC Act*). For information about how the GBRMPA may use your information, see http://www.gbrmpa.gov.au/privacy/privacy_notice_for_permits.*

[6] If a person other than the person proposing to take action is to be nominated as the proponent, please contact the Referrals Gateway(1800 803 772) to obtain an alternative contacts, signatures and declarations page.

same person at item 1 above and if applicable):
9. ACN/ABN of designated proponent (if not the same person named at item 1 above):

COMPLETE THIS SECTION ONLY IF YOU QUALIFY FOR EXEMPTION FROM THE FEE(S) THAT WOULD OTHERWISE BE PAYABLE

I qualify for exemption from fees under section 520(4C)(e)(v) of the EPBC Act because I am:

□ an individual; OR

□ a small business entity (within the meaning given by section 328-110 (other than subsection 328-119(4)) of the *Income Tax Assessment Act 1997*); OR

X not applicable.

If you are small business entity you must provide the Date/Income Year that you became a small business entity:

Note: You must advise the Department within 10 business days if you cease to be a small business entity. Failure to notify the Secretary of this is an offence punishable on conviction by a fine (regulation 5.23B(3) *Environment Protection and Biodiversity Conservation Regulations 2000* (Cth)).

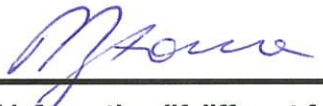
COMPLETE THIS SECTION ONLY IF YOU WOULD LIKE TO APPLY FOR A WAIVER

I would like to apply for a waiver of full or partial fees under Schedule 1, 5.21A of the EPBC Regulations. Under sub regulation 5.21A(5), you must include information about the applicant (if not you) the grounds on which the waiver is sought and the reasons why it should be made:

X not applicable.

Declaration

I declare that to the best of my knowledge the information I have given on, or attached to this form is complete, current and correct.
I understand that giving false or misleading information is a serious offence.
I agree to be the proponent for this action.
I declare that I am not taking the action on behalf of or for the benefit of any other person or entity.

Signature  Date 25/9/15

9.2 Person preparing the referral information (if different from 8.1)

Individual or organisation who has prepared the information contained in this referral form.

Name	Cassandra Arkinstall
Title	Environmental Scientist
Organisation	Aurecon Australasia Pty Ltd
ACN / ABN (if applicable)	54 005 139 873

Postal address	Locked Bag 331, Brisbane Qld 4001
Telephone	07 3163 8765
Email	Cassandra.arkinstall@aurecongroup.com
Declaration	I declare that to the best of my knowledge the information I have given on, or attached to this form is complete, current and correct. I understand that giving false or misleading information is a serious offence.
Signature	C. Arkinstall. Date 25 September 2015

REFERRAL CHECKLIST

NOTE: This checklist is to help ensure that all the relevant referral information has been provided. It is not a part of the referral form and does not need to be sent to the Department.

HAVE YOU:

- ❑ Completed all required sections of the referral form?
- ❑ Included accurate coordinates (to allow the location of the proposed action to be mapped)?
- ❑ Provided a map showing the location and approximate boundaries of the project area?
- ❑ Provided a map/plan showing the location of the action in relation to any matters of NES?
- ❑ Provided a digital file (preferably ArcGIS shapefile, refer to guidelines at Attachment A) delineating the boundaries of the referral area?
- ❑ Provided complete contact details and signed the form?
- ❑ Provided copies of any documents referenced in the referral form?
- ❑ Ensured that all attachments are less than three megabytes (3mb)?
- ❑ Sent the referral to the Department (electronic and hard copy preferred)?

Attachment A

Geographic Information System (GIS) data supply guidelines

If the area is less than 5 hectares, provide the location as a point layer. If the area greater than 5 hectares, please provide as a polygon layer. If the proposed action is linear (eg. a road or pipline) please provide a polyline layer.

GIS data needs to be provided to the Department in the following manner:

- Point, Line or Polygon data types: ESRI file geodatabase feature class (preferred) or as an ESRI shapefile (.shp) zipped and attached with appropriate title
- Raster data types: Raw satellite imagery should be supplied in the vendor specific format.
- Projection as GDA94 coordinate system.

Processed products should be provided as follows:

- For data, uncompressed or lossless compressed formats is required - GeoTIFF or Imagine IMG is the first preference, then JPEG2000 lossless and other simple binary+header formats (ERS, ENVI or BIL).
- For natural/false/pseudo colour RGB imagery:
    - If the imagery is already mosaiced and is ready for display then lossy compression is suitable (JPEG2000 lossy/ECW/MrSID). Prefer 10% compression, up to 20% is acceptable.
    - If the imagery requires any sort of processing prior to display (i.e. mosaicing/colour balancing/etc) then an uncompressed or lossless compressed format is required.

Metadata or 'information about data' will be produced for all spatial data and will be compliant with ANZLIC Metadata Profile. (http://www.anzlic.org.au/policies_guidelines#guidelines).

The Department's preferred method is using ANZMet Lite, however the Department's Service Provider may use any compliant system to generate metadata.

All data will be provide under a Creative Commons license (http://creativecommons.org/licenses/by/3.0/au/)