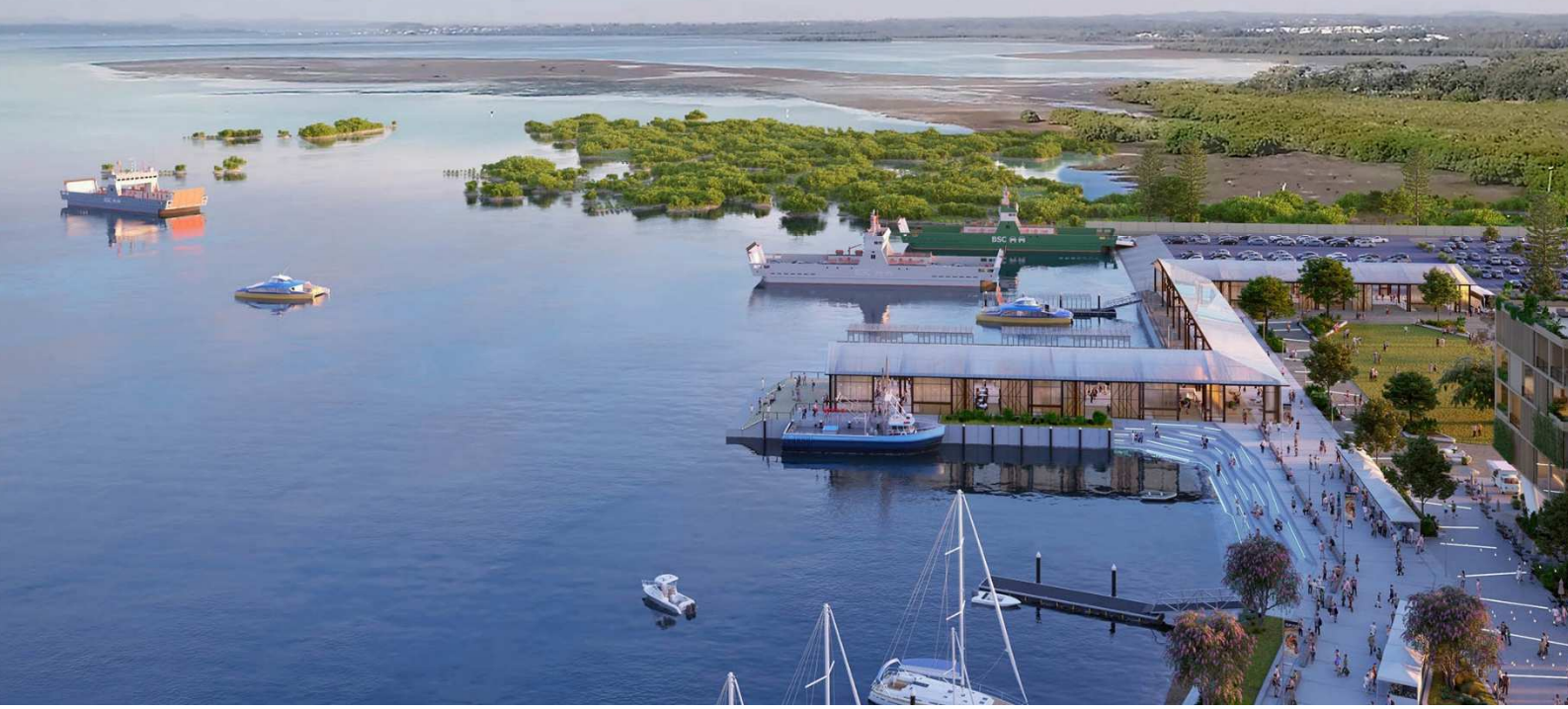
Toondah Harbour Project
Environmental Impact Statement

Supplementary Report

Prepared for Walker Group
24 November 2023



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Executive Summary

Introduction

Toondah Harbour is an existing marine facility located in the suburb of Cleveland in the Redland City Local Government Area (LGA), approximately 30 kilometres (km) south east of Brisbane. Toondah Harbour was constructed on reclaimed land and has been operational since 1972 when it was used as an industrial barge terminal to support sand mining operations on Minjerribah (North Stradbroke Island). The harbour currently serves as the base for water taxi, passenger and vehicle ferry services between the mainland and Minjerribah.

In June 2013, at the request of Redland City Council (RCC), the Queensland Government declared Toondah Harbour a priority development area (PDA) under the *Economic Development Act 2012* (ED Act). The intent of the PDA is to revitalise the harbour, improve the transport function by better integrating ferry and bus services and managing car parking, and establish Toondah Harbour as a high-quality urban environment that capitalises on the amenity of Moreton Bay.

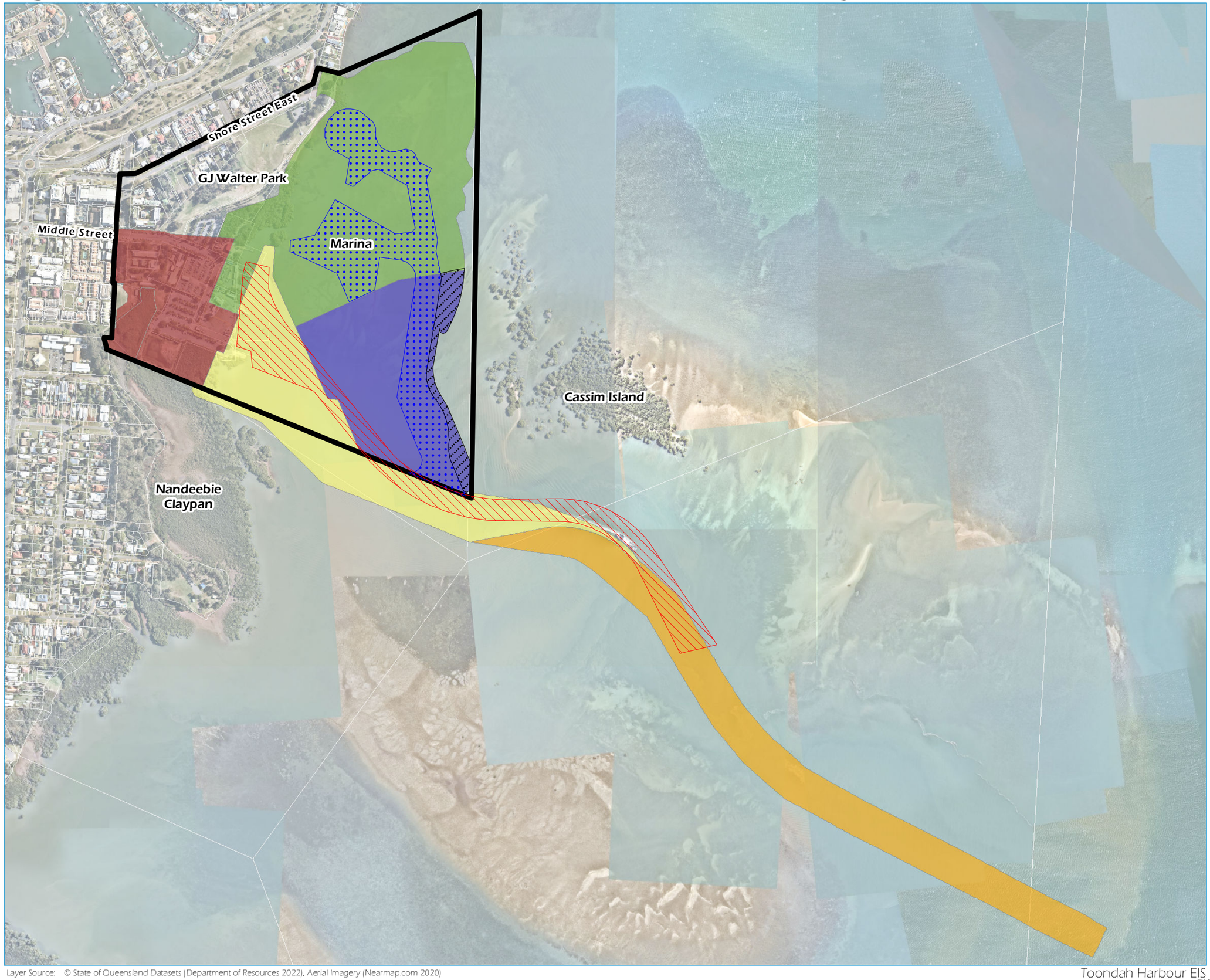
In September 2014, Walker Group Holdings Pty Ltd (the Proponent) was announced by RCC and the Queensland Government as the preferred development partner to redevelop the government owned land in the PDA. The Toondah Harbour Project (the Project) includes the following key components:

- Capital dredging of up to 530,000 m^3 of marine sediment to expand Fison Channel so that it meets minimum requirements for safe navigation set out in the Permanent International Association of Navigational Congresses (PIANC 2014) Harbour Approach Channels Design Guidelines. Currently, the channel is approximately 45 m wide (excluding batters) with a target depth of -2.5 m below Lowest Astronomical Tide (LAT). The Project proposes to widen the channel to 75 m (excluding batters), with a target depth of -3 m LAT. Dredging will be undertaken in two separate campaigns with Stage 1 encompassing the turning basin and inner Fison channel and Stage 2 the outer Fison Channel.
- All dredged and excavated sediments generated by capital dredging will be beneficially reused to reclaim a portion of the sub-tidal area north of the harbour to create new landforms for proposed public open space, including community facilities, and urban uses.
- Up to 200 wet berths within a marina basin and internal waterways providing access to Fison Channel.
- The reclamation will be formed in two discrete stages – north and south. For each stage, a perimeter bund will be established to contain the dredged material, which will limit indirect impacts outside of the project footprint. The reclamation has been designed to balance dredge material volumes with fill requirements, minimising the need to import fill or dispose of dredge material offsite.
- New harbour and public transport infrastructure, facilities and amenities for ferry customers and visitors will be constructed south of the existing vehicle ferry loading area. These works will be undertaken concurrently with the first reclamation stage.
- Proposed uses on the reclamation areas and the new harbour include a hotel, residential apartments, retail and commercial development centred around a new marina plaza. A further residential precinct will be located in the western part of the PDA.
- A network of open space and recreation areas including a 3.5 ha foreshore park, education centre, boardwalks, plazas, walking paths, neighbourhood parks and a ramp for non-motorised vessels such as kayaks and dinghies.
- Installation of civil infrastructure and services – such as electrical, gas, telecommunications, water supply, sewerage infrastructure and roads will keep pace with development projects.

Project key components are shown on **Figure ES-1** with an image of Toondah Harbour provided as **Plate ES-1**.

Plate ES-1: Toondah Harbour

Figure ES-1: Key Components of the Toondah Harbour Project



Legend

- Toondah Harbour PDA
- Old DCDB
- Harbour Precinct
- Stage 1 Reclamation
- Stage 2 Reclamation
- Stage 1 Dredging – Turning Basin and Inner Channel
- Stage 2 Dredging – Outer Channel
- Marina & internal navigation waterways
- Dredge Spoil Pond and Break Wall
- Existing Turning Basin and Entrace Channel

TOONDAH HARBOUR

walker

0 100 200 300 400 m

GDA 1994 MGA zone 56 Scale (A3): 1:8,600

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Toondah Harbour EIS

FILE REF. 9858 E Figure 1_2 Toondah Harbour Key Components E

The Project was referred under the EPBC Act to the Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEEW) on **5 June 2018** (EPBC Reference number 2018/8225) and was made a controlled action on **23 July 2018**, to be assessed by environmental impact statement (EIS).

The Proponent prepared a Draft EIS in accordance with the final guidelines which was published for a period of 40 business days for public review and comment. The public comment period commenced on **12 October 2022** and concluded on **6 December 2022**.

Following the public comment period, all submissions received were reviewed and collated to summarise issues raised. In order to finalise the EPBC Act process for the Project the proponent must take all comments received into account and provide a summary to DCCEEW of the comments received and how they have been addressed.

This Supplementary Report has been prepared to summarise and respond to comments received on the Draft EIS for the Toondah Harbour Project. In doing so the report addresses section 104(2) of the EPBC Act which states that the finalised environmental impact statement must:

1) take account of any comments received within the period for comment; and
2) contain a summary of any such comments and how those comments have been addressed.

The purpose of this report is to:

- Document the public consultation process implemented prior to and during the release of the Draft EIS.
- Summarise submissions received from the community and government agencies during the comment period, noting that a number of discussions have been held with various community groups and agencies prior to, during and post the comment period.
- Respond to comments raised during public consultation including providing additional technical information and studies where required.

This Supplementary Report addresses issues raised through the EIS process, and in conjunction with the Draft EIS, is considered the Finalised Environmental Impact Statement (Final EIS) for the Toondah Harbour Project under the EPBC Act.

Public Consultation

A range of community and stakeholder engagement activities were undertaken prior to and during the public notification period or the Draft EIS. Engagement activities included:

<u>Prior to Draft EIS Release</u>

- Face-to-face community drop-in sessions in the local area.
- Online community drop-in sessions (promoted as Talk Toondah sessions).
- Formation of three technical focus groups and facilitation of meetings with each group.
- Key stakeholder meetings.
- A staffed project information centre was established in the Cleveland CBD.
- A Project telephone hotline and email address.

During Public Notification of the Draft EIS

- Displays of the full Draft EIS document at multiple key locations in the project area.
- An online Virtual Information Centre with the full Draft EIS available for viewing.
- Project website.
- Advertising (print and digital) and press releases.
- Social media and Electronic Direct Mail (EDM).
- Stakeholder meetings.
- Pop up displays.

The steps taken by the proponent exceeded the EPBC Act requirements for public notification and comment. Activities undertaken in addition to those required under the EPBC Act included:

- Providing hard copies of the Draft EIS to three local libraries (the EBPC Act only requires one). Over 150 USB sticks were also provided in the libraries for people to take digital versions of the Draft EIS home.
- An online Virtual Information Centre (VIC) providing a range of resources including information sheets and flythroughs and 3D renderings of the Project.
- Hosting 16 pop up information sessions in a range of public places such as shopping centres.
- Four online information sessions (Toondah Talk) for the community to ask questions directly to the project scientists and technical experts.

A series of meetings and workshops were also held with relevant Commonwealth and Queensland Government departments during and post the public notification period. Meetings held post-publication of the Draft EIS covered a range of technical disciplines.

Invitations were individually emailed to the respective Chief Executive Officers and Presidents of Birdlife Australia, the Australian Conservation Foundation, the Queensland Wader Study Group, the Koala Action Group and Redlands 20230 for an EIS briefing session. These sessions were offered as an opportunity for each group to gain important technical and scientific information and to ask questions directly to the project team, ecologists and scientists. None of these groups responded to the initial invitation and a subsequent follow up invitation.

During the public notification period, Birdlife Australia held multiple community workshops on the Draft EIS, and promoted these sessions as being run by the 'Toondah Alliance', a combination of Australian Conservation Foundation, Birdlife Australia, and Redlands2030.

During the workshops, the presenters provided an overview of the Project, information on the EIS process and timeline, as well as guide packs on how to make a submission. A range of the information included in the information pack was factually incorrect or misrepresented the Draft EIS. Examples of information provided vs facts from the Draft EIS are included in **Table ES-1**.

Table ES-1: Birdlife Australia Guide Pack Inaccuracies

Inaccurate Statement	Factually Correct Statement
Toondah Harbour provides important feeding and roosting habitat for more than 40,000 EPBC-listed migratory shorebirds over the Australian summer.	The Draft EIS (Section 17.3.7) found that the total migratory shorebirds recorded feeding on the Toondah Harbour tidal flats was an average of 98 birds in 2014/15 and an average of 29 in 2021/22. In the last 5 years an average of 3 Eastern Curlews have been observed on the mudflat.
The Draft EIS does not address the life stage of the birds impacted by the Project. Studies by QWSG suggest that intertidal areas similar to and including those found at Toondah Harbour may contain a sizeable proportion of juvenile Eastern Curlews.	Surveys carried out at the site and surrounding areas included winter surveys when juvenile migratory shorebirds that had not migrated for breeding season would still be present. Over 5 years no Eastern Curlew were observed on the Toondah Harbour mudflat during winter. They have been observed at the sandbank offshore of Toondah Harbour and Oyster Point during winter surveys. Those sites are over 2 km and 450m from the proposed channel extension respectively. Oyster Point is also more than 550m from the reclamation area or harbour upgrade works, more than double the recommended buffer distance.
The Draft EIS claims there are precedents for developments within Ramsar boundaries nationally and internationally. This claim and the precedents presented are misleading.	As identified in Chapter 4 of the Draft EIS the Riverwalk development (EPBC 2006/3176) in Victoria was approved to deliver 2,200 residential lots and other urban uses over a 197 ha area within the Port Phillip Bay (Western Shoreline) and Bellarine Peninsula Ramsar Site. Other examples are also provided in the Supplementary Report.
The Draft EIS…. implies that the Project is justified in destroying tidal flats at Toondah Harbour – because the real problem occurs overseas.	The Draft EIS does not justify impacts by saying the real problem is overseas. It references a range of peer reviewed literature that recognise shorebird species with the greatest reliance on the Yellow Sea as a stopover site have experienced the greatest population declines.
The Draft EIS considers tidal feeding habitat within the Project footprint as separate to the Moreton Bay Ramsar Site.	Tidal feeding habitat is addressed in the context of the Ramsar site in Chapter 27 of the Draft EIS. Assessment found that shorebird density within the Project footprint was generally low compared to other areas of the Ramsar site.
The Draft EIS fails to address the cumulative impacts resulting if the Project is approved.	Cumulative and consequential impacts are addressed in Chapter 26 of the Draft EIS.
Recent surveys conducted by BirdLife Australia staff counted between 160 and 180 Eastern Curlew at Oyster Point, a key roosting site within the impact area of the Proposal. This number far exceeds what was presented in the draft EIS.	Section 17.3.3.3 of the Draft EIS states maximum Eastern Curlew counts at Oyster Point as 130. Similar to the Birdlife Australia counts. Oyster Point is 450m south of proposed channel extension and more than 550m from the reclamation area or harbour upgrade works, more than double recommended buffer distances. It is not expected to be impacted by the Project.
Impacts of activities such as dredging and sediment, light pollution, sound pollution, contamination risk, have not been addressed for their cumulative and multiplier effects.	The Draft EIS addresses all impacts over the life of the project including construction and ongoing use.

Inaccurate Statement	Factually Correct Statement
The EIS claims the project will result in no increase in vessel traffic, despite the plan to construct a 400-berth marina.	The project includes a 200-berth marina, not 400. The Project will result in the removal of an existing recreational boat ramp which is expected to result in no net increase in recreational boat traffic. The proponent will fund upgrades to a nearby boat ramp to offset removal of the ramp.
The Proponent's advertising has consistently contained appealing artists impressions of the project, whilst omitting to show the 80 or so high rise residential towers that will contain 3600 units.	Accurate 3D renderings of the Project have been provided in the Draft EIS. While the number of buildings has not been finalised, it is expected to be closer to 50 buildings in total. More than half of the buildings will be 4 storeys or less.
The proposal also includes large scale commercial development	The project only includes a minor commercial component (2,500 m^2) most of which is required to support the harbour and marina.
No traffic mitigation measures have been suggested for other streets [aside from Middle Street] in or around the Toondah Precinct.	A range of measures have been identified for other streets including prohibiting construction traffic from Shore Street East and designating that road as a 40km/hr road and fitted with electronic signage to indicate vehicle speed and warn of koalas crossing. Walker will also fund a Cleveland Koala Safe Neighbourhood program in partnership with RCC.

Submissions Summary

A range of submission types were received over the public notification period. Nearly all submissions were lodged electronically to the email inbox with a small number provided through the PO Box. In addition to being supplied electronically, most submissions were provided via 'portal' websites or online forms that either pre-filled or provided pre-composed content to be included in the submission. These portal websites lodged a submission on behalf of an individual or entity after they had entered details such as their name and email address into an online form. It should be noted that under the EPBC Act there are no rules or minimum requirements to determine what constitutes a 'properly made' submission – any comment received during the public notification period is counted.

A total of 26,225 submissions were received during the public notification period for the Draft EIS. Of these 1,939 were from people who made multiple submissions, resulting in a total of 24,286 unique submitters. Some individuals made more than 50 submissions on the Project. Statistics on public sentiment refer only to the number of **submitters** (i.e. that person is either for or against the Project no matter the number of individual submission they lodged) while statistics on issues raised included all **submissions**, no matter who sent them.

Submitters from the Redland City LGA – a total of 3,211 – show 52% of are in support of the Project. Submitters from the suburb of Cleveland - a total of 936 – show 58% are supportive (**Table ES-2**). Overall sentiment showed the majority of submitters outside of the Redlands oppose the Project. The majority of these submissions were in response to a national mail out campaign that was linked to a 'portal' platform and online forms that either pre-filled or provided pre-composed content to be included in the submission. The campaign mail outs and portals did not provide important site and contextual information, project imagery or plans. No links to the EIS documentation were provided. Many of these forms and other collateral included factually incorrect information about the Project (refer to Table ES-1).

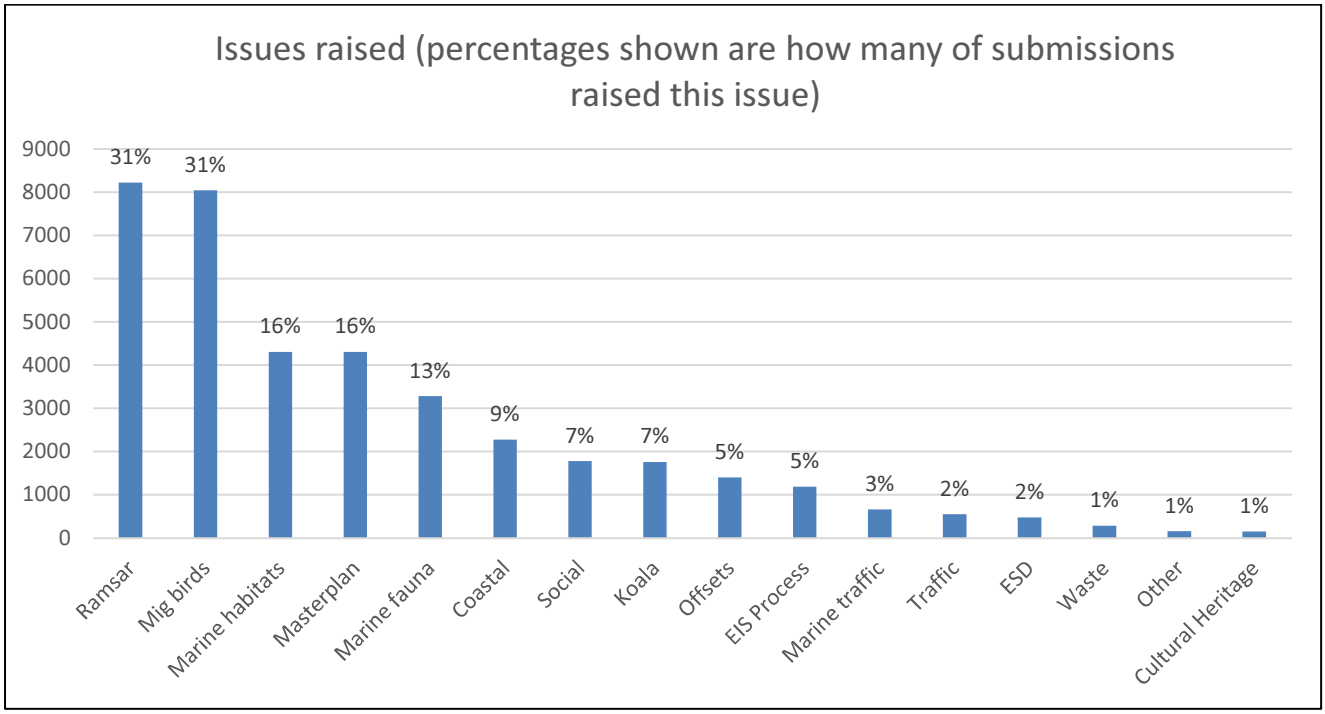
Table ES-2: Summary of Submitter Sentiment

	Submitters	Positive		Against	
Cleveland	943*	545	58%	390	42%
Redland LGA	3,211*	1,680	52%	1,528	48%
All Areas	24,286*	3,372	14%	20,895	86%

* a small number of submissions were neutral

The analysis of submissions showed that issues most commonly raised were around Ramsar and migratory birds, with approximately 31% of submissions raising each of these topics. The next most frequently raised issues were marine habitats and masterplan (16%). These issues were followed by coastal processes (9%), social (7%), koala (7%), offsets (5%) and the EIS process (5%). This analysis considered all submissions received, including those from repeat submitters.

It should be noted that the number of times a matter has been raised does not necessarily reflect the number of comments requiring response. For example, Ramsar was one of the issues consistently raised by submissions, however most comments on the Ramsar site related to the Project not meeting the definition of "wise use" or being inconsistent with Australia's obligations under the Ramsar site. This meant that several thousand submissions are addressed through a small number of responses. Alternatively, while koala impacts were raised by relatively fewer submissions some of those submissions were highly detailed with several comments requiring response.



Project Description Updates

Amendments have been made to the masterplan as a result of the comments received through public submissions and ongoing consultation with DCCEEW. These changes include incorporating additional open space and providing larger

buffers to sensitive receptors. A range of additional studies have also been completed providing further justification and details on the Project design and construction.

Masterplan Optimisation

The Project has responded to site constraints, and ongoing consultation with relevant experts and DCCEEW, to avoid and minimise impacts to marine habitats and adjacent sensitive receptors such as Cassim Island by reducing the footprint by **over a third** from the first version of the master plan released in 2015. Since that time, the project, excluding the turning basin and entrance channel has been reduced by approximately 20.3 ha (**Figure ES-2**).

Final EIS Masterplan

The Final EIS masterplan is provided as **Figure ES-3**. The overall footprint area of the Project has not changed from the Draft EIS however the internal layout has been modified to ensure of a 250 m buffer between urban uses and the most westerly mangroves of Cassim Island. Open space, park areas and the education centre facilities have also been increased from what was shown in the Draft EIS masterplan to provide a more accurate indication of the mix of uses.

Community Infrastructure Provided by the Project

The Project will include significant investment in public infrastructure, most of which will be delivered within the first five years of works commencing. Approximately $100 million will be invested in infrastructure including major upgrades of sub-tidal and land-based infrastructure at the boat harbour, new foreshore parks and car parking, promenades, and community buildings. This calculation doesn't include smaller publicly accessible parks and open space areas around buildings, or retail, cafes and other public spaces which will also provide benefits to the community.

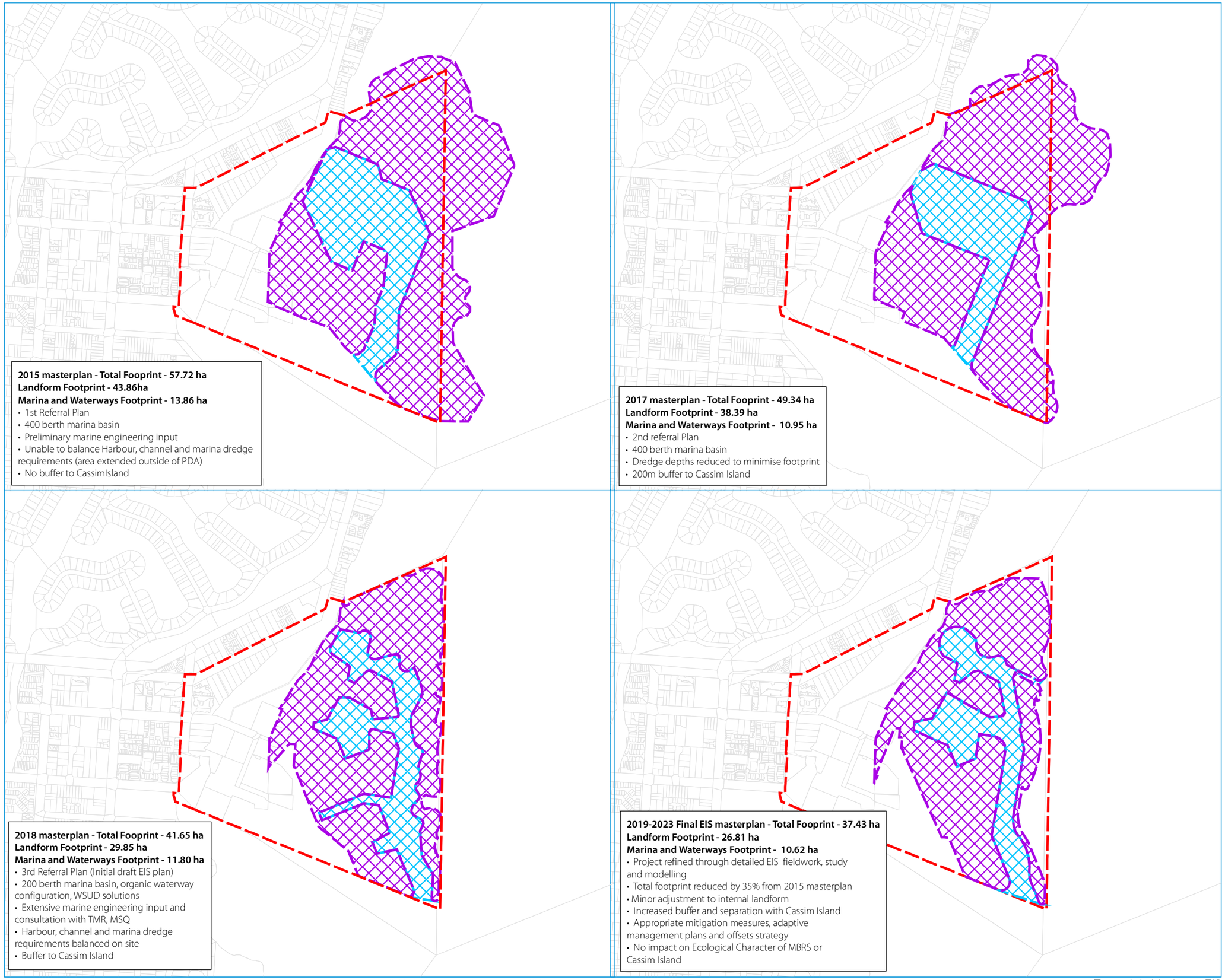
Alignment with the Toondah Harbour PDA Development Scheme

The Project is located within the Toondah Harbour PDA therefore is subject to the Toondah Harbour PDA Development Scheme. The development scheme is the regulatory document that controls land use, infrastructure planning and development in the PDA. PDAs are parcels of land within Queensland identified for development to deliver significant benefits to the community.

An assessment of the Project against the Toondah Harbour PDA Development Scheme has been completed. The key outcomes of this assessment are:

- The Master Plan is consistent with the Structure Plan, as it contains the core elements and land uses contemplated by the Structure Plan as described in section 3.3.2 of the Development Scheme.
- Notwithstanding some differences from the spatial layout of the Structure plan elements, the Masterplan is consistent with the PDA vision of the Development Scheme particularly given that the Development Scheme sets the broad planning principles but does not restrict the Development to any particular form.
- While the Structure Plan identifies "indicative" locations for the key land reclamation and marina opportunities, the Development Scheme does not preclude other designs and their respective technical, engineering and environmental inputs from being considered.
- As a result of the detailed planning process, it was determined that the configuration of the reclamation and marina as depicted in the Structure Plan is not technically or environmentally practicable and would not necessarily support the PDA Vision or the provisions of the Development Scheme.

Figure ES-2: Change to Project Footprint Over Time



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Toondah Harbour EIS

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DATE: 31/07/2023

FILE REF. 9858 E Figure 4_1 Change to Footprint A

Figure ES-3: Toondah Harbour Final EIS Masterplan

Redlands Housing Strategy Assessment

A housing and demand study for the Redland LGA has been completed as part of the Supplementary Report. The study includes an assessment of how the Project aligns with public policy objectives at a local, state, and federal level, including Toondah Harbour's contribution towards strategic economic development and housing targets. The Project will play a pivotal role in Redland LGA achieving its strategic objectives including delivery of 200 new apartments per year (Redland Housing Strategy 2011-2041) and providing 12,500 new consolidation dwellings (SEQ Regional Plan 2017). It is noted that the Draft Redland Housing Strategy 2023-2046 identified the need to deliver 6,000 apartments or 'smaller dwellings' by 2046. This would equate to delivering 400 new apartments per year, doubling the goals of the previous strategy. Of significance to achieve this ambition of delivering 400 new apartments annually, the report found that on average across the last 3 years there were only 110 apartments approved per year a shortfall of 72.5% of the target based only on approvals. The ongoing shortfall equation compounds even further when looking at actual delivered supply only as 65% of approved projects progress to construction.

Cleveland, where the Project is located, is identified as a Principal Activity Centre under the SEQ Regional Plan 2017, identifying it for primarily multiple dwelling development. Cleveland's role as a Principal Activity Centre is characterised by its connection to public transport, retail centres, health and personal services, and social amenity. These factors were influential in the designation of Toondah Harbour as a PDA in 2013 and highlight the development's role as a provider of suitable housing for the region's population to age within their established community. The Project is positioned uniquely, in that much of its proposed infrastructure is of regionally significant scale. Opportunities are scarce at other locations within the Redland LGA to facilitate comparable development. This is particularly true with respect to the port upgrade, alterations to the channel, and the significant public foreshore parklands.

It should be noted that the recent draft Shaping SEQ 2023 update has revised the dwelling supply targets to approximately 68% - 70% consolidation dwellings. This will require established areas and Principal Activity Centre such as Cleveland to deliver a greater amount of consolidation dwellings to meet the current housing crisis and ongoing housing diversity and supply, over the next two decades.

History of Toondah Harbour

A review of the history of development proposals at Toondah Harbour and, more broadly, options to provide access from the mainland to Minjerribah (North Stradbroke Island) was completed by Redland Investment Corporation (RIC) for the Supplementary Report.

All plans for development at Toondah Harbour have included dredging and some form of reclamation with one proposal in 1988 showing a reclamation area stretching east of Cassim Island. The Queensland Government provided a lease for this work however it did not progress. Further planning studies were completed throughout the 1990s and 2000s leading to the establishment of the Toondah Harbour Priority Development Area in June 2013.

The long history of proposals at Toondah Harbour and other locations in the Redland LGA show the need to provide improved boating facilities and access to Minjerribah (North Stradbroke Island) has existed for several decades. Many of these proposals have been supported by local and state government with several going to public tender. The inability to progress any of the past options were due to the prohibitive costs to the public to upgrade the port, harbour and channel and the inability to provide buffers and appropriate interfaces to the surrounding environment. The Toondah Harbour proposal has addressed these issues through best practice design responses, private investment and bi-partisan government and local support.

Detailed Description of the Site and Action

Two additional studies were completed in response to comments on the marine works. Specifically, additional details are provided on the design process and parameters for the turning basin and entrance channel as well as early works at the reclamation site to outline how the initial construction pad and excavation works will be implemented while minimising environmental impacts.

Dredge and Turning Basin Design

Additional detail and justification on the design process for the extension of Fison Channel and the harbour turning basin has been provided.

The proposed dredging has been identified as necessary to provide and maintain navigation access and safety for Toondah Harbour. It is a requirement of the PDA Development Scheme infrastructure plan to 'undertake dredging to straighten and widen the existing Fison Channel'. The land use plan for the PDA also outlines dredging and channel access requirements which include 'extending the swing basin to meet the needs of the existing and future vehicle ferries and contributing to the gradual straightening of Fison Channel'.

The channel and turning basin have been designed to provide a two-way channel for the adopted future design vessel using the Harbour Approach Channels Design Guidelines, PIANC Report No 121 Maritime Navigation Commission (2014). These guidelines are accepted as best practice throughout the world. The design of navigation channels and turning basins in PIANC (2014) is based on the largest vessel likely to regularly utilise those areas, which is termed the 'design vessel'. The design vessel (80m x 15m) is not significantly larger than the largest existing vessel in use (67.68m x 13m) and would be appropriate to use at Toondah Harbour. This design basis was supported by the Regional Harbour Master for Toondah Harbour.

It is noted that, based on the design parameters, the existing Fison Channel does not meet the minimum widths for a safe two-way channel for the existing largest vessel (the MV Minjerribah). This vessel has a beam of 13m, which would result in a channel width of 65m. The current channel has a width of approximately 45m. The turning basin is also well below the recommended widths for safe navigation. The existing turning basin width is approximately 80m. Based on the existing largest vessel the turning basin diameter should be at least 135m.

Reclamation Early Works

Additional detail on how early works for the reclamation will be implemented has been provided including details on how construction of the initial bund area and working pad will be completed while minimising environmental impacts.

Additional Assessment Updates

Comments received through the public submissions process have been categorised in accordance with the technical studies completed for the Draft EIS. Responses have been provided for each issue/comments, many of which required contributions from subject matter experts in the Project team.

Soils, Sediment and Contaminated Land

Additional studies completed as part of the Supplementary Report for the soil, sediment and contaminated land assessment include a Draft Acid Sulfate Soils Management Plan (ASSMP) for the dredging and reclamation works and a Detailed Site Investigation (DSI) of potential contamination sources within the terrestrial areas of the Project footprint.

The Draft ASSMP includes a range of measures for managing ASS through the dredging and reclamation process, including additional sampling prior to works commencing to better define the extent and concentration of ASS, liming rates for different management areas and procedures for ongoing testing and management.

The scope of the DSI was to undertake soil and groundwater assessment to address the data gaps identified in the Preliminary Site Investigation completed for the Draft EIS. The DSI included:

- Soil assessment across the nominated investigation areas at the site.
- Installation of groundwater monitoring bores at targeted locations near potential sources of contamination.
- Development and sampling of new and existing groundwater monitoring bores
- Laboratory analysis of soil and groundwater samples for contaminants of potential concern
- Preparation of a report detailing the works undertaken and recommendations for further investigation, management or remediation works (if required).

Field sampling consisted of the advancement of 79 boreholes with a depth between one and four metres below ground surface (mbgs), or 0.5 m into natural soil. Seven bores were extended up to 5.5 mbgs and converted into groundwater monitoring bores for future sampling. The groundwater bores were in addition to the nine boreholes installed during groundwater investigations for the Draft EIS.

The DSI identified a number of areas of soil and/or groundwater contamination associated with existing sources on site. Based on the nature and extent of contamination identified, it was concluded that on-site remediation can be incorporated into the site construction works, although some off-site disposal of contaminated soil material may be required depending on the outcomes of additional sampling to be completed prior to the commencement of specific site activities.

Coastal Processes and Maritime Engineering

No additional investigations were required to respond to public comments on coastal processes. Comments generally only required clarifications of existing information provided in the Draft EIS.

Air Quality

While a range of comments were received on the air quality assessment, most were associated with impacts on amenity and not Matters of National Environmental Significance (MNES). Additional modelling was completed to demonstrate compliance with relevant guidelines.

Noise and Vibration

Additional noise and vibration assessment completed for the Supplementary Report was associated with developing a simple geometric spreading model for underwater noise and vibration assuming a reflective seabed and accounting for depth of water.

The additional assessment of underwater noise and vibration completed for the Supplementary Report found underwater noise levels may be slightly higher than those predicted in the Draft EIS, however the increases are minor and would not be expected to result in additional or more intense impacts to marine fauna.

Koala and Terrestrial Ecology

No additional investigations were required to respond to public comments on koala and terrestrial ecology. Comments generally required clarifications and minor additional information to existing information provided in the Draft EIS.

Migratory Shorebirds

No additional investigations were required to respond to public comments on migratory shorebirds. Comments generally only required clarifications and minor additional information to existing information in the Draft EIS. While the comments received did not trigger a need for additional surveys, shorebird surveys were completed at in October 2023 to add to the data collected for the Draft EIS.

Seven high tide surveys were conducted at the Oyster Point and Nandeebie Claypan roost sites over the week of 22 to 28 October 2023 A single low tide survey was conducted on 21 October 2023 on the Toondah Harbour mudflat. Key outcomes from the additional surveys were:

- Migratory shorebirds were found using the Oyster Point roost on all seven surveys including up to 239 Eastern Curlew and 411 Bar-tailed Godwit. The observation of 239 Eastern Curlew during a single survey represents the largest number of Eastern Curlew recorded roosting at Oyster Point over the past 23 years.
- Migratory shorebirds were found using the Nandeebie Claypan roost on four of the seven surveys, including up to 133 Eastern Curlew and 35 Bar-tailed Godwit. The observation of 133 Eastern Curlew represents the largest number of Eastern Curlew recorded roosting at Nandeebie over the past 28 years. On all occasions that migratory shorebirds were recorded at Nandeebie, the birds were first recorded roosting at Oyster Point and moved to Nandeebie only after they had been disturbed.
- A total of 35 migratory shorebirds were observed foraging on the mudflats within the Toondah Harbour PDA, including 8 Bar-tailed Godwits and 7 Eastern Curlews. These numbers are consistent with previous surveys completed for the Draft EIS.

Despite the long duration and high frequency of past monitoring of shorebirds using Nandeebie Claypan and Oyster Point, the October 2023 surveys recorded larger numbers of Eastern Curlew roosting at both sites than during any previous surveys or QWSG counts. The increased use of Oyster Point is also broadly consistent with community reports over the past year. This increase has coincided with the loss of the offshore sandbank roost site located 2 km east of Toondah Harbour which has been eroded over the previous 12 months by natural hydrological processes to the point that it now does not remain exposed during high tides.

The October 2023 survey results to not change the assessment of the impacts of the project on migratory shorebirds (including threatened species such as Eastern Curlew) in the Draft EIS, since the assessment of impacts was undertaken under the assumption that Nandeebie Claypan was an important roost site for shorebirds (including threatened species such as Eastern Curlew) based on historical use. The Draft EIS impact assessment found, amongst other things, that there is a 50 m buffer between the roost site and the closest project feature, which is the extended car parking for the ferry terminal. This is similar to the current buffer of 50 m to the existing dredge spoil pond. The buffer is dominated by mangrove forest which provides a visual and sound barrier from ferry terminal operations. No buildings will be located within 250 m of the Roost site and the new ferry terminal, which will be near its current location therefore is not expected to result in an increase in impacts compared to current operations.

Marine Ecology and Water Quality

Additional studies completed as part of the Supplementary Report for the marine ecology and water quality assessments include:

- A draft silt curtain procedure for dredging operations.
- Additional assessment of the potential for the Project to impact on White's Seahorse.
- Additional assessment on the risk of vessel strike on Threatened and Migratory Marine Species.

A draft procedure has been developed to outline a process for the deployment of silt curtains during stage 1 and 2 of capital dredging associated with the Project. This procedure will be included in tender documentation for the dredging component of the Project to guide implementation. A more detailed procedure will be developed by the dredge contractor based on the specific dredge plant utilised.

White's seahorse was listed as endangered by the Commonwealth in December 2020. The EPBC Act requires proponents to address matters listed at the time the decision was made on the approval process. As a result, the EIS is not required to address significant impacts on White's Seahorse, however an assessment was still completed as part of the Draft EIS for completeness. Further analysis carried out for the Supplementary Report has determined White's seagrass is unlikely to occur at the Project site. While the known range is from St Georges Basin in NSW to Hervey Bay in Queensland, the vast majority of records for this species are from Sydney Harbour and Port Stephens, NSW.

Additional assessment has been carried out on risk of boat strike to marine fauna as a result of construction and ongoing uses of the Project. The assessment has been completed with reference to publications published after submission of the Draft EIS, feedback from public submissions, and following contact with organisations using Moreton Bay with respect to their observations of these fauna in Moreton Bay. The increase in vessel traffic as a result of the Project is likely to be limited to an increase in ferry traffic of 10%, and an increase in the size of the ferries. This has the potential to impact individuals of some threatened and migratory species. A range of management measures will be put in place to minimise this potential impact. With the implementation of these mitigations measures, it is unlikely that the Project will result in a significant residual impact to these species.

Moreton Bay Ramsar Site

The topic that received the highest number of comments on the Draft EIS were impacts from the Project on the Moreton Bay Ramsar Site (MBRS). While a range of comments have been received**,** the bulk of these comments were a variation of one or multiple of the following:

- The Project would be inconsistent with Australia's obligations under the Ramsar Convention.
- No Projects have ever been approved in a Ramsar site in Australia or internationally.
- The Project does not meet the definition of "wise use" of the Ramsar Site.

<u>Australia's Obligations under the Ramsar Convention</u>

As a Contracting Party to the Ramsar Convention, Australia has made a commitment to:

- designate suitable wetlands for inclusion on the List of Wetlands of International Importance;
- formulate and implement planning to promote conservation of listed wetlands and as far as possible the wise use of all wetlands;
- arrange to be informed at the earliest possible time if the ecological character of any listed wetland has changed, is changing or is likely to change as a result of technological developments, pollution or other human interference, and report any such changes to the Ramsar Convention;
- promote the conservation of wetlands and waterfowl by establishing nature reserves on wetlands;
- encourage research and exchange of data and publications;
- promote the training of personnel in the fields of wetland research and management;
- consult with other contracting parties to the Convention to review and promote the implementation of the Convention; and
- represent Australia at the triennial Conference of the Contracting Parties, collating the National Report for these meetings and other reporting to the Convention.

Approval of the Project would not be inconsistent with any of these obligations.

Projects Located within Ramsar Sites

A range of developments have been approved or are located within Ramsar sites both in Australia and internationally. For example:

- The Riverwalk development (EPBC 2006/3176) in Victoria was approved to deliver 2,200 residential lots and other urban over a 197 ha area within the Port Phillip Bay (Western Shoreline) and Bellarine Peninsula Ramsar Site.
- Riviera Harbour (EPBC 2002/732) in the Gippsland Lakes Ramsar site in Victoria was also approved to carry out works within the boundaries of the Ramsar site. The works included dredging, dredge material disposal and a canal estate with residential lots.
- Vineyards Estate Residential Development, Werribee, Victoria (EPBC 2003/960) - In 2005, the Federal Government approved a 190 lot residential subdivision within the Port Phillip Bay (Western Shoreline) and Bellarine Peninsula Ramsar site. It included dredging of a 500 m entrance channel for the estate through The Coorong, Lake Alexandrina and Albert Ramsar Wetlands Site.
- Sweetwater Canal Housing Development, Meningie, South Australia (EPBC 2004/1422) - The project entailed the construction of a 300 lot residential canal development adjacent to Lake Albert, South Australia.
- Point Grey Marina Project, Western Australia (2010/5515) - Point Grey Marina Project is a 300 to 400-boat onshore marina project created through excavation at Point Grey, adjoining the Peel-Yalgorup Ramsar Site. In 2014, the Federal Government approved the dredging of 2.5 km, 50 m wide (5 ha) navigation channel within the Ramsar site.

Internationally, Ramsar sites include a range of tourism and urban infrastructure within their boundaries. Examples include several marinas, apartments and hotels located within the Etang de Salses-Leucates Ramsar site in France, and a resort and mixed-use residential development within the Sungai Pulai Ramsar site in Malaysia. The capital city of Thailand's Krabi Province (population 32,644) is located within a Ramsar site.

Wise Use

The Ramsar convention does not prohibit development in Ramsar wetlands, but they must demonstrate that they maintain or enhance the ecological character of the site and be in accordance with the principles of wise use. The wise use of wetlands is '*the maintenance of their ecological character, achieved through the implementation of ecosystem approaches, within the context of sustainable development*' (Ramsar Convention 2005). The wise use concept requires ecological character to be maintained, while at the same time delivering services and benefits now and into the future for human well-being. The location of the Project, within less than 0.02% of the MBRS, is a reasonable and proportional means of achieving significant economic, social, cultural, educational and conservation benefits and services.

The Project will contribute significantly to nature-based tourism within the MBRS with over 70% (approximately 25.8 ha of 36.5 ha) of the reclamation areas within the Ramsar site being taken up with uses that contribute to the ecological character of the MBRS. These include:

- Parklands and open space – 12.4 ha
- Marina and internal channels – 10.4 ha
- Harbour upgrades – 1.3 ha
- Education centre – 0.1 ha
- Dredge material disposal pond and breakwater – 1.6 ha

Marinas and harbours are an existing ecological characteristic and new facilities, sensitively designed, are capable of being 'wise use'. By developing infrastructure and marine services for Minjerribah (North Stradbroke Island), the Project will also enable financially sustainable eco-tourism. Open space within the development will contribute significantly to

wise use by providing foreshore parklands for people to interact with Moreton Bay with features such as the non-motorised boat ramp providing direct interaction with the Ramsar site using low impact watercraft. The education centre will also provide a focal point for nature-based learning.

In addition to the 'wise uses' the remaining 30% of the reclamation areas (10.8 ha) will be used for infrastructure that will facilitate wise uses. The includes roads, parking, residential areas, a hotel and retail and commercial space. Without these uses the significant contribution to community infrastructure that will allow for increased interaction with Moreton Bay would not be possible.

A breakdown of Project uses within the Ramsar site and how they contribute to wise use is included as **Figure ES-4**.

Environmental Offsets Strategy

The environmental offsets strategy has been updated to address these comments and reflect Project changes that have occurred post notification of the Draft EIS.

Based on the outcomes of updated detailed assessments, the Project is considered likely to have a significant residual impact (SRI) on the following MNES:

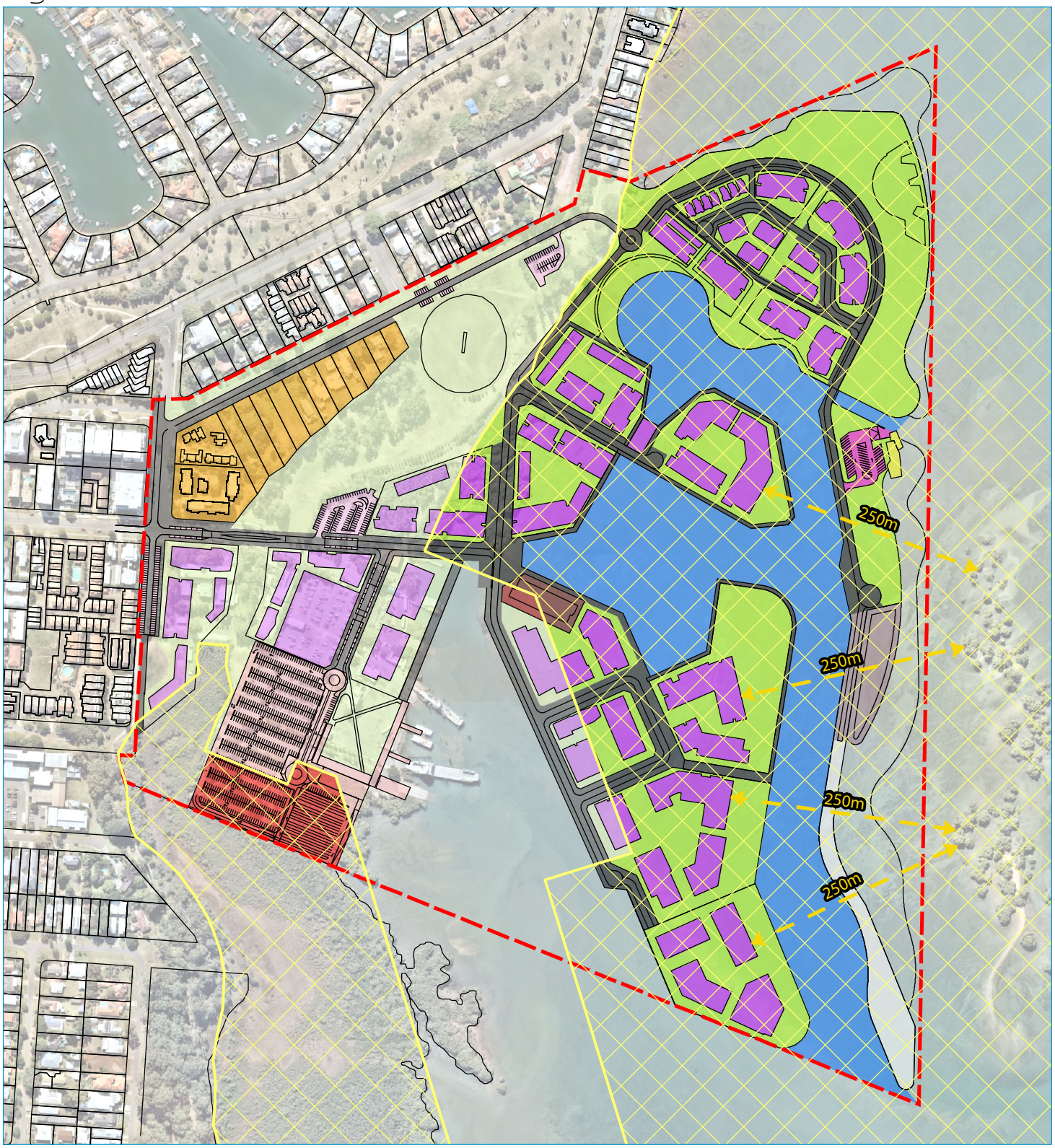
- The loss of 28.9 ha of foraging habitat for a range of threatened and migratory shorebird species which will reduce the potential area of occupancy for these species within Moreton Bay by 0.29%.
- The area of the MBRS within the Project footprint (reclamation and dredge areas) will be substantially modified impacting on a range of wetland habitats including seagrass, mangrove, rocky rubble and unvegetated sand and mud substrate. The Project will result in the permanent modification of 58.7 ha of the over 120,000 ha MBRS (approximately 0.02%) including:
    - 2.5 ha of mangroves (approximately 0.03% of all mangroves in the MBRS);
    - 35 ha of seagrass (approximately 0.2% of all seagrass in the MBRS);
    - 1.1 ha of rocky rubble; and
    - 19.4 ha of unvegetated sand and mud substrate (approximately 0.2% of mudflats within the MBRS).

The overall objective of the offsets strategy is to provide a conservation gain for the MNES impacted by the Project, which will in turn provide a benefit to the ecological character of the MBRS. It is proposed to deliver a suite of direct and indirect offsets through a fund managed by a third party with the ability to access public land and obtain approvals not available to a commercial entity such as the Proponent. The fund will be established so that offset projects undertaken meet the principles outlined in the EPBC Act Environmental Offsets Policy, including the need to provide conservation benefit for the matters impacted.

There are no tools under the EPBC Act to calculate funds for offsets delivery, therefore the Queensland environmental offset financial calculator (QEOFC) has been used to identify an appropriate financial contribution to offset impacts from the Project. Using the QEOFC a total financial payment of $9,041,401 will be provided to offset SRIs on MNES.

The offset will be delivered through an established and experienced third-party not-for-profit organisation (Offset Fund Manager (OFM)) which will establish an Environmental Trust Fund (ETF) that will utilise grants, donations and regulatory (offset) contributions to fund essential and highly needed broadscale environmental works programs throughout the region. To help guide the ETF, an Implementation Advisory Group (IAG) will be established to provide advice and oversight for selection and implementation of projects. Offset projects will be selected by the OFM based on recommendations from the IAG.

Figure ES - 4: Ramsar Wise Use



Toondah Harbour EIS

Legend

- PDA boundary
- Moreton Bay Ramsar
- Design Details
- Measurement

Wise Use

- Dredge Material Disposal Pond - 0.7 ha
- Education Centre - 0.1 ha
- Harbour Updgrades - 1.3 ha
- Marina and Internal Channels - 10.4 ha
- Parklands and Open Space - 12.4 ha
- Rockwall Breakwater - 0.9 ha

Facilitate Wise Use

- Hotel Retail and Commercial Uses - 0.2 ha
- Parking - 0.2 ha
- Residential Uses - 6.0 ha
- Roads - 4.4 ha

Outside Ramsar

- Harbour Updgrades - 1.8 ha
- Hotel Retail and Commercial Uses - 0.1 ha
- Parking - 0.6 ha
- Parklands and Open Space - 8.8 ha
- Residential Uses - 2.5 ha
- Roads - 2.9 ha
- Existing Residential - Not Part of Development - 2.2 ha

N

0 100 200 Meters

GDA 1994 MGA zone 56

Scale (A4): 1:6,000

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TOONDAH HARBOUR

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Layer Source: © State of Queensland Datasets (Department of Resources 2023), Aerial (Nearmap 2020) DATE 21/11/2023

FILE REF. 9858 E Figure 5_13 Ramsar Wise Use B

Aboriginal Cultural Heritage

The Proponent is currently consulting with the Quandamooka Yoolooburrabee Aboriginal Corporation (QYAC) in regard to current and future native cultural heritage requirements at the site including the preparation of a Cultural Heritage Management Plan (CHMP). These discussions are confidential and convened on a 'without prejudice' basis. The Proponent is bound by its obligation to keep these discussions in confidence. The Proponent remains committed to meet its Duty of Care and will continue to work in consultation with QYAC for the benefit of Quandamooka in the preparation of a CHMP and other commitments agreed by the parties.

The assessment of Indigenous cultural heritage for the Project has been designed to avoid and/or mitigate any impacts to Indigenous cultural heritage. A site specific Indigenous cultural heritage assessment was prepared by Everick Heritage and includes assessment of site data through a range of sources including databases, discussions, public and unpublished resources, studies and onsite investigation.

Chapter 10 of the Everick Report contains a risk assessment and recommendations for a framework in respect of a consultation and heritage management strategy for the Project. Four (4) categories are identified and explained as follows:

Category One: Known Heritage Areas

There are four (4) sites within the Study Area, of which, two (2) include artefact scatters and two (2) containing isolated artefact scatters. The Everick Report makes recommendations, including that any impacts of the Project must be referred to QYAC for consideration. The responsibilities of QYAC upon any referral are detailed.

Category Two: High Risk Area

There are two (2) High Risk Areas identified in the Everick Report, located around Known Heritage Areas along the foreshore. QYAC considers there is a high likelihood that archaeological or other places of Cultural Heritage significance may occur. Future development of this area should be undertaken in consultation with QYAC and the responsibilities of QYAC upon any referral are detailed.

Category Three: Moderate Risk Area

There are four (4) Moderate Risk Areas identified in the Everick Report with a possibility that further Aboriginal Cultural Heritage exists in these locations. QYAC considers there to be a moderate likelihood that archaeological or other places of Cultural Heritage Significance might occur.

Category Four: Low Risk Area

This area comprises the balance of the Study Area, including most the foreshore area and area of high disturbance (i.e. the ferry terminal). Any surface monitoring is at the discretion of QYAC.

Mechanisms to deal with any unrecorded findings of Indigenous cultural heritage importance are anticipated to be incorporated into a CHMP, being negotiated with the Quandamooka People. A process has been identified to stop work and recover material should it be found. Based on the above, the Project is considered unlikely to cause a significant impact on known cultural heritage.

A summary of the values, sustainability principles, potential impacts and mitigation measures in relation to Indigenous cultural heritage is presented in the Everick Report.

Public submission Comment Response

Detailed responses to comments received from members of the public during notification of the Draft EIS are included and have been categorised to align with chapters from the Draft EIS with cross references to the Draft EIS provided where relevant. Categories include:

- Sediment Quality and Acid Sulfate Soils
- Coastal Processes and Maritime Engineering
- Air Quality
- Noise and Vibration
- Koala and Terrestrial Ecology
- Migratory Shorebirds
- Marine Ecology and Water Quality
- Ramsar Assessment
- Environmental Offsets
- Project Description, Assessment Framework and EIS Document
- Social and Economic Assessment
- Cultural Heritage

Each category has been further divided into themes so that readers can more easily find topics of interest. Comments include all of those received by various community groups and auto generated forms. Responses have been provided for 353 comments. Comments have generally been taken directly from the individual submissions, however in some instances comments addressing the same or similar topics have been combined to avoid repetition.

Outside of the additional assessment carried out, responses to comments generally required referencing back to the Draft EIS and in some cases providing minor additional information. For example, utilising additional peer reviewed literature or information sources to provide further clarity on an issue.

State and Federal Agency Response

Department of Climate Change, Energy, the Environment and Water

Additional information was requested by the Department of Climate Change, Energy, the Environment and Water (DCCEEW) post release of the Draft EIS. Additional information requests included:

1. Further investigation of potential land contamination issues at the site as identified by the Preliminary Site Investigation.
2. Additional information on how the Offsets Strategy will address the EPBC Act Environmental Offsets Policy including demonstrating all impacts to MNES are addressed by the strategy.
3. Evidence that Indigenous cultural heritage has been addressed in accordance with legislative requirements.
4. Clarification around the implementation of some of the mitigation measures identified in the Draft EIS, in particular the use of the silt curtain around the dredge and management of early works for the reclamation.

Items 1 and 2 have been addressed in the 'Additional Assessment Updates' section of the executive summary, Item 3 under 'Aboriginal Cultural Heritage' while item 4 has been addressed in the 'Detailed Description of the Site and Action' section.

Queensland State Assessment Agencies

A number of Queensland's State assessment agencies contributed to a submission on the Draft EIS. The Draft EIS is being assessed under the Commonwealth EPBC Act therefore the State Government has no legislative role in the assessment process. While no State level applications have been lodged at this point, the release of the Draft EIS presented an opportunity for relevant State agencies to provide feedback on the assessment process to this point. The submission included inputs from a range of State Government agencies. Five meetings/workshops were held with the various agencies to discuss the comments provided and address keys issues raised. These issues were categorised under five headings:

- Overall submissions review
- Project need and alternatives
- Marine Ecology and Water Quality
- Sediment Quality and Acid Sulfate Soils
- Moreton Bay Ramsar Site

Many of the issues raised by the State were responded to through public submissions. One of the key items raised by the Department of Environment and Science (DES) and Department of Agriculture and Fisheries (DAF) was to provide further details on how impacts to tidal habitats and matters of state environmental significance have been avoided and minimised in the PDA and Redland coast.

The Project is not just a port upgrade or capital dredging project, it is a partnership between the Proponent and the state and local government carried out within a PDA declared specifically for that purpose. Both reclamation and urban development are supported by the Toondah Harbour PDA Development Scheme and are key components of the PDA vision.

Alternate options to the Project were addressed in the Draft EIS. This included discussion on how the masterplan was optimised to minimise impacts while achieving the required outcomes of the Toondah Harbour Development Scheme, which includes widening and straightening the entrance channel, swing basin extension, marina, harbour upgrade and mixed-use development. Further detail on how the Project footprint has been progressively reduced through design optimisation is included in this Supplementary Report. Reclamation areas within the tidal zone have reduced by approximately **35% (57.72 ha to 37.43 ha)** since the initial design in 2015. This has occurred through a reduction in the size of the marina and optimisation of the dredge channel and basin, minimising the volume of dredge material used to form the reclamation areas.

The iterative re-design of the Project masterplan and footprint since the initial proposal in 2015 demonstrates how the Project has responded to site constraints and ongoing consultation with relevant experts and DCCEEW. This has resulted in a significant reduction of the footprint on tidal lands while still achieving the required outcomes of the Toondah Harbour PDA Development Scheme. The redesign efforts are consistent with the environmental mitigation hierarchy to avoid and minimise impacts where possible, as recommended in supporting policies to the EPBC Act and the Ramsar Convention.

Impacts to marine habitat resulting from the Project were compared to coverage of those marine habitats Moreton Bay, the Marine Investigation Area (MIA – assessment area for the Project based on a conservative estimate of the potential impact) and Zone of Influence (ZoI – assessment area potentially impacted by cumulative and consequential impacts from the Project). The MIA covers an area of coast stretching from Cleveland Point to Victoria Point which represents approximately one third of the Redland coastline. The ZoI covers an area of central and southwest Moreton Bay stretching from the Brisbane River to the Logan River. In most cases marine habitats impacted by the Project are 0.2% or less of their

representation in Moreton Bay. In the MIA, which only covers an approximately 10 km stretch of coastline including the PDA, Impacts represent 1.8%, 1.5%, 4.9% and 0.75% of bare mud/sand, mangrove, seagrass and rubble habitats respectively.

In addition to the reduction in the Project footprint, the Project has been designed to avoid indirect impacts on marine habitats with coastal modelling showing there will be minimal change to waves and currents outside of the immediate Project area. Turbidity plumes from dredging have the potential to reduce light penetration. However, dredging events will be relatively short lived and result in turbidity spikes lower than those already occurring at the site minimising the effects of the plumes. Management measures such as silt curtains around dredge areas will reduce the extent and severity of turbidity plumes, further minimising any potential for impact.

Summary of Impacts to MNES

The Toondah Harbour Project Environmental Impact Statement (EIS) has addressed Matters of National Environmental Significance (MNES). The specific MNES the Project was required to assess were wetlands of international importance; listed threatened species and communities; and listed migratory species. To complete this assessment a range of detailed studies have been completed over a period spanning several years. Key studies have included:

- Sampling and analysis of potential contaminants and acid sulfate soils in over 100 locations covering the land and tidal components of the Project area.
- The installation of 14 groundwater bores to collect water quality samples and other data to carry out modelling of potential changes to the existing groundwater regime.
- Detailed modelling of coastal processes and dredge plumes including collection of several months of site specific current data and modelling of a range of potential extreme events and sea level rise.
- Collection of more than three years of background water quality data including the deployment of multiple turbidity logging instruments to collect reading in real time every 15 minutes.
- Detailed modelling of stormwater treatment and receiving water quality to demonstrate the Project will not result in adverse water quality impacts.
- Collection of background air quality data and modelling of potential impacts to sensitive receptors.
- Collection of background data and modelling of ambient and underwater noise and vibration to identify risk of impact to marine and terrestrial fauna.
- Modelling of light sources from the completed Project to identify impacts to adjacent mudflats and other external receptors.
- Assessment of impacts to terrestrial flora and fauna including GPS plotting of all habitat trees within the Project area and use of a UAV to monitor koala movement within and adjacent the Project area.
- On ground surveys of all marine habitats within the Project area and surrounding areas where there was potential for indirect impacts, surveys for marine megafauna and detailed analysis of the potential for impacts from boat traffic.
- Migratory shorebird surveys spanning a period of more than 7 years from October 2014 to December 2021. This included 52 surveys of the mudflats within the Project footprint as well as multi year surveys at nearby roost sites including Cassim Island, Oyster Point and Nandeebie Claypan. Additional surveys were completed at the mudflats, Oyster Point and Cassim Island in October 2023. Surveys were also completed over a 567 ha area of mudflats spanning approximately 34 km of coastline north and south of Toondah Harbour.
- Development of a method for assessing impacts to the Ecological Character of a Ramsar site and implementing the method to assess the potential to impact on the Moreton Bay Ramsar Site (MBRS).

Outcomes of the MNES assessment include:

Threatened Species

Threatened species considered likely to be significantly impacted by the Project are Eastern curlew, Great knot, Lesser sand plover and Bar-tailed godwit. All four are migratory shorebird species that use the mudflats where reclamation and dredging will occur as foraging habitat. Two of the species, great knot and lesser sand plover, have only been observed once on the mudflats across seven years of surveys. Eastern curlew is observed at the site in low numbers (average of 3) and do not utilise the adjacent roost sites. The Bar-tailed godwit is observed on the mudflat and at Cassim Island in small numbers. Importantly, significant impacts are considered likely for all four species due to a loss of critical habitat or 'area of occupancy' for that species. Tidal flats in Toondah Harbour are only considered critical habitat for these species as they are located within the MBRS and not because of the number of individuals using the area.

Five threatened marine species have the potential to utilise habitats within or adjacent to the Project footprint: loggerhead turtle, green turtle, hawksbill turtle, dugong and Australian humpback dolphin. While dugong and marine turtles feed on seagrass, the Project footprint does not provide significant habitat for them. Australian humpback dolphin is found throughout the bay; however, the Project footprint is not part of their core habitat.

The Project is not expected to have a significant impact on any terrestrial fauna species including koala. The proposed koala underpass beneath Middle Street, habitat tree planting and establishment of a 'Koala Safe Neighbourhood' in Cleveland will ensure the increased traffic at this location is not a barrier to koala movement.

Migratory Species

The dominant migratory species observed at Toondah Harbour were the Grey-tailed Tattler and Whimbrel, both of which utilise the mudflat and Cassim Island roost site. The Project is expected to result in short-term disruption of roosting behaviour from construction noise however this will be minimised by avoiding high noise generating activities during winter months when fewer migratory shorebirds are present.

Moreton Bay Ramsar Site

While the Project will not result in a change to the ecological character of the MBRS a small area of the wetland (less than 0.02%) will be substantially modified. Habitat loss is well under 1% of all comparative habitats in the MBRS.

While direct impacts from the Project are unavoidable, it will also provide a number of benefits to MNES including:

- Creation of approximately 1.5 km of rockwall that will be designed to provide fish habitat and roosting habitat for a number of migratory bird species, including grey-tailed tattler, ruddy turnstone and terek sandpiper.
- Marine structures such as dolphins and jetties will provide structure and habitat for fish species.
- Creation of oyster reefs within the Project footprint will provide further habitat for fisheries species.
- Stormwater treatment will reduce nutrient loads released into Moreton Bay during storm events given that the existing harbour currently has no treatment measures.
- The upgrade of the ferry terminal, turning basin and Fison Channel, and the provision of an education centre as well as a visitor information centre, will add significantly to the recreational, tourism and educational values of Moreton Bay, both of which are considered critical services of the MBRS.
- Creation of an additional 12.4 ha of open space and parklands along the Cleveland foreshore to allow greater interaction and public enjoyment of the Ramsar site.
- The interpretation and awareness raising of Aboriginal cultural heritage values through signage, public art and opportunities for land and sea country management and cultural and nature-based tourism activities will promote the Indigenous cultural heritage of Moreton Bay, which is considered a critical service of the MBRS.

In addition to the above the Proponent has committed to a comprehensive adaptive management regime including:

- Further sampling prior to the commencement of works.
- Detailed baseline monitoring.
- Real time construction monitoring.
- Active management techniques such as the use of silt curtains during dredging.

The proponent has also voluntarily committed to establishing a technical advisory panel to regularly review and provide recommendations to ensure best practice management throughout the life of the Project.

Further the Project will deliver approximately $100 million of infrastructure, providing direct benefits to the public and environment, most of which will be delivered within the first five years of development. In addition, more than $9 million will be provided through a trust fund to deliver projects benefiting the matters impacted, including migratory shorebirds and marine habitats.

As a result, the Project will provide a significant net benefit to the environment and Moreton Bay as well as making a substantial contribution to the community and facilitating urban development.

Plate ES-2: 3D Concept Model of the Toondah Harbour Project

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Appendices

1. Introduction

1.1. Background

Toondah Harbour is an existing marine facility located in the suburb of Cleveland in the Redland City Local Government Area (LGA), approximately 30 kilometres (km) south east of Brisbane. Toondah Harbour was constructed on reclaimed land and has been operational since 1972 when it was used as an industrial barge terminal to support sand mining operations on Minjerribah (North Stradbroke Island). Vehicle ferry services commenced in 1974. The harbour currently serves as the base for water taxi, passenger and vehicle ferry services between the mainland and Minjerribah. Land uses within the harbour area include multiple ferry terminals, a public boat ramp, extensive areas of surface car parking for ferry customers, an office complex temporarily leased by a trade college, and a disused dredge material disposal pond. The overwater areas are made up of a mix of tidal and intertidal habitats, and include existing wet berths, the turning basin and the harbour entrance channel, known as Fison Channel.

In June 2013, at the request of Redland City Council (RCC), the Queensland Government declared Toondah Harbour a priority development area (PDA) under the *Economic Development Act 2012* (Qld) (ED Act). The intent of the PDA is to revitalise the harbour, improve the transport function by better integrating ferry and bus services and managing car parking, and establish Toondah Harbour as a high-quality urban environment that capitalises on the high amenity of Moreton Bay.

The Toondah Harbour PDA Development Scheme commenced in May 2014 and in June 2014, Economic Development Queensland (EDQ) and RCC called for expressions of interest from the private sector to redevelop public lands in the Toondah Harbour PDA in accordance the PDA Development Scheme. In September 2014, Walker Group Holdings Pty Ltd (the Proponent) was announced as the preferred development partner to redevelop the public landholdings in the PDA.

The Toondah Harbour Project (the Project) includes the following key components:

- Capital dredging of up to 530,000 m^3 of marine sediment to expand Fison Channel so that it meets minimum requirements for safe navigation set out in the PIANC (2014) Harbour Approach Channels Design Guidelines. Currently, the channel is approximately 45 m wide (excluding batters) with a target depth of -2.5 m below Lowest Astronomical Tide (LAT). The Project proposes to widen the channel to 75 m (excluding batters), with a target depth of -3 m LAT. Dredging will be undertaken in two separate campaigns with Stage 1 encompassing the turning basin and inner Fison channel and Stage 2 the outer Fison Channel.
- All dredged and excavated sediments generated by capital dredging will be beneficially reused to reclaim a portion of the sub-tidal area north of the harbour to create new landforms for proposed public open space, including community facilities, and urban uses.
- Up to 200 wet berths will be included within the reclamation area through a marina basin and internal waterways providing access to Fison Channel.
- The reclamation will be formed in two discrete stages – north and south. For each stage, a perimeter bund will be established to contain the dredged material, which will limit indirect impacts outside of the project footprint. The reclamation has been designed to balance dredge material volumes with fill requirements, minimising the need to import fill or dispose of dredge material offsite.
- New harbour and public transport infrastructure, facilities and amenities for ferry customers and visitors will be constructed south of the existing vehicle ferry loading area. These works will be undertaken concurrently with the first reclamation stage.
- Proposed uses on the reclamation areas and the new harbour include a hotel, residential apartments, retail and commercial development focused around a new marina plaza. A further residential precinct will be located in the western part of the PDA.

- Installation of civil infrastructure and services – such as electrical, gas, telecommunications, water supply, sewerage infrastructure and roads will keep pace with development projects.

Disturbance to the existing GJ Walter Park will be minimised with embellishments added to improve amenity.

Project location and key components are shown on Figure 1-1 and Figure 1-2 respectively. An aerial image of Toondah Harbour is included as Plate 1-1.

Plate 1-1: Aerial of Toondah Harbour

1.2. EPBC Act Approval Process

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) is the Australian Government's central piece of environmental legislation. The EPBC Act provides a legal framework to protect and manage nationally and internationally important flora, fauna, ecological communities and heritage places — defined in the EPBC Act as matters of national environmental significance (MNES).

The Project was referred under the EPBC Act to the Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEEW) on **5 June 2018** (EPBC Reference number 2018/8225) and was made a controlled action on **23 July 2018**, to be assessed by environmental impact statement (EIS). The relevant controlling provisions of the EPBC Act for the controlled action decision were:

- Wetlands of international importance (sections 16 & 17B);
- Listed threatened species and communities (sections 18 & 18A); and
- Listed migratory species (sections 20 & 20A).

Figure 1-1: Project Location

Legend

Project location

Moreton Bay Ramsar site

Toondah Harbour EIS

TOONDAH HARBOUR

walker

N

0 10 20 30 km

GDA 1994 MGA zone 56

Scale (A4):1:650,000

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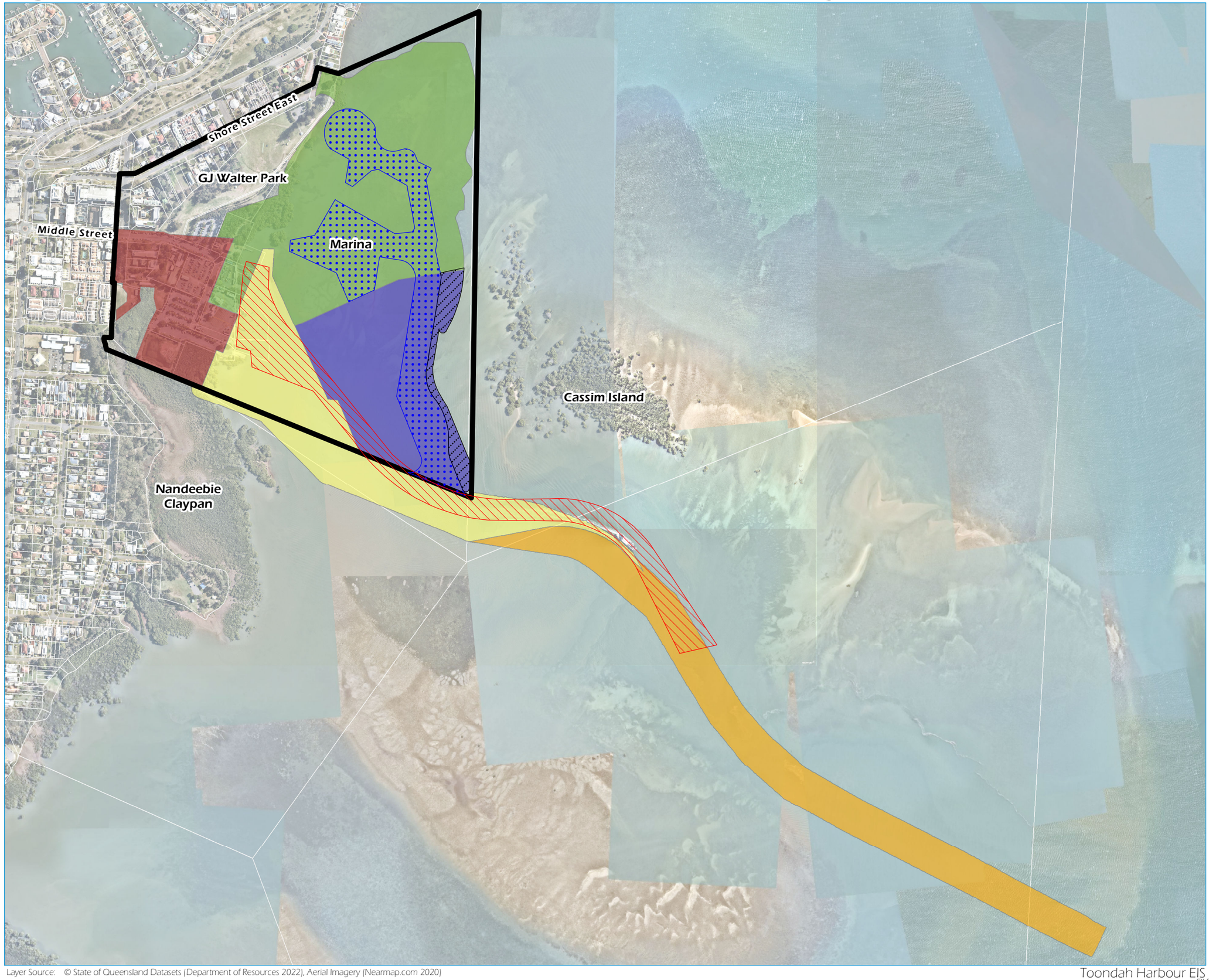
Layer Source: © State of Queensland Datasets (Department of Resources 2022)

DATE 11/07/2022

FILE REF. 9858 E Figure 1_1 Project Location D

Figure 1-2: Key Components of the Toondah Harbour Project



Legend

- Toondah Harbour PDA
- Old DCDB
- Harbour Precinct
- Stage 1 Reclamation
- Stage 2 Reclamation
- Stage 1 Dredging – Turning Basin and Inner Channel
- Stage 2 Dredging – Outer Channel
- Marina & internal navigation waterways
- Dredge Spoil Pond and Break Wall
- Existing Turning Basin and Entrace Channel

TOONDAH HARBOUR

walker

0 100 200 300 400 m

GDA 1994 MGA zone 56

Scale (A3): 1:8,600

N

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DATE: 31/07/2023

Layer Source: © State of Queensland Datasets (Department of Resources 2022), Aerial Imagery (Nearmap.com 2020)

Toondah Harbour EIS

FILE REF. 9858 E Figure 1_2 Toondah Harbour Key Components E

Draft tailored guidelines for the EIS were released for public comment by DCCEEW on **6 February 2019** with the comment period closing on **6 March 2019**. The final guidelines were released to the public on **3 April 2019**.

The Proponent prepared a Draft EIS in accordance with the final guidelines which was published for a period of 40 business days for public review and comment. The public comment period commenced on **12 October 2022** and concluded on **6 December 2022**.

Following the public comment period, all submissions received were reviewed and collated to summarise issues raised. In order to finalise the EPBC Act process for the Project the proponent must take all comments received into account and provide a summary to DCCEEW of the comments received and how they have been addressed.

A decision period of 40 business days applies once finalised documentation has been supplied to DCCEEW and they decide the material meets the necessary provisions of the EPBC Act. All documentation must be made available to the public within 10 business days of DCCEEW informing the proponent that the material is acceptable.

1.3. Purpose of Report

This Supplementary Report has been prepared to summarise and respond to comments received on the Draft EIS for the Toondah Harbour Project. In doing so the report addresses section 104(2) of the EPBC Act which states that the finalised environmental impact statement must:

a) take account of any comments received within the period for comment; and
b) contain a summary of any such comments and how those comments have been addressed.

The purpose of this report is to:

- Document the public consultation process implemented prior to and during the release of the Draft EIS.
- Summarise submissions received from the community and government agencies during the comment period, noting that a number of discussions have been held with various community groups and agencies prior to, during and post the comment period.
- Respond to comments raised during public consultation including providing additional technical information and studies where required.

This Supplementary Report addresses issues raised through the EIS process, and in conjunction with the Draft EIS, is considered the Finalised Environmental Impact Statement (Final EIS) for the Toondah Harbour Project under the EPBC Act.

No modifications have been made to the Draft EIS document released for public comment. While the public submissions process has resulted in changes to aspects of the project, including increased buffers to ecologically sensitive areas, additional management measures and an increase in proposed offsets, additional assessment completed for the Supplementary Report has not altered the outcomes of the significant impact assessment on MNES outlined in the Draft EIS.

Where conflicts exist between the Draft EIS and Supplementary Report, the information in the Supplementary Report supersedes the Draft EIS.

1.4. Report Structure

The structure of this supplementary report, including an outline of the content of each chapter, is presented in Table 1-1.

Table 1-1: Structure of Report

Chapter No.	Chapter Name	Contents of Chapter
1	Introduction	Background to Project, approvals process, and purpose and structure of report
2	Public Consultation	Information on public consultation undertaken prior to the release of the Draft EIS, and during the Draft EIS notification phase. Also, information on consultation with government agencies and project opponents prior to and after public notification of the Draft EIS.
3	Summary of Submissions on the Draft EIS	Details on types of submissions received on the Draft EIS (including proformas and pre-filled content), and key issues raised in submissions.
4	Project Description Updates	Updates to the Project description as a result of the public comments and ongoing discussions with Federal and State Government agencies.
5	Additional Assessment Updates	A summary of the key additional studies and assessment carried out in response to public and government agency comments on the Draft EIS and the outcomes of these studies.
6	Public Submissions Comment Response	A series of tables addressing public comments received. Comments have been categorised to reflect the technical areas addressed by the Draft EIS.
7	State and Federal Agency Comment Response	Summary of discussions with Federal and State agencies, including additional information requested and how the Project has responded to agency requests.
8	Conclusion	Concluding remarks and summary of key issues.

2. Public Consultation

Public consultation on the Project commenced prior to the release of the Draft EIS Guidelines by the Australian Government (refer to Section 1.2 for information on the EPBC Approvals process) and continued through the public release of the Draft EIS and beyond. An overview of the consultation process over the life of the Project is provided in this Chapter.

2.1. Prior to Release of the Draft EIS

Prior to the release of the Draft EIS, the engagement process undertaken enabled community members and stakeholders to:

- Provide input and feedback to inform the development of the Draft EIS and features within the proposed master plan.
- Have conversations with project team members about technical information based on facts gathered through the environmental assessment process.
- Bring their observations, issues and ideas to the forefront of conversation.
- Express their sentiment about the Project.
- Create relationships and an open line of communication with the EIS project team.

Consultation and engagement activities undertaken for the Project between January 2016 and December 2020 allowed the project team to connect with 5,735 community members and stakeholders, and included unadvertised pop-up listening posts (Redland City); face-to-face community drop-in sessions in the local area; online community drop-in sessions (promoted as Talk Toondah sessions); formation of three technical focus groups and facilitation of meetings with each group; key stakeholder meetings; and a statistically valid telephone survey with 300 randomly selected Redland City residents. Furthermore, a staffed project information centre was established in the Cleveland CBD, community updates were provided, a Project website was set up, as well as a Project telephone hotline and email address.

During consultation, the top three topics discussed by community members and stakeholders related to:

- Urban development and density.
- Traffic impacts.
- Business opportunities.

Out of the 5,735 interactions with community and stakeholders, 1,015 were conversations with a member of the project team (face-to-face, online via teleconference and webinar platforms, and over the phone). Community and stakeholder sentiment was recorded during 845 conversations at the project information centre and the listening posts, where deeper conversations with community members were possible. It is important to note that the information centre was advertised, while the listening posts were unadvertised 'pop-up' sessions.

These interactions found sentiment expressed across all three activities (face-to-face, information centre, and pop-ups) to mostly be supportive (55%), followed by unsupportive (22%), unsure (12%), neutral (8%) and undetermined (3%).

Common themes that emerged in relation to the perceived benefits of the Project and potential opportunities related to improved public facilities, including the ferry terminal facilities and public parkland; improved housing options; revitalisation and activation of Cleveland's coastline; improved recreation opportunities for families and children; potential for an upturn in the Cleveland economy; and potential for more job opportunities in Cleveland.

Common themes that emerged in relation to the perceived impacts of the proposed development related to scale of the Project; perceived environmental impacts; perceived traffic impacts; perceived geotechnical challenges Raby Bay is currently facing; the need for community infrastructure; potential construction impacts; and potential impacts to Cleveland CBD businesses.

Public consultation carried out during this period is detailed in Appendix 1-P of the Draft EIS.

2.2. During Public Notification of the Draft EIS

A range of engagement activities were undertaken during the public notification period for the Draft EIS. Engagement activities included:

- Displays of the full Draft EIS document at multiple key locations in the project area.
- An online Virtual Information Centre with the full Draft EIS available for viewing.
- Project website.
- Community information sessions.
- Advertising (print and digital).
- Social media.
- Stakeholder meetings.
- Pop up displays.
- Electronic Direct Mail (EDM).
- DL Postcard brochures.
- Press releases.

A summary of these activities is provided in the following sections while the full engagement activity report is included as **Appendix A**.

2.2.1. Overview of the Public Notification Process

The public notification period for the Draft EIS ran from 12 October until 6 December 2022. A range of traditional and digital engagement activities were utilised to inform the community and stakeholders about the Draft EIS public display phase, including where to review the document and how to make a submission.

The focus of the engagement was to:

- Inform and educate the community and key stakeholders about the proposed development.
- Share the scientific findings of the research conducted as part of the Draft EIS studies.
- Provide stakeholders with the opportunity to ask questions about the project.
- Encourage open, and transparent dialogue.
- Inform the community and key stakeholders about the Draft EIS public display process and timeframes, including their opportunity to make a submission.

Details of the Draft EIS public display phase, including how to access the Draft EIS document and how to make a submission, were published in print and digital editions of The Courier Mail and The Australian on 12 October 2022. Details also featured in the Redland City Bulletin digital edition on 12 October 2022, and in the print edition on 19 October 2022.

The Draft EIS was on display in hard copy at three local libraries, the State Library and the Commonwealth Government Offices. The locations were:

- Cleveland Library (Cnr. Bloomfield and, Middle St, Cleveland QLD 4163);
- Capalaba Library (14 Noeleen St, Capalaba QLD 4157);
- Victoria Point Library (7/15 Bunker Rd, Victoria Point QLD 4165);
- Queensland State Library (Cultural Precinct, Stanley Place, South Brisbane 4101); and
- Department of Climate Change, Energy, the Environment and Water office (John Gorton Building, King Edward Terrace, Parkes, ACT 2600).

In addition, the Proponent made over 150 USB sticks available at local libraries and the Queensland State Library for the public to take should they wish to review the document at another stage. While not included in the advertisements, or a requirement of the EPBC Act, a hard copy of the Draft EIS and USBs were also provided to the library on Minjerribah (North Stradbroke Island) for public viewing and comment. This hard copy was available to view for the majority but not the whole display period.

2.2.2. Consultation During Public Notification

A range of active and passive consultation activities were carried out during the public notification period. Key activities included:

- Fourteen different fact sheets were developed and made available to the community, distributed through pop up displays, the Project website, the Project virtual information centre, and also provided to Redland City Councillors. The fact sheets covered a range of topics, including the Draft EIS process and consultation, the Project masterplan and Project benefits, boating and fishing, environmental and ecological aspects, and social, tourism and traffic. The fact sheets included a QR code to the virtual information centre and contact information for anyone wanting further information on the Project or how to make a submission.
- Media coverage was monitored throughout the Draft EIS public notification phase. In summary, there were 17 recorded publications on the Project, 13 of which were in the local publications, one in a Gold Coast publication, one Queensland, and two National publications. Additionally, there were three recorded television and two recorded radio media mentions of the Project.

Four independently facilitated virtual community information sessions were held throughout the public comment period. Each session focused on specific parts of the EIS. Sessions included presentations from the Project team and the subject matter expert for each topic. Sessions were promoted the week prior via social media and advertised in the Redland City Bulletin (print and digital). Refer to Table 2-1 for details on these sessions.

Table 2-1: Community Information Sessions

Topic	Date	Subject Matter Expert
Shorebirds	15/11/2022	Dr Penn Lloyd Principal Ecologist and Director, Biodiversity Assessment and Management Pty Ltd
Fisheries	22/11/2022	Dr Daryl McPhee Associate Professor, Bond University
Koalas	24/11/2022	Adrian Caneris Managing Director, Biodiversity Assessment and Management Pty Ltd

Topic	Date	Subject Matter Expert
Coastal Process	29/11/2022	Paul Guard Principal Coastal Engineer, BMT
Marine Ecology and Water Quality (held concurrently with the Coastal Processes session)	29/11/2022	Carol Conacher Aquatic Ecologist, FRC Environmental

In addition to these community information sessions, the Proponent contacted a range of community and environmental groups offering one-on-one information sessions with the Project team. Groups contacted included:

- Redlands2030
- BirdLife Australia
- The Redlands Community Alliance for Responsible Planning (CARP)
- The Redlands Koala Action Group (KAG)
- Queensland Wader Study Group (QWSG)
- Australian Conservation Foundation (ACF).

Invitations were individually emailed to the respective Chief Executive Officers and Presidents of these organisations. These sessions were offered as an opportunity for each group to gain important technical and scientific information and to ask questions directly to the project team, ecologists and scientists. None of these groups responded to the initial invitation and a subsequent follow up invitation.

Eight pop-up displays were also held in local locations, during the EIS notification phase. The displays lasted three hours and were staffed by two Project representatives to answer questions about the proposed development and the EIS submission process. The locations included:

- Redland Bay Ferry Terminal
- Capalaba Central Shopping Centre
- Birkdale Fair Shoppng Centre
- Capalaba Markets
- Victoria Point Shopping Centre
- Mt Cotton Central Shopping Centre
- Redland Bay Village Shopping Centre.

Fact sheets were available for visitors to take in printed form or download digitally by scanning a QR code displayed on the fact sheets and pull up banners at the display. Copies of the Draft EIS document were also available for visitors to take away on a USB stick. A looping flyover video of the development was playing on a laptop.

A total of 141 conversations were had at these pop-up displays, varying from 5 to 41 at each.

2.2.2.1. Virtual Information Centre and Online

A virtual information centre (VIC) was hosted online as an engagement platform encouraging the community and stakeholders to connect with the Project. Visitors to the VIC could access information including fact sheets, videos, interviews with subject matter experts, view the project master plan and view or download the Draft EIS.

A total of 4,633 visits were made to the VIC, with 3,124 unique visitors and 7,902 views of the Draft EIS. This indicates visitors to the website viewed the document multiple times.

The dedicated project hotline and email address were available for the community to contact the Project team. Twelve enquiries were recorded through the hotline and 26 email enquiries were received.

2.2.2.2. Stakeholder Meetings

The Proponent facilitated a number of meetings (in person and virtual) with key stakeholders prior to and during the Draft EIS notification period. The stakeholders and issues discussed are presented in Table 2-2.

Table 2-2: Stakeholder Meetings

Stakeholder	Issues / Topics
Redlands Investment Corporation	Draft EIS submissions process Project approval
North Stradbroke Island Chamber of Commerce	Benefits to the businesses of North Stradbroke Island
The Redland City Bulletin	Project news and updates
Redlands Coast Chamber of Commerce	Benefits to the businesses of the Redlands
Economic Development Queensland	Draft EIS submissions process Project approval
Redland City Council (councilors and Mayor)	Project approval Information to disseminate to constituents Draft EIS submissions process
QLD State Govt MPs	Project update EIS Status update
Redland City Council (Specific Departments)	Project update EIS Status update
QLD State Govt. Depts.	Project update EIS Status update
Local Businesses	Project update EIS Status update
Local Community Groups	Project update EIS Status update

2.3. Consultation with Commonwealth and State Agencies

A series of meetings and workshops have been held with relevant Commonwealth and Queensland Government departments during and post the public notification period. Meetings held post-publication of the Draft EIS covered a range of technical disciplines. A summary of meetings held is presented in Table 2-3. **The list of meetings is not intended to be exhaustive but includes all formal meetings held after the Draft EIS was publicly notified.**

Queensland Government agencies consulted during these meetings included:

- The Department of State Development Infrastructure, Local Government and Planning (DSDILGP)
- The Department of Seniors, Disability Services and Aboriginal and Torres Strait Islander Partnerships (DSDATSIP)
- The Department of Environment and Science (DES)
- The Department of Agriculture and Fisheries (DAF)
- The Department of Resources (DoR)
- The Department of Transport and Main Roads (TMR)

Table 2-3: Government Agency Meetings Post Draft EIS Notification

Date	Agency / Department	Issues / Topics
20 October 2022	DES, DSDILGP	Draft EIS public notification briefing
24 November 2022	DCCEEW	Offsets strategy and cultural heritage assessment process.
28 March 2023	DCCEEW	Key issues from public submissions, additional assessment requirements including contaminated land, offsets and cultural heritage.
19 April 2023	DES, DSDILGP, DSDATSIP, DAF	General discussion of State government agency submissions – lead to more targeted meetings addressing specific technical areas.
8 May 2023	DES, DSDILGP, DAF	Project need, alternatives and Priority Development Area requirements
18 May 2023	DES, DSDILGP	Marine ecology and water quality
5 June 2023	DES, DoR	Acid Sulfate Soils
9 June 2023	DCCEEW	Site meeting and Supplementary Report status update.
15 June 2023	DES	The Moreton Bay Ramsar Site and migratory shorebirds
22 June 2023	DCCEEW	Offset financial calculation and Supplementary Report status update.

2.4. Consultation by Project Opponents

During the public notification period, Birdlife Australia held multiple community workshops on the Draft EIS, and promoted these sessions as being run by "Toondah Alliance" (a combination of Australian Conservation Foundation, Birdlife Australia, and Redlands2030). During the workshops, the presenters provided an overview of the Project, information on the EIS process and timeline, as well as guide packs on how to make a submission. They also presented their own experts on some of the Draft EIS topics.

The members from "Toondah Alliance" assisted people with making submissions on the Draft EIS and supplied the guide packs on how to make a submission. Documents had been drafted by the Environmental Defenders Office and provided to the Alliance. Two guide packs provided were both titled *Save Toondah Harbour: Guide for providing comment on the Proposed Toondah Harbour Development*, and are included in **Appendix B**.

The guide packs included instruction on how to make a submission which stated:

1. *Start by stating that you oppose Walker Group's inappropriate and environmentally destructive Toondah Harbour proposal.*
2. *Add a sentence or two about why you care about saving Toondah Harbour, and why protecting shorebird habitat and Ramsar Wetlands matters to you. It is important that your comments feel personal.*
3. *Finally, add some specific comments about the draft EIS, that support what you've already said. You do not have to write about all of the suggested topics that are included in the Guide. You can pick and choice which topics that matter the most to you and include specific comments (see separate handouts) that provide more details about your concerns.*

The short guide provides a sample submission with suggested topics for inclusion such as (with supporting guidance / information under each):

- Relevant impacts of the proposed action.
- The Draft EIS includes inadequate information and misrepresentations.
- The proposed action does not support ecologically sustainable development.
- The proposed action does not meet the objectives of the EPBC Act.
- Environmental record of the Proponent.
- The proposed action is not supported by economic and social matters.

The long version guide pack included the above information, with the addition of providing comments that could be included in a submission (provided by different organisations) on migratory shorebirds (Birdlife Australia), Ramsar (Birdlife Australia), Moreton Bay Marine Park and marine species (Australian Marine Conservation Society), Koala (Koala Action Group Qld), and a general commentary section (Redlands2030).

A range of the information included in the information pack was factually incorrect or misrepresented the Draft EIS. Examples of information provided vs facts from the Draft EIS are provided in Table 2-4.

Table 2-4: Birdlife Australia Guide Pack Inaccuracies

Inaccurate Statement	Factually Correct Statement
Birdlife Australia	
The proposed Toondah Project is in direct conflict with various international treaties and conservation planning documents for migratory shorebirds.	The Project does not conflict with the Ramsar convention, Bonn convention or bilateral migratory bird agreements with Japan (JAMBA), China (CAMBA and the Republic of Korea (ROKAMA). These agreements are between Federal governments and generally require the identification of key areas for shorebirds and the establishment of frameworks to minimise impacts on wetlands and migratory species. They do not prohibit development in any form.
The Draft EIS does not address the life stage of the birds impacted by the Project. Studies by QWSG suggest that intertidal areas similar to and including those found at Toondah Harbour may contain a sizeable proportion of juvenile Eastern Curlews.	Surveys carried out at the site and surrounding areas included winter surveys when juvenile migratory shorebirds that had not migrated for breeding season would still be present. Over 5 years no Eastern Curlew were observed on the Toondah Harbour mudflat during winter. They have been observed at the sandbank offshore of Toondah Harbour and Oyster Point during winter surveys. Those sites are over 2 km and 400m from the Project footprint respectively.
Contrary to claims made in the Draft EIS, the Project will result in the destruction of 3.8% of feeding habitat within 5km of the project area.	This statement is not contrary to any claims made in the Draft EIS. The Draft EIS compared habitat loss to Moreton Bay and the Ramsar Site specifically. The latter was a requirement of assessing impacts to the Ecological Character of the site.
The Draft EIS…. implies that the Project is justified in destroying tidal flats at Toondah Harbour – because the real problem occurs overseas.	The Draft EIS does not justify impacts by saying the real problem is overseas. It references a range of published, peer reviewed literature that recognise shorebird species with the greatest reliance on the Yellow Sea as a stopover site have experienced the greatest population declines.
The Draft EIS considers tidal feeding habitat within the Project footprint as separate to the Moreton Bay Ramsar Site.	Tidal feeding habitat is addressed in the context of the Ramsar site in Chapter 27 of the Draft EIS. Assessment found that shorebird density within the Project footprint was generally low compared to other areas of the Ramsar site.
The Draft EIS fails to address the cumulative impacts resulting if the Project is approved.	Cumulative and consequential impacts are addressed in Chapter 26 of the Draft EIS.
The Draft EIS claims there are precedents for developments within Ramsar boundaries nationally and internationally. This claim and the precedents presented are misleading and should not be equated to the scope and scale of what is being proposed by the Toondah Harbour Project.	As identified in Chapter 4 of the Draft EIS, the Riverwalk development (EPBC 2006/3176) in Victoria was approved to deliver 2,200 residential lots and other urban uses over a 197 ha area within the Port Phillip Bay (Western Shoreline) and Bellarine Peninsula Ramsar Site. Other examples are also provided in Chapter 4.

Inaccurate Statement	Factually Correct Statement
Recent surveys conducted by BirdLife Australia staff and volunteers counted between 160 and 180 Eastern Curlew at Oyster Point, a key roosting site within the impact area of the Proposal. This number far exceeds what was presented in the Draft EIS.	Section 17.3.3.3 of the Draft EIS states maximum Eastern Curlew counts at Oyster Point as 130. Similar to the Birdlife Australia counts. Oyster Point is 450m south of proposed channel extension and more than 550m from the reclamation area or harbour upgrade works, more than double recommended buffer distances. It is not expected to be impacted by the Project.
Toondah Harbour provides important feeding and roosting habitat for more than 40,000 EPBC-listed migratory shorebirds over the Australian summer.	The Draft EIS (Section 17.3.7) found that the total migratory shorebirds recorded feeding on the Toondah Harbour tidal flats was an average of 98 birds in 2014/15 and an average of 29 in 2021/22. In the 5 years prior to the release of the Draft EIS an average of 3 eastern curlews have been observed on the mudflat.
Australian Marine Conservation Society	
[The Project will result in] removal of an important buffer against coastal erosion and storm surge.	Detailed modelling (section 8.4.5 of the Draft EIS) found the Project effectively provides a shielding mechanism from Toondah Harbour to south of Oyster Point. This shielding produces a reduction in wave height within and around the Project. Overall, the model results indicate that the Project provides additional protection for the adjacent shorelines in an extreme event scenario.
The period of construction for the project is an acknowledged 18 years. Impacts of activities such as dredging and sediment, light pollution, sound pollution, contamination risk, have not been addressed for their cumulative and multiplier effects over this time period.	The Draft EIS addresses all impacts over the life of the project including construction and ongoing use.
The EIS claims the project will result in no increase in vessel traffic, despite the plan to construct a 400-berth marina and claiming additional tourist visits to Minjerribah will result from an upgraded ferry terminal.	The project includes a 200-berth marina, not 400. The Project will result in the removal of an existing recreational boat ramp therefore is expected to result in no net increase in recreational boat traffic. The proponent will fund upgrades to a nearby boat ramp to offset removal of the ramp.
Koala Action Group	
The proposal also includes large scale commercial development and a 400-berth marina.	The project only includes a minor commercial component (2,500 m^2) most of which is required to support the harbour and marina. The project includes a 200-berth marina, not 400.

Inaccurate Statement	Factually Correct Statement
No traffic mitigation measures have been suggested for other streets [aside from Middle Street] in or around the Toondah Precinct.	A range of measures have been identified for other streets including: ▪ No construction traffic allowed to use Shore Street East. Construction traffic will be required to use only designated routes. ▪ Shore Street East designated as a 40km/hr road and fitted with electronic signage to indicate vehicle speed and warn of koalas crossing. ▪ Install go slow zones and permanent attendant to 'walk' construction traffic through the area of Middle Street adjacent to GJ Walter Park during peak construction periods.
Noise from construction works will be 6 days per week and pumping of water 24 hours a day, 7 days a week.	Water will not be pumped 24 hours a day, 7 days a week. It is unclear what this comment is in reference to.
The digging up of acid sulphate soils in Moreton Bay marine park will omit odours that are likely to negatively impact residents.	Any potential acid sulfate soils excavated or dredged will be treated with lime prior to oxidisation, therefore there will be no odour.
The Proponent's advertising has consistently contained appealing artists impressions of the project, whilst omitting to show the 80 or so high rise residential towers that will contain 3600 units.	Accurate 3D renderings of the Project have been provided in the Draft EIS and a flythrough can be found on the Project website. All are based on 3D models of the Project footprint described in the Draft EIS. While the number of buildings has not been finalised, it is expected to be closer to 50 buildings in total. More than half of the buildings will be 4 storeys or less.
It appears the developer funded consultants estimate of the number of birds feeding in the Toondah Ramsar site and surrounding habitat is on the low side.	Maximum bird counts reported in section 17.3.3.3 of the Draft EIS are similar to those reported by a range of local conservation groups during the public notification process, and in many cases exceeded them.

3. Summary of Submissions on the Draft EIS

3.1. Submission Types

A range of submission types were received over the public notification period. Nearly all submissions were lodged electronically to the email inbox with a small number provided through the PO Box. In addition to being supplied electronically, most submissions were provided via 'portal' websites or online forms that either pre-filled or provided pre-composed content to be copied and pasted into the submission form. These portal websites lodged a submission on behalf of an individual or entity after they had entered details such as their name and email address into an online form. Submission 'portals' included:

- The Toondah Alliance 'Do Gooder' website form
- Australian Marine Conservation Society website form
- Redlands 2030 pre-composed submissions
- Birdlife Australia – Save the Bay EIS Response Resources
- The Proponent's website form.

The various submission portals and the information provided in them are described in the following sub sections. All submissions have been reviewed and included in the various statistical analysis presented in this report. Likewise, issues raised by the pre-filled and pre-composed content have been summarised and addressed in this report.

It should be noted that under the EPBC Act there are no rules or minimum requirements to determine what constitutes a 'properly made' submission – any comment received during the public notification period is considered to be a submission. For example, if an email was received simply stating "no to Toondah", this is a submission, and has been included in our collation and analysis. Similarly, a submission does not need to have a name, signature, address or postcode, or any other information for it to be considered and included. Every submission received during the public notification period has been read, categorised and included in the statistics, analysis and response included in this document.

3.1.1. The Toondah Alliance 'Do Gooder' website form and proformas

The 'do gooder' website provided instructions and a mechanism for making an online submission on the Draft EIS. Under the heading "Put in your comments to Save Toondah Harbour" it stated:

> *Adding your comments is easy, even just a few sentences will have an impact.*
> *It is very important that your comments are personal. Here is a quick guide to help.*
>
> 1. *Start by stating that you oppose Walker Corporation's inappropriate and environmentally destructive proposal.*
> 2. *Add a sentence or two about why you care about this issue and why protecting shorebird habitat and Ramsar Wetlands is important to you.*
> 3. *Add some specific comments about the draft EIS (found below).*

Followed by suggested specific comments relating to the Eastern Curlew and Ramsar wetlands.

The page requested a postcode, first and last name, and email address fields to be infilled, and provided the subject line: Comment on Toondah Harbour EIS, and a field for inputting comments, and a submission button. See Plate 3-1 for a screenshot of the webpage. Additionally, the Toondah Alliance generated at least six different proformas for people to sign and submit. Examples of the proformas are included in **Appendix C**.

The portal lodged a submission on behalf of an individual or entity after they had entered details such as their name and email address into an online form.

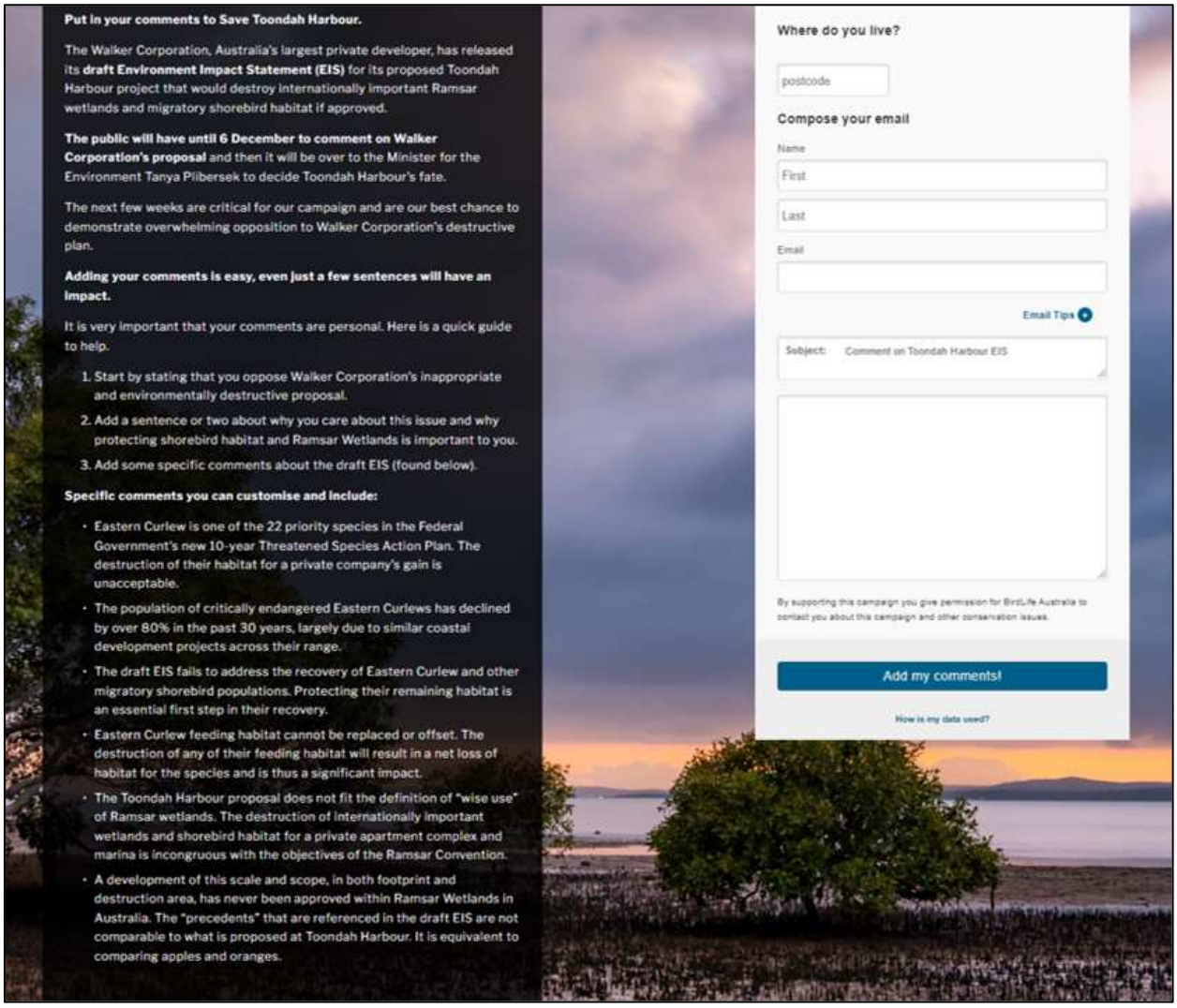


Plate 3-1: Do-Gooder Pro Forma Webpage

3.1.2. Australian Marine Conservation Society website form

The Australian Marine Conservation Society (AMCS) was similar to the do-gooder website in that it supplied an online form that required people to input basic information such as name, email address and postcode. It also included a text box for inputting a message for an individual submission. Unlike the do gooder form the text box was pre-filled by a standard AMCS message, and submitters had the ability to edit the message. Wording from the pre-generated message is included as **Appendix D**.

3.1.3. Redlands 2030 pre-composed submissions

The Redlands2030 website provided a range of pre-filled Draft EIS submissions. The pre-populated options included a general submission against the project, or seven more detailed submissions, based on topic. The general submission included discussion on Ramsar, impacts to marine and wetland habitats, Eastern Curlew, Koala, social, and masterplan – "please upgrade the ferry terminal, but do not reclaim the bay". This was the most commonly recorded submission from this website.

The submitter could select one of the pre-populated options, fill in some optional fields of personal information (name, email address and postal address), and press submit, and the relevant submission was emailed via the do gooder email to the Toondah submission email inbox. There was also an option to compose your own submission and submit it through this channel.

The pre-populated submissions and the overarching explanation Redland2030 provided are presented in Table 3-1 and the automatically generated submissions are included in **Appendix E**. It is noted that the explanation provided below have been extracted directly from Redland2030 information and has not been edited for factual, spelling or grammatical errors.

Table 3-1: Redland2030 Pre-populated Submissions

Topic	Redland2030 Explanation / description
General / no topic provided	(no explanation provided)
EIS non-compliance with Guidelines	The proponent was obliged by the EPBC process to construct a set of guidelines for the EIS. When they met the standards of the Minister, they were released. The EIS must now meet the published guidelines. There are many examples where we believe this is not the case.
EIS Failure against EPBC Criteria	Submission demonstrating fundamental failure of the Toondah Harbour proposal Environmental Impact Statement under the EPBC Act against the following assessment criteria: a) Protects the environment especially the Matters of National Environmental Significance b) Promotes ecologically sustainable development c) Promotes conservation of biodiversity d) Promotes a cooperative approach to the protection and management of biodiversity e) Assists in the cooperative implementation of Australia's international environmental responsibilities.
Loss of Scenic Amenity	Due to the secrecy that has been carefully maintained around the true nature of this proposal, the local public have not been aware that the Project, should it be approved, will take place over an estimated 20 years, during which there will be many impacts on Redlands residents, especially those living in and around Cleveland. An important one of these is the loss of the views and recreational experiences we take for granted as an integral part of bayside living.
Impact on Koalas	A number of koalas make the Toondah Harbour precinct their home, and others traverse the area regularly. The EIS suggests that impacts on the koala population can be mitigated.

Topic	Redland2030 Explanation / description
Consequential and Facilitated Impacts	The Toondah EIS Guidelines mandate a detailed assessment of facilitated or consequential impacts on MNES at the local, regional, state, national and international scale. Consequential impacts are poorly assessed leaving gaps in this requirement.
RAMSAR "Wise Use"?	This draft submission canvasses the damage that will be done to the internationally protected RAMSAR wetlands should the proposed project proceed. The rationale for its rejection under the "wise use" provision is explored.
Matters of National Environmental Significance	In this draft submission the case is made for rejection of the proposed project on the grounds that is does not meet the requirements for the MNES criteria.

Additionally, Redland2030 disseminated paper copy submissions for people to fill out their personal details and submit. An example is included in **Appendix E**.

Based on feedback from members of the public these forms were at times provided with misleading information on the Project. Correspondence was received by the Proponent after the notification period was completed withdrawing a negative submission. The correspondence is re-produced in full below:

In light of the recent publicity regarding the Toondah Harbour project, it came to mind that I inadvertently provided a submission against the Walker Corporation Toondah Harbour project during the public notification period. I would like to retract my position against the project, and confirm I fully support the redevelopment of Toondah Harbour and the scheme proposed by Walker Corporation.

Having the opportunity to reflect on the moment I provided the submission against the project, I was not briefed or provided any detail regarding the petition like form I was asked to complete while socialising with friends at a BBQ event. During the event I was approached by another attendee who asked me to support them in "saying no to Toondah Harbour development". For clarity, the person seeking submissions did not provide me with any detail regarding the project, did not furnish me with any plans of the proposal or an understanding of the process Walker Corporation have undertaken in assessing the environmental impacts and mitigation measures which will be closely scrutinised throughout the development.

I would like it to be known to the decision makers within this process, the manner in which those seeking submissions against the project did not provide any detail regarding the scientific reports and research undertaken by Walker Corporation in constructing the Draft EIS. Rather, I was induced to make a negative submission against the project based on emotive comments of "Walker destroying the bay" and what I now know as false statements such as "Walker constructing 60 x 10 story apartments".

The manner in which I was put on the spot to agree with the individual and provide them the submission was misleading the audience and some would consider it bullying, presenting their point of view without any scientific research to accompany their unfounded and incorrect statements.

Please withdraw my submission against the project, and take this letter as a position of support for the redevelopment of Toondah Harbour and Walkers scheme to transform this area into what will be a world class gateway to our bay islands. Following further review of the information available, I believe that the Toondah Harbour project should proceed and be a showcase example of development progress and the environment can coexist.

3.1.4. Birds Queensland

Birds Queensland also had a webpage with background information and a suggested submission. The page was titled *Toondah Harbour Development EIS – Submissions Needed*, dated 28 October 2022. It referred to the Redlands2030 website submission page and provided a link to it. It presented "key points" regarding the Project and impacts to Ramsar wetlands and migratory birds, and information on how and when to make a submission.

3.1.5. The Proponent's website form

The Proponent's website presents information on the Project, including an overview and location of the Project. During the public notification phase the website also included a link to Draft EIS document, and a page to make a submission on the EIS.

The webpage offered an option to make a positive submission on the Project, and one of the following support types could be selected as the reasoning behind the positive submission:

- Improved lifestyle
- Jobs and economy
- Protecting the environment
- Safer Harbour
- Tourism.

The submitter was required to include details such as name, address, postcode and email address in order for the form to be completed. Security measures were included on the page to ensure it could not be exploited by bots or other malware.

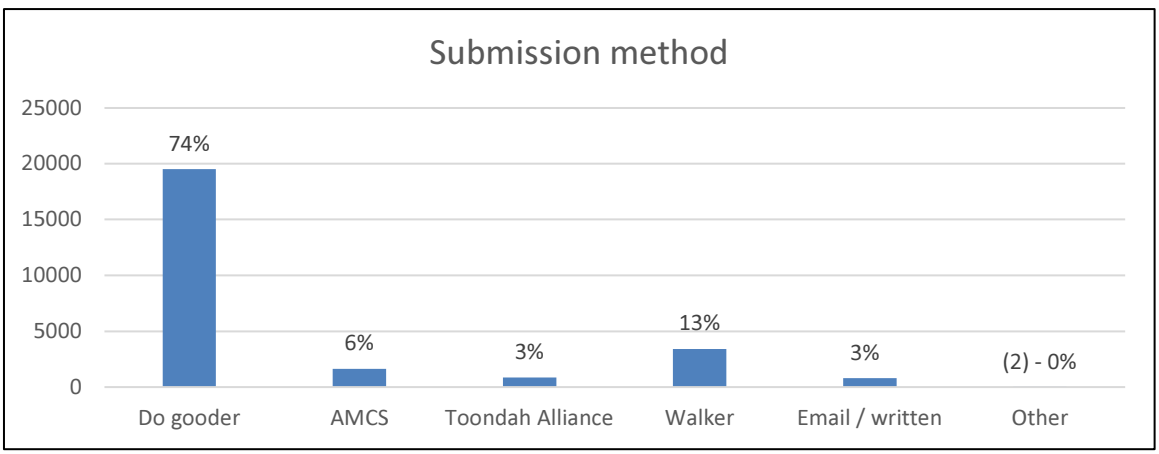
3.2. Submissions Received

The following section provides some summary statistics from the analysis of all submissions that were received.

3.2.1. General Response

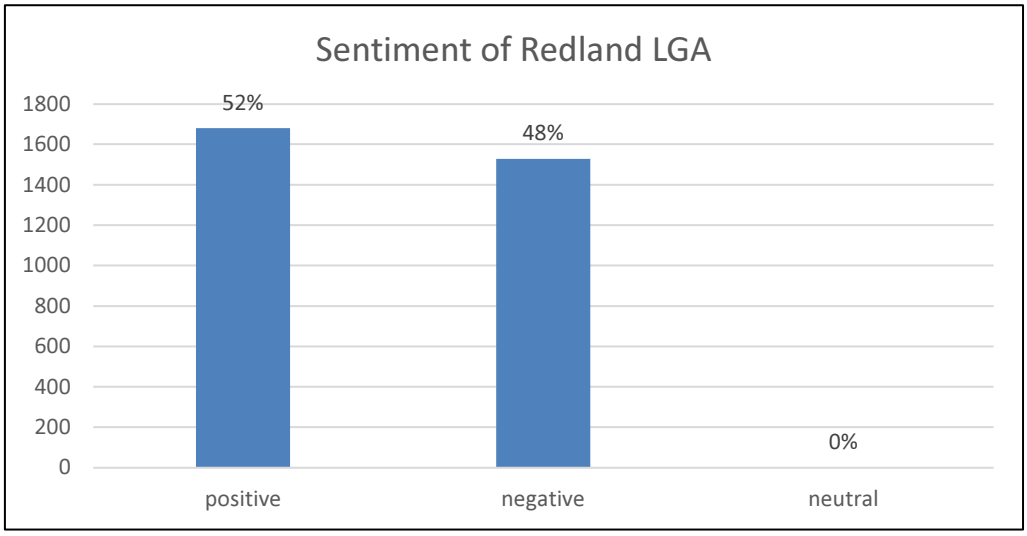
A total of 26,225 submissions were received during the Draft EIS public notification period. Of these 26,225 submissions, 1,939 were from people who made multiple submissions, resulting in a total of 24,286 unique submitters.

Of the 26,225 submissions received, the vast majority (19,520) were generated through the do gooder website (refer to section 3.1.1), with a further 1,633 through the AMCS website, and 854 via the Toondah Alliance methods. The Proponent's website generated 3,405 submissions. There were 813 submissions recorded as "written / email" or "other". Generally, these were submissions that came directly from an individual or entity via their email address.

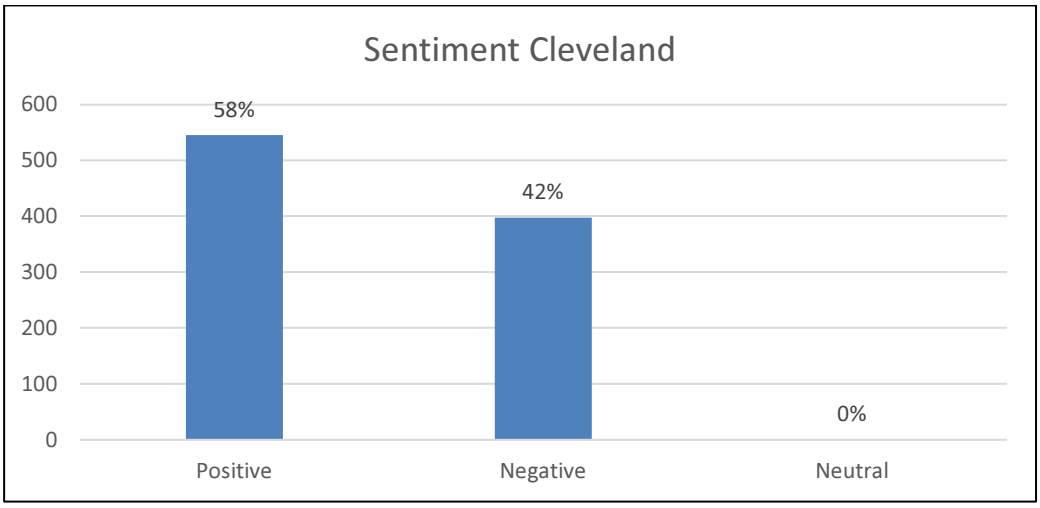


3.2.2. Sentiment toward the Project

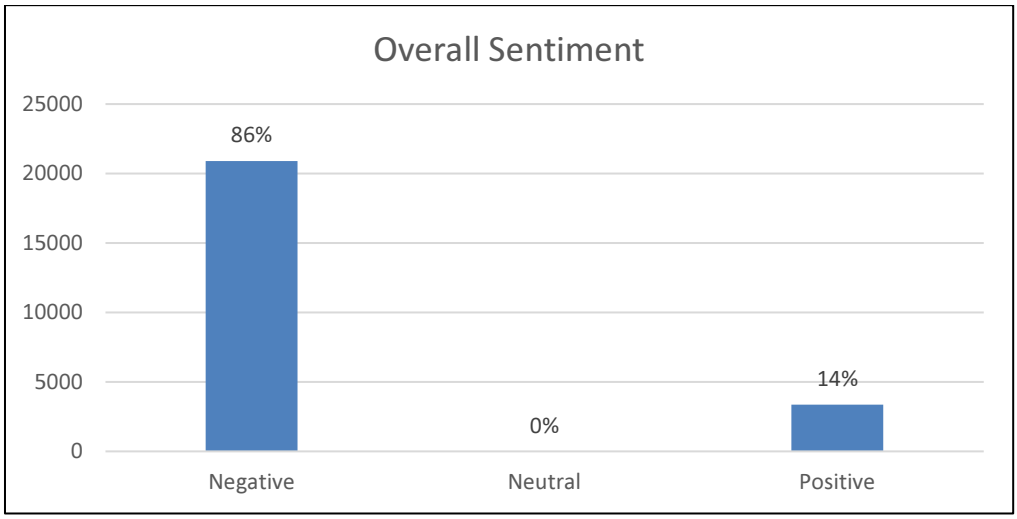
With repeat submitters counted only once, analysis of submitters from Redland City LGA postcodes (4157, 4158, 4159, 4160, 4161, 4163, 4164, 4165, 4183, and 4184) – a total of 3,211 – show 52% are supportive and 48% are unsupportive of the Project.



Analysis of submitters from the Cleveland postcode (4163) - a total of 943 - show 58% are supportive and 42% are unsupportive of the Project.



Overall sentiment toward the Project showed 86% of submitters are unsupportive. Most of these submissions were provided via 'portal' websites or online forms that either pre-filled or provided pre-composed content to be included in the submission. Many of these forms included factually incorrect information about the Project (refer to Table 2-4).



3.2.3. Comment on the Draft EIS

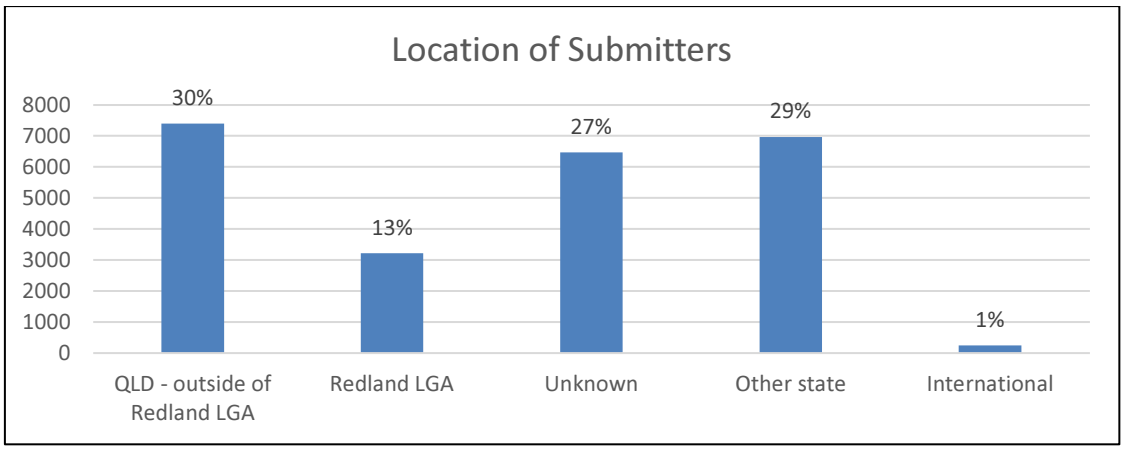
The majority (57%) of submitters did not make a comment on the content of the Draft EIS and just stated support or opposition to the Project. Of the total submitters, 43% included a comment relevant to content within the Draft EIS.

A conservative approach was taken when analysing whether a submission included a comment on the Draft EIS or not. If a submission included any mention of site-specific details such as the Ramsar site or migratory birds it was counted as a comment on the Draft EIS. If the submission only mentioned Toondah Harbour by name, a completely different location or only included abuse towards the Proponent or government it was not considered as a direct comment on the Draft EIS.

Approximately 1% to 2% of submissions referred to inaccurate locations, with a majority of these requesting to not develop North Stradbroke Island, Moreton Island, "the island", Toondah Island, and even Fraser Island. To be conservative, where submissions referred to the incorrect location but still referred to 'wetlands' or 'Ramsar', were still counted as a submission addressing Ramsar.

3.2.4. Locations of Submitters

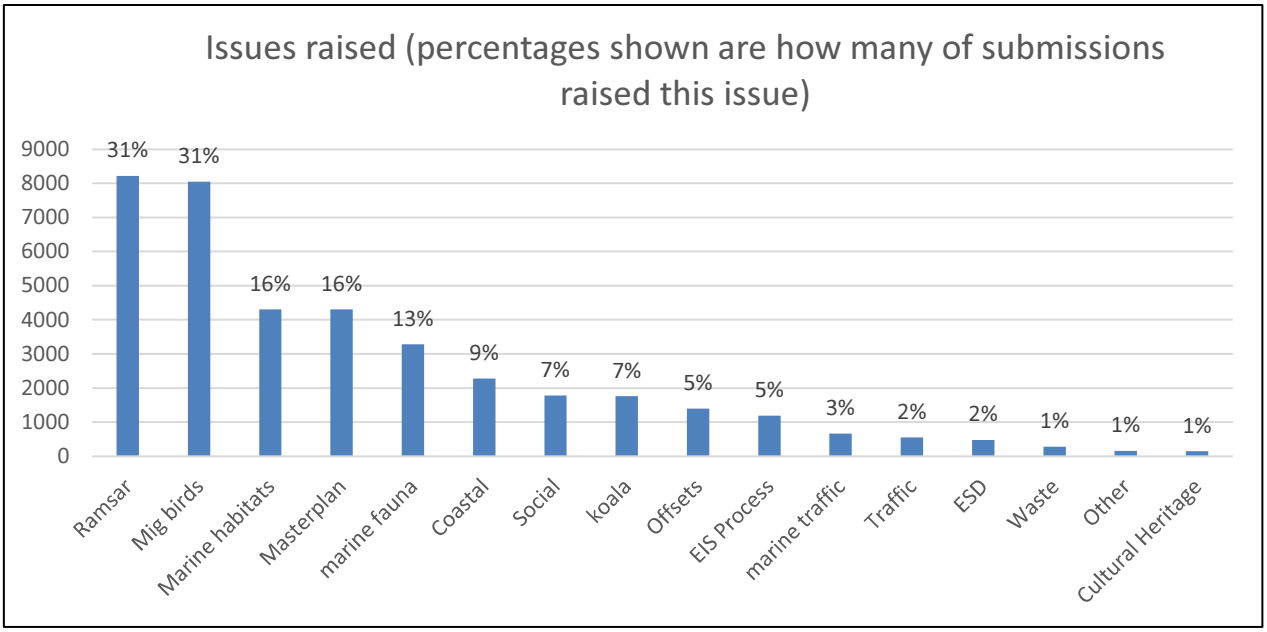
Only 13% of submitters came from within the Redland LGA. Overall, the majority of submitters were from Queensland (43%). Approximately 29% of submitters were from another states, and 27% did not include a postcode or any identifiable address. Approximately 1% of submitters were international. Note – these statistics include only one submission per submitter, repeated submissions were not included in the statistical analysis.



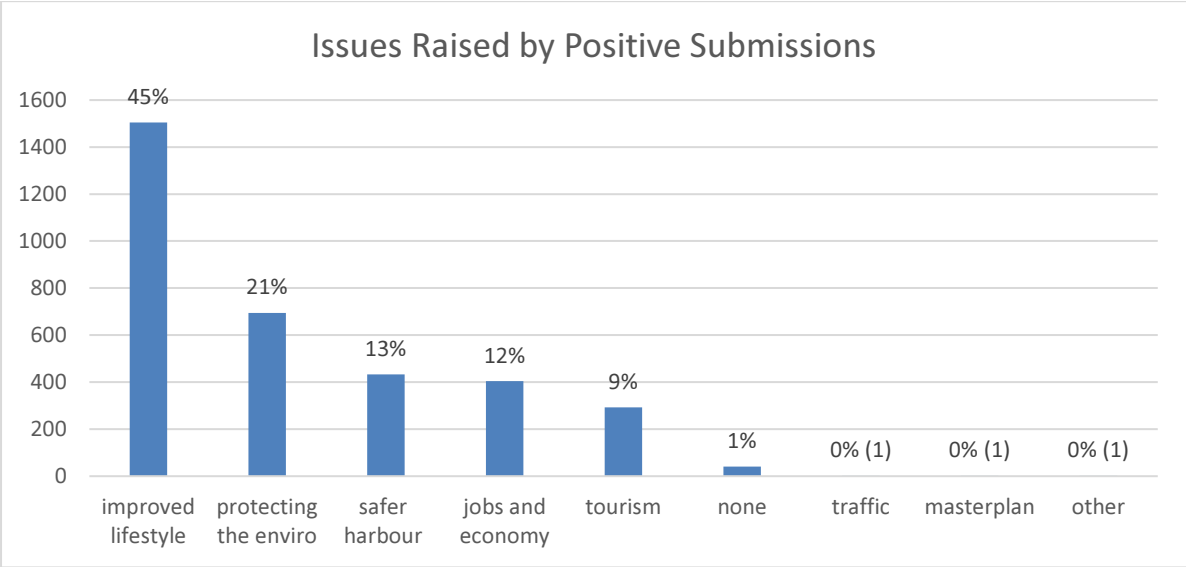
3.2.5. Summary of Issues Raised by Submissions

The analysis of submissions showed that issues most commonly raised were around Ramsar and migratory birds, with 31% of submissions raising at least one of these topics. The next most frequently raised issues were marine habitats and masterplan (16% of submission raised each of these topics). These issues were followed by coastal processes (9%), social (7%), koala (7%), offsets (5%) and the EIS process (5%). This analysis considered all submissions received, including those from repeat submitters, as a number of repeat submitters addressed different issues in each submission.

It should be noted that the number of times a matter has been raised does not necessarily reflect the number of comments requiring response. For example, Ramsar was one of the issues consistently raised by submissions, however most comments on the Ramsar site related to the Project not meeting the definition of "wise use" or being inconsistent with Australia's obligations under the Ramsar site. This meant that several thousand submissions are addressed through a small number of responses. Alternatively, while koala impacts were raised by relatively fewer submissions some of those submissions were highly detailed with several comments requiring response.



The majority of positive submissions came via the Proponent's website, which offered the categories listed in Section 3.1.4. Lifestyle benefits were raised in 45% of these submissions, followed by protecting the environment in 21%. Note – the Proponent's website submission method only allowed for one support type / issue to be selected. These statistics do not include repeat submitters.



3.2.6. Inappropriate and Irrelevant Comments

A number of submissions included inappropriate and irrelevant comments. The sample of comments below have been provided to highlight the range of comments received:

- *Do society a favour and take your garbage proposal to your death bed asap.*
- *In terms of the God, Money, we also need to stop the tentacles of increasing network of influence from the various christian wealth-religions with their self-serving twisting the bible to basically justify pillage & plunder. Cos "dominion" is our gift from god & we go live in Eden when we die anyway.*
- *Oh right, so stuff the planet & no empathy for all other people, poor or rich in other religions or or not religious! It is abject, abusive & although I am aethiest, i can still imagine Jesus rolling in his grave at some of his teachings being used to sell plans, books on how to increase your wealth.*
- *Please do not let the greedy corrupt Government & Walker developers rape Australian coastline, kill untold numbers of wildlife, forever & irrevocably alter the environment; all for greed ! The power of the greedy leaders will destroy us all in the end.*
- *Stop this* [omitted] *corrupt destructive* [omitted] *and invest in some eco farms or natural restoration projects!!*

4. Project Description Updates

Amendments have been made to the masterplan as a result of comments received through public submissions and ongoing consultation with DCCEEW. These changes include incorporating additional open space and providing larger buffers to sensitive receptors. A range of additional studies have also been completed providing further information and detail on the Project design and construction.

4.1. Project Details

Additional information provided in this section relates to the Project Details described in Chapter 1 the Draft EIS and should be read in conjunction with that chapter. Further information is provided on the Proponent, masterplan history, Final EIS masterplan, community infrastructure provided by the Project, the history of Toondah Harbour and how the Project will help address the existing shortfall in housing supply in Redland City.

4.1.1. Proponent Information

The Draft EIS included details on the Project Proponent (Walker Group Holdings Pty Ltd) including examples of where the Proponent has successfully delivered projects within sensitive environmental areas.

Section 15 of the EPBC Act EIS Guidelines state:

The EIS must include details of any proceedings under a Commonwealth, State or Territory law for the protection of the environment or the conservation and sustainable use of natural resources against:

a) the person proposing to take the action; and

b) for an action for which a person has applied for a permit, the person making the application.

If the person proposing to take the action is a corporation, details of the corporation's environmental policy and planning framework must also be included.

This information was provided in the referral documentation for the Project which has been available on the EPBC Act Public Portal (and its preceding database) since 5 June 2018. For clarity this information is re-stated below.

Walker Group Holdings Pty Ltd has not been subject to proceedings under a Commonwealth, State or Territory Law.

A subsidiary of Walker Group Holdings, Kew Development Corporation Pty Ltd was subject to proceedings under State law:

Kew Development Corporation Pty Ltd and Heritage Victoria: In 2007 Kew Development Corporation Ptd Ltd (a Walker subsidiary) pleaded guilty to excavating within a Tree Preservation Zone at its Kew Cottages site in Melbourne resulting in the damage to the root of a tree. Kew Development Corporation was required to fund heritage tree protection measures in Kew Cottage's future stages. The tree was retained and is in good health today.

Walker Group Holdings Pty Ltd has been a registered entity since 29 April 2000.

4.1.2. Masterplan Optimisation

The tidal components of the masterplan for the Toondah Harbour Project have evolved significantly since the first version was released in 2015 as part of the original EPBC Act referral that was later withdrawn. Since that time, the project footprint (excluding the turning basin and entrance channel, which did not have a completed concept design until 2018) has been reduced by approximately 20.3 ha. That equates to over a third of its original area. These changes have occurred through optimisation of different Project components to avoid and minimise impacts to marine habitats and adjacent sensitive receptors such as Cassim Island.

Figure 4-1 provides a comparison of the Project footprint at key stages of the design process. These stages and key differences include:

- **2015 masterplan** – submitted with the original EPBC Act referral in 2015 (2015/7612) that was since withdrawn. Included a footprint of 57.72 ha within tidal areas. While dredge volumes had not been accurately assessed this masterplan included a 400 berth marina in the middle of the existing mudflat, which would have generated significant additional dredging volumes compared to the current masterplan. No buffer was provided between Cassim Island and urban uses.
- **2017 masterplan** – submitted with the second EPBC Act referral in 2017 (2017/7939). Included a footprint of 49.34 ha within tidal areas (a reduction of 8.38 ha). Included a significant reduction in the marina and internal waterways (13.86 ha to 10.95) but still included up to 400 berths. A 200m buffer was provided between Cassim Island and urban uses.
- **2018 masterplan** - submitted with the third (and current) EPBC Act referral in 2018 (2018/8225). Included a footprint of 41.65 ha within tidal areas (a further reduction of 7.69 ha). The marina was reduced to 200 berths however internal waterways were increased to include a 'natural' design aesthetic. The 200m buffer was retained between Cassim Island and urban uses.
- **2023 (Final EIS) masterplan** – included with the Draft and Final EIS. The footprint has been reduced to 37.43 ha within tidal areas. This is a 35% reduction when compared to the 2015 masterplan footprint of 57.72 ha in the tidal zone. The reduction from the 2018 masterplan occurred predominantly through optimisation of dredge areas and shifting the development footprint to provide a 250m buffer between Cassim Island and urban uses.

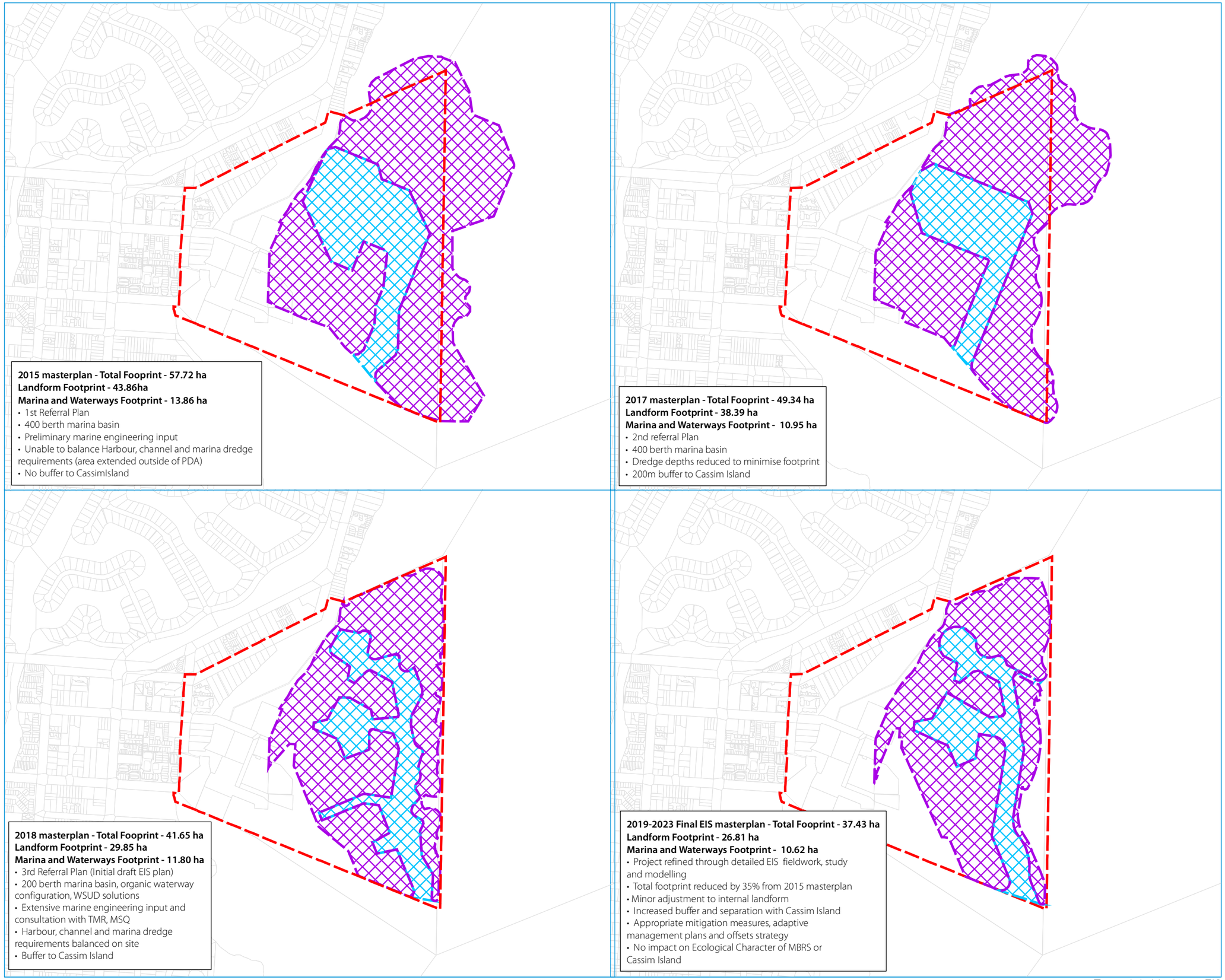
The iterative re-design of the Project masterplan and footprint since the initial proposal in 2015 demonstrates how the Project has responded to site constraints and ongoing consultation with relevant experts and DCCEEW. This has resulted in a reduction of the footprint on tidal lands by over one third while still achieving the required outcomes of the Toondah Harbour PDA Development Scheme. The redesign efforts are consistent with the environmental mitigation hierarchy to avoid and minimise impacts where possible, as recommended in supporting policies to the EPBC Act and the Ramsar Convention.

4.1.3. Alignment with the Toondah Harbour PDA Development Scheme

As outlined in section 1.5.2 of the Draft EIS, the Project is located within the Toondah Harbour PDA therefore is subject to the Toondah Harbour PDA Development Scheme.

The development scheme is the regulatory document that controls land use, infrastructure planning and development in the PDA. Spatial outcomes for the Toondah Harbour PDA are governed by the development scheme's land use plan and infrastructure plan. The land use plan includes a vision statement, structure plan, precinct plan and a height plan.

Figure 4-1: Change to Project Footprint Over Time



Layer Source: © State of Queensland Datasets (Department of Natural Resources, Mines and Energy 2020), Aerial Imagery (Nearmap.com 2020)

Toondah Harbour EIS

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DATE: 31/07/2023

FILE REF. 9858 E Figure 4_1 Change to Footprint A

The PDA Development Schemes vision statement describes the overall outcomes to be achieved for the PDA, including:

- Creating a mixed-use node incorporating medium density residential development, commercial offices, cultural facilities, tourist accommodation including a boutique hotel, and restaurants, cafes and shops.
- Providing appropriate infrastructure and parking facilities in accessible locations that have regard to coastal resources.
- Providing a marina with accompanying marine services, boating industry and car parking.

The PDA Development Scheme infrastructure plan details the infrastructure necessary to support the proposed land uses within the PDA and identifies applicable infrastructure charges. Key infrastructure requirements that inform the design and master planning for the Project include:

- Development of a new plaza and passenger ferry terminals.
- A ticketing and information centre for Moreton Bay and Minjerribah (North Stradbroke Island).
- Capital dredging to straighten, widen and deepen the Fison Channel and allows for two ferry operators to be located at the harbour.
- Extension of the existing turning basin to meet the needs of the existing and future vehicle ferry fleet.
- A staged marina and associated marine engineering and dredge spoil disposal strategy.
- Provision to create new land, including the development of piers/land reclamation areas which may accommodate dredge spoil disposal and be utilised for marine services and marine based maintenance service industries and urban purposes.
- Opportunities to extend GJ Walter Park into the bay with a north facing tidal area.
- Establishment of a new mixed-use plaza as civic space and an attractive arrival point into the PDA.

Assessment of the Toondah Harbour Project against the Toondah Harbour PDA Development Scheme has been carried out by Clayton Utz. The key outcomes of this assessment are:

- The Master Plan is consistent with the Structure Plan, as it contains the core elements and land uses contemplated by the Structure Plan as described in section 3.3.2 of the Development Scheme.
- Notwithstanding some differences from the spatial layout of the Structure plan elements, the Masterplan is consistent with the PDA vision of the Development Scheme particularly given that the Development Scheme sets the broad planning principles but does not restrict the Development to any particular form.
- While the Structure Plan identifies "indicative" locations for the key land reclamation and marina opportunities, the Development Scheme does not preclude other designs and their respective technical, engineering and environmental inputs from being considered.
- As a result of the detailed planning process, it was determined that the configuration of the reclamation and marina as depicted in the Structure Plan is not technically or environmentally practical and would not necessarily support the PDA Vision or the provisions of the Development Scheme.

The full review against the PDA development scheme is included as **Appendix F** to this Supplementary Report.

4.1.4. Final EIS Masterplan

The Final EIS masterplan is provided as Figure 4-2. The overall footprint area of the Project has not changed from the Draft EIS, however the internal layout has been modified to clearly show the 250m buffer between urban uses and Cassim Island. Open space / park areas have also been increased from what was shown in the Draft EIS masterplan to provide a more accurate indication of the mix of uses. Final Project footprint areas, including overlap with the Moreton Bay Ramsar Site and Marine Park, is shown on Figure 4-3. Conceptual imagery showing greenspace near foreshore housing, marina housing, and education centre are shown in Plates 4-1 to 4-3.

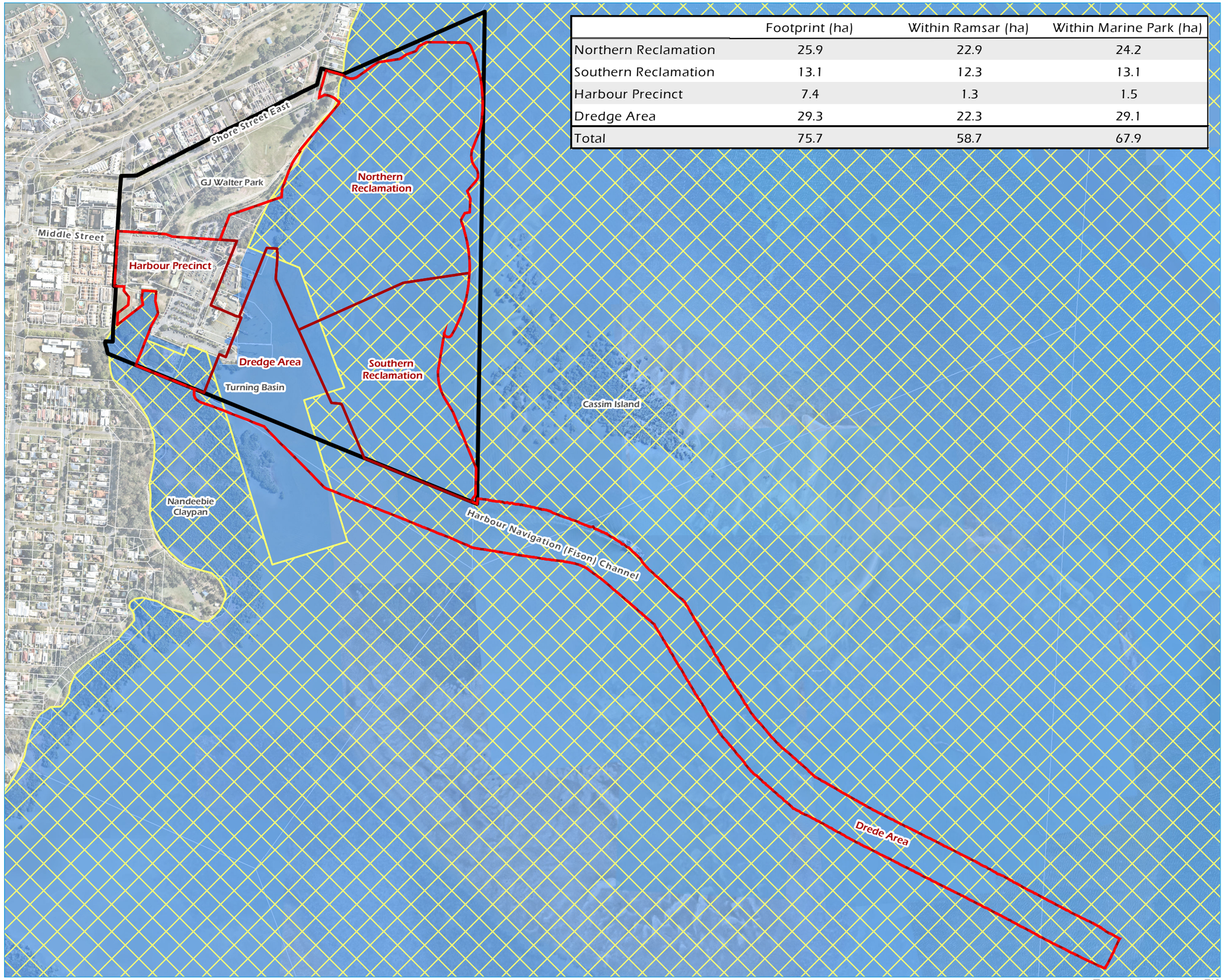
Figure 4-2: Toondah Harbour Final EIS Masterplan

Plate 4-1: Conceptual imagery of foreshore housing.

Plate 4-2: Conceptual imagery of marina housing.

Plate 4-3: Conceptual imagery of education centre.

Figure 4-3: Final EIS Project Footprint Summary



	Footprint (ha)	Within Ramsar (ha)	Within Marine Park (ha)
Northern Reclamation	25.9	22.9	24.2
Southern Reclamation	13.1	12.3	13.1
Harbour Precinct	7.4	1.3	1.5
Dredge Area	29.3	22.3	29.1
Total	75.7	58.7	67.9

Legend

- Toondah Harbour PDA (Project Area)
- Qld DCDB
- Project Footprint

Moreton Bay Marine Park Zones

- Habitat Protection Zone
- Moreton Bay Ramsar site

TOONDAH HARBOUR

walker

0 100 200 300 400 m

GDA 1994 MGA zone 56

Scale (A3): 1:8,600

N

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FILE REF. 9858 E Figure 4_3 Project Footprint Summary

Layer Source: © State of Queensland Datasets (Department of Resources 2022), Aerial Imagery (Nearmap.com 2020)

Toondah Harbour EIS

4.1.5. Community Infrastructure Provided by the Toondah Harbour Project

The Project will include significant investment in public infrastructure, most of which is proposed to be delivered within the first five years of works commencing. Table 4-1 outlines the cost of community infrastructure being delivered by the Proponent at no cost to the public and for which the Proponent will gain no financial benefit. A cost breakdown is included as **Appendix G** to this Supplementary Report.

Approximately $100 million will be invested including major upgrades of sub-tidal and on land-based infrastructure at the boat harbour, foreshore parks and promenades, and community buildings. It should be noted that this does not include smaller parks and open space areas around buildings, or retail, cafes and other public spaces which will provide benefits to the community as well as the proponent.

Table 4-1: Investment in Public Infrastructure

Infrastructure	Description	Cost Estimate (2023 $)
Capital dredging to Fison Channel and turning basin	Dredging and placement of dredge material only – does not include treatment or stabilization for reclamation.	$42,780,000
Ferry terminals	Marine infrastructure associated ferry terminal upgrades including RoRo berths, pontoons, navigational lighting, etc.	$13,872,000
Ferry car parking	Additional car parking at ferry terminal including grading, etc.	$5,037,000
Bus interchange	Transport hub at ferry terminal	$1,111,000
The new waterfront plaza	Revetments and plaza area – does not include buildings such as cafes, retail, etc	$7,347,000
Ticketing and information centre	Hub building within plaza for use by council and ferry operators	$2,156,000
Waterfront boardwalk promenade	Contiguous promenade on and over the waterfront	$11,714,000
Improvements and extension to GJ Walter Park	Playground, furniture, lighting, etc	$764,000
Foreshore Parklands	New beach and parklands including furniture, lighting, plantings, etc	$14,279,000
TOTAL INVESTMENT IN PUBLIC INFRASTRUCTURE		**$99,060,000**

4.1.6. Project Need and Alternatives

Additional information has been compiled to support the location and need for the Project (refer to section 1.4 and 1.5 of the Draft EIS) including a housing and demand study for the Redland Local Government Area (LGA) and overview of the history of proposals to upgrade Toondah Harbour as well as other options for providing improved access between Minjerribah (North Stradbroke Island) and the mainland.

4.1.6.1. Redlands Housing Strategy Assessment

A housing and demand study for the Redland LGA has been completed by Urbis as part of the Supplementary Report and is included as **Appendix H**. The study includes an assessment of how the Project aligns with public policy objectives

at a local, state, and federal level, including Toondah Harbour's contribution towards strategic economic development and housing targets.

Strategic documents which identify the importance of new housing delivery, particularly higher density apartment accommodation within the Redland LGA, include:

- The Redlands Housing Strategy 2011-2041
- South East Queensland (SEQ) Regional Plan 2017
- National Housing Accord
- QLD Housing Strategy Action Plan 2021-2025
- The pending Redland Housing Supply and Diversity Strategy 2023-2046.

The study found that the Project will play a pivotal role in achieving the following strategic objectives for the Redland LGA:

- Development of predominantly multiple dwellings within Cleveland Principal Activity Centre (Redland Housing Strategy 2011-2041).
- Delivery of 200 new apartments per year through 2031 (Redland Housing Strategy 2011-2041).
- The Draft Redland House Strategy 2023-2046 (released October 2023) specifically identifies the Toondah Harbour PDA as an area to accommodate population growth solely in the form of attached high rise development.
- It is noted that the Draft Redland Housing Strategy 2023-2046 identified the need to deliver 6,000 apartments or 'smaller dwellings' by 2046. This would equate to delivering 400 new apartments per year, doubling the goals of the previous strategy. Of significance to achieve this ambition of delivering 400 new apartments annually, the report found that on average across the last 3 years there were only 110 apartments approved per year a shortfall of 72.5% of the target based only on approvals. The ongoing shortfall equation compounds even further when looking at actual delivered supply only as 65% of approved projects progress to construction.
- 12,500 new consolidation dwellings in Redland LGA (SEQ Regional Plan 2017), equating to 500 'infill' dwellings per year.

It should be noted that the recent draft Shaping SEQ 2023 update has revised the dwelling supply targets to approximately 70% consolidation dwellings. This will require established areas and Principal Activity Centre such as Cleveland to deliver a greater amount of consolidation dwellings to meet the current housing crisis and ongoing housing diversity and supply, over the next two decades.

Cleveland, where the Project is located, is identified as a Principal Activity Centre under the SEQ Regional Plan 2017, identifying it for primarily multiple dwelling development. Cleveland's role as a Principal Activity Centre is characterised by its connection to public transport, retail centres, health and personal services, and social amenity. These factors were influential in the designation of Toondah Harbour as a PDA in 2013 and highlight the development's role as a provider of suitable housing for the region's population to age within their established community.

The Project is positioned uniquely, in that much of its proposed infrastructure is of regionally significant scale. Opportunities are scarce at other locations within the Redland LGA to facilitate comparable development. This is particularly true with respect to the port upgrade, alterations to the channel, and the significant public foreshore parklands.

The upgrades to the port are anticipated to unlock a greater degree of water-based commercial, recreational and lifestyle benefits to the region; it is expected that it will hold a high social value. The additional free public parking spaces to be provided by the Proponent complement the port upgrade, increasing the community use social value.

Given that Toondah Harbour's current functionality has deteriorated to the extent that the ferry terminal is classified as dilapidated, the port upgrade will offer high social value, underpinned by the Harbour's role as the main ferry access point to popular tourist destination Minjerribah (North Stradbroke Island).

4.1.6.2. History of Toondah Harbour

A review of the history of development proposals at Toondah Harbour and, more broadly, options to provide access from the mainland to Minjerribah (North Stradbroke Island) was completed by Redland Investment Corporation (RIC) for the Supplementary Report and included as **Appendix I**.

The review found that proposals and investigations for infrastructure providing access from the mainland to Minjerribah (North Stradbroke Island) have been in the public forum since the early 1900s. Proposals originally included a potential bridge crossing; however, after several tenders and government announcements of impending construction dating back to 1946, this concept was finally abandoned in 1986 as it was considered unviable due to the cost of construction, lack of interest in the proposal from private industry partners and opposition from residents who showed a preference to upgrade water transport services.

A boat haven and landing point at Toondah Harbour was first proposed by local council in 1937 with various concepts investigated over several decades. Development plans have been identified from as early as 1966 which included a large breakwater stretching from shore street in the north to Oyster Point in the south with reclaimed land to be converted into industrial development (Plate 4-4).

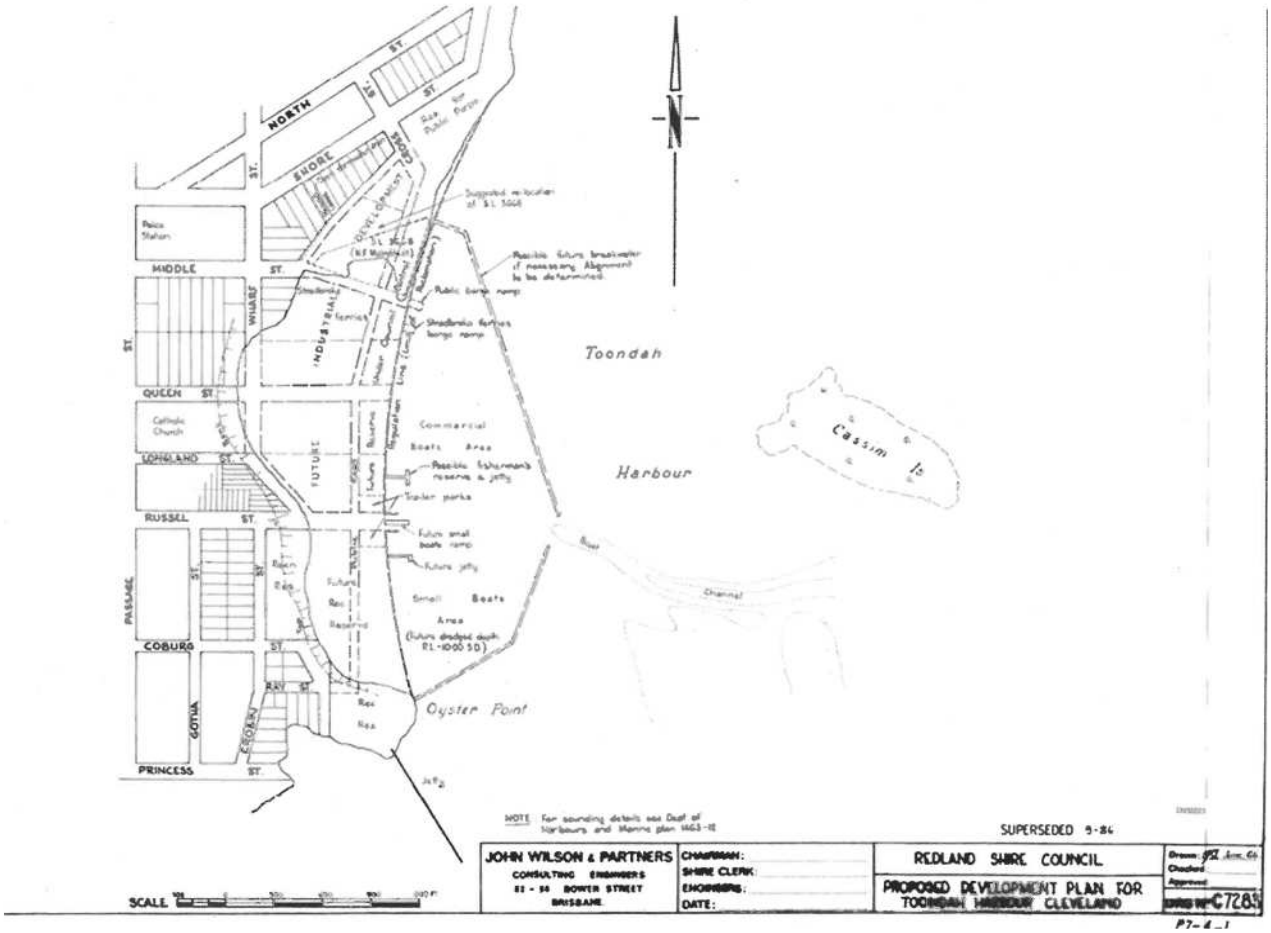


Plate 4-4: 1966 Toondah Harbour Development Concept

In 1983 the Queensland Government sought expressions of interest for development at Toondah Harbour. The development boundary covered an area of 80 ha which included the Toondah Harbour mudflat and Cassim Island (Plate 4-5). Investigations associated with this tender included locating the port at Raby Bay, however it was decided that it was not a suitable location due to the additional travel distance and congestion with private boating in the area.

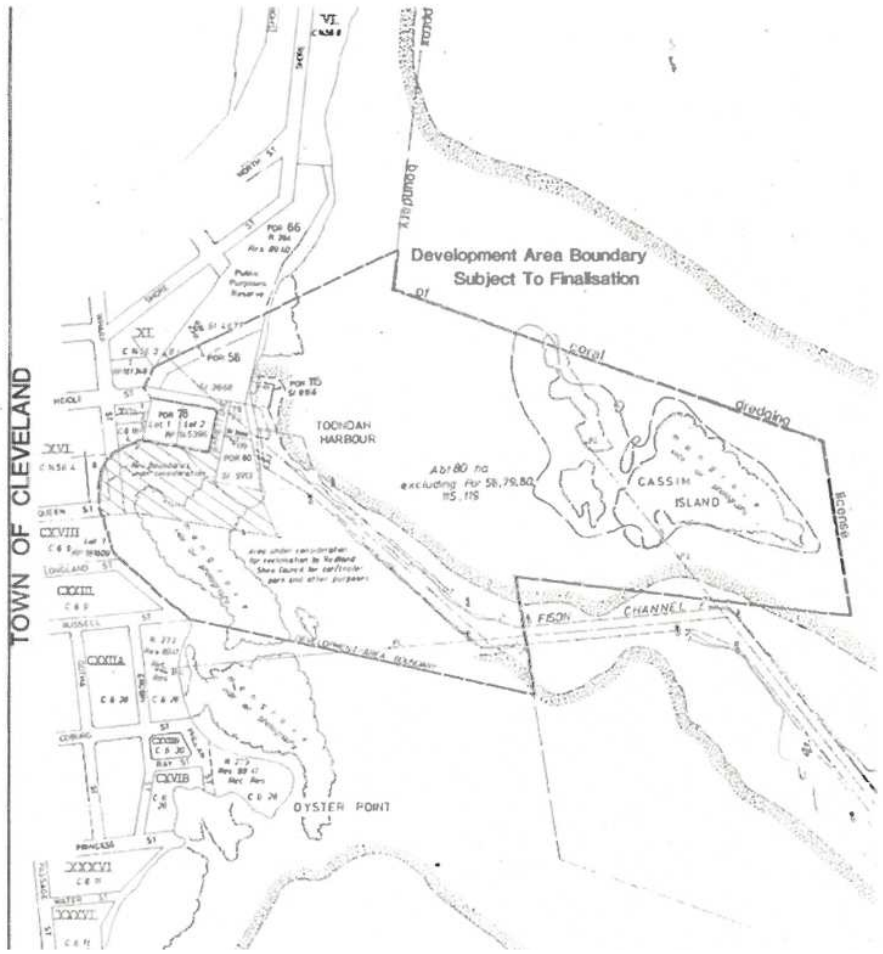


Plate 4-5: 1983 Toondah Harbour Development Boundary

All plans for development at Toondah Harbour have included dredging and some form of reclamation with one proposal in 1988 showing a reclamation area stretching east of Cassim Island. The Queensland Government provided a lease for this work however it did not progress. Further planning studies were completed throughout the 1990s and 2000s leading to the establishment of the Toondah Harbour Priority Development Area in June 2013.

The long history of proposals at Toondah Harbour and other locations in the Redland Coast show the need to provide improved boating facilities and access to Minjerribah (North Stradbroke Island) has existed for several decades. Many of these proposals have been supported by local and state government with several going to public tender. The inability to progress any of the past options were due to the prohibitive costs to the public to upgrade the port, harbour and channel and the inability to provide buffers and appropriate interfaces to the surrounding environment. The Toondah Harbour proposal has addressed these issues through best practice design responses, private investment and government support.

4.2. Detailed Description of the Site and Action

Additional information provided in this section relates to the detailed description of the site and action described in Chapter 2 of the Draft EIS, in particular section 2.4 – Dredging and Reclamation works. This section of the Supplementary Report should be read in conjunction with those sections of the Draft EIS.

Two additional studies were completed in response to comments on the marine works. Specifically, additional details are provided on the design process and parameters for the turning basin and entrance channel as well as early works at the reclamation site to outline how the initial construction pad and excavation works will be implemented while minimising environmental impacts.

Responses to other comments on coastal processes and maritime engineering received through the public notification process are included in section 6.3 of this Supplementary Report.

4.2.1. Dredge and Turning Basin Design

Additional detail on the design process for the extension of Fison Channel and the harbour turning basin has been provided as **Appendix J**.

The proposed dredging has been identified as necessary to provide and maintain navigation access and safety for Toondah Harbour. The need for new infrastructure, including dredging, at Toondah Harbour is outlined in the Toondah Harbour PDA Development Scheme. The development scheme is the regulatory document that guides planning, promoting, coordinating and controlling land development within the Toondah Harbour PDA.

It is a requirement of the PDA Development Scheme infrastructure plan to 'undertake dredging to straighten and widen the existing Fison Channel'. The land use plan for the PDA also outlines dredging and channel access requirements which include 'extending the swing basin to meet the needs of the existing and future vehicle ferries and contributing to the gradual straightening of Fison Channel'.

The channel and turning basin has been designed to provide a two-way channel for the adopted future design vessel using the Harbour Approach Channels Design Guidelines, PIANC Report No 121 Maritime Navigation Commission (2014). These guidelines are accepted as best practice throughout the world and are an industry recognised standard for the design of navigational channels. PIANC (2014) has been used as the design basis for numerous guidelines and ports in Australia including Maritime Safety Queensland's (MSQ) Anchorage Area Design and Management Guideline (2019) and the Port of Hastings Concept Channel Design and Channel Development Strategy (AECOM and GHD 2017).

The design of navigation channels and turning basins in PIANC (2014) is based on the largest vessel likely to regularly utilise those areas, which is termed the 'design vessel'. The design vessel adopted for future ferry operations and design of the Fison Channel was based on discussions with the existing ferry operator. This is considered a reasonable approach having regard to the experience of the existing ferry operator at Toondah Harbour and other sites around Australia. The design vessel (80m x 15m) is not significantly larger than the largest existing vessel in use (67.68m x 13m) and would be appropriate to use at Toondah Harbour.

PIANC (2014) identifies for concept design the nominal diameter of the turning basin is 2 x L, therefore the turning basin diameter for the design vessel length is 160m. Based on the summation of various contributions to channel width, a reasonable channel width for concept design purposes is considered to be 5B, or 75m.

The design basis was supported by the Regional Harbour Master for Toondah Harbour who in correspondence dated 5 November 2019 stated that:

MSQ has reviewed the navigation channel preliminary design dimensions against PIANC using the nominated 80m x 15m x 2m design vessel. The proposed channel dimensions are assessed as being suitable for a two-way channel, subject to a range of traffic management controls. For example:

- *General passing procedures / protocols*
- *Restricted passing at the bends in the channel*
- *An operational speed limit*
- *Adopting a one way traffic flow in adverse environmental conditions*
- *Management of interaction with recreational traffic*

The adopted channel dimensions are not considered to be conservative in their extent, in fact the Regional Harbour Master has noted that the channel would still need to be subject to a range of traffic management controls including adopting a one-way traffic flow in adverse environmental conditions.

It is noted that, based on the design parameters, the existing Fison Channel does not meet the minimum widths for a safe two-way channel for the existing largest vessel (the MV Minjerribah). This vessel has a beam of 13m, which would result in a channel width of 65m. The current channel has a width of approximately 45m. The turning basin is also well below the recommended widths for safe navigation. The existing turning basin width is approximately 80m. Based on the existing largest vessel the turning basin diameter should be at least 135m.

The existing and design turning basin dimensions are shown on Figure 4-4.

4.2.2. Reclamation Early Works

Additional detail on how early works for the reclamation will be implemented has been provided as **Appendix K**.

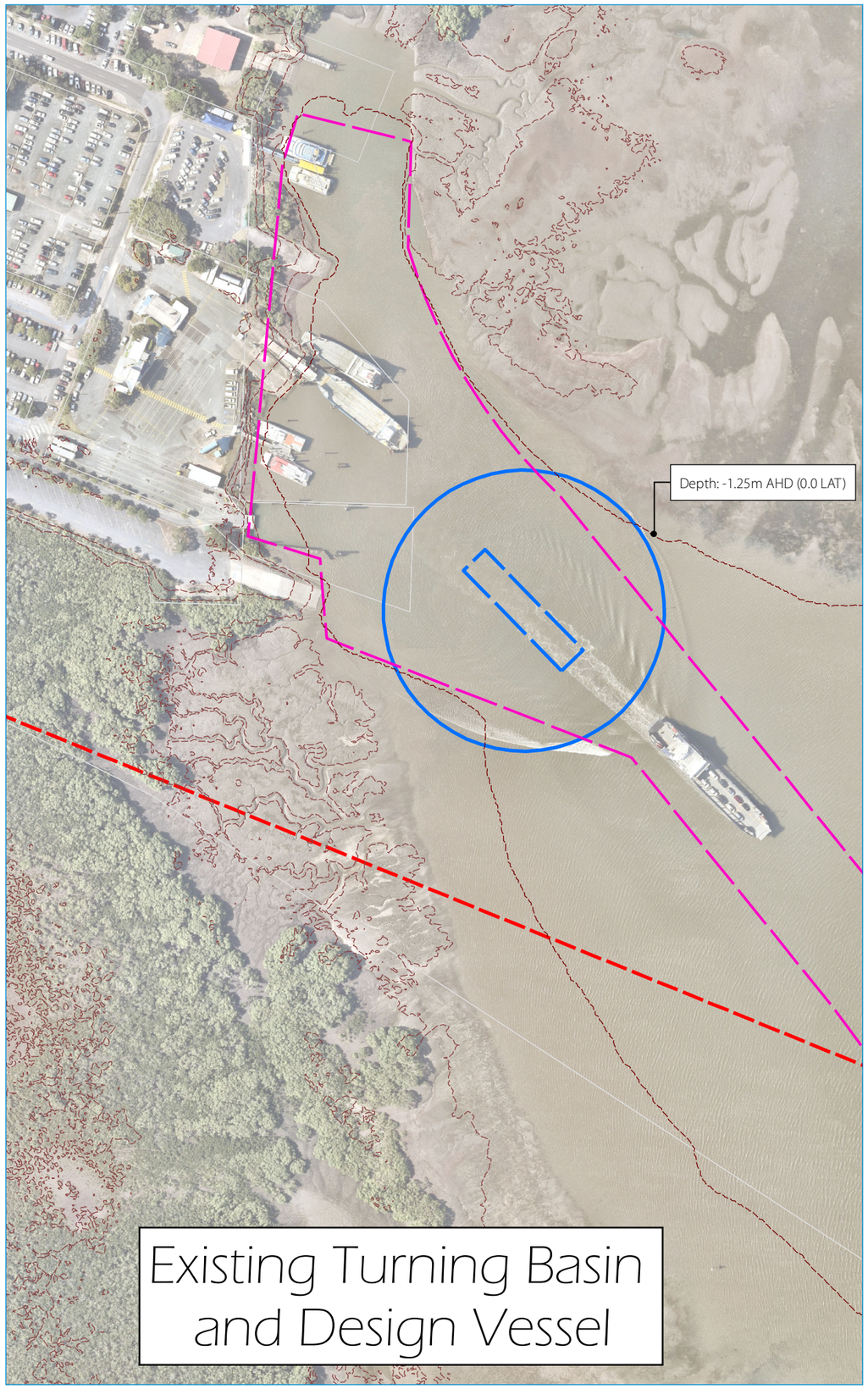
Firstly, prior to the initial pad being developed, a rock bund incorporating a sheet pile cut-off wall would be constructed. In advance of the rock bund and sheet pile wall construction, a silt curtain would be installed to mitigate turbidity associated with this construction activity. The initial pad would be developed through a combination of the rock fill imported for the rock bund and the excavation, treatment, drying and compaction of the *in situ* very soft and soft clays. The depth of these materials in the western/north-western portion of the project is relatively shallow, less than 1.0 to 1.5m.

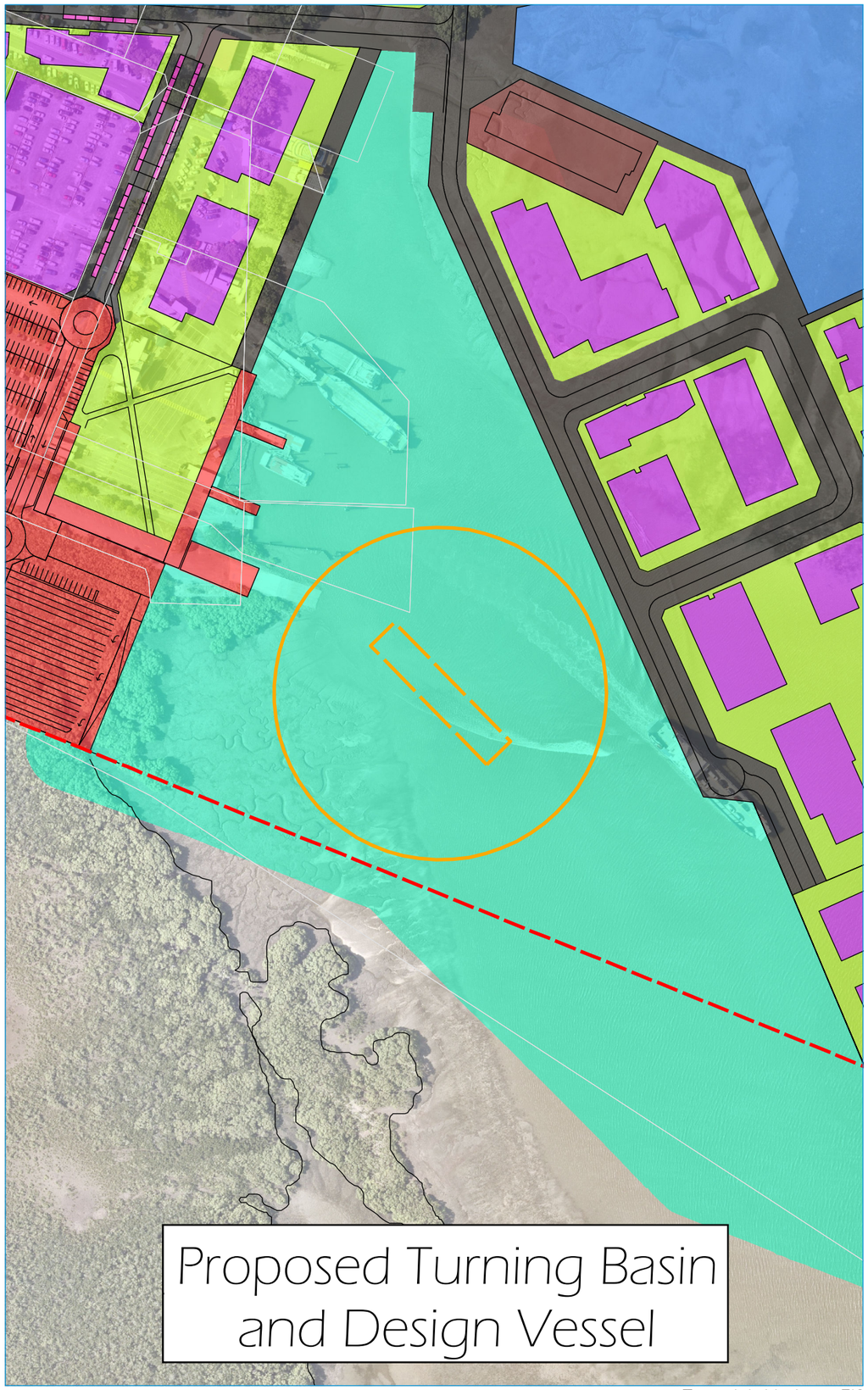
The upper very weak sediment layer will be removed in advance of construction of the rock bund by long-reach excavator working from the bund, loaded into trucks situated on the crest of the rock bund, and transported to the initial pad constructed in the western/north-western area of the site. At this location the material would be treated, dried to the optimum moisture content, and compacted. If necessary, the long-reach excavator working from the bund could be augmented by a barge-mounted long-reach excavator working the tides, loading skips or loading a hopper feeding a solids-handling pump.

The risk of discharge of sediments to areas external to the project site during construction of the perimeter bund would be managed by the prior installation of a silt curtain beyond the bund alignment, and by aligning the bund inside the project boundary. Due to the shallow water depths, the silt curtain may need to be suspended between temporarily installed piles.

Following treatment and drying to the optimum moisture content the material would be used as fill on site. It would not be trucked off site.

Figure 4-4: Vessel Turning Circles





Legend

- Toondah Harbour PDA (Project Area)
- Qld DCDB
- Indicative 67.68m Vessel
- PIANC Design Turning Diameter
- Indicative 80m Vessel
- PIANC Design Turning Diameter
- Exisiting Channel
- Existing Contours

TOONDAH HARBOUR

walker

0 25 50 100 m

GDA 1994 MGA zone 56 Scale (A3): 1:960

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DATE: 31/07/2023

FILE REF: 9858 E Figure 4_4 Vessel Turning Circles A

Layer Source: © State of Queensland Datasets (Department of Natural Resources, Mines and Energy 2020), Aerial Imagery (Nearmap.com 2020)

5. Additional Assessment Updates

Comments received through the public submissions process have been categorised in accordance with the technical studies completed for the Draft EIS. Responses have been provided for each issue/comments, many of which required contributions from subject matter experts in the Project team. The list of contributors is provided in Table 5-1. Any additional studies or investigations completed for the Supplementary Report are summarised in this Chapter. Detailed responses to specific issues/comments are provided in Chapter 6.

Table 5-1: Comment Response Contributors

Contributor	Technical Area	Association
Dr Penn Lloyd	Migratory Shorebirds	BAAM Ecology
Adrian Caneris	Koala and terrestrial ecology	BAAM Ecology
Carol Conacher	Marine Ecology	Frc Environmental
Jim Dixon	Geotechnical Engineering	Soil Surveys
Dr Anna Sheldon	Contaminated Land	Environmental Earth Sciences International
Greg Britton	Maritime Engineering	Royal Haskoning DHV
Geordie Galvin	Air Quality	Astute Environmental
Mark Simpson	Ambient and Underwater Noise	Simpson Engineering Group

5.1. Soils, Sediments and Contaminated Land

Additional studies completed as part of the Supplementary Report for the soil, sediment and contaminated land assessment include:

- A Draft Acid Sulfate Soils (ASS) Management Plan for the dredging and reclamation works.
- A detailed site investigation (DSI) of potential contamination sources within the terrestrial areas of the Project footprint.

The key outcomes of these studies are summarised below with the Draft ASS Management Plan provided as **Appendix L** and the Contaminated Land DSI included as **Appendix M** to this Supplementary Report. Comments/issues raised through the public comment period have been addressed in Table 6-1 with references provided to the additional studies where appropriate. It should be noted that the DSI was requested by the Department of Climate Change, Energy, the Environment and Water (DCCEEW) and was not in response to any comments received through the public notification process.

5.1.1. Draft Acid Sulfate Soils Management Plan for Dredging and Reclamation Works

Acid Sulfate Soil (ASS) is a general term applying to both a soil horizon that contains sulfides (i.e. Potential Acid Sulfate Soil - PASS) and an acid soil horizon affected by oxidation of sulfides (i.e. Actual Acid Sulfate Soil - AASS). ASS may be peats, silts, clays, or sands.

When left undisturbed and submerged in an anoxic (oxygen deficient) environment, pyrite (in acid sulfate soil) is not chemically active. Pyrite oxidizes in the presence of oxygen and hydrogen to form sulfuric acid. As this material is not

chemically active within the saturated sediments it is not considered to be a 'contaminant', however it is agreed that, if untreated, ASS can result in significant impacts to the environment once disturbed and exposed to oxygen.

Sampling for ASS was carried out in accordance with the National Acid Sulfate Soils Guidance: Guidelines for the dredging of acid sulfate soil sediments and associated dredge spoil management 2018 (NASSG) when historical sampling from maintenance dredging campaigns was taken into account. Appendix B of the NASSG states:

for projects where adequate information is available to indicate the sediment materials being considered for dredging are relatively homogenous, or existing information is available on the sediment composition, then the number of additional samples may be reduced. As a minimum requirement, it is recommended that the number of samples taken be as described in Table B2.

Several historical sediment investigations have been conducted at Toondah Harbour as part of the approval process or maintenance dredging campaigns. The Sediment Sampling and Analysis Plan (SSAP – Appendix 2-A of the Draft EIS) reviewed sediment data from analysis carried out in 1994, 2004, 2006, 2013 and 2018. For locations where existing information is available Table B2 of the NASSG identifies that between 10 and 20 samples should be carried out for material volumes from 500,000m^3 – 2,000,000m^3.

The most recent analysis, undertaken in 2018, was used to reduce the amount of sample sites required for the capital dredging. Including the 2018 sampling a total of 25 sample locations (14 in 2019 and 11 in 2018) were used to characterise sediments within or adjacent the proposed dredge channel. This exceeds the requirements of the NASSG. Sample locations are shown on Figure 5-1.

During the 2019 sampling event, field and field oxidised pH testing and chromium testing was carried out on all samples and sub samples collected (47 samples over 14 sediment cores). A further 34 tests were carried out over 11 sediment cores during the 2018 surveys resulting in a total of 81 individual sub samples. Sub sampling was undertaken at 0.5m intervals or wherever there were changes in the sediment characteristics.

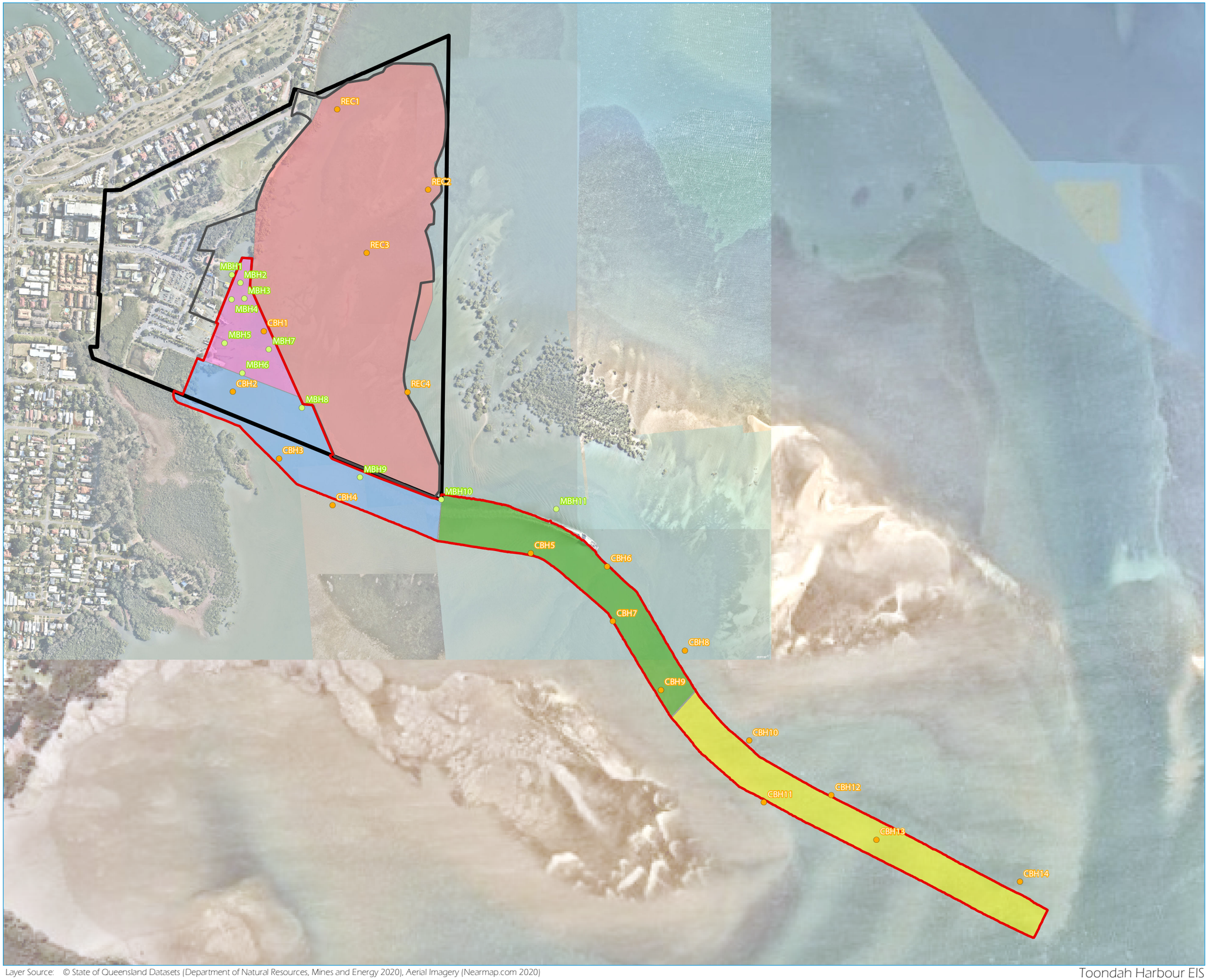
In addition to the 25 sample locations in the dredge area an additional four boreholes were completed within the reclamation area to characterise sediments. A number of the sample sites completed within the proposed or existing dredge area (CBH1, MBH1, MBH2 and MBH7) either fringe or are within the proposed reclamation area so can also be used in the characterisation of the reclamation area.

Potential sulfidic acidity was high at all sites sampled during the 2018 and 2019 events, except REC1. The existing acidity plus potential acidity at this site was below the action criteria, and hence not ASS. The remaining sub-samples at all sites have potential sulfidic acidity high enough that some treatment is required. Net acidity of the samples increased with depth at most sites, with the highest net acidity approximately at a depth of 2 m, after which, net acidity dropped again.

The insitu acid neutralising capacity (ANC) of the sediments ranged from 38 to 7,090 moles H+/t in the proposed dredge area and 121 to 6,480 moles H+/t in the proposed reclamation area. This neutralising capacity generally comes from shell fragments containing calcium carbonate occurring naturally in the sediments.

In almost all samples the ANC was sufficient to neutralise all ASS. The NASSG indicate that neutralising capacity should not be considered when assessing management of ASS as shell fragments may not neutralise the acid as efficiently on ground as it does in a laboratory. While it can't be relied upon it is noted that sediments within both the dredge and reclamation areas contain significant potential neutralising capacity.

Figure 5-1: ASS Sampling Locations (2018 and 2019)



Legend

- Toondah Harbour PDA (Project Area)
- Qld DCDB
- Dredge Area
- Reclamation Area
- ASS D1
- ASS D2
- ASS D3
- ASS D4
- ASS R1
- 2019 Sediment Analysis
- 2018 Sediment Analysis

TOONDAH HARBOUR

walker

0 100 200 300 400 m

GDA 1994 MGA zone 56

Scale (A3): 1:9,000

N

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DATE: 28/07/2023

FILE REF. 9858 E Figure 5_1 ASS Sampling A

Layer Source: © State of Queensland Datasets (Department of Natural Resources, Mines and Energy 2020), Aerial Imagery (Nearmap.com 2020)

Toondah Harbour EIS

For the purposes of implementing management measures, ASS in the sediments at Toondah Harbour have been characterised into eight separate treatment areas as shown on Figure 5-1 and summarised in Table 5-2. The 20th and 80th percentiles for each treatment area have been used for existing plus potential acidity and liming rate ranges to provide an indication of treatment levels for most of the sediments. It is noted that two sub samples at depths greater than 2m at BH7 and BH5 (ASS D3) contained existing plus potential acidities of 1,600 and 2,000 moles H+/t respectively. Both samples are at or below the target depth for dredging (-3m LAT) so will form a very small component of the overall dredge volume. Additional sampling will be carried out within these treatment areas to better define the extent of these ASS prior to the commencement of dredging. Additional sampling will also be carried out in the reclamation area to characterise sediments excavated within the bund.

Table 5-2: ASS Characterisation by Treatment Areas

Treatment Area	Dredge / Excavation Volumes	Sample Sites	Sub samples	Existing Plus Potential Acidity Range (moles H^+/t)*	Liming Rate Range (kg $CaCO_3$/t)*
ASS R1	600,000 m^3	REC1, REC2, REC3, REC4, MBH1, MBH2, MBH3, MBH7	19	288 - 486	22 - 36
ASS D1	46,000 m^3	CBH1, MBH4, MBH5, MBH6	17	344 - 398	26 – 30
ASS D2	261,000 m^3	CBH2, CBH3, CBH4, MBH8, MBH9, MBH10	20	344 – 734	26 – 55
ASS D3	138,000 m^3	CBH5, CBH6, CBH7, CBH8, CBH9	18	303 - 519	23 - 39
ASS D4	85,000 m^3	CBH10, CBH11, CBH12, CBH13, CBH14	12	305 - 459	23 - 34

* The 20th and 80th percentiles for each treatment area have been used

A Draft ASSMP for the dredging and reclamation activities has been developed as part of the Supplementary Report and is included as **Appendix L**. The Draft ASSMP includes a range of measures for managing ASS through the dredging and reclamation process, including additional sampling prior to works commencing to better define the extent and concentration of ASS, liming rates for different management areas and procedures for ongoing testing and management.

5.1.2. Contaminated Land Detailed Site Investigation

A preliminary site investigation (PSI) was completed by Environmental Earth Sciences International (EESI) as part of the Draft EIS. While the PSI identified a number of potential contamination issues, as would be expected at an operational harbour, it concluded that these issues could be managed on site and that further testing and analysis would be required prior to works commencing to define any issues and develop specific management measures. The PSI identified the additional investigations that a Detailed Site Investigation (DSI) should include:

- Identifying the extent of historical landfilling activities within GJ Walter Park, particularly in the southern part of the park, including assessment of the types of waste disposed in the landfill.
- Analysis of the area of historical ponds associated with the landfill area.
- Contamination status of groundwater down gradient from landfilling areas and former ponds.
- Contamination status of soil or groundwater in vicinity of fuel storage and supply infrastructure.
- Contamination status of fill materials used in raising the level of the Toondah Harbour area.
- Contamination status of dredge material within the dredge sediment pond.
- Status of fuel storage (and other potentially contaminating activities) within the trade college lot.

- Extent, and neutralising capacity, of ASS materials beneath the site (covered natural material), within fill materials and in dredge spoil.

A DSI has been completed for the Supplementary Report and included as **Appendix M**. The scope of the DSI was to undertake soil and groundwater assessment to address the data gaps identified in the PSI. This included:

- Soil assessment across the nominated investigation areas at the site.
- Installation of groundwater monitoring bores at targeted locations near potential sources of contamination.
- Development and sampling of new and existing groundwater monitoring bores
- Laboratory analysis of soil and groundwater samples for contaminants of potential concern
- Preparation of a report detailing the works undertaken and recommendations for further investigation, management or remediation works (if required).

Field sampling consisted of the advancement of 79 boreholes with a depth between 1 and 4 metres below ground surface (mbgs), or 0.5 m into natural soil. Seven bores were extended up to 5.5 mbgs and converted into groundwater monitoring bores for future sampling. The groundwater bores were in addition to the nine boreholes installed during groundwater investigations for the Draft EIS. Sample locations are shown on Figure 5-2.

The DSI identified a number of areas of soil and/or groundwater contamination associated with existing sources on site. Based on the nature and extent of contamination identified, it was concluded that on-site remediation can be incorporated into the site construction works, although some off-site disposal of contaminated soil material may be required depending on the outcomes of additional sampling to be completed prior to the commencement of specific site activities. Key finding from the study were (refer to Figure 5-3):

- **GJ Walter Park** - Further investigation was undertaken in the southern part of the lot, in the area of expected disturbance during site redevelopment. Historical landfilling was identified in southern and central parts of the site. Ash and other waste material were found in a fill layer in the south-eastern portion of the site and was associated with minor hydrocarbon and PAH contamination. Groundwater shows minor leachate impact from the historical landfilling activities.
- **Workshop area –** Soil investigation did not detect any Contaminants of Potential Concern (CoPC) above relevant screening criteria. Groundwater shows impact from the historical landfilling activities in GJ Walter Park.
- **Passenger Ferry Terminal** - Site has diesel and waste oil above-ground fuel storage tanks (ASTs). Hydrocarbon contamination was found during the soil investigation, located adjacent to the diesel AST. Groundwater did not show evidence of impact by hydrocarbon contamination, however it was not possible to install a monitoring bore in the immediate vicinity of the AST due to access constraints imposed by the existing site infrastructure.
- **Vehicle ferry terminal** – Hydrocarbon contamination was found during the soil investigation, located adjacent to the diesel AST fuel-line infrastructure. Groundwater shows hydrocarbon impact and Light-Non-Aqueous Phase Liquid (LNAPL) was encountered on the area.
- **Public boat ramp and car park** – Mineral sands containing radiation were found to be used as fill in the south-eastern portion of the boat ramp, the mineral sands were found under 0.5 m of fill and hardstand which is considered to be an effective capping layer while the material remains in-situ. No other CoPC above relevant screening criteria were identified. The mineral sands at this location were grey in colour and different in appearance to other sand materials in fill at the site. It is therefore anticipated that this material can be readily delineated visually.
- **Former dredge sediment pond** - The soil investigation did not detect any CoPC above relevant screening criteria.
- **Trade College** - Site access was restricted as it is currently operating as a Trade College. Further investigations would be completed prior to any on-ground works commencing when facilities are not occupied. The restricted

soil investigation did not detect any CoPCs above relevant screening criteria. Groundwater PFOS concentrations were above the Marine water 99% ecological screening criteria.

- **All Areas** – A layer of black, organic rich sandy clay was found across all the areas of the site, at the top of the natural soil profile. This layer varied in thickness from 1 m to greater than 2 m and was encountered from 2 to 3 m below the ground surface. This material was found to be acid sulfate soil with a high acid generation potential.

Based on the findings of the DSI the following investigations are required prior to works commencing in specific areas of the site:

- Soil investigations to assess fill materials and underlying natural soil within Trade College. This will be completed following removal of site access restrictions, particularly site buildings.
- Further investigation and delineation of extent of hydrocarbon contamination in ferry terminals to assess potential for on-site remediation and re-use as part of site development. Further investigation will be completed following removal of access restrictions including vegetation and the site building.
- Further delineation and radiation survey of the mineral sands in southern boat ramp.

In addition to the investigations to be carried out prior to specific site works, the following remediation and management measures are to be implemented:

- Hydrocarbon contaminated soil is to be treated on-site as part of the site works in a dedicated treatment area. Future and current onsite workers will be made aware of the impacted areas.
- Future onsite workers will be made aware of areas of historical landfill. Disturbed waste will be either excavated, classified and disposed of to landfill under a DES permit notice or re-encapsulated within an appropriate containment cell on the lot.
- Impacts of leachate on groundwater will be managed through geotechnical capping to reduce leachate production.
- Site works, future and present, will be made aware of the presence and extent of radioactive mineral sands near the existing boat ramp. Management options include off-site disposal to an appropriate facility or encapsulation onsite in an appropriately designed containment cell.

The issues outlined above can be managed and remediated on-site with minimal risk to the surrounding environment and will result in the removal of a range of existing contamination related environmental risks.

Figure 5-2: Contaminated land Sampling Locations

Toondah Harbour EIS

Legend

- Site Boundary
- EMR Listed Lots
- Land Filling
- Residential
- Trade college
- G. J. Walter Park
- Toondah Harbour ferry terminal
- Soil bore location
- Groundwater bore location
- Pre-existing groundwater bore location

N

0 50 100 150 Meters

GDA 1994 MGA zone 56 Scale (A4): 1:3,500

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TOONDAH HARBOUR walker

Layer Source: © State of Queensland Datasets (Department of Resources 2023), Aerial (Nearmap 2020) DATE 28/07/2023

FILE REF. 9858 E Figure 5_2 Contaminated Land A

Figure 5-3: Contaminated Land Site Locations and Lot Numbers

Legend

Site Boundary

Investigation Area

Toondah Harbour EIS

TOONDAH HARBOUR walker

N 0 50 100 150 Meters

GDA 1994 MGA zone 56 Scale (A4): 1:3,600

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FILE REF: 9858 E Figure 5_3 Contaiminated Land Locations A

5.2. Coastal Processes and Maritime Engineering

No additional investigations were required to respond to public comments on coastal processes. Comments generally only required clarifications of existing information provided in the Draft EIS. Additional studies completed as part of the Supplementary Report for maritime engineering are described in section 4.2.

Comments/issues raised through the public comment period have been addressed in Table 6-2 with references provided to the additional studies where appropriate.

5.3. Air Quality

While a range of comments were received on the air quality assessment, most were associated with impacts on amenity and not MNES. Additional modelling was completed to demonstrate compliance with relevant guidelines which is reflected in the responses in Table 6-3.

The additional modelling was generally relegated to adding sensitive receptors and running additional construction and ambient condition scenarios. The outputs of the additional work are included as **Appendix N** to the Supplementary Report. Comments/issues raised through the public comment period have been addressed in Table 6-3 with references provided to the additional studies where appropriate.

5.4. Noise and Vibration

Additional noise and vibration assessment completed for the Supplementary Report was generally associated with developing a simple geometric spreading model for underwater noise and vibration assuming a reflective seabed (i.e. a seabed that does not absorb noise and vibration) and accounting for depth of water. The modelling process is summarised below with inputs, outputs and details of the underwater noise model included as **Appendix O**. Comments/issues raised through the public comment period have been addressed in Table 6-4 with references provided to the additional studies where appropriate.

5.4.1. Underwater Sound Levels

The most common metrics used in evaluating underwater sound comprises:

- Peak sound pressure level (Lpeak) - the absolute value of the maximum variation from the neutral position in either positive or negative peak amplitudes
- Root Mean Square (RMS) – Decibel measure of the square root of mean square (RMS) pressure. For impulses, the average of the squared pressures over the time that comprise that portion of the waveform containing 90% of the sound energy of the impulse.
- Sound exposure level (SEL) - SEL is the constant sound level in one second, which has the same amount of acoustic energy as the original time-varying sound (i.e., the total energy of an event). SEL is calculated by summing the cumulative pressure squared over the time of the event.
- Peak to Peak sound pressure level (Lp-p) - the absolute sum of the positive and negative peak amplitudes

For impact piling 90% of the sound energy from a single impulse usually occurs over a period of less than 1 second. If an impact piling "event" is defined as a single strike, the RMS for single-strike impact piling is usually greater than the SEL. If the "event" is all strikes required for the pile, the SEL (accumulated over driving the complete pile) may be numerically more or less than the RMS (maximum) depending on the number of strikes and the sound pressure levels of each strike.

It is computationally intensive to calculate the RMS for each strike in accordance with the definition, however some reports use a simplified method where the maximum impulse level for each second of pile driving is reported. The impulse level is an RMS sound pressure level (SPL) with a 35-millisecond (ms) time constant. The time constant is

approximately the same time duration in which most acoustic energy in a pile-driving acoustical pulse is contained. Use of this descriptor allows for the direct measurement of pulsed-RMS levels in the field. However, the impulse setting on sound level meters has a time constant of 1,500 ms while the signal level is decreasing.

For vibration piling the event is continuous and over a period much longer than 1 second. This long duration operation permits numerous metrics to be developed for vibratory piling over various time periods, such as RMS (1 second maximum), RMS (10 seconds maximum) and RMS (entire period). The most conservative value would be RMS (1 second maximum) and the RMS (entire period) would give the energy average. Additionally, the SEL is often presented as a series of 1 second continuous measurements.

Typical underwater noise sources at Toondah Harbour would include recreational vessels, vehicle ferries and fishing trawlers. As a result, the ambient underwater noise would range between 60 and 140 decibels (dB) depending on boat traffic, wind and wave action.

5.4.2. Adopted Underwater Sound Model

The intertidal area to the east of the site boundary generally increases at a rate of approximately 0.5 m to 1 m per 100 m then beyond the intertidal area at a slightly greater rate of approximately 2 m per 100 m. To the south of the site the water quickly increases in depth due to Fison Channel. For the purposes of this analysis, it is assumed the depth of water to be 1 m per 100 m plus a minimum depth of 0.5 m.

The proposed equations adopt the conservative general format of the shallow water propagation equation described by Duncan and Parsons (2011) with a correction factor of 6.6 dB to provide a probability of exceedance of 1%. The propagation equations are corrected to match the highest measurements obtained from comparative investigations at Salcha, Alaska (CALTRANS 2020) and the Little Creek Joint Expeditionary Base (Illingworth and Rodkin Inc 2017). This methodology is expected to provide a conservatively high estimate of the likely sound levels in the water.

Updated underwater vibration contours are provided as Figures 3 through 13 of **Appendix O**.

Since the sheet piling location would occur around the site perimeter, the presented contours represent the maximum likely noise occurring over the duration of the project. For the impact piling a single location was selected that is close to the existing harbour. In all instances, mitigation measures have not been included.

5.4.3. Potential Impacts on Marine Fauna

The additional assessment of underwater noise and vibration completed for the Supplementary Report found underwater noise levels may be slightly higher than those predicted in the Draft EIS, however the increases are minor and would not be expected to result in additional or more intense impacts to those outlined (refer to section 16.5.1.11 of the Draft EIS).

A comparison of Project noise sources (refer to **Appendix O** of this Supplementary Report) to the temporary and permanent hearing threshold shift of a range of species (refer to Tables 16-3, 16-4 and 16-5 of the Draft EIS) potentially occurring in the study area including southern right whale, Australian humpback dolphin, dugong and green turtle found:

- Underwater noise from dredging may cause some temporary behavioural change, however is unlikely to have a significant impact on the marine mammals, turtles and fish that are in the vicinity of the Project area. Marine mammals are likely to avoid areas that are being dredged and return once dredge activities have ceased.
- Underwater noise associated with sheet piling will be limited to when piling occurs in water, that is, approximately 3.25 hours either side of high tide when piling away from the shore, and for a shorter time in

shallower water near the shore. Noise levels from sheet piling would be less than the level for behavioural change even in areas immediately adjacent to the works, and well below the permanent and temporary threshold shifts for marine mammals, turtles and fish outside a 40m buffer around the work area.

- The highest underwater noise levels resulting from the Project will be generated during the impact pile driving of circular piles associated with the ferry terminal development. These piles will be driven in by hammering, which produces an intense impulsive underwater noise which last less than 1 second. Modelling indicates hammering will produce noise levels with the potential to result in behavioural change in some marine fauna up to 1 km from the noise source. It should be noted that the model outputs do not incorporate the high level of attenuation from the mudflats surrounding the ferry terminal which will effectively keep any impacts to within the turning basin and inner Fison Channel.

Overall, while noise may cause some minor behavioural changes for some species, such as turtles temporarily moving away from nearby low value foraging areas, this is not anticipated to have a significant impact on any individuals or populations of threatened marine fauna. This is due to the relatively small size of the area impacted, the temporary nature of the impact, the distance to the seagrass beds, and the large area of other available foraging grounds.

5.5. Koala and Terrestrial Ecology

No additional investigations were required to respond to public comments on koala and terrestrial ecology. Comments generally only required clarifications and minor additional information to what was provided in the Draft EIS. Comments/issues raised through the public comment period have been addressed in Table 6-5.

5.6. Migratory Shorebirds

No additional investigations were required to respond to public comments on migratory shorebirds with most requiring clarification of information presented and minor additional information to existing information in the Draft EIS. Comments/issues raised through the public comment period have been addressed in Table 6-6.

While the comments received did not trigger a need for additional surveys, the Proponent engaged BAAM to carry out shorebird surveys in October 2023 to add to the data collected for the Draft EIS. The results of the additional surveys are included as **Appendix P** and summarised in this section.

5.6.1. Additional Surveys

Seven high tide surveys were conducted at Oyster Point and Nandeebie Claypan over the week of 22 to 28 October 2023 at tide heights that ranged from 1.89 m to 2.41 m (Cleveland Point tidal predictions). Surveys were completed in the early morning and late afternoon during the week and on weekend days. This survey effort exceeds the minimum guideline requirement of four surveys during the period when the majority of shorebirds are present in the area. A single low tide survey was conducted on 21 October 2023 on the Toondah Harbour mudflat (refer to Chapter 17 of the Draft EIS for plans and further description of the survey areas).

Surveys of shorebirds roosting at the two high tide roost sites and foraging within or adjoining the Toondah Harbour PDA at low tide were conducted in accordance with EPBC Act Policy Statement 3.21: Industry guidelines for avoiding, assessing and mitigating impacts on EPBC Act listed migratory shorebird species (Commonwealth of Australia 2015).

5.6.1.1. Oyster Point

Migratory shorebirds were found using the Oyster Point roost on all seven surveys, with the total number of migratory shorebirds ranging from 183 to 474. This included sighting of up to 239 Eastern Curlew and up to 411 Bar-tailed Godwit, as well as up to 13 Red Knot. The observation of 239 Eastern Curlew during a single survey represents the largest number

of Eastern Curlew recorded roosting at Oyster Point over the past 23 years (refer to Appendix 2-N of the Draft EIS) and equates to 0.68% of the flyway population of the species.

The birds roosting at Oyster Point were subject to frequent disturbance by people using the adjoining public park facilities on every survey, to the point that the disturbance usually caused the birds to eventually leave the Oyster Point roost to relocate to an alternative roost, including Nandeebie Claypan. Eastern Curlews roosting at Oyster Point were surprisingly tolerant of people on foot, including with dogs on leash, tolerating approaches to within 30m before taking flight. This indicates the birds are habituating to increased interactions with people using the park.

5.6.1.2. Nandeebie Claypan

Migratory shorebirds were found using the Nandeebie Claypan roost on four of the seven surveys, with the total number of migratory shorebirds ranging from 120 to 160 when present. These included totals of up to 133 Eastern Curlew and up to 35 Bar-tailed Godwit, as well as 1 Red Knot. The observation of 133 Eastern Curlew represents the largest number of Eastern Curlew recorded roosting at Nandeebie over the past 28 years (refer to Appendix 2-N of the Draft EIS) and equates to 0.38% of the flyway population of the species.

On all occasions that migratory shorebirds were recorded at Nandeebie, these birds were first recorded roosting at Oyster Point and moved to Nandeebie only after they had been disturbed off the Oyster Point roost. Thus, the numbers recorded at Nandeebie are not additional to those recorded at Oyster Point. The few disturbances to shorebirds roosting at Nandeebie were mostly caused by natural events (i.e. disturbance by other birds), with only one instance of people disturbing roosting birds.

5.6.1.3. Toondah Harbour PDA

A total of 35 migratory shorebirds were observed foraging on the mudflats within the Toondah Harbour PDA, including 8 Bar-tailed Godwits and 7 Eastern Curlews. These numbers are consistent with previous surveys completed for the Draft EIS (refer to Chapter 17 and Appendix 2-N of the Draft EIS). It is notable that the number of migratory shorebirds foraging on the mudflat has not increased even though record numbers of birds were observed at the adjacent roost sites.

5.6.1.4. Reasons for Increased Numbers of Eastern Curlews at the Roost Sites

The migratory shorebird assessment completed for the Draft EIS (refer to Chapter 17 and Appendix 2-N of the Draft EIS) included extensive project specific surveys of the high tide roost sites at Nandeebie Claypan and Oyster Point and review of data collected by the Queensland Wader Study Group (QWSG). When combined, data from over 318 surveys spanning 1996 to 2021 at Nandeebie Claypan and 423 surveys spanning 2000 to 2021 at Oyster Point were utilised.

Despite the long duration and high frequency of past monitoring of shorebirds using Nandeebie Claypan and Oyster Point, the October 2023 surveys recorded larger numbers of Eastern Curlew roosting at both sites than during any previous surveys or QWSG counts. The increased use of Oyster Point is also broadly consistent with community reports over the past year. This increase has coincided with the loss of the offshore sandbank roost site located 2 km east of Toondah Harbour. This sandbank, which was used by up to 230 Easten Curlew in the summer of 2021/22 (refer to Chapter 17 and Appendix 2-N of the Draft EIS) has been eroded over the previous 12 months by natural hydrological processes to the point that it now does not remain exposed during high tides. Site observations also indicate there has been an increase in disturbance at the Geoff Skinner roost at Wellington Point, including increased incursion of off-road motorbike and bicycle riders. It is possible that the combination of the loss of the offshore sandbank roost site and increasing frequency of disturbance at the Geoff Skinner roost has contributed to the increasing numbers of Eastern Curlew roosting at Oyster Point and a return to roosting at Nandeebie Claypan when the birds are disturbed from the Oyster Point roost. Further observations would be required to confirm this.

5.6.1.5. Discussion

The Draft EIS studies found that, while the Nandeebie Claypan had supported nationally significant numbers of Bar-tailed Godwit and Eastern Curlew in the past, they had not been observed at the site since March 2019 and March 2015 respectively. Based on the observed steady decline in shorebird use of the roost site over the period 1995 to 2021 and the absence of any shorebirds using the roost site over 45 consecutive surveys, it was concluded that Nandeebie Claypan had been abandoned as a roost site. However, the recent observations of Eastern Curlew at Oyster Point and in particular returning to roosting at Nandeebie Claypan, confirms that the roost sites remains nationally significant for Eastern Curlew as part of a network sites in the local region. Nandeebie Claypan appears to provide additional habitat in the face of increased pressures at other preferred sites (Oyster Point and the Offshore Sandbank).

The October 2023 survey results to not change the assessment of the impacts of the project on migratory shorebirds (including threatened species such as Eastern Curlew) in the Draft EIS, since the assessment of impacts was undertaken under the assumption that Nandeebie Claypan was an important roost site for shorebirds (including threatened species such as Eastern Curlew) based on historical use. The Draft EIS impact assessment found, amongst other things, that there is a 50 m buffer between the roost site and the closest project feature, which is the extended car parking for the ferry terminal. This is similar to the current buffer of 50 m to the existing dredge spoil pond. The buffer is dominated by mangrove forest which provides a visual and sound barrier from ferry terminal operations. No buildings will be located within 250 m of the Roost site and the new ferry terminal, which will be near its current location therefore is not expected to result in an increase in impacts compared to current operations.

Notwithstanding the recent survey results, the ongoing encroachment of mangroves establishing across the Nandeebie roost site is still expected to continue to decrease the suitability of the site as a shorebird roost, including for Eastern Curlew, consistent with the overall trends reported for Moreton Bay (Fuller et al. 2021). The evidence of steadily increasing pressures on the network of available roost sites also suggests that active management of the Nandeebie Claypan roost site focussed on control of mangrove encroachment and removal of mangroves to open up the roost site would provide a substantial benefit to improving the resilience of the roost site network in southern Moreton Bay for shorebirds including Eastern Curlew.

As the roost sites are located on State land adjacent to RCC parks the Proponent is unable to carry out physical works within these areas without Local and State Government approval. However, the proponent has already committed to the following actions in the Draft EIS:

- Engage with RCC and the Queensland Government to implement a prohibition area for watercraft at Cassim Island and the offshore sandbar roost site.
- Obtain agreement with RCC to implement measures to rehabilitate Nandeebie Claypan and reduce the risk of disturbance to shorebirds roosting there from increased public use of the footpath/cycleway adjacent to the roost site.
- Obtain agreement from RCC to put in place measures to protect shorebirds roosting at Oyster Point from increased public use of the recreational facilities adjoining the roost and install prominent site-specific information signage about migratory shorebird use of the roost site and their sensitivity to disturbance.

5.6.2. Updates to Noise Impacts on Migratory Shorebirds

A number of comments were received on the presentation of the noise contours in the Draft EIS as the ecologically sensitive receptors (i.e. migratory shorebird roost sites at Cassim Island, Oyster Point and Nandeebie Claypan) were not clearly displayed. Plans showing contours from high noise generating construction activities in relation to sensitive receptors are included as Figure 5-4 to Figure 5-10. These figures do not change the impact assessment or other sections of the migratory shorebird assessment as modelling outcomes have not been altered. The outcomes of the impact analysis from the Draft EIS are summarised below and cross referenced with the new figures.

Project activities with the most potential to cause high noise levels at Cassim Island are bund wall construction, including the establishment of the sheet piling and placement of rock armouring for the eastern edge of the northern reclamation, and sheet piling and creation of the rockwall breakwater, which will be carried out as part of the southern reclamation. Noise modelling shows maximum noise levels at Cassim Island of 60-65 dB(A) during these construction periods (Figure 5-5 and Figure 5-9). Creation of the sheet pile bunds and rock walls will be short-lived, taking 2-4 months for each of the reclamation areas to be fully enclosed. Noise levels will be highest when the works are adjacent the roost site (Figure 5-5 and Figure 5-7), which will likely take less than one month. Noise levels at Cassim Island during this period will be up to 65 dB(A). Once the outer perimeter is complete, works within the reclamation area and other construction activities such as the use of excavators or construction of buildings are not expected to result in noise levels above 60 dB(A) at Cassim Island.

While most construction works will be carried out during the day, dredging operations will be ongoing 24 hours a day, six days per week. The narrower dredging sections in the Fison Channel and central parts of the turning basin must be dredged at night whilst there is no ferry traffic. Modelling indicated maximum noise levels at Cassim Island from the dredging activities at night are not expected to exceed 60 dB(A) (Figure 5-10).

Considering that noise generated during the dredging, reclamation and construction phases of the Project will also be accompanied by visual disturbance of moving people and machinery that may approach within 80 m of the north-western portion and 120-130 m of the south-western portion of the Cassim Island roost, it is likely that noise disturbance exceeding 60 dB(A) in the receiving environment during some construction activities would cause shorebirds roosting along the western edges of the roost site to take flight from time to time. To mitigate the risk of this impact, works that will result in noise levels exceeding 60 dB(A) in the receiving environment of the higher density roosting areas at the Cassim Island roost will be restricted to the winter months (mid-April to August) when few migratory shorebirds are present.

Given that the mangrove roost site is up to 700 m long and 300 m wide, it is expected that birds taking flight in response to disturbance will move to portions of the roost site more distant from the source of the disturbance in the first instance, as they have been observed to do in response to disturbance during field surveys. The extent to which migratory shorebirds will abandon the roost site in response to repeated disturbance from their currently preferred roosting areas in the roost site is difficult to predict, but based on existing behaviour it is more likely that the birds would shift their preferred roosting locations within the roost rather than abandon the roost.

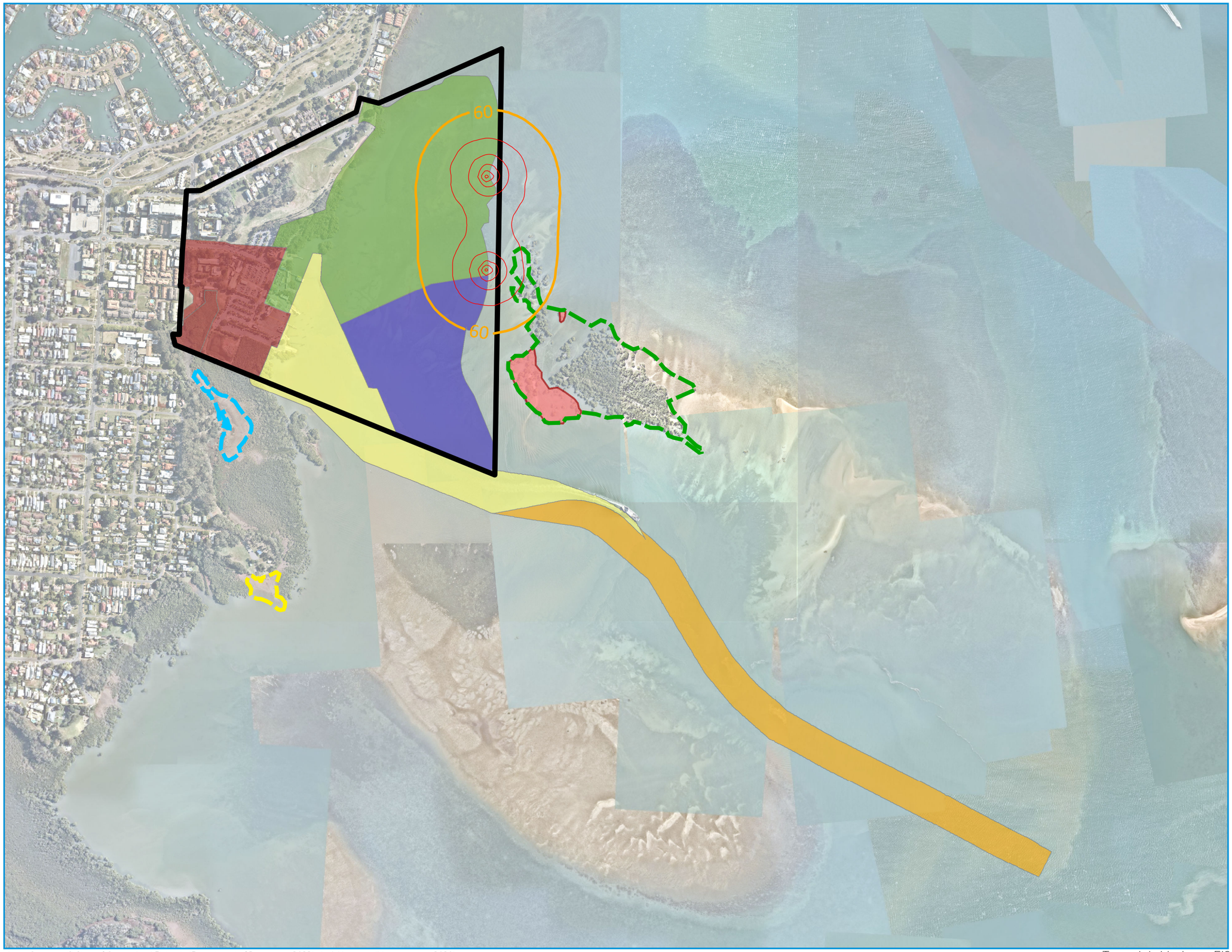
The staged dredging and reclamation program, with stage 1 dredging and reclamation occurring at least 240 m from the preferred south-western roosting area provides an opportunity to monitor the impacts of dredging and reclamation on the responses of roosting birds to noise and visual disturbance and adaptively manage mitigation measures before stage 2 dredging and reclamation occurs. This staging also allows time for birds using preferred areas of the roost to habituate to increased non-lethal noise and activity disturbance in proximity to the roost site.

Modelling (Simpson Engineering 2022a) shows maximum noise levels at the Nandeebie Claypan roost site are predicted to be 65–70 dB(A) and will occur during works on the southern car park area of the ferry terminal. These works are expected to last 2–4 months, with high noise-generating activities such as placement of rock armouring accounting for a smaller portion of this period. During most works, noise levels at Nandeebie Claypan are not expected to exceed 55 dB(A).

To mitigate the risk of this impact, works that will result in noise levels exceeding 60 dB(A) in the receiving environment of the Nandeebie Claypan roost site will be restricted to the winter months (mid-April to August), when migratory shorebirds are generally absent from Moreton Bay. Noise impacts after the completion of the ferry terminal car park are not likely, due to the reduced predicted noise levels.

Figure 5-4 Ambient Construction Noise Contours

Noise from Perimeter Sheet Piling and Rock Revetment – Works on Northern Reclamation Eastern Perimeter



Legend

- Toondah Harbour PDA
- Old DCDB
- Harbour Precinct
- Stage 1 Reclamation
- Stage 2 Reclamation
- Stage 1 Dredging – Turning Basin and Inner Channel
- Stage 2 Dredging – Outer Channel
- Cassim Island roost site
- Nandeebie claypan roost site
- Oyster Point roost site
- Cassim Island High Roosting Density Area
- Noise Contours 60 db
- Noise Contours 60+ db

TOONDAH HARBOUR

walker

0 50 100 150 200 250 m

GDA 1994 MGA zone 56

Scale (A3): 1:10,000

N

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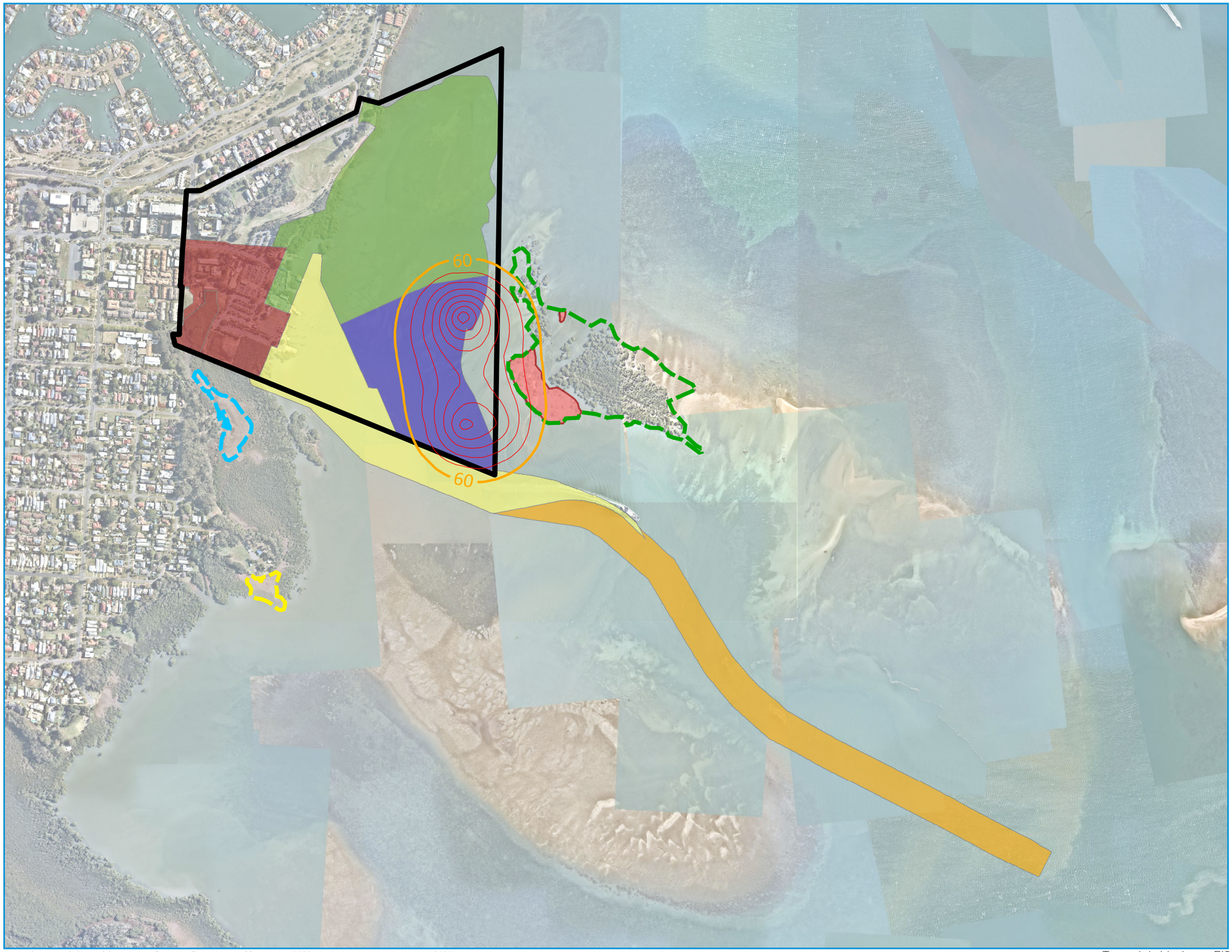
Layer Source: © State of Queensland Datasets (Department of Resourcesy 2022), Aerial Imagery (Nearmap.com 2020)

Figure 5-5 Ambient Construction Noise Contours

Noise from Perimeter Sheet Piling and Rock Revetment – Works on Southern Reclamation Eastern Perimeter



Legend

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walker

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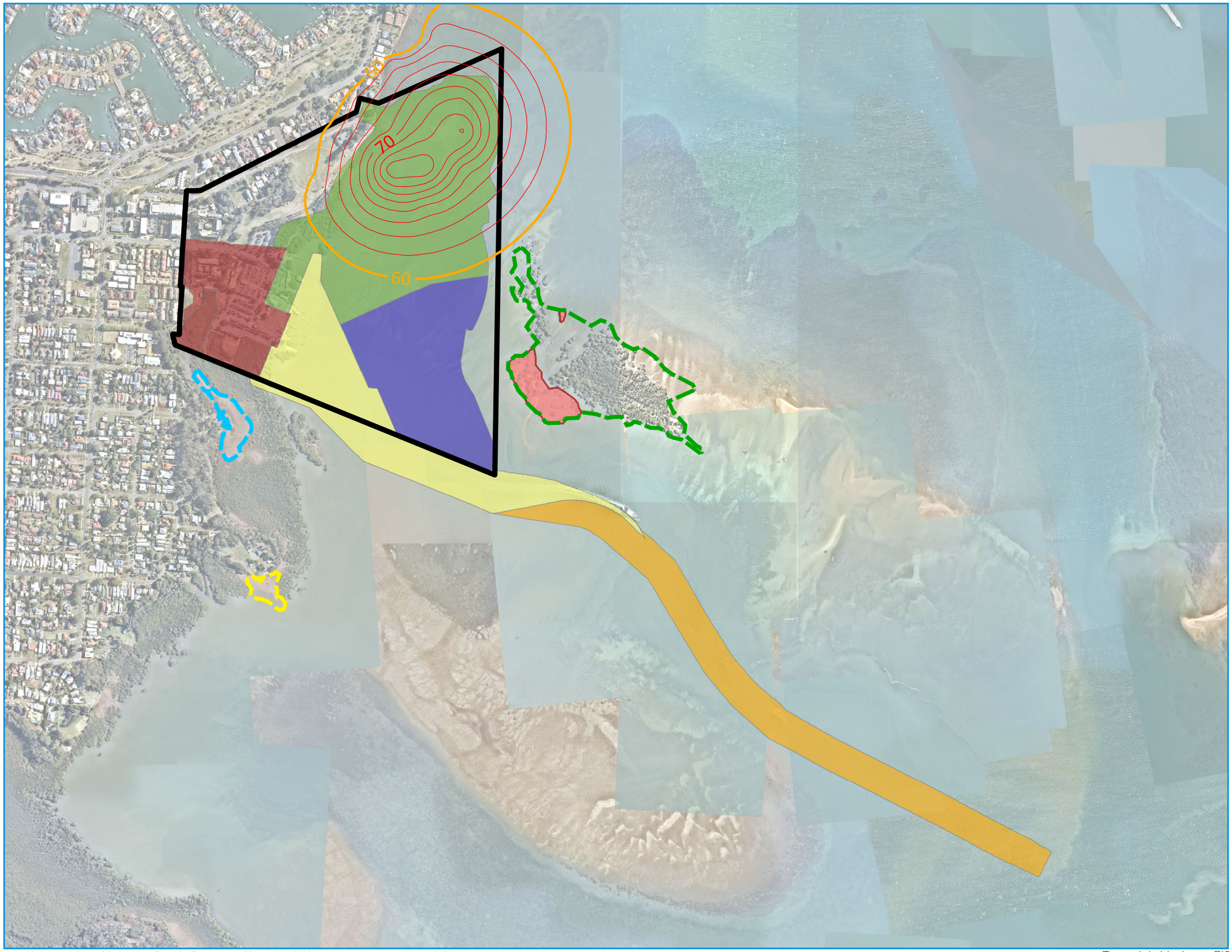
Toondah Harbour EIS

Figure 5-6 Ambient Construction Noise Contours

Noise from Internal Earthworks and Revetments – Northern Reclamation Earthworks and Marina



Legend

- Toondah Harbour PDA
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- Noise Contours 60 db
- Noise Contours 60+ db

TOONDAH HARBOUR

walker

0 50 100 150 200 250 m

GDA 1994 MGA zone 56

Scale (A3): 1:10,000

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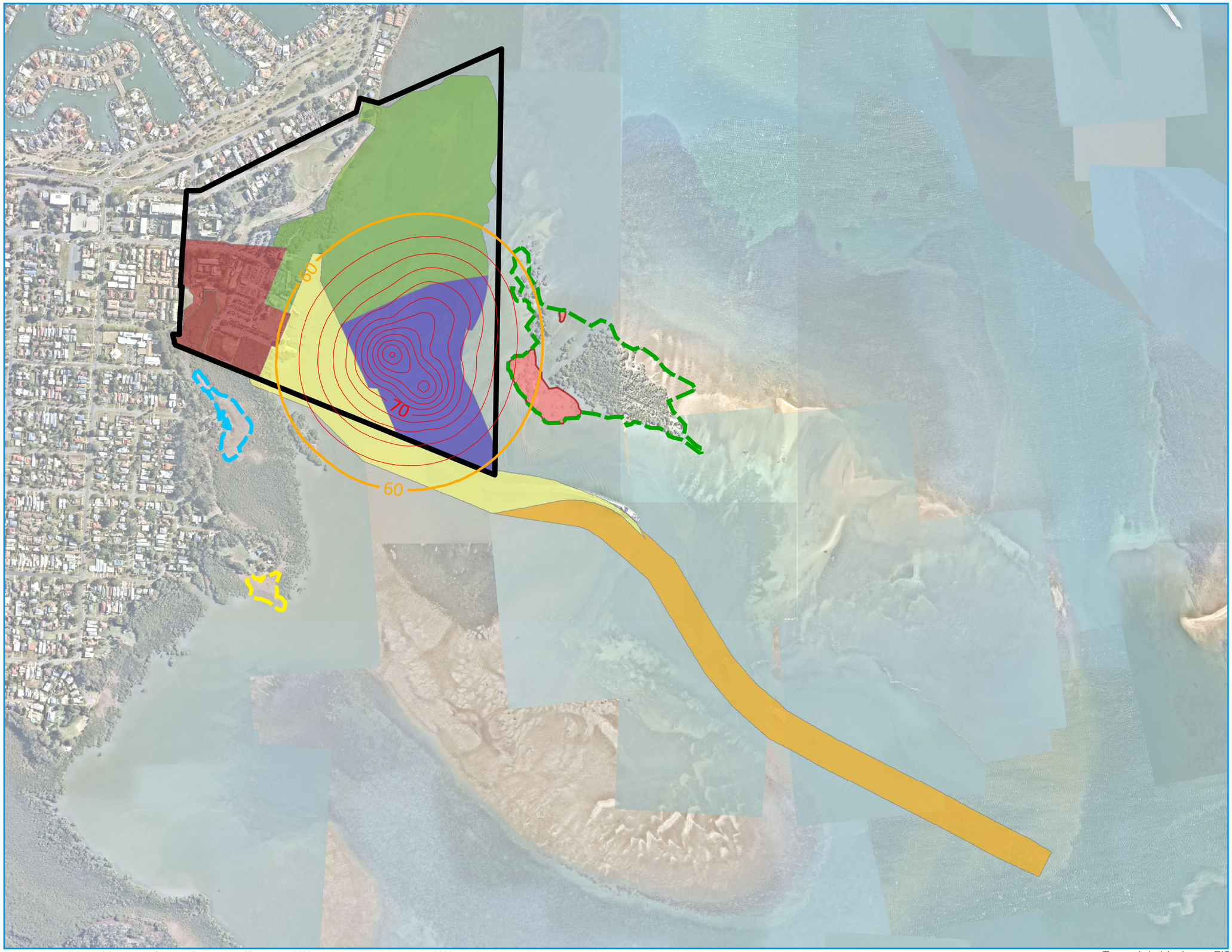
Toondah Harbour EIS

Figure 5-7 Ambient Construction Noise Contours

Noise from Internal Earthworks and Revetments – Southern Reclamation Earthworks and Internal Channels



Legend

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- Oyster Point roost site
- Cassim Island High Roosting Density Area
- Noise Contours 60 db
- Noise Contours 60+ db

TOONDAH HARBOUR

walker

0 50 100 150 200 250 m

GDA 1994 MGA zone 56

Scale (A3): 1:10,000

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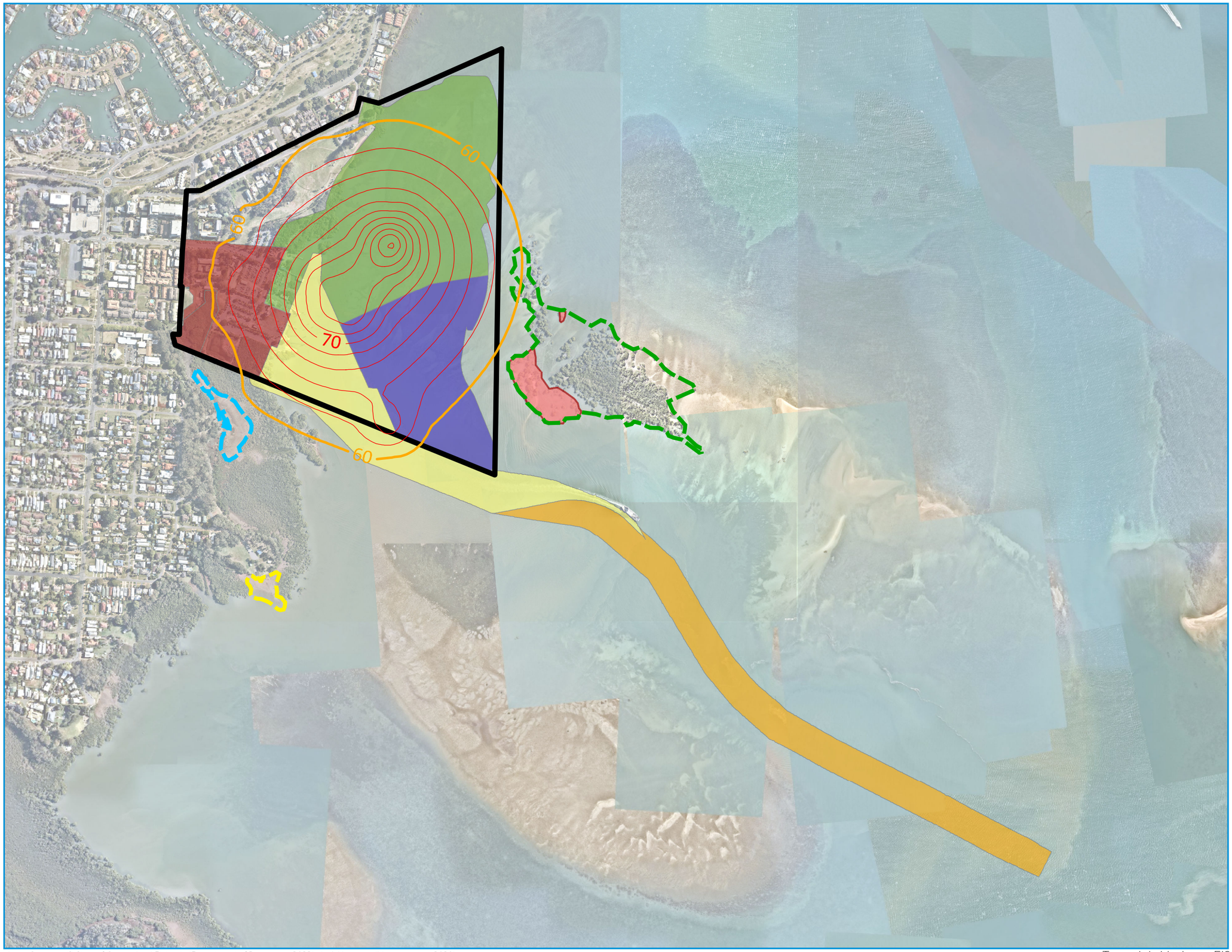
Layer Source: © State of Queensland Datasets (Department of Resourcesy 2022), Aerial Imagery (Nearmap.com 2020)

Toondah Harbour EIS

Figure 5-8 Ambient Construction Noise Contours

Noise from Dredging and Reclamation Landforming – Stage 1 Dredging and Northern Reclamation



Legend

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- Oyster Point roost site
- Cassim Island High Roosting Density Area
- Noise Contours 60 db
- Noise Contours 60+ db

TOONDAH HARBOUR

walker

0 50 100 150 200 250 m

GDA 1994 MGA zone 56

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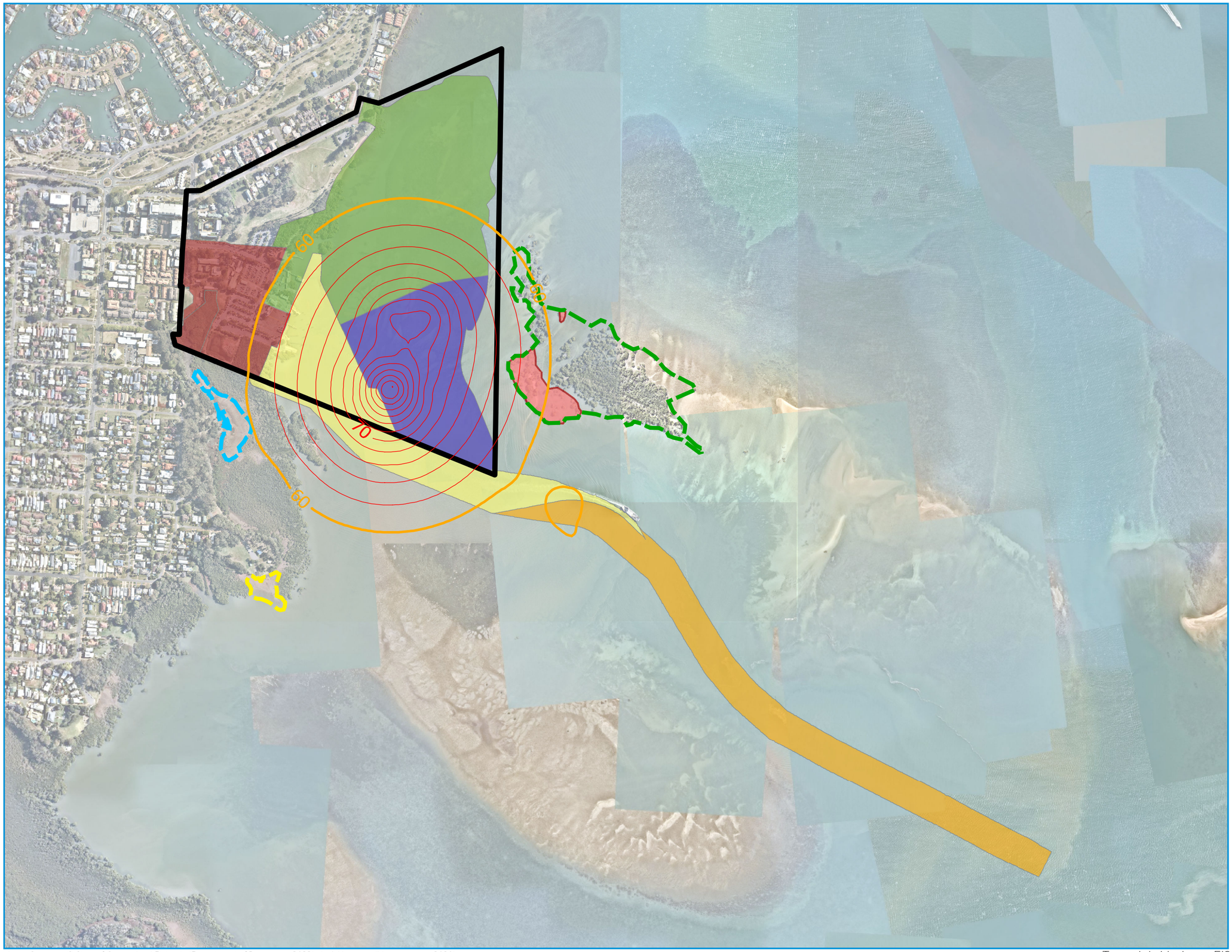
Layer Source: © State of Queensland Datasets (Department of Resourcesy 2022), Aerial Imagery (Nearmap.com 2020)

Figure 5-9 Ambient Construction Noise Contours

Noise from Dredging and Reclamation Landforming – Stage 2 Dredging and Southern Reclamation.



Legend

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TOONDAH HARBOUR

walker

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GDA 1994 MGA zone 56

Scale (A3): 1:10,000

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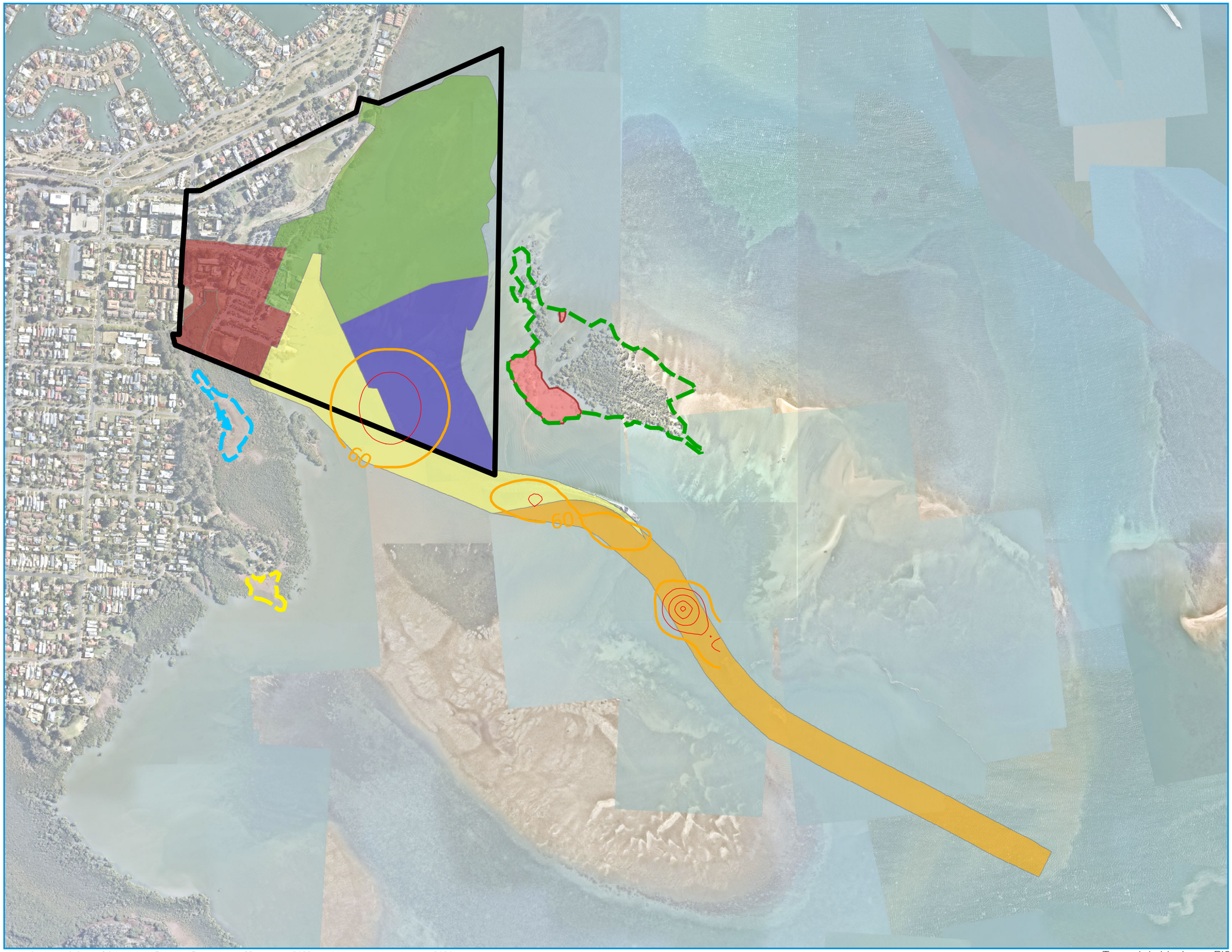
FILE REF. 9858 E Figure 5_9 Noise Contours A

Layer Source: © State of Queensland Datasets (Department of Resourcesy 2022), Aerial Imagery (Nearmap.com 2020)

Toondah Harbour EIS

Figure 5-10 Ambient Construction Noise Contours

Noise from Dredging Alone including Workboat and Unloading Barge



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- Noise Contours 60 db
- Noise Contours 60+ db

TOONDAH HARBOUR

walker

0 50 100 150 200 250 m

GDA 1994 MGA zone 56

Scale (A3): 1:10,000

N

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DATE: 1/08/2023

FILE REF: 9858 E Figure 5_10 Noise Contours A

Layer Source: © State of Queensland Datasets (Department of Resourcesy 2022), Aerial Imagery (Nearmap.com 2020)

Toondah Harbour EIS

5.7. Marine Ecology and Water Quality

Additional studies completed as part of the Supplementary Report for the marine ecology and water quality assessments include:

- A draft silt curtain procedure for dredging operations (**Appendix Q**).
- Additional assessment of the potential for the Project to impact on White's Seahorse (**Appendix R**).
- Additional assessment on the risk of vessel strike on Threatened and Migratory Marine Species (**Appendix S**).

The key outcomes of these studies are summarised below. All comments/issues raised have been addressed in Table 6-7 with references provided to the additional studies where appropriate.

5.7.1. Draft Silt Curtain Procedure

A draft procedure has been developed to outline a process for the deployment of silt curtains during stage 1 and 2 of capital dredging associated with the Project. This procedure will be included in tender documentation for the dredging component of the Project to guide implementation. A more detailed procedure will be developed by the dredge contractor based on the specific dredge plant.

The procedure outlines the following process for implementation of silt curtains during dredging:

1. The location/s of the dredge will be confirmed with the site manager or work area manager prior to deployment.
2. Ferry operators will regularly be consulted on the location of the dredge to avoid interfering with ferry operations.
3. Location and configuration of the silt curtain is to be agreed by the site manager or work area manager, dredge contractor and ferry operators prior to the dredge being deployed to a new area.
4. The silt curtain is to be deployed prior to dredging commencing in accordance with manufacture specifications and advice from relevant experts.
5. The dredge contractor is to carry out daily monitoring of the silt curtain and must prepare an inspection checklist to be included with weekly reporting.
6. Any rips, tears, gaps or other obvious leaks through the silt curtain must be communicated to the site manager or work area manager as soon as practicable.
7. Turbidity monitoring will be carried out within the silt curtain and adjacent down current (approx. 10m from floatation devices) as part of the ongoing water and marine ecology monitoring program.

Silt curtains will be utilised at all times during dredging unless the dredge contractor or ferry operators notify the site or work area manager that it is a navigation or workplace safety risk. Permission must be provided by the site manager to dredge without a sediment curtain in place. The dates and times dredging commences and stops without the curtain must be recorded by the dredge operator and provided to the site manager as part of weekly environmental reporting.

5.7.2. Additional Assessment of White's Seahorse

White's seahorse was listed as endangered by the Commonwealth in December 2020. The EPBC Act requires proponents to address matters listed at the time the decision was made on the approval process, i.e., at the time of the referral decision (s158A of the EPBC Act). The Project was made a controlled action on 23 July 2018. As a result, the EIS is not required to address significant impacts on White's Seahorse, however an assessment was still completed as part of the Draft EIS for completeness (refer to section 24.4.3 of the Draft EIS).

Further analysis has determined White's seagrass is unlikely to occur in at the Project site. While the known range is from St Georges Basin in NSW to Hervey Bay, the vast majority of records for this species are from Sydney Harbour and Port Stephens. White's seahorse has been recorded in seagrass beds near a jetty at Wynnum, and at Victoria Point (Burfiend

pers comm) and there are records of it near Moreton Island, Minjerribah and the Gold Coast Seaway. White's seahorse does not occur in inter tidal areas and is also unlikely to occur in the shallow sub-tidal areas (Harasti pers comm 2023). Most of the seagrass within the PDA is intertidal and consequently White's Seahorse are unlikely to occur in the Project area. It is also considered unlikely they would be in the channel that is currently dredged every two years (removing structure), or on bare sand or mud.

Males often have home ranges of approximately $1m^2$, whereas their female partners may have home ranges around 100 times larger, with juveniles settling relatively close to their parents. Sex differences in areas of occupancy may serve to reduce competition for food between the partners (Lourie et al., 1999). In seagrass beds with White's Seahorse, individuals preferentially select deeper areas with dense seagrass, more epiphytic prey types and fewer predators (Manning et al. 2018). While White's seahorse can occur in seagrass beds, in an extensive study in Port Stephens and Port Jackson (Harasti 2014), no adults or juveniles used sand or seagrass beds dominated by *Zostera muelleri* (the dominant species in the PDA, and one of the dominant seagrasses in the MIA) or *Halophila ovalis*.

5.7.3. Additional Assessment of Vessel Strike Risk

Additional assessment has been carried out on risk of boat strike to marine fauna as a result of construction and ongoing uses of the Toondah Harbour Project. The assessment has been completed with reference to publications published after submission of the Draft EIS, feedback from public submissions, and following contact with organisations using Moreton Bay with respect to their observations of these fauna in Moreton Bay. Organisations that were contacted included: Stradbroke Flyer (the water taxi service operating from Toondah Harbour to Minjerribah), Volunteer Marine Rescue (VMR) Raby Bay, Brisbane Whale Watching, and Dolphin Research Australia. These organisations are thanked for their valuable contributions. The Queensland National Parks and Wildlife stranding team was also contacted in June 2023, but no response was received.

The assessment includes threatened and migratory marine mammals and reptiles that are known to, are likely to, or may potentially occur in the Project area. Specific species addressed are:

- southern right whale (endangered and migratory)
- loggerhead turtle (endangered and migratory)
- green turtle (vulnerable and migratory)
- hawksbill turtle (vulnerable)
- humpback whale (migratory)
- Australian humpback dolphin (migratory)
- dugong (migratory).

In summary, the increase in vessel traffic as a result of the Project is likely to be limited to an increase in ferry traffic of 10%, and an increase in the size of the ferries. This has the potential to impact individuals of some threatened and migratory species. A range of management measures will be put in place to minimise this potential impact, including:

- Educational signage explicitly stating the risk to wildlife and identifying wildlife at risk.
- Educational social media posts and press releases, identifying seasonal risks to wildlife, identifying wildlife at risk and discriminating between behaviours of different species.
- Supporting recreational and commercial boat operators to install propeller guards to reduce impacts to marine fauna in the case of boat strike.
- Supporting public education regarding the impact of vessel strike, including the impact of speed on wildlife, and the behaviour of different species.
- Supporting further go-slow areas in the Marine Park to encompass the home ranges of marine turtles and mammals other than dugong (whose main habitat is already protected in go-slow areas).
- Supporting compliance of commercial and private vessels with movement restrictions.

- Supporting seasonal go-slow areas in the Marine Park to mitigate risks to migratory species.
- Contributing to patrols (e.g. via a First Nations Ranger program) to ensure go-slow areas and other management initiatives are complied with.
- Supporting monitoring of megafauna monitoring throughout the Bay, to feed into public awareness campaigns and training with the objective of reducing impacts to these species.
- Supporting annual ongoing training of all commercial vessel operators to look out for, and avoid marine mammals and turtles, particularly prior to whale migration seasons, and emphasising differences in behaviour between species.
- Assist commercial operators and regulators to develop a mitigation tool-kit that provides guidance to stake-holders and managers on what measures are most suited to specific locations, species and vessel types.
- Assist commercial operators develop vessel-strike management plans.
- Supporting mitigation to reduce the likelihood and severity of megafauna vessel collision, such as encouragement and regulation to reduce impacts, such as minor routing changes and speed regulation.
- Provision of ledges, where possible, along the southern boundary of the channel, to allow turtles to move at low tide from the intertidal flat into an area of the channel that is too shallow for boat traffic (noting the wider channel will also reduce the risk of boat strike to turtles at low tide, as there will be a larger area of vessels and turtles to manoeuvre in).

With the implementation of these mitigations measures, it is unlikely that the Project will result in a significant residual impact to any of these species.

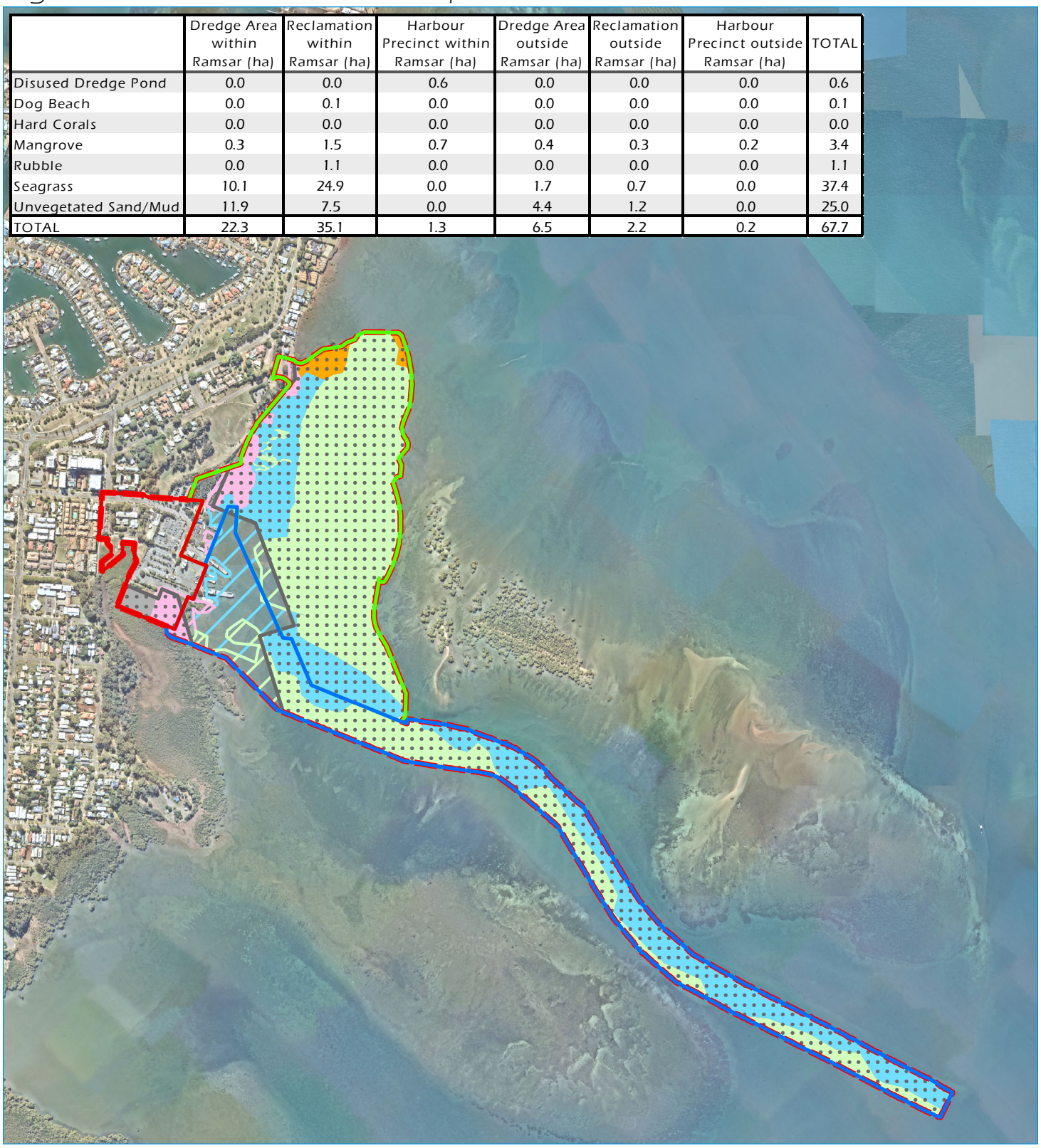
5.7.4. Marine Habitat Areas Clarification

A number of public comments and discussions with government agencies identified confusion with the areas of marine habitat directly impacted by the Project. This confusion seems to have stemmed from the differentiation between all marine habitats impacted by the Project footprint, and those impacted within the Ramsar site. A small portion of marine habitat affected by the Project is located outside of the Ramsar site.

In order to provide clarification, the areas of all marine habitats impacted have been consolidated on **Figure 5-11** which includes a table with the impact areas.

Figure 5-11: Marine Habitats Impacted

	Dredge Area within Ramsar (ha)	Reclamation within Ramsar (ha)	Harbour Precinct within Ramsar (ha)	Dredge Area outside Ramsar (ha)	Reclamation outside Ramsar (ha)	Harbour Precinct outside Ramsar (ha)	TOTAL
Disused Dredge Pond	0.0	0.0	0.6	0.0	0.0	0.0	0.6
Dog Beach	0.0	0.1	0.0	0.0	0.0	0.0	0.1
Hard Corals	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mangrove	0.3	1.5	0.7	0.4	0.3	0.2	3.4
Rubble	0.0	1.1	0.0	0.0	0.0	0.0	1.1
Seagrass	10.1	24.9	0.0	1.7	0.7	0.0	37.4
Unvegetated Sand/Mud	11.9	7.5	0.0	4.4	1.2	0.0	25.0
TOTAL	22.3	35.1	1.3	6.5	2.2	0.2	67.7



Toondah Harbour EIS

Legend

- Project Footprint
- Dredging
- Habour Precinct
- Reclamation Area
- Ramsar within development footprint (58.7 ha)
- Disused dredge pond within Ramsar
- Existing dog beach within Ramsar

Marine habitats within Ramsar
- Mangrove
- Rubble
- Unvegetated Sand/Mud
- Seagrass

Marine habitats outside of Ramsar
- Mangrove
- Unvegetated Sand/Mud
- Seagrass

N

0 100 200 300 400 Meters

GDA 1994 MGA zone 56

Scale (A4): 1:15,000

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TOONDAH HARBOUR

walker

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FILE REF. 9858 E Figure 5_11 Marine Habitat Impact A

5.8. Moreton Bay Ramsar Site Assessment

The topic that received the highest number of comments on the Draft EIS were impacts from the Project on the Moreton Bay Ramsar Site (MBRS). While a range of comments have been received and responded to in Table 6-8**,** the bulk of these comments were a variation of one or multiple of the following:

- The Project would be inconsistent with Australia's obligations under the Ramsar Convention.
- No Projects have ever been approved in a Ramsar site in Australia or internationally.
- The Project does not meet the definition of "wise use" of the Ramsar Site.

5.8.1. Australia's Obligations Under the Ramsar Convention

As a Contracting Party to the Ramsar Convention, Australia has made a commitment to:

- designate suitable wetlands for inclusion on the List of Wetlands of International Importance;
- formulate and implement planning to promote conservation of listed wetlands and as far as possible the wise use of all wetlands;
- arrange to be informed at the earliest possible time if the ecological character of any listed wetland has changed, is changing or is likely to change as a result of technological developments, pollution or other human interference, and report any such changes to the Ramsar Convention;
- promote the conservation of wetlands and waterfowl by establishing nature reserves on wetlands;
- encourage research and exchange of data and publications;
- promote the training of personnel in the fields of wetland research and management;
- consult with other contracting parties to the Convention to review and promote the implementation of the Convention; and
- represent Australia at the triennial Conference of the Contracting Parties, collating the National Report for these meetings and other reporting to the Convention.

Approval of the Project would not be inconsistent with any of these obligations.

5.8.2. Projects Approved in Ramsar Sites

As identified in section 4.3.2 of the Draft EIS, a range of developments have been approved or are located within Ramsar sites both in Australia and internationally.

For example, the Riverwalk development (EPBC 2006/3176) in Victoria was approved to deliver 2,200 residential lots and other urban over a 197 ha area within the Port Phillip Bay (Western Shoreline) and Bellarine Peninsula Ramsar Site. While the development is within the boundaries of the Ramsar site, the area was considered degraded and approval conditions required a range of measures to be implemented to protect the ecological character of the site including improving habitat values for the Growling Grass Frog.

Riviera Harbour (EPBC 2002/732) in the Gippsland Lakes Ramsar site in Victoria was also approved to carry out works within the boundaries of the Ramsar site. The works included dredging, dredge material disposal and a canal estate with residential lots covering 0.042% of the Gippsland Lake Ramsar site (a larger area by percentage of site than that of the Toondah Harbour Project which is 0.02% of the MBRS).

Further examples have been identified as part of studies for the Supplementary Report. These include:

- Vineyards Estate Residential Development, Werribee, Victoria (EPBC 2003/960) - In 2005, the Federal Government approved a 190 lot residential subdivision within the Port Phillip Bay (Western Shoreline) and Bellarine Peninsula Ramsar site. The 24 ha site was originally part of the Western Treatment Plant but was sold and used for grazing.

- Sweetwater Canal Housing Development, Meningie, South Australia (EPBC 2004/1422) - The project entailed the construction of a 300-lot residential canal development adjacent to Lake Albert, South Australia. It included dredging of a 500 m entrance channel for the estate through The Coorong, Lake Alexandrina and Albert Ramsar Wetlands Site.
- Point Grey Marina Project, Western Australia (2010/5515) - Point Grey Marina Project is a 300 to 400-boat onshore marina project created through excavation at Point Grey, adjoining the Peel-Yalgorup Ramsar Site. In 2014, the Federal Government approved the dredging of a 2.5 km, 50 m wide (5ha) navigation channel within the 26,677 ha Ramsar Site due to the shallow depths of some areas of the Harvey Estuary.

Internationally, Ramsar sites include a range of tourism and urban infrastructure within their boundaries. Examples include several marinas, apartments and hotels located within the Etang de Salses-Leucates Ramsar site in France, and a resort and mixed-use residential development within the Sungai Pulai Ramsar site in Malaysia.

5.8.3. Wise Use

The Ramsar convention does not prohibit development in Ramsar wetlands, but they must demonstrate that they maintain or enhance the ecological character of the site and be in accordance with the principles of wise use. The wise use of wetlands is '*the maintenance of their ecological character, achieved through the implementation of ecosystem approaches, within the context of sustainable development*' (Ramsar Convention 2005). The wise use concept requires ecological character to be maintained, while at the same time delivering services and benefits now and into the future for human well-being. Wise use of Australia's wetlands involves achieving a balance of uses which will deliver ecosystem, economic and social/cultural benefits over the long term.

While this was addressed in Chapter 27 of the Draft EIS, a more direct review of the Project against the definition of wise use has been completed for the Supplementary Report. This assessment is informed by legal opinion from Davis Advisory on whether the Toondah Harbour Project would be considered wise use of the Moreton Bay Ramsar Wetlands (**Appendix T**). The legal opinion concluded that the Project '*is capable of meeting the 'wise use' obligation by maintaining and developing the ecological character of the MBRS, using an integrated ecological systems approach to management of the site and ensuring sustainable use in the future*'.

The location of the Project, within less than 0.02% of the MBRS, is a reasonable and proportional means of achieving significant economic, social, cultural, educational and conservation benefits and services.

The Project as currently designed is capable of satisfying each of the three elements of 'wise use' of the listed Ramsar site. The key elements of wise use as applicable to the Project focuses:

- firstly on ecological character through a combination of ecosystem components and other related benefits that characterise a wetland;
- secondly that integrated land, water and living resources are promoted within the ecosystem; and
- thirdly that sustainable development is capable of preserving the environment through resource use that actively promotes longevity.

The Moreton Bay Ramsar Information Sheet (RIS) describes the social and tourism components of the MBRS that contribute to its ecological value. Section 4.1 of the RIS states: *The Bay's proximity to Brisbane and the Gold and Sunshine Coasts makes it ideal for visitors. More than 12 million visits to the Bay occur each year where people enjoy nature-based activities, from boating to snorkelling, diving, recreational fishing and camping.*

This statement indicates that nature-based tourism is a part of the ecological character of the MBRS therefore facilitating this use would be considered a wise use of the Ramsar Site. The Project will contribute significantly to this aspect of the

site with over 70% (approximately 25.8 ha of 36.5 ha) of the reclamation areas within the Ramsar site being taken up with uses that contribute to the ecological character of the MBRS. These include:

- Parklands and open space – 12.4 ha
- Marina and internal channels – 10.4 ha
- Harbour upgrades – 1.3 ha
- Education centre – 0.1 ha
- Dredge material disposal pond and breakwater – 1.6 ha

The existing port facility is currently within the ecological character of the site and its redevelopment will contribute significantly to tourism and recreational values. Marinas and harbours are an existing ecological characteristic and new facilities, sensitively designed, are capable of being 'wise use'. By developing infrastructure and marine services for Minjerribah (North Stradbroke Island), the Project will also enable financially sustainable eco-tourism. Redevelopment of the site, in particular the channel and boat harbour, will ensure the current degradation of the MBRS through existing contamination issues and deterioration of marine infrastructure is alleviated.

Open space within the development will contribute significantly to wise use by providing foreshore parklands for people to interact with Moreton Bay with features such as the non-motorised boat ramp providing direct interaction with the Ramsar site using low impact watercraft. The education centre will also provide a focal point for nature-based learning.

In addition to the 'wise uses' the remaining 30% of the reclamation areas (10.8 ha) will be used for infrastructure that will facilitate wise uses. The includes roads, parking, residential areas, a hotel and retail and commercial space. Without these uses the significant contribution to community infrastructure that will allow for increased interaction with Moreton Bay would not be possible.

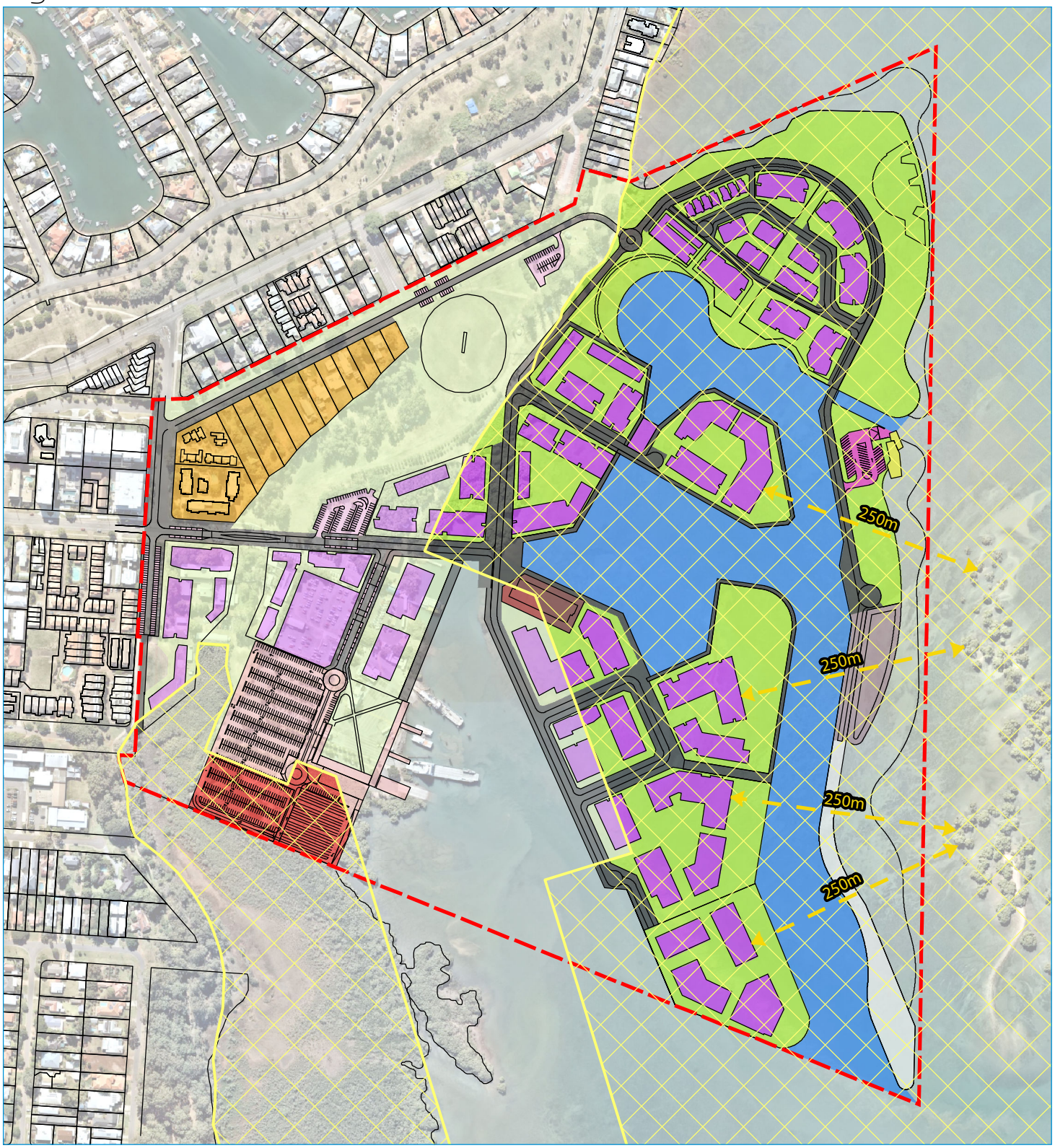
When applying the 'wise use' test, it is reasonable to assess a wetlands project as an integrated whole, rather than by taking each component individually. Residential and retail developments can be considered by reference to how they contribute to achieving the wider objectives of the Project. Therefore, residential and hotel accommodation and retail facilities that promote and facilitate economic, social, cultural, research and educational services and benefits would subsequently meet the principles pertaining to the 'wise use' test.

A breakdown of Project uses within the Ramsar site and how they contribute to wise use is included as Figure 5-12.

While, on balance, the Project can demonstrate wise use of the MBRS, it will also result in a substantial environmental offset contribution through the delivery of over $9 million of beneficial projects. Environmental offsets will be delivered through a third party not for profit or government supported organisation overseen by a panel of independent experts to ensure transparency in the process and provide positive conservation outcomes for the MNES impacted by the Project, including the MBRS. It is expected that offset projects will be delivered within the Redland City LGA as well as the broader Moreton Bay area providing benefits at the local and regional scales. While the money will be used to provide an overall benefit for threatened and migratory shorebird species and wetland habitats, it is expected that it will be the catalyst for further financial contributions that will combine to provide significant conservation benefits to Moreton Bay.

The Project is thus capable of meeting the test of proportionality where its positive impact on the ecological character of the Ramsar site as a whole will advance the objective of the Ramsar Convention to ensure the sustainable use of wetlands 'for the benefit of humankind'.

Figure 5-13: Ramsar Wise Use



Toondah Harbour EIS

Legend

PDA boundary
Moreton Bay Ramsar
Design Details
Measurement

Wise Use
- Dredge Material Disposal Pond - 0.7 ha
- Education Centre - 0.1 ha
- Harbour Updgrades - 1.3 ha
- Marina and Internal Channels - 10.4 ha
- Parklands and Open Space - 12.4 ha
- Rockwall Breakwater - 0.9 ha

Facilitate Wise Use
- Hotel Retail and Commercial Uses - 0.2 ha
- Parking - 0.2 ha
- Residential Uses - 6.0 ha
- Roads - 4.4 ha

Outside Ramsar
- Harbour Updgrades - 1.8 ha
- Hotel Retail and Commercial Uses - 0.1 ha
- Parking - 0.6 ha
- Parklands and Open Space - 8.8 ha
- Residential Uses - 2.5 ha
- Roads - 2.9 ha
- Existing Residential - Not Part of Development - 2.2 ha

N

0 100 200 Meters

GDA 1994 MGA zone 56

Scale (A4): 1:6,000

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FILE REF. 9858 E Figure 5_13 Ramsar Wise Use B

5.9. Environmental Offsets Strategy

All public comments received on the Offsets Strategy in the Draft EIS are addressed in Table 6-9. In general comments are variations on the following:

- The Offsets Strategy does not comply with the EPBC Offset Policy or Tailored Guidelines.
- The amount of $4.5 million is not enough and the calculation of the offset contribution is not clear.
- The strategy needs to provide further detail on how offsets will be delivered, how they will provide benefits to matters impacted and how they will be maintained and funded.

In addition to the comments received by the public, ongoing consultation with DCCEEW identified the following concerns with the offset strategy provided in the Draft EIS:

- Some habitats within the reclamation area were not included even though they are part of the MBRS.
- Further review is required on whether dredging will result in any significant residual impacts (SRIs).
- Additional detail is required on how the financial contribution has been calculated including the multiplier applied to impacts on the MBRS given its status as a wetland of international importance.

The environmental offsets strategy has been updated to address these comments and reflect Project changes that have occurred post notification of the Draft EIS. Key changes and an overview of the offsets strategy are provided below and an updated offset strategy is attached as **Appendix U**.

5.9.1. Significant Residual Impacts

Significant residual impacts (SRIs) to MNES were assessed against the Significant Impact Guidelines 1.1 in Chapters 24, 25, and 27 of the Draft EIS. These impacts have been updated in the Supplementary Report in response to a range of comments from the public and state and commonwealth agencies. Key changes to the outcomes of the SRI assessment that need to be reflected in the Offset Strategy are:

- Previously the dredge area was not considered a SRI as it would only result in the depth of already sub tidal areas being increased and recolonised by a range of marine flora and fauna. While marine habitats, such as seagrasses, are expected to recolonise sections of the dredge area the types of communities cannot be predicted and may differ from those that are currently present. As a result, dredge areas are now considered an SRI.
- Some substrates within the Project footprint, such as rocky rubble, were not considered to provide habitat for threatened species therefore were not considered to contribute to the ecological character of the Moreton Bay Ramsar site. It is acknowledged that all habitats within the MBRS provide some value to the ecological character therefore these have been included as a SRI.

Based on the outcomes of updated detailed assessments the Project is considered likely to have a significant residual impact on the following MNES:

- The loss of 28.9 ha of foraging habitat for a range of threatened and migratory shorebird species which will reduce the potential area of occupancy for these species within Moreton Bay by 0.29%.
- The area of the MBRS within the Project footprint (reclamation and dredge areas) will be substantially modified impacting on a range of wetland habitats including seagrass, mangrove, rocky rubble and unvegetated sand and mud substrate. The Project will result in the permanent modification of 58.7 ha of the over 120,000 ha MBRS (approximately 0.02%) including:
    - 2.5 ha of mangroves (approximately 0.03% of all mangroves in the MBRS);
    - 35 ha of seagrass (approximately 0.2% of all seagrass in the MBRS);
    - 1.1 ha of rocky rubble; and
    - 19.4 ha of unvegetated sand and mud substrate (approximately 0.2% of mudflats within the MBRS).

5.9.2. Offset Delivery Approach

The overall objective of the offsets strategy is to provide a conservation gain for the MNES impacted by the Project, which will in turn provide a benefit to the ecological character of the MBRS. It is proposed to deliver a suite of direct and indirect offsets through a fund managed by a third party with the ability to access public land and obtain approvals not available to a commercial entity such as the Proponent. The fund will be established so that offset projects undertaken meet the principles outlined in the EPBC Act Environmental Offsets Policy, including the need to provide conservation benefit for the matters impacted.

There are no tools under the EPBC Act to calculate funds for offsets delivery, therefore the Queensland environmental offset financial calculator (QEOFC) has been used to identify an appropriate financial contribution to offset impacts from the Project. The QEOFC was 'reverse engineered' by the Department of Environment and Science (DES) from the EPBC Act Offsets Guide. Estimates for the 15 individual inputs in the guide were developed by experts for each conservation matter. That information was then used to identify the multipliers on which the financial offset amount is calculated.

The QEOFC calculates financial offsets based on three components: on ground costs, landholder incentive costs and administrative costs. A multiplier is also applied to the calculation to ensure additionality based on the size and scale proportionate to the significant residual impact. For habitats comparable to the MNES being impacted (i.e. marine plants and wetlands) a multiplier of four is applied. That is, the financial calculation assumes that for every 1 ha of habitat impacted the financial equivalent of 4 ha of a similar habitat will be delivered through the offset funds.

On ground costs encompass establishment and ongoing maintenance of the habitats being offset. Estimates of on-ground management costs are highly variable, dependant on multiple site factors including location, access, and the type of management actions involved. The cost approach in the QEOFC is based on expert advice from Natural Resource Management bodies and local government, academic papers and industry feedback. On-ground costs for the marine environment are set at a higher rate to cater for higher costs of offsetting in marine and remote environments. For impacts on marine habitats in Moreton Bay an on-ground cost five times multiplier, or $150,000 per hectare, of offset area is applied by the QEOFC.

There is limited published information on the cost of restoring marine habitats, and what information exists shows large variations depending on a range of factors such as location, habitat type, the extent of the area to be restored, the level of degradation, and the chosen restoration method. However, peer reviewed literature suggests that $30,000 per hectare of offset area is suitable for mangrove and seagrass habitats:

- Bayraktarov et al. (2016) estimated the cost of seagrass restoration to be between $24,000 and $156,000 / ha and mangroves between $9,000 and $40,000 / ha.
- Saunders et al. (2020) identified a range of examples where marine ecosystem rehabilitation had a cost of <$70,000 / ha including examples of seagrass restoration for ~$10,000 / ha and mangroves for $1,200 / ha.
- Seagrass restoration was successfully achieved at a site in South Australia for ~$6,500 / ha (Bayraktarov et al. 2016; Wear et al. 2010).

Bayraktarov et al. (2015) indicates that coral reefs and saltmarshes are the most expensive marine habitats to restore with costs of several hundred thousand dollars per hectare.

5.9.3. Financial Contribution

The QEOFC has been used to calculate the financial contribution. Attributes from the QEOFC applied to the calculation are as follows:

- All threatened animals have a 4x multiplier applied to calculate the offset area. This has been utilised as the multiplier for impacts to migratory shorebird species.

- There is no specific multiplier for Ramsar sites. All marine based matters, including marine parks, have a 4x multiplier. In recognition of the higher protection attributed to Ramsar site a premium 5x multiplier will be applied which aligns with the multiplier for conservation parks and nature refuges in Queensland.
- An on-ground cost of $30,000 per hectare of offset area is applied by the QEOFC to marine areas within Moreton Bay (i.e. if a 5x multiplier is used an on-ground cost of $150,000 is applied for every hectare impacted).
- For areas identified as both marine habitat within the Ramsar site and migratory shorebird habitat there is effectively a 9x multiplier, or $270,000 per hectare, applied as the financial offset is calculated separately for each matter.
- To account for economies of scale for large offsets, a sliding scale of per hectare costs is applied to the financial settlement amount. For marine habitat there is a 25% reduction for offsets over 25 ha and 50% reduction for offsets over 100 ha.
- The maximum administrative cost of $1 million has been added to the total.

Using the above attributes and calculation method provided in Appendix 4 of the Queensland Environmental Offsets Policy a total financial payment of $9,041,401 is required to offset SRIs on MNES.

The offset funds will be legally secured prior to the commencement of any site works through a bank guarantee or similar process. Funds will then be released in stages aligning with impacts associated with dredging and reclamation stages. The release of funds will occur prior to the works commencing on the following components of the development:

- Stage 1 reclamation (~40% of impact) - $3,616,564
- Stage 1 dredging (~25% of impact) - $2,260,353
- Stage 2 reclamation (~25% of impact) - $2,260,353
- Stage 2 dredging (~10% of impact) - $904,141

5.9.4. Offset Delivery Method

The offset will be delivered through an established and experienced third-party not-for-profit organisation (henceforth referred to as the Offset Fund Manager (OFM)) which will establish an Environmental Trust Fund (ETF) that will utilise grants, donations and regulatory (offset) contributions to fund essential and highly needed landscape-scale environmental works programs throughout the region.

To avoid any conflict of interests the ETF is separate and additional to any funds or grants provided by government organisations and is designed to enable the OFM to act as the delivery agent for offsets and other environmental contributions.

The ETF is intended to align with national and state offsetting policies with a clear objective to protect and restore environmental assets listed as matters of national or state environmental significance (MNES and MSES). Primary among these are listed threatened species habitats and, of particular relevance in the region, the internationally important Moreton Bay Ramsar site.

The ETF will provide for the prioritisation and coordinated delivery of projects in partnership with community organisations, philanthropic donors, Traditional Owners, conservation bodies, industry and government. Its aim is to deliver environmental works in the region through a strategic landscape-scale approach, building on local programs and existing initiatives.

Environmental projects are challenging to implement in urban, coastal and marine environments where most available natural areas are under council or state government ownership. The complicated tenure arrangements and overlapping rights and interests make it difficult for non-government organisations to access such areas to undertake physical works or research activities. Council can overcome this challenge in areas that are under its ownership or control.

To help guide the ETF, an Implementation Advisory Group (IAG) will be established to provide advice and oversight for selection and implementation of projects. The Group will be appointed by the OFM with input from DCCEEW, DES and relevant approval holders. It will be made up of scientific, community, government and industry members with knowledge and interest in the Moreton Bay region. OFM staff will provide secretariat services, but the Group will function independently.

5.9.5. Providing Conservation Benefits

While offset projects will ultimately be selected by the OFM based on recommendations from the IAG, there are a range of management plans and strategies that could be utilised for an initial tranche of projects. These plans have been developed by various government departments, not-for-profit organisations and initiatives. Opportunities include a number of unfunded projects that may be implemented through the ETF. Examples include:

- Redland City Council's Redlands Coast Bay and Creeks Plan and Action Plan 2021-2026;
- Resilient Rivers' Lower Brisbane-Redlands Coastal Catchment Action Plan;
- Healthy Land and Water's South East Queensland Natural Resource Management Plan 2009 – 2031.

It should be noted the above are provided as examples only. They are publicly available sources and specific projects have not been discussed with any of the entities responsible.

5.9.6. Assessment Against the EIS Guidelines

The EPBC Act EIS Guidelines outline details that need to be addressed by the offset strategy for the Project. All of the guideline requirements have been addressed by this strategy however it is noted that some details, such as the completion of an offsets guide, are not applicable to the proposed ETF.

Where requirements are not applicable the strategy has provided details on why and, where necessary, outlined how those requirements will be met through the implementation of the ETF. A summary of how the offset strategy responds to the EIS Guidelines is included in Table 5-3.

Table 5-3: Assessment of the Offset Strategy Against the EIS Guidelines

EIS Guideline Requirements	Offset Strategy Response
Objectives	The primary objective of the ETF is to provide conservation benefits to the Moreton Bay Ramsar Site (MBRS) through effective and practicable delivery of actions that compensate for residual significant impacts caused by the Project under the EPBC Act.
Quantity of impacts which are being offset	Based on the outcomes of detailed assessments the Project is considered likely to have a significant residual impact on the following MNES: ▪ The loss of 28.9 ha of foraging habitat for a range of threatened and migratory shorebird species; and ▪ The area of the MBRS within the Project footprint will be substantially modified impacting on a range of wetland habitats including seagrass, mangrove, rocky rubble and unvegetated sand and mud substrate. The Project will result in the permanent modification of 58.7 ha of the MBRS.

EIS Guideline Requirements	Offset Strategy Response
The type of offsets proposed (direct/indirect)	Offsets will be provided through an ETF which will be funded by the proponent. A total financial payment of $9,041,401 is required to offset SRIs on MNES. The ETF will deliver a range of direct offsets. Indirect offsets will only be considered where it can be demonstrated that a greater benefit to the protected matter is likely to be achieved.
The location and suitability of proposed direct offsets	A detailed examination of potential projects will be carried out to determine which are the highest priority and will provide the most value for habitats in Moreton Bay. The outcome of this process will be an ETF Project Delivery Strategy that will outline at least 5 years' worth of projects including budget requirements. This process will be run by the IAG which is proposed to include representatives from the relevant Federal, State and Local government departments.
Current land tenure or proposed future of any proposed offset and the method of securing enduring protection of the offset site and managing the offset for the life of the impact	The offset funds will be legally secured prior to the commencement of any site works through a bank guarantee or similar process.
The nature of and extent to which actions of the Queensland Government or RCC would be required to implement the proposed offsets	This process will be run by the IAG which is proposed to include representatives from the relevant Federal, State and Local government departments.
How staging of the overall development will impact the delivery of offsets	The offset funds will be legally secured prior to the commencement of any site works through a bank guarantee or similar. Funds will then be released in stages aligning with impacts associated with dredging and reclamation stages. The release of funds will occur prior to the works commencing on the following components of the development: ▪ Stage 1 reclamation (~40% of impact) - $3,616,564 ▪ Stage 1 dredging (~25% of impact) - $2,260,353 ▪ Stage 2 reclamation (~25% of impact) - $2,260,353 ▪ Stage 2 dredging (~10% of impact) - $904,141
Specific environmental outcomes to be achieved, and reasoning for these in reference to relevant statutory recovery plans, conservation advice and threat abatement plans	Project specifics will be addressed through the ETF Project Delivery Strategy. Table 3 of the Offsets Strategy outlines a series of requirements any offset project must meet in order to be selected. Offsets projects must be able to demonstrate a conservation outcome for the matter being impacted. A review of key threats and conservation priorities for the matter impacted must be carried out including national guidelines, conservation advice, recovery plans and recent peer reviewed literature.

EIS Guideline Requirements	Offset Strategy Response
A completed 'offsets guide'	The offset guide is not applicable to the ETF. There are no tools under the EPBC Act to calculate funds for offset delivery, therefore the QEOFC has been used to identify an appropriate financial contribution. The QEOFC was 'reverse engineered' by DES from the EPBC Act Offsets Guide. Estimates for the 15 individual inputs in the guide were developed by experts for each conservation matter.
Risk assessment	Project specifics will be addressed through the ETF Project Delivery Strategy. Table 3 of the Offsets Strategy outlines a series of requirements any offset project must meet in order to be selected. The ETF Project Delivery Strategy will include a risk assessment for each project nominated demonstrating that there is a high level of certainty conservation outcomes will be achieved.
Environmental management activities and mitigation measures including the timing of actions	Project specifics will be addressed through the ETF Project Delivery Strategy. Table 3 of the Offsets Strategy outlines a series of requirements any offset project must meet in order to be selected.
A monitoring program	Project specifics will be addressed through the ETF Project Delivery Strategy. Table 3 of the Offsets Strategy outlines a series of requirements any offset project must meet in order to be selected. A draft management plan will be provided with the ETF Project Delivery Strategy including an ongoing monitoring program and criteria for measuring conservation outcomes at milestones and completion of the project.
Detailed and time-specific outcomes against which the achievement of the proposed offset outcomes will be measured	Project specifics will be addressed through the ETF Project Delivery Strategy. Table 3 of the Offsets Strategy outlines a series of requirements any offset project must meet in order to be selected. The ETF Project Delivery Strategy will include the following information at a minimum for each offset project: ▪ A delivery schedule for each offset project outlining when conservation outcomes will be achieved. ▪ A draft management plan outlining key measures, parties responsible for delivering those measures and timing of delivery. ▪ A review of peer reviewed scientific literature demonstrating conservation outcomes can be achieved.
The outcomes of the offset strategy need to be specific, measurable and achievable.	See previous responses.

5.10. Aboriginal Cultural Heritage

The Proponent is currently consulting with the Quandamooka Yoolooburrabee Aboriginal Corporation (QYAC) in regard to current and future native cultural heritage requirements at the site including the preparation of a Cultural Heritage Management Plan (CHMP). These discussions are confidential and convened on a 'without prejudice' basis. The Proponent is bound by its obligation to keep these discussions in confidence.

Several comments were received on Aboriginal Cultural Heritage during the public comment period, many of which were directed at the consultation process. Most comments on cultural heritage fall broadly under the following three themes:

- The EIS has not considered Aboriginal significance of the Toondah Harbour landscape/seascape.
- The proposed development has the potential to damage cultural heritage within the Ramsar listed site and the marine and land areas adjacent to the proposed development site.
- The cultural heritage consultation process has only communicated with QYAC and has not engaged with other traditional owners.

The Proponent remains committed to meet its Duty of Care and will continue to work in consultation with QYAC for the benefit of Quandamooka in the preparation of a CHMP and other commitments agreed by the parties. While details of the consultation with QYAC cannot be provided in full, further information addressing the Aboriginal Cultural Heritage assessment to this point is provided in the sections below.

5.10.1. Introduction

The construction and operation of the project must achieve the purposes of the *Aboriginal Cultural Heritage Act 2003* (ACHA) and the *Torres Strait Islander Cultural Heritage Act 2003* with respect to the proposed project site and ensure that the nature and scale of the proposed project does not compromise the cultural heritage significance of a heritage place or heritage area. Unless section 86 of the ACHA or *Torres Strait Islander Cultural Heritage Act* applies, the proponent must develop a CHMP in accordance with the requirements of Part 7 of these Acts.

The purpose of this assessment is to describe the Aboriginal cultural heritage values of the proposed development at Toondah Harbour (Project) and potential impacts arising as a result, in accordance with the ACHA and the EIS Guidelines. It considers the methods used to identify values and outlines suitable management and protection measures to be implemented by the Proponent through project design, construction and operation to minimise any such impacts, having regard to previously recorded or newly identified Aboriginal heritage sites in the Project area.

The site specific Indigenous cultural heritage assessment was prepared by Everick Heritage and is attached as **Appendix V**. The assessment was undertaken and developed based on the relevant legislative obligations including (amongst other things) the Aboriginal cultural heritage Duty of Care Guidelines.

The Proponent's objective is to comply with the Aboriginal cultural heritage Duty of Care through the development and implementation of an agreed CHMP, to address cultural heritage for the Project in consultation with the Quandamooka People.

5.10.2. Scope of Aboriginal Cultural Heritage Assessment

As part of the overall consideration of development impacts, Aboriginal cultural heritage has been assessed in accordance with the EIS Guidelines. The intention of the Aboriginal cultural heritage assessment is to:

- provide a context for assessing Indigenous occupation within the Project area;
- recognise the presence of registered Indigenous heritage sites in the Project area; and

- outline management and protection strategies to be implemented for the Project through the development of a CHMP with the identified Aboriginal party regarding the proposed project works in accordance with the *ACHA* and the *Cultural Heritage Management Plan Guidelines*.

5.10.3. Methodology

Review of Background Data

A review of previous reports and assessments was undertaken by the Proponent, including:

a) Australian Heritage Database.
b) National Native Title Tribunal Register of Native Title Claims.
c) Queensland Department of Seniors, Disability Services and Aboriginal and Torres Strait Islander Partnerships Cultural Heritage Database and Register (public facing access and mapping).
d) EPBC Act National Heritage List and Commonwealth Heritage List.
e) The indigenous cultural heritage assessment prepared by Everick Heritage (Provided as **Appendix V** and hereby referred to as the Everick Report) for QYAC.

A review of the databases and materials referred to (directly above) was undertaken to ascertain the environmental, ethnographic and archaeological context of the area with a view to identifying any (un)known objects and/or places of cultural significance. However, for the purposes of this assessment, reliance is placed on the research results of the identified databases, which is detailed in Chapter 5 (Heritage Databases) of the Everick Report.

The fundamental framework of the Everick Report is to consider Aboriginal cultural heritage in accordance with the legislative requirements and accepted assessment practices. The framework for this assessment is as follows:

a) A search of the DATSIP Aboriginal Cultural Heritage Database and Register to identify:
    (i) recorded Aboriginal Cultural Heritage places in the Study Area; and
    (ii) the Native Title or Aboriginal Party(s) and/or Cultural Heritage Bodies for the Study Area.
b) Conduct research of the Project area and surrounding region to assess the extent and nature of land use through time, including any modifications to the land, ground surface disturbance and prior land use.
c) Conduct a Duty of Care assessment as required under the ACHA.

The Everick Report considers the environmental context (Chapter 3) and details the results of a desktop review of the archelogy of Moreton Bay (Chapter 4), setting out an important context for the on-site inspection and recommendations made.

Site Inspection

A Site Inspection of the Study Area was carried out by Everick Heritage on 15 March 2019 with QYAC representatives. The details of the inspection are described in the Everick Report at Chapter 6 (Site Inspection). For the purposes of this assessment, reliance is placed on the site inspection carried out by Everick together with QYAC attendees as detailed in Chapter 6 of the Everick Report.

The survey results of the Site Inspection are detailed in Chapter 7 of the Everick Report, including details of artefact and isolated artefact scatters. The survey results of Everick's investigations conclude that:

a) there were no recorded Aboriginal Cultural Heritage sites listed on the DSDSATSIP database within one (1) kilometre of the Study Area. There is one (1) previously recorded DSDSATSIP site within three (3) kilometres of the Study Area.
b) four (4) sites of Aboriginal Cultural Heritage were identified within the Study Area comprising two (2) artefact scatters and two (2) isolated scatters.

c) review of historical aerial imagery suggests that much of the south-eastern portion of the Study Area has been subject to Significant Ground Disturbance (i.e. dumping sediment, burying the original land surface).
d) six (6) areas were identified as being of risk to Aboriginal Cultural Heritage (i.e. potential to contain sub-surface cultural heritage).
e) potential for the proposed works to harm Aboriginal Cultural Heritage a demonstrated by the identification of Cultural Heritage material, and a sub-surface testing investigation was proposed and subsequently undertaken.
f) initial areas of risk to Aboriginal Cultural Heritage and management recommendations were revised as part of the testing exercise to facilitate a greater understanding of the potential of the Study Area to potentially hold archaeology.

Chapter 8 of the Everick Report contains a summary of the excavation test pits in the Study Area and the results of those investigations.

The archaeological significance of the Cultural Heritage assessment is set out in Chapter 9 of the Everick Report, detailing the value of the Study Area as a whole. Chapter 9 concludes with a series of statements on the significance of Aboriginal Cultural Heritage of the Study Area.

Importantly, the Quandamooka People provided the following statement regarding the Study Area (and surrounds):

The Quandamooka People have a continued connection with the Study Area and immediate surrounds. The rich resources of the immediate area are able to support intensive occupation. Archaeological sites comprise an important part of the cultural significance of the immediate region and form part of a cultural complex of sites, connecting the islands with the mainland.

Of note, the Everick Report identifies that the Cleveland area is of high cultural significance to the Quandamooka People, noting that the Traditional Owners have strong spiritual, social, historical and scientific connections.

Given the abundance of fresh water, local resources and proximity to Moreton Bay, Cleveland is considered an important area for traditional and contemporary resource use.

Chapter 9 of the Everick Report closes with the following analysis:

The Quandamooka People view these archaeological sites as part of an interconnected cultural landscape that stretched well beyond the boundaries of the Study Area. The sensitive coastal and wetland environments surrounding the Moreton bay [sic] *area are also of high significance to the Quandamooka People. It is also important to note that despite the extensive disturbance history of the Study Area, intangible values remain intact as the area relates to its broader landscape.*

Chapter 10 of the Everick Report (closely tied to Chapter 9) contains a risk assessment and recommendations for a framework in respect of a consultation and heritage management strategy for the Project. Four (4) categories are identified and explained as follows:

<u>Category One: Known Heritage Areas</u>
There are four (4) sites within the Study Area, of which, two (2) include artefact scatters and two (2) containing isolated artefact scatters. The Everick Report makes recommendations, including that any impacts of the Project must be referred to QYAC for consideration. The responsibilities of QYAC upon any referral are detailed.

Category Two: High Risk Area

There are two (2) High Risk Areas identified in the Everick Report, located around Known Heritage Areas along the foreshore. QYAC considers there is a high likelihood that archaeological or other places of Cultural Heritage significance may occur. Future development of this area should be undertaken in consultation with QYAC and the responsibilities of QYAC upon any referral are detailed.

Category Three: Moderate Risk Area

There are four (4) Moderate Risk Areas identified in the Everick Report with a possibility that further Aboriginal Cultural Heritage exists in these locations. QYAC considers there to be a moderate likelihood that archaeological or other places of Cultural Heritage Significance might occur.

Category Four: Low Risk Area

This area comprises the balance of the Study Area, including most the foreshore area and area of high disturbance (i.e. the ferry terminal). Any surface monitoring is at the discretion of QYAC.

QYAC will require a 'Finds Procedure' in order to allow works to occur in locations with a Cultural Heritage Officer on call should suspected Aboriginal material be located, depending on the works to be undertaken and the specific location.

The plan in this Chapter identifies each of the High, Medium, Low Risk areas together with Known Heritage sites.

This summary of the Everick Report is only high level and undertaken with a view to direct attention to the relevant parts of the Everick Report for further consideration in context of surrounding paragraphs.

5.10.4. Native Title Party

The Quandamooka People are Traditional Owners with recognised Native Title Rights in and around Moreton Bay. Quandamooka refers geographically to the southern Moreton Bay including the islands, waters and areas adjacent to the mainland coastline.

The following information has been extracted from the QYAC website regarding the recognition of Native Title for the Quandamooka People in and around Cleveland, North Stradbroke Island and Moreton Bay areas:

4 July 2011

On 4 July 2011, the Quandamooka People were recognized as having Native Title rights and interests in 54,408 hectares of land on North Stradbroke Island: Delaney on behalf of the Quandamooka People v State of Queensland [2011] FCA 741 (Determination).

As part of the determination, Quandamooka People's native title rights included:

- *2,264 hectares of Exclusive Possession lands; and*
- *22,639 hectares of onshore areas, and over about 29,505 hectares of offshore areas of Non Exclusive possession lands.*

Exclusive Possession

Exclusive possession lands still have underlying Crown title (radical title), however Quandamooka people have the recognised rights to possession, occupation, use and enjoyment to the exclusion of all others (Paragraph 3(a) Determination). Native Title has always existed, and the determination is not a new right that exists from date of determination onwards, rather a formal declaration that Quandamooka People have always held that right.

Quandamooka People are able to own, occupy and use the exclusive possession lands, but are not able to sell those lands. They have the right to exclude all others from the lands and to control access which includes government agencies.

Quandamooka People also have the following rights to the exclusion of all others:

- *The right to live and be present on the area,*
- *The right to conduct ceremonies,*
- *The right to maintain places of importance and areas of significance to the native title holders;*
- *The right to teach on the area about the physical and spiritual attributes of the area;*
- *The right to light fires for the domestic purposes such as cooking; and,*
- *The right to take, use, share and exchange traditional natural resources and seawater for any non-commercial purpose.*

Non-Exclusive Possession

Non-exclusive possession rights of the Quandamooka People recognised by the Federal Court and consented to by the State of Queensland include the right to live and be present on the area, conduct ceremonies, to maintain places of importance and areas of significance to the native title holders, and to take, use, share and exchange traditional natural resources and seawater for any non-commercial purpose (Paragraph 3(b) and 3 (c) of the Determination).

Traditional Natural Resources include animals and plants as defined within the Nature Conservation Act 1992 (Qld), seaweed, charcoal, shells and resin, any clay, soil, sand, ochre, gravel or rock on or below the surface of the Determination Area (paragraph 13 Determination).

On Non-exclusive possession lands the following Native Title interests of the Quandamooka People are recognised, however other non-Quandamooka People have similar rights in the same lands:

- *The right to live and be present on the area,*
- *The right to conduct ceremonies,*
- *The right to maintain places of importance and areas of significance to the native title holders;*
- *The right to teach on the area about the physical and spiritual attributes of the area;*
- *The right to light fires for the domestic purposes such as cooking; and,*
- *The right to take, use, share and exchange traditional natural resources and seawater for any non-commercial purpose.*

In addition, Quandamooka People have non-exclusive rights over offshore areas, including the right to:

(a) be present in the area, including by accessing and traversing the area; and
(b) take, use, share and exchange traditional natural resources and seawater for any non-commercial purpose.

The Quandamooka People will exercise its non-exclusive rights along the rights of others and parts of the determination area will continue to be shared by all those with an interest in the area, including members of the public.

The following information has been extracted from the QYAC website regarding the Quandamooka People's efficacious connection to the land and waters:

The Quandamooka People have a strong continuous connection to the land and waters of Quandamooka Estate. We protect both the tangible and intangible aspects of our culture that have been a part of our history for thousands of years while still harnessing opportunities for growth and progress.

Our purpose is to undertake cultural heritage in accordance with the Aboriginal Cultural Heritage Act 2003. We believe that this is the way to achieve the highest level of protection that can be given to our culture and heritage.

QYAC is the body responsible for determining ongoing risks to cultural heritage in accordance with the Native Title Determination delivered 4 July 2011. Indigenous cultural heritage will be managed under a CHMP specific to the Project. Details of the CHMP are confidential to the parties who will be signatories to the document and therefore, not included in the EIS.

5.10.5. Everick Report

An independent assessment of potential impacts of the Project was conducted by Everick Heritage as commissioned by QYAC for the Proponent, which:

...was undertaken in order to assist with the management of Aboriginal Cultural Heritage within the Toondah Harbour Priority Development Area...

The Part 6 Everick Report was presented to and has been approved by the Chief Executive of the Department of Aboriginal and Torres Strait Islander Partnerships, Queensland.

In the delivery of the Project, the Proponent will be guided by its sustainability principles when considering the potential impacts the Project may have on Indigenous heritage values and sites, and on the development and implementation of an Indigenous Cultural Heritage Management Plan **(CHMP)**, relevantly:

(a) recognising the essential rights of all to healthy, clean and safe environments, equal opportunity, fair remuneration, ethical procurement and adherence to the rule of law;
(b) support organisational ethics, decision making with respect for universal principles through identification, mitigation and the prevention of adverse short and long-term impacts on society and the environment; and
(c) adhere to fiscal strategies, objectives and targets that balance the needs of stakeholders, including immediate needs and those of future generations.

These principles will be met through the application of the following objectives:

(a) maximise sustainability knowledge and awareness through procurement commitments, sharing sustainability outcomes with the community, stakeholders and industry and through awareness training;
(b) enhance liveability of local communities through recognition of heritage values, community benefit initiatives, public open space and urban design;
(c) optimise employment and training opportunities for (amongst others), Aboriginal and Torres Strait Islanders and people who live in close proximity to the Project, through apprenticeships, training and development and workforce participation; and
(d) minimising impact of the Project through efficient use of resources (i.e. water), minimising pollution (i.e. air quality, noise and vibration), mitigating impacts on biodiversity (i.e. ecological values) and maximising sustainable procurement (i.e. social aspects and selection criteria).

In accordance with these principles, cultural heritage values are reflected with the fundamental focus upon the Indigenous people having the responsibility of custodianship of their heritage, being acknowledged. Settling a CHMP will occur in conjunction with the identified Aboriginal party.

Where practicable, development of the Project will avoid locations of Indigenous cultural heritage however where it cannot be avoided, measures to mitigate impacts will be undertaken with the Aboriginal party in accordance with the terms of an agreed CHMP.

5.10.6. Legislative Framework

Cultural heritage plays a fundamental role in the community. This part sets out the legislative instruments which apply to the area under which the Aboriginal cultural heritage assessment has been considered.

Commonwealth Legislation

Environment Protection and Biodiversity Conservation Act 1999

Fundamental objectives of the EBPC Act includes a co-operative approach with respect to the protection and management of the environment and biodiversity, which includes those in connection with Indigenous peoples, namely:

- to promote a co-operative approach to the protection and management of the environment involving governments, the community, land-holders and indigenous peoples
- to recognise the role of indigenous people in the conservation and ecologically sustainable use of Australia's biodiversity; and
- to promote the use of indigenous peoples' knowledge of biodiversity with the involvement of, and in co-operation with, the owners of the knowledge.

In order to achieve the objects of the EBPC Act, it is necessary for the Proponent to promote a partnership approach to environmental protection and biodiversity conservation through recognising and promoting indigenous peoples' role in, and knowledge of, the conservation and ecologically sustainable use of biodiversity.

The EPBC Act acknowledges three types of cultural heritage, namely:

- World Heritage Sites: recognised and protected for their outstanding universal value (which may be cultural, natural or both) in accordance with the provisions of the Convention Concerning the Protection of the World Cultural and Natural Heritage.
- National Heritage Places: comprises a register of national heritage places (natural, historic or indigenous) considered to be of outstanding heritage significance to Australia.
- Commonwealth Heritage Places: which are of historic, natural or indigenous significance and are in the Australian Government ownership or control.

Queensland Legislation

Human Rights Act 2019

The *Human Rights Act 2019* (Qld) (HR Act) protects various fundamental human rights which include, amongst others, cultural rights for Aboriginal peoples and Torres Strait Islander peoples.

Section 28 of the HR Act recognises the distinct cultural rights of Aboriginal and Torres Strait Islander peoples as Australia's first people and that they must not be denied the right to live and practice their culture. This includes the right to maintain and strengthen their distinctive spiritual, material and economic relationship with the land, territories, waters, coastal seas and other resources with which they have a connection under Aboriginal tradition or custom.

This provision is premised upon two international instruments, namely Article 27 of the International Covenant on Civil and Political Rights together with Articles 8, 25, 29 and 31 of the United Nations Declaration on the Rights of Indigenous Peoples.

Aboriginal Cultural Heritage Act 2003

The *Aboriginal Cultural Heritage Act 2003* (Qld) (ACHA) seeks to provide effective recognition, protection and conservation of Aboriginal cultural heritage in the State of Queensland.

Aboriginal cultural heritage is defined in the ACHA as anything that is:

- a significant Aboriginal area in Queensland; or
- a significant Aboriginal object; or
- evidence of archaeological or historical significance of Aboriginal occupation of an area of Queensland.

Identified Aboriginal cultural heritage sites are protected by inclusion on the Aboriginal and Torres Strait Islander Cultural Heritage Database Register overseen by the Queensland Department of Seniors, Disability Services and Aboriginal and Torres Strait Islander Partnerships (DSDSATSIP).

Recognised or potential places of cultural heritage importance are protected in accordance with the Duty of Care provisions of the ACHA. Section 28 of the ACHA requires person(s) undertaking development activities to take all reasonable and practicable measures to ensure that their activities do not harm Aboriginal cultural heritage.

The ACHA Duty of Care Guidelines (16 April 2004) requires a land user to make an assessment of the proposed land use and the likelihood of it causing harm to Aboriginal cultural heritage. The activity categories comprising the Duty of Care, are as follows:

- Category 1: no surface disturbance is proposed. Such activities are generally unlikely to harm Aboriginal cultural heritage and may proceed without further cultural heritage assessment.
- Category 2: no additional surface disturbance and will not result in additional harm to Aboriginal cultural heritage to that which has already occurred and may proceed without further cultural heritage assessment.
- Category 3: in Developed Areas (i.e. road and rail infrastructure). Activities that occur in these areas are generally unlikely to harm Aboriginal cultural heritage and may proceed without further cultural heritage assessment, provided they do not extend beyond current levels of ground disturbance.
- Category 4: in an area that has already been subject to significant ground disturbance. Further activities are unlikely to result in harm to Aboriginal cultural heritage and may proceed without further cultural heritage assessment. However, care should be taken with to ensure any residual Aboriginal cultural heritage values are not impacted. The Aboriginal Party should be contacted in the event that any feature of potential cultural significance is uncovered.
- Category 5: will create additional surface disturbance, and so have a high risk of harming Aboriginal cultural heritage if it exists. These activities cannot proceed without cultural heritage assessment, and it is generally necessary to notify the appropriate Aboriginal Party to seek advice in relation to cultural heritage values of the area.

The Everick Report identifies the Project area to be a Category 4' Significant Ground Disturbance' proposal.

5.10.7. Cultural Heritage Management Plan

Unless an exemption applies under section 86 of the ACHA (or *Torres Strait Islander Cultural Heritage Act 2003*), a CHMP must be prepared in accordance with Part 7 of the ACHA. An exemption does not apply to the proposal and as such, the Proponent seeks to manage Aboriginal Cultural Heritage through the establishment of a CHMP for the Project. Irrespective, a CHMP is compulsory where an EIS is required.

The ACHA provides in Part 7, mechanisms for a formal arrangement for the management of Aboriginal cultural heritage as part of the proposed development, including by way of a CHMP.

A CHMP is a government approved agreement between a land user and the Cultural Heritage Body and/or the Aboriginal Party of an area that outlines how project activities may be managed to avoid harm to Aboriginal cultural heritage, or to minimise harm where avoidance is not reasonably practicable.

The Project will be developed in accordance with an agreed CHMP with QYAC. The proposed CHMP will define the process by which Indigenous cultural heritage is identified within the Project area and detail mechanisms for the development of site management strategies to maximise the retention of Indigenous heritage values wherever possible.

5.10.8. Cultural Heritage

Aboriginal and Torres Strait Islander culture is the oldest, enduring culture in the world, having survived generations over the last 65,000 years. It follows that this rich tradition must be conserved for present and future generations given the Indigenous culture is part of the rich fabric which makes Australia unique and lends itself to its identity.

Broadly, cultural heritage encompasses all places and values of archaeological, traditional, historical or contemporary significance. Cultural heritage is both tangible (i.e. artefacts, remains, objects) and intangible (i.e. traditional knowledge, stories, rituals).

Cultural heritage assessments investigate the significance of a place, site or item and forms a fundamental part of the management and conservation of cultural heritage values. The intention of a cultural heritage assessment is on the premise that Aboriginal cultural heritage should be conserved and protected. To this end, project Proponents have a statutory obligation to protect these values.

5.10.9. Past Land Use

Prior to colonial settlement, Australia was occupied by Aboriginal people. Today, the preservation of physical evidence of its cultural landscape is less prevalent. Areas where disturbance to the ground surface and vegetation have been minimal are likely to retain traces of Aboriginal occupation however, this evidence is likely to be less obvious in areas that have undergone disturbances of varying degrees.

The Everick Report both describes and depicts the historical development of the Study Area together with the Quandamooka People's historical and present connection with the land. Aerial images show disturbances in the area for residential and commercial development (including associated road and jetty infrastructure) has been occurring for several decades. Vegetation clearing and dredging of the channel to facilitate water transport between Cleveland and Minjerribah is evident. The Study Area has been the subject of ground disturbing activities including clearing, reclamation for the Stradbroke Ferry facilities and residential development. The level of current impact to the Study Area is described as having *at least a moderate impact upon potential impact Aboriginal Cultural Heritage*.

5.10.10. Duty of Care Assessment and Potential Impacts

Survey and historical information detailed in the Everick Report suggests that the Study Area has been used primarily for residential and urban purposes with some clearing for buildings, roads, carparks and dwellings. Insofar as the Moreton Bay area, the Study Area has been reclaimed and filled in parts along the foreshore, revegetated in part with mangroves. Of note:

The foreshore of the G.J. Walter Park is the only original foreshore of the whole Study Area and offers a reasonable explanation for the presence of the artefacts observed.

The level of disturbance identified in the Everick Report for the Study Area is Category 4: *Areas previously subject to Significant Ground Disturbance* and that the impact from the Project would have at least a moderate impact upon potential intact Aboriginal Cultural Heritage (but will otherwise comply with the Guidelines). That is, activities in areas

that have previously been subject to significant ground disturbance. Where an activity is proposed in a Category 4 area, it is generally unlikely that Aboriginal cultural heritage will be harmed, but there is a chance that remnant cultural heritage will be impacted. In particular, it should be noted that while the ground surface in these areas has been disturbed and it is likely that any displaced artefacts are of negligible scientific value, they may be of significance to the Quandamooka People. In the event objects of potential Aboriginal cultural heritage significance are discovered, the Quandamooka People will be consulted and further cultural heritage assessment undertaken.

The Project will not have any impacts to registered cultural heritage sites, however results of the survey undertaken indicate a portion of the Project intersects with cultural heritage objects. The management of these locations will be undertaken in accordance with the agreed CHMP process.

In addition to potential impacts to identified sites and isolated artefacts, is the potential for previously undetected Indigenous cultural heritage to be revealed during further investigations and impact mitigation work prior to construction. Unrecorded items of Indigenous cultural heritage may occur in unexamined areas of the Project area. These impacts will be managed through the implementation of an approved CHMP.

Whilst no direct reference is made in the Everick Report, the Proponent notes that there will be activities proposed in the Category 2 (Activities causing No Additional Surface Disturbance) and Category 3 (Developed Area) that are generally / unlikely to harm Aboriginal cultural heritage and the activity will comply with the Guidelines. The types of activities falling into these categories include the use, maintenance and protection of existing utilities and services such as, roads and powerlines within the existing alignment or other infrastructure footprint and the use and maintenance of services and utilities (i.e. electricity infrastructure, water and sewerage disposal) on areas where such services and utilities are currently being provided. Additionally, tourism and visitation activities on an area where such activities are already taking place.

5.10.11. Impact Avoidance and Management

It is intended that the CHMP will recognise the primary role of the Quandamooka People as custodians of their heritage. Mitigation measures to be included in the CHMP will include however will not be limited to:

(a) avoidance of Indigenous cultural heritage, where practical;
(b) further investigations; and
(c) relocation of cultural heritage items in consultation and agreement with the Quandamooka People.

The CHMP will include management measures for the construction period that addresses:

(a) Cultural heritage induction for the workforce and monitoring of specific construction activities where there is a high potential of sub-surface finds (if any);
(b) procedures for unexpected finds; and
(c) conflict resolution.

Upon completion of the Project, cultural heritage items recovered prior to construction and objects identified and salvaged during construction may require management and safe-keeping. Issues relating to the storage of objects will be agreed upon and specified in the CHMP. Each of these items are set out in further detail below.

Avoidance

The preferred mitigation measure for known cultural heritage places is to avoid impact wherever possible. At present, all known heritage places and places of identified archaeological significance, lie outside the areas to be further disturbed by any significant level of development. By this, the Proponent confirms that the:

(a) identified location of the four (4) Known Heritage artefacts are on State Reserve tenure land, which is intended to remain as State Reserve (Council, as trustee for the purpose of recreation, namely G.J. Walter Park); and

(b) location of the High Risk and Medium Risk areas are situated on land identified as being for State Reserve (Council, as trustee for the purpose of recreation, namely G.J. Walter Park) for the proposed Foreshore Park and Marina Basin (over Unallocated State Land).

The balance of the areas for the proposed development are shown as Low Risk. To the extent that the areas shown as being 'High Risk' or 'Known Heritage' lie outside the areas intending to be significantly disturbed by the Project activities and as such, are considered unlikely to be impacted.

Unexpected Finds

Although historical, archival and ground-truthed research has identified locations of cultural heritage value or potential cultural heritage value in the Study Area, there is still the possibility that further, currently unidentified areas/items exist.

In the location of the proposed development, cultural heritage items are likely to be represented by such items as shells, stone artefacts, historical objects and bone. In the event such items are found, the same 'Stop Work' process outlined below will be implemented.

Stop Work

Should cultural heritage archaeological deposits be uncovered during construction of the Project, a 'Stop Works' process as outlined below will be followed:

(a) relevant work will cease in the immediate area and the local site will be secured.
(b) the identified material on site will not be removed or disturbed further (barriers or temporary fences may be erected as a buffer around the find if required).
(c) to the extent there is no QYAC Cultural Heritage Officer in attendance at the time, QYAC will be contacted and asked to attend the site. Further, in accordance with the relevant legislation, the relevant government entities will be informed using the approved form.
(d) the find will be reported directly by the site supervisor (or other appropriate manager) or through an onsite cultural heritage specialist.
(e) the government agencies will determine the significance and future management of the find. This may involve the clearance of the site for development, recording and excavation, or protection.

Cultural Heritage Induction

To facilitate the identification of historical cultural heritage, information on Indigenous cultural heritage will be incorporated into the general site induction. This document will be prepared by a qualified cultural heritage specialist and include the following:

(a) familiarisation material for work crews so that they are aware of what constitutes a cultural heritage find.
(b) clear instructions on what to do should such material be found. This component will be integrated with the Indigenous cultural heritage inductions developed under the CHMP to provide a holistic overview of the heritage and archaeological resources which may exist within the Project Site.
(c) identified, practical mitigation and management measures will be negotiated with the relevant government entity and form party of the CHMP for the Project.

5.10.12. Consideration of the Engage Early Guidance

The Australian Government's *Engage Early: Guidance for proponents on best practice Indigenous engagement for environmental assessments under the EPBC Act (2016)* document provides guidance to project proponents on when Indigenous communities should be consulted and sets out DCCEEWs expectations on how Indigenous engagement should occur. The *Interim Engaging with First Nations People and Communities on Assessments and Approvals Under the*

Environment Protection and Biodiversity Conservation Act 1999 was also released in first quarter 2023. The interim guidance takes into account the independent review of the EPBC Act led by Professor Graeme Samuel AC and updates the Engage Early guidance.

As outlined in the Interim guidance: '*Broadly, the department considers that respectful and effective engagement includes (but may not be limited to):*

- *ensuring cultural safety*
- *building and maintaining trust*
- *engaging early and often*
- *negotiating suitable timeframes*
- *negotiating suitable submission formats*'

The interim guidance goes on to explain:

- *Ensuring cultural safety means that the cultural identity, wants and needs of First Nations peoples and communities are protected and not likely to be subject to assault, challenge or rejection.*
- *Building and maintaining trust with First Nations peoples and communities may require the proponent to invest in ongoing relationships and partnerships.*
- *First Nations peoples and communities should be engaged as early in the project planning phase as possible.*
- *Statutory timeframes imposed by the EPBC Act, in which the public are invited to provide comment on proposals, may not reflect the cultural obligations, community dynamics or decision-making processes of First Nations peoples and communities.*
- *Many of the submission formats imposed by the EPBC Act and associated policies may not reflect the communication needs or preferences of First Nations peoples and communities.*

To date, there has been ongoing engagement and high level without prejudice negotiation of the draft CHMP between the Proponent and the Quandamaooka People. Whilst the discussions were held in confidence and on a without prejudice basis, the intent, to address items in accordance with the *Aboriginal Cultural Heritage Act 2003*, relevant guidelines and as otherwise discussed and agreed by the parties.

The CHMP process the Proponent and QYAC are currently engaged in addresses the interim guidance. No timeframes have been placed on the completion of this process, however the Project will not commence without an agreed CHMP including a process that ensures indigenous heritage is respected throughout all phases of development.

5.10.13. Management Recommendations

Insofar as how the Project will deal with concerns around Cultural Heritage Management, the Proponent confirms that the Management Recommendations contained in Chapter 11 of the Everick Report will be adopted and implemented, namely:

Management Recommendations

As a result of the desktop study, site inspection and sub-surface investigation of the Study Area, there is considered to be a moderate likelihood that the proposed project will harm Aboriginal heritage, dependant on the nature of location of the proposed works. This conclusion is based on evidence of abundant occupation at TP5 and previous ground disturbance throughout much of Study Area. The following recommendations are cautionary in nature and are the result of consultation with the QYAC Cultural Heritage Department.

Recommendation 1: Record Sites on DATSIP Database

Aboriginal Cultural Heritage sites located during the survey should be recorded on the DATSIP database. Information including recorder, site location (plan), site type/s, site material/s and landscape context should be provided in the site registration. The information provided to DATSIP should be in the form of a polygon. The boundaries of the polygon must be determined by the probable extent of the archaeology and must be considered as an approximate boundary.

Recommendation 2: Avoid Known Sites

It is recommended that avoidance of known sites be undertaken (Figure 20). This includes the four (4) Aboriginal Cultural Heritage sites identified in this report, including two (2) artefact scatters/occupation sites (THAS01, THAS02/TP5) and two (2) isolated artefacts (THIA01, THIA02).

Recommendation 3: Further Sub-Surface Investigation at THAS02/TP5

Test Pit 5 results confirm the sub-surface nature of artefacts and occupation at THAS02, further sub-surface investigations should be undertaken. These investigations should be conducted using hand excavation to accurately investigate the extent, nature and chronology of the TP5 site. This will allow the site to be adequately applied, protected and/or salvaged. If further excavations are not possible, then a buffer of at least 10 m around the centre coordinates should be instated.

Recommendation 4: Cultural Heritage Monitoring

Cultural Heritage monitoring by a QYAC Cultural Heritage Officer is recommended in areas of High and Moderate Risk (see Figure 89). Monitoring should occur during the initial ground surface disturbance activities, including vegetation removal and ground clearance up to 1 metre. Site monitoring by a QYAC Cultural Heritage Officer will mitigate potential impacts to archaeological materials and other cultural heritage. Should archaeological or other cultural heritage be identified during construction works, QYAC may require cessation of works provided the finds are of particular significance. Additional consultation and archaeological or anthropological investigations may be required.

Recommendation 5: Cultural Heritage Induction for Contractors

Cultural Heritage Induction deals with the physical heritage that may be encountered within the Study Area. The implementation of this Induction procedure aims to avoid further harm to Aboriginal Cultural Heritage. All relevant staff and contractors who will be undertaking sub-surface ground disturbance must attend a Cultural Heritage Induction prior to construction commencing. The Induction will be a one-time session run by QYAC during the pre-start phase.

Recommendation 6: Aboriginal Objects Finds Procedure

Walker Corporation should ensure that a finds procedure for Aboriginal Cultural Heritage is formulated in consultation with QYAC. The finds procedure ensures that Aboriginal Cultural Heritage is handled in an appropriate way, not disturbed and QYAC are notified immediately. The GPS location of the material is to be recorded at the time of discovery and if required, an appropriately qualified archaeologist and QYAC representative are to be engaged to further investigate and document the material in accordance with the relevant legislation.

Recommendation 7: Aboriginal Human Remains

Should any development, ongoing land-use or erosion uncover human remains at any stage within the Study Area, all activities that led to the discovery of the remains must halt in the immediate area to prevent further harm. The location where they were found should be cordoned off and the remains themselves should be left untouched. The nearest police station (Cleveland), QYAC and the Quandamooka Traditional Owners and the DATSIP Brisbane office are to be notified immediately. If the remains are found to be of Aboriginal origin and the police release the scene, QYAC and the DATSIP should be consulted as to how the remains should be dealt with. Work may only resume after agreement is reached between all notified parties, provided it is in accordance with all parties' statutory obligations.

In the event that minor impacts / upgrades are required to existing infrastructure outside of the current Study Area, works plans should be referred to QYAC for consideration. Responsibilities of QYAC in this case will mirror those outlined above.

The Proponent otherwise will adopt to the greatest extent possible an agreement-based process with the Quandamooka People. The Proponent is committed to adopting a range of principles to apply to cultural heritage management. Ultimately, the CHMP will form the governing document for Project compliance with the ACHA.

It is anticipated the general form of the CHMP will contain:

- **Overarching principles**: provisions regarding the ownership of Aboriginal cultural heritage, management of cultural heritage information, dispute resolution and general administrative arrangements.
- **Any recommended further Cultural Heritage Assessment**: to the extent further investigation is to be carried out on site, the CHMP will provide for additional detailed field surveys to identify Indigenous cultural heritage places or objects located within the Project area. Any such surveys will be carried out prior to construction commencing.
- **Development of Cultural Heritage Management Strategies**: provision of establishing agreed strategies detailing how significant areas and objects identified during the initial cultural heritage assessment will be managed during project construction. Avoidance of Indigenous cultural heritage places will be the preferred strategy should this be technically feasible. Where there is no flexibility to avoid a site, the loss will be offset by a suitable program of mitigation that collects and preserves the data that a site may hold for future research purposes. Provisions will be made for cultural induction processes, the development of a cultural awareness program, procedure for accidental discovery of cultural material and accidental discovery of human remains, and management of cultural heritage material, conflict resolutions and other contingencies.
- **Establishment of post-construction heritage agreement**: Provisions related to developing, if necessary, formal agreements detailing ongoing management arrangements for cultural places during the operational phase of the Project.

As part of the CHMP development, the Proponent will work with the Quandamooka People to develop key performance indicators to promote the implementation of best practice cultural heritage management. Methods for measuring performance against key performance indicators will also be detailed in the CHMP.

6. Public Submissions Comment Response

Detailed Responses to comments received from members of the public during notification of the Draft EIS are included in Table 6-1 to Table 6-11. Comments have been categorised to align with chapters from the Draft EIS with cross references to the Draft EIS provided where relevant. Categories include:

- Sediment Quality and Acid Sulfate Soils
- Coastal Processes and Maritime Engineering
- Air Quality
- Noise and Vibration
- Koala and Terrestrial Ecology
- Migratory Shorebirds
- Marine Ecology and Water Quality
- Ramsar Assessment
- Environmental Offsets
- Project Description, Assessment Framework and EIS Document
- Social and Economic Assessment
- Cultural Heritage

Each category has been further divided into themes so that readers can more easily find topics of interest.

Comments include all of those received by various community groups and auto generated forms as described in Section 3.1 of the Supplementary Report. Responses have been provided for 356 comments. Comments have generally been taken directly from the individual submissions, however in some instances comments addressing the same or similar topics have been combined to avoid repetition.

6.1. Soil, Sediment and Contaminated Land Comments and Responses

Comments received on sediment analysis and acid sulfate soils (ASS) have been compiled and responded to in Table 6-1 using either direct wording from a single submission or an amalgam of comments encompassing the same issue. A total of 11 issues on coastal processes and maritime engineering were raised through public submissions. Issues were categorised into three themes being Acid Sulfate Soils, sediment analysis process and carbon and nutrients.

The table should be read in conjunction with Chapter 7 of the Draft EIS and associated technical appendices. Cross referencing to the Draft EIS has been included where appropriate and additional investigations included in appendices to this Supplementary Report.

Table 6-1: Soil, Sediment and Contaminated Land Comments and Responses

Theme	Comment ID	Comment	Response
Acid Sulfate Soils	SQ1	The EIS reports proposed dredge and reclamation areas are not considered contaminated, but then it states that sediment throughout the proposed dredge and reclamation areas contains PASS (Potential Acid Sulphate Soil). When acid sulphate soils are disturbed, they can generate large amounts of sulfuric acid, iron, aluminium and sometimes heavy metals. This can cause major impacts to the environment and to infrastructure.	Acid Sulfate Soil (ASS) is a general term applying to both a soil horizon that contains sulfides (i.e. Potential Acid Sulfate Soil - PASS) and an acid soil horizon affected by oxidation of sulfides (i.e. Actual Acid Sulfate Soil - AASS). ASS may be peats, silts, clays, or sands. When left undisturbed and submerged in an anoxic environment, pyrite (in acid sulfate soil) is chemically inactive. Pyrite oxidizes in the presence of oxygen and hydrogen to form sulfuric acid. As this material is chemically inert within the saturated sediments it is not considered to be a 'contaminant', however it is agreed that, if untreated, ASS can result in significant impacts to the environment once disturbed and exposed to oxygen. The sediments at Toondah Harbour contain very high in situ acid neutralising capacity (ANC) which is generated from lime within shell fragments found in the sediments. In almost all samples the ANC was sufficient to neutralise all ASS. The National Acid Sulfate Soils Guidance: Guidelines for the dredging of acid sulfate soil sediments and associated dredge spoil management 2018 (NASSG) indicate that neutralising capacity should not be considered when assessing management of ASS as shell fragments may not neutralise the acid as efficiently in the natural environment as it does in a laboratory. As a result, the Draft EIS requires all sediments that contain ASS to be treated with lime to ensure the acid forming potential is neutralised. Liming rates have been calculated using best practice management guidelines and provided in Appendix 2-A of the Draft EIS. A Draft Acid Sulfate Soils Management Plan (ASSMP) for the dredging and reclamation activities has been developed as part of the Supplementary Report and is included as **Appendix L**. The Draft ASSMP includes a range of measures for managing ASS through the dredging and reclamation process, including additional sampling prior to works commencing to better define the extent and concentration of ASS, liming rates for different management areas and procedures for ongoing testing and management.
	SQ2	The EIS Appendix 2-A report concludes that liming is required; however, at no stage does it estimate the volumes of lime that may be required for the project. The volume of agricultural lime that will be needed to neutralise the potential acidity will be significant and may be a significant impact in itself.	The volume of lime required to treat ASS is not commonly included as part of an EIS. Nonetheless, an estimate of lime volumes required over the life of the Project has been calculated in response to comment ME8 (refer to section 6.1 of the Supplementary Report). In the dredge area, the liming rates (no allowance for ANC) are on average of 3.7% of overall material volumes. In the reclamation area, the liming rates are on average of 3.2% of overall material volumes. These percentages are not unusual in the management of ASS. Adopting an average dry density of 1.1t/m^3 and taking the average liming rate of 3.7%, for a dredging volume of 530,000m^3 (583,000t), the quantity of lime required to treat the dredge material would be approximately 22,000t. Adopting an average dry density of say 1.0t/m^3 gives a total mass of sediments to be treated of 650,000t. At an average liming rate of 3.2%, the quantity of lime required to treat sediments in the reclamation area would be approximately 21,000t. The estimated quantity of lime to treat all sediments in the dredging and reclamation process would be approximately 43,000t over the life of the Project. This aligns with the predicted level of imported material (approximately 150,000 m^3).
	SQ3	Sample numbers and sampling intervals were inadequate to provide a characterisation of the ASS material within the project area. Australian ASS sampling guidelines for dredge sediment suggest 29 sampling locations for a full investigation of a dredge volume of 530,000 m^3 and a minimum of 56 sampling locations for a full ASS	Sampling was carried out in accordance with the National Acid Sulfate Soils Guidance: Guidelines for the dredging of acid sulfate soil sediments and associated dredge spoil management 2018 (NASSG) when historical sampling from maintenance dredging campaigns was taken into account. Appendix B of the NASSG states:

Theme	Comment ID	Comment	Response
		investigation of a site the size of the reclamation area (estimate of 703,000m^3).	*for projects where adequate information is available to indicate the sediment materials being considered for dredging are relatively homogenous, or existing information is available on the sediment composition, then the number of additional samples may be reduced. As a minimum requirement, it is recommended that the number of samples taken be as described in Table B2.* Several historical sediment investigations have been conducted at Toondah Harbour as part of the approval process or maintenance dredging campaigns. The Sediment Sampling and Analysis Plan (SSAP – Appendix 2-A of the Draft EIS) reviewed sediment data from analysis carried out in 1994, 2004, 2006, 2013 and 2018. For locations where existing information is available Table B2 of the NASSG identifies that between 10 and 20 samples should be carried out for material volumes from 500,000m^3 – 2,000,000m^3. The most recent analysis, undertaken in 2018, was used to reduce the amount of sample sites required for the capital dredging. Including the 2018 sampling a total of 25 sample locations (14 in 2019 and 11 in 2018) were used to characterise sediments within or adjacent the proposed dredge channel. This meets the requirements of the NASSG. Sample locations are shown on **Figure 5-1**. Field and field oxidised pH testing and chromium testing was carried out on all samples and sub samples collected (47 samples over 14 sediment cores). A further 34 tests were carried out over 11 sediment cores during the 2018 surveys resulting in a total of 81 individual sub samples. Sub sampling was undertaken at 0.5m intervals or wherever there were changes in the sediment characteristics. In addition to the 25 sample locations in the dredge area an additional four boreholes were completed within the reclamation area to characterise sediments. A number of the sample sites completed within the proposed or existing dredge area (CBH1, MBH1, MBH2 and MBH7) either fringe or are within the proposed reclamation area so can also be used in the characterisation of the reclamation area. A Draft ASSMP for the dredging and reclamation activities has been developed as part of the Supplementary Report and is included as **Appendix L**. The Draft ASSMP includes a range of measures for managing ASS through the dredging and reclamation process, including additional sampling prior to works commencing to better define the extent and concentration of ASS, liming rates for different management areas and procedures for ongoing testing and management.
	SQ4	No PASS assessment has been undertaken for the material to be removed as part of the perimeter bund wall development.	Sample locations REC2, REC4, CBH1, MBH7, MBH8, MBH9, MBH10, MBH11, MBH12 and MBH13 (refer to **Figure 5-1**) are all positioned on or near the location of the bund wall and are representative of material to be removed s part of the perimeter bund development. It is acknowledged further analysis of ASS is required in the reclamation and dredge areas. A Draft ASSMP for the dredging and reclamation activities has been developed as part of the Supplementary Report and is included as **Appendix L**. The Draft ASSMP includes a range of measures for managing ASS through the dredging and reclamation process, including additional sampling prior to works commencing to better define the extent and concentration of ASS, liming rates for different management areas and procedures for ongoing testing and management. The Draft ASSMP specifically identifies the reclamation as an area for further analysis. It is noted 88 individual samples have been assessed for ASS throughout the dredge and reclamation areas providing a good indication of ASS present at the site. The additional sampling will provide a better understanding of liming rates however is unlikely to result in any other changes to the management measures outlined in the Draft ASSMP.
	SQ5	A comprehensive ASSMP should be presented for detailed regulatory and scientific review prior to a decision being made on project approval.	A Draft ASSMP for the dredging and reclamation activities has been developed as part of the Supplementary Report and is included as **Appendix L**. The Draft ASSMP includes a range of measures for managing ASS through the dredging and reclamation process, including additional sampling prior to works commencing to better define the extent and concentration of ASS, liming rates for different management areas and procedures for ongoing testing and management. The Draft ASSMP is anticipated to be further refined through consultation with the State government prior to finalisation.
	SQ6	Recent studies with anthropogenic impacts of constant noise comparable to vibration piling and impulsive pile driving noise on benthic organisations has demonstrated a positive interaction effect	Stenton et al. (2022) does not reference ASS and instead is an experimental study looking at the combined impacts of cadmium in the water column and noise from pile driving on Norway Lobster. Water quality and sediment analysis at the site has not identified cadmium at levels that would result in environmental impact. In all but one sample cadmium was not identified above the limit of reporting (i.e. the level detectable by laboratory analysis).

Theme	Comment ID	Comment	Response
		(in a mathematical sense not an environmental sense) between noise and cadmium, a component of acid sulphate soils. Stenton et al. (2022) observed an interaction effect between pile driving sounds and acid sulphate soil chemicals with the early life of the Norway lobster. There are clearly no Norway lobsters in the Toondah Harbour RAMSAR site however in the slightly deeper waters off the RAMSAR site is a major settlement area for juvenile sand crabs.	As noted in the comment, Stenton et al. (2022) identified a mathematical, not environmental interaction between noise and cadmium. The paper states '*Exposure to piling playbacks and cadmium caused a wide range of physiological effects on larval Nephrops, with the drivers each having individual effects, but also demonstrating various interactions when co-occuring. The multifaceted nature of these effects makes direct assessment of risk and harm of these drivers on the species difficult to judge. In some scenarios, exposure to piling playbacks could be considered beneficial, promoting larval survival and growth rates in cadmium-contaminated waters, however the opposite is also true for more pristine environments'.* Given the uncertainty in the outcomes of the study and differing environmental conditions it is considered to have limited applicability to the Toondah Harbour Project.
Sediment Analysis Process	SQ7	There are no result tables summarising individual data points, only summary tables showing analyte means and 95% UCL (upper confidence limit) of all samples analysed in each of two investigation areas, the proposed dredge area and the proposed reclamation area.	Chapter 7 of the Draft EIS does not contain full result tables as it only provides a summary of the sediment analysis results. The Sediment Sampling and Analysis Technical Report (Appendix 2-A of the Draft EIS) includes summary tables for all samples within the dredge and reclamation areas as required by the National Assessment Guidelines for Dredging 2009 (NAGD). All laboratory results including a full suite of analytes for each individual sample is included as Appendix C of the Sediment Sampling and Analysis Technical Report.
	SQ8	No Quality Assurance/Quality Control (QA/QC) Compliance Assessment Reports, as usually supplied by the testing laboratory/ies, were appended to the reports.	QA/QC was carried out in strict accordance with the NAGD. The measures and their results are addressed in section 4 of the Sediment Sampling and Analysis Technical Report (Appendix 2-A of the Draft EIS). Laboratory results from the QA/QC process are included in Appendix C of the Sediment Sampling and Analysis Technical Report.
	SQ9	Sampling has generally failed to segregate sample collection at each of the sites based on their textural differences as is required by the NAGD.	Sampling was carried out in accordance with the NAGD, which included segregation for variations in physical characteristics where appropriate. As noted in the Sediment Sampling and Analysis Technical Report (Appendix 2-A of the Draft EIS) '*No distinct strata over 50 cm was observed in any of the cores, and hence separate subsampling of distinct strata was not required*'.
Carbon and Nutrients	SQ10	While the report acknowledges that dredging can cause increases in turbidity, it claims that this will only have "temporary" effects, and sediments settle a few days after dredging activities. This could be true, but what is not temporary is the carbon, nitrogen and phosphorus released into the water column once marine soils are disturbed.	The Draft EIS (section 7.3.1.2) and the Sediment Sampling and Analysis Technical Report (Appendix 2-A of the Draft EIS) address nutrients within the sediments to be dredged and the potential for environmental impacts. The investigations concluded that the risk of porewater contamination from the disturbance of sediment in Toondah Harbour was low. The concentration of nitrogen, nitrates, ammonia and phosphates identified in the sediment at Toondah Harbour is not considered to be of any environmental concern. As identified in the Draft and Supplementary Report a range of management measures will be put in place to minimise sediment dispersal during the dredging process. This includes selection of the dredge plant, a backhoe dredge, which generally results in less suspended sediment than other methods of dredging. A silt curtain will also be used where possible during dredging, which will reduce the plume to almost nothing outside of the Project footprint. It is noted that in previous assessments of the quality of sediment in Toondah Harbour, there was a concern that the concentration of ammonia in the pore water of the sediment may cause toxicity and make the sediment unsuitable for disposal at Mud Island (WBM 2006). As a result of this concern, there were extensive investigations consistent with the tiered approach in the NAGD. These investigations included: ▪ Determining the concentration of ammonia in the pore water of the sediments from Toondah Harbour, and Mud Island as a potential placement site; ▪ Numerical modelling to determine likely impacts to water quality; ▪ Elutriate, bioavailability and toxicity testing; ▪ Monitoring the concentration of ammonia in the water column after placement at Mud Island; and ▪ Measuring the concentration of ammonia in the pore water five days after disposal. These studies determined that (WBM 2005; 2006; BMT WBM 2013): ▪ The concentration of ammonia in the water column was close to background within 10 minutes, and at background levels within one hour of placement of the dredged material; and ▪ Sediment porewater ammonia concentrations at Mud Island were similar to baseline conditions within five days of placement.

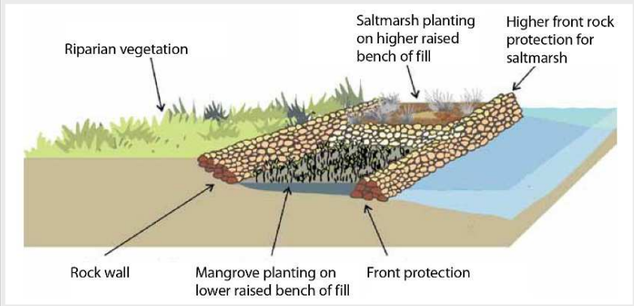
Theme	Comment ID	Comment	Response
			These studies concluded that the risk of impacts at Toondah Harbour from release of nutrients in porewater was low and the contaminants of potential concern (COPCs) in the Toondah Harbour sediments would not cause adverse effects to aquatic ecosystems, either in place or following sea disposal (noting that the highest risk of contamination occurs during sea disposal, which is not proposed by the Toondah Harbour Project). Chemical analyses and bioavailability tests found that COPCs: (i) were not likely to be bioavailable, (ii) were not at concentrations likely to cause toxic effects, and (iii) if released during disposal of the sediments COPC concentrations would remain below water quality guidelines. The WBM sediment analysis reports are included as **Appendix W**.
	SQ11	The project will also release 9,728 tons CO2 from dredging the soils, contributing to climate change. These impacts are not temporary and have not been considered in the report. They are clearly against the State and Federal Policies of maintaining nitrogen levels in Moreton Bay, stopping the loss of wetlands, and reducing carbon emissions from land use change.	Blue carbon is both captured and stored by coastal ecosystems. The removal of mangroves and seagrass will prevent further capture of carbon by these plants. In coastal ecosystems carbon is predominantly stored in the sediments, with 50% to 99% of carbon stored up to 6 m deep below the surface (The Blue Carbon Initiative 2019). Most of the sediment within the disturbance footprint will be buried by the proposed development. Burial of the sediment will prevent the release of carbon to the atmosphere or ocean. Further, in areas where the sediment is not buried, anaerobic conditions are likely to limit the rate of decomposition of organic carbon and its consequent release to the atmosphere (Macreadie et al. 2019). The mangrove plant material that is removed can be chipped and composted, with composting a recognised method of carbon sequestration (Biala 2011). The Project's offset strategy will include measures to increase seagrass and mangrove habitats within Moreton Bay. A requirement of the offset strategy is to provide an overall conservation benefit for the matters impacted, however this would also provide benefits for carbon sequestration.

6.2. Coastal Processes and Maritime Engineering Public Comments and Responses

Comments received on coastal processes and maritime engineering have been compiled and responded to in Table 6-2 using either direct wording from a single submission or an amalgam of comments encompassing the same issue. A total of 50 issues on coastal processes and maritime engineering were raised through public submissions. Issues were categorised into seven themes being coastal protection and seal level rise, coastal and dredge plume modelling, material quantities, channel and basin design, maintenance dredging, navigation and constructability.

The table should be read in conjunction with Chapter 8, sections 2.4 and 2.6 of the Draft EIS and associated technical appendices. Cross referencing to the Draft EIS has been included where appropriate and additional investigations included in appendices to this Supplementary Report.

Table 6-2: Coastal Processes and Maritime Engineering Public Comments and Responses

Theme	Comment ID	Comment	Response
Coastal Protection and seal level rise	ME1	The design of this harbour which is mostly enveloped with rock wall does not align with the Redlands Coastal Hazard Adaptation Strategy which preferences the use of natural bank defence against coastal processes instead of manmade hard rock wall.	Rock has been incorporated in the concept design of the external and internal foreshores of the development due to the obliquity of the incident wind waves and vessel wash, to ensure the foreshores are stable. The principles of Environmentally Friendly Seawalls (NSW Government, 2012) will be incorporated in the detailed design of the rock protection in specific locations externally and internally to provide a more naturalistic outcome. This could take the form of a step-type seawall incorporating a bench of both mangroves and saltmarsh, as shown diagrammatically in Plate 1. An actual constructed example of a step-type rock seawall is shown in Plate 2.  **Plate 1:** A step-type rock seawall incorporating a beach of both mangroves and saltmarsh (NSW Government, 2012)  **Plate 2**: Example of step-type rock seawall incorporating saltmarsh (Claydon Reserve, Kogarah Bay, Georges River estuary, Sydney)
	ME2	A rockwall is inadequate to deal with rising sea levels and the more extreme storm tides that the project area is predicted to experience over the next century.	A rock wall is a well-established proven means of foreshore protection. During detailed design the design event would be selected having regard to accepted best practice and the potential impacts of climate change on design parameters over the life of the Development. A rock wall can also be readily adapted during its design life if required, for example by raising the crest level.
	ME3	Who will be responsible for the clean-up if the Development fails? The Project will result in a greater risk of coastal erosion. Either this could destroy properties elsewhere or result in taxpayer-funded sea defence into the future. Will the developer indemnify the owners, the Council and the State Government against losses associated with sea level rise and storm surges? Will the developer pay for the park restoration after inevitable erosion? Will insurance for these properties be available and affordable?	Impacts from the project in the event of sea level rise are addressed in section 8.4.5 of the Draft EIS with further detail provided in Appendix 2-E. Detailed modelling found the Project effectively provides a shielding mechanism from Toondah Harbour to south of Oyster Point. This shielding produces a reduction in wave height within and around the Project. Overall, the model results indicate that the Project provides additional protection for the adjacent shorelines in an extreme event scenario. Shoreline processes and sediment dynamics (erosion and accretion) were addressed in section 8.4.3 and 8.4.4 of the Draft EIS. The assessment included detailed modelling as well as review of historical and contemporary aerial imagery at Toondah and Manly Boat Harbours. The assessment found that construction of the Manly boat harbour, which is comparable in size and positioning to the Toondah Harbour Project, has had minimal impact on the surrounding shoreline. Modelling of erosion and accretion also found that, while some local changes to seabed morphology can be expected, the magnitude of those changes beyond the Project footprint will be small. Sea level rise associated with climate change will also cause changes to the coastal and seabed morphology with or without the Project.

Theme	Comment ID	Comment	Response
	ME4	What will be the impact of more frequent and more powerful cyclones on the Development?	Modelling of the impact of extreme storm events were carried out as part of studies for the Draft EIS. The modelling results are discussed in section 8.4.5 of the Draft EIS with further detail provided in Appendix 2-E. The extreme storm event selected for modelling was ex-tropical cyclone Oswald in 2013, which produced the most significant wind conditions from the east to north-east (the longest fetch to Toondah Harbour) in the 23 year record from Brisbane Airport. On 27 January 2013 the system impacted Brisbane, the Gold Coast and Sunshine Coast with damaging destructive winds, torrential rain, and dangerous surf. Six people were killed due to the extreme weather over the course of the week. Modelling showed that the Project would remain above storm surge in all but the worst storms after a 1.5m sea level rise. During the detailed design stage for the Project the extreme event selected for design of structures such as the seawalls would be reviewed and agreed with relevant agencies. The frequency of cyclones is not as much an issue since the design event would be selected to be suitably rare and more frequent cyclones would not be as severe.
	ME5	Toondah Harbour is likely to be affected by sea level rise. It is on average 2 metres above sea level. The proposed 3,600 units are to be built right at sea level where the mudflats are.	The proposed finished level of the land platform is not on average 2m above sea level, but rather a further 1m higher at 3m above existing mean sea level (3m AHD), (refer to drawings showing the waterway profile, edge treatments and finished land platform in the Marine Infrastructure Design Report, included in Appendix 1-L of the Draft EIS). Potential wave and water level impacts on the proposed development were modelled under extreme event conditions (ex-tropical cyclone Oswald – the most significant event identified at the site) with two different sea level rise scenarios: ▪ 0.4m sea level rise, considered to be the most likely change over the next 50 years; and ▪ 1.5m sea level, as required by the EIS guidelines, a worst case far-future scenario. The modelling results are discussed in section 8.4.5 of the Draft EIS with further detail provided in Appendix 2-E. In summary, the maximum water level during the extreme storm event with 0.4m sea level rise did not result in any inundation of the design land platform level of 3m AHD. The maximum water level during the extreme storm event with 1.5m sea level rise corresponded to 3.08m AHD and briefly exceeded the design land platform level. This is not considered to be a concern for a number of reasons: ▪ The inundation is very minor (0.08m); ▪ The inundation would only be for a brief period, noting that a significant component of the elevated water level is astronomical tide, which is independent of weather events, hence low tide would always follow a high tide; ▪ A sea level rise of 1.5m is highly unlikely to represent the world's climate future, having regard to the existing national policies and expected future policies regarding fossil fuels and renewable energy; and ▪ Even if sea level rise approached values which could potentially cause inundation of the design land platform level, this would be well beyond the design life of the development and adaption strategies could be employed. The proposed units are not to be the built at sea level where the mudflats are. The units would be constructed above the finished land platform level therefore residents would be outside of the storm tide zone even in these extreme and unlikely events.
	ME6	With built-form land being exposed to the severity of climate change issues, is RL3.00 AHD sufficient?	
	ME7	How high is this development that the 3 metres of extreme sea level does not impact. Or it does impact and it is not shown?	
	ME8	Modelled worst case scenario as outlined in section 8.4.5.2 of the Draft EIS is 1.5m sea level rise which is a requirement. The impact from this SLR is shown in a graph but not as a map. It needs to clearly illustrate that in extreme events the water level will impact upon this development and the damaged infrastructure, soil, rocks, etc could be washed back into the bay.	The impact of the 1.5m sea level rise during storm surge is shown on Figures 8-36 (water levels) and 8-37 (maximum wave heights) of the Draft EIS. As outlined in the response to ME5 and ME6 the Project has been designed to withstand predicted sea level rise including storm surge. Model results indicate that the Project will provide additional protection for the adjacent shorelines in this extreme event scenario.

Theme	Comment ID	Comment	Response
	ME9	The analysis of impact is based upon historical tides and waves without consideration that the future will be different with sea level rise and climate change.	Modelling of extreme events and climate change is addressed in section 8.4.5 of the Draft EIS, including predictions of changes in water level in wave height. Further detail of climate change and extreme event modelling is included in section 6.2.5 of Appendix 2-E of the Draft EIS. It is noted that, while modelling is a powerful predicative tool, many variables cannot be quantified when predicting future change. For example, while present day bathymetry was used for the simulations bathymetry will adjust over time in unknown ways, and therefore the results of the modelling are not completely representative of future conditions. They do however provide an indication of relative impacts with and without the Project in place.
	ME10	The IPCC is due to release their latest report "AR6 Synthesis Report" in late 2022 or early 2023. It is anticipated that this report will provide updates on earlier (AR5) impact predictions. Government requirements for minimum design levels and building resilience standards may need to be changed as a result.	The Project can only be designed in accordance with standards and guidelines current at the time of development. As addressed in previous responses (ME4 – ME6) modelling has shown the Project would withstand a storm surge after 1.5m sea level rise. This is higher than any predicted sea level rise for 2100, including in the recently released IPCC AR6 synthesis report.
Coastal and Dredge Plume Modelling	ME11	There is concern at the use of 2013 ex Tropical Cyclone Oswald as the design event. Coincident with ongoing warming of the seas, extreme events with higher intensity are expected to impact the SE Queensland coast in the future. In April 2021 Cyclone Seroja crossed the WA Coast at Kalbarri, a similar latitude to Moreton Bay. Comparing ex Tropical Cyclone Oswald with Cyclone Seroja. Ten-minute sustained winds of 65k/hr and 120k/hr respectively were recorded.	Ex Tropical Cyclone Oswald was selected as it was the most significant event identified at the site from analysis of wind speed records between 1 April 1994 and 30 March 2017. While it is acknowledged larger storms may occur in the future, the strength of the storm would be impossible to predict. The drivers of climate and weather patterns for Western Australia (Indian Ocean Dipole) and Eastern Australia (El Nino) are completely different therefore weather patterns are not interchangeable. The West Australian coastline is also not protected by a series of fringing islands such as those present around Moreton Bay, which act as a barrier to coastal winds on the mainland. Any storm of that magnitude would be an extremely rare occurrence that would affect all areas of the coastline in Moreton Bay. It is of note that modelling also included a 1.5m sea level rise which is well above any current predictions for 2100.
	ME12	It is not clear what tide information was input to the model and the basis on which the time of the extreme event was selected.	The model outputs of extreme events shown in section 8.4.5 of the Draft EIS represent the maximum water and wave levels predicted by the modelling. That is, when wind, wave and tidal conditions combine to result in the maximum water and wave levels. These were chosen as they show the worst possible impact based on the conditions input to the model. The time period for the modelling extended from approximately 17 January 2017 to 6 February 2017. This period covered the time Cyclone Oswald impacted South East Queensland.
	ME13	There appears to be no mention of storm surge in Section 8.4.5 of the Draft EIS. It is not clear what, if any, component of the predicted 3.08m AHD 'maximum water level' is attributable to storm surge.	It is acknowledged that the term storm surge is not included in section 8.4.5of the Draft EIS. It does however reference 'extreme event' several times which is specifically defined as ex-Tropical Cyclone Oswald. All outputs shown in this section are also labelled as Ex-Tropical Cyclone Oswald Simulation. Section 8.4.5 of the Draft EIS clearly states that '*Potential wave and water level impacts of the completed Stage 2 of the Project were modelled under extreme event conditions using the SWAN and TUFLOW-FV models. From analysis of Brisbane Airport (weather station ID: 040842) wind-speed records 01/04/1994 – 30/03/2017, ex-Tropical Cyclone Oswald was the most significant event identified at the site*' and '*Two different levels of sea level rise (SLR) were superimposed to the modelled water level boundary conditions in order to represent possible future climate change scenarios: 0.4 m sea level rise (likely change over the next 50 years); and 1.5 m sea level rise (required by the EIS guidelines – worst case, far-future scenario)*'. Further detail on modelling methodology is included in Appendix 2-E of the Draft EIS.
	ME14	There has been examples of computer modelled impacts on coastal erosion in NSW that are projected to not occur until well into the future and then those impacts occurred in the next storm season. Events beyond the modelled standard conditions do occur and while unlikely they do have a disproportionate impact.	The Project team cannot comment on modelling for other sites, in particular as no specific examples have been provided. The coastal processes modelling has been carried out using industry best practice methods by experienced engineers. The modelling system was calibrated and validated using a comprehensive set of data collected specifically for the Project. These datasets included measurements of water levels, current velocity, wave parameters, turbidity at multiple locations for extended periods of time spanning all seasonal conditions. In addition, current velocities were measured across several transects and compared to the modelled velocities. The modelling system was also validated using data from external agencies where available. The model and associated report was peer reviewed (refer to Appendix 2-F of the Draft EIS) by an independent expert. The review noted that '*The study has adopted a thorough and robust approach and provides sufficient evidence to allow a detailed assessment of the potential marine/coastal impacts of the proposed Toondah Harbour development and associated dredging on the environment*'.

Theme	Comment ID	Comment	Response
	ME14	Due to the high number of variables and assumptions that need to be addressed in any dredge plume prediction modelling, actual plume levels can vary widely and can potentially be well in excess of modelled predictions, especially given that the fines content in dredged material at Toondah Harbour is likely to comprise over 80% of the total volume of the dredged material.	The modelling system was calibrated and validated using a comprehensive set of data collected specifically for the Project. These datasets included measurements of water levels, current velocity, wave parameters, turbidity at multiple locations for extended periods of time spanning all seasonal conditions. In addition, current velocities were measured across several transects and compared to the modelled velocities. The modelling system was also validated using data from external agencies where available. Modelled ambient sediment dynamics were calibrated against data from monitoring sites, located within 1800 metres of the Project footprint over 31 October to 15 December 2015. A high degree of correlation between modelled and observed turbidity was achieved (refer to section 4.5.4.2 of the Appendix 2-E of the Draft EIS). While modelling is a predictive tool, the results of the validation provide a high degree of confidence the model is accurately predicting suspended sediment movement throughout the Toondah Harbour area. Studies that have reviewed modelled dredge plume impacts vs actual monitoring undertaken during dredging have shown actual impacts to be consistent with or smaller than those predicted by modelling (Ports Australia 2014; BMT WBM 2014). It is also of note that modelling does not include the use of a silt curtain, which will be required to be utilised whenever possible during dredging. Dredge plumes will be almost nothing when the silt curtain is in place. The statement "the project will not have long-lasting sedimentation and erosion effects of a project lasting 15-20 years" could not be found in the Draft EIS. Section 8.4.4 of the Draft EIS states '*while some local changes to seabed morphology can be expected, the model indicates that the magnitude of those changes beyond the Project footprint will be small. Sea level rise associated with climate change will also cause changes to the coastal and seabed morphology with or without the Project*'. This statement is supported by model outputs (Figure 8-30 and 8-31 in the Draft EIS). Figure 8-14 of the Draft EIS shows changes in tidal velocities on completion of the northern reclamation and stage 1 of dredging. The Project will be in this configuration temporarily with the southern reclamation expected to commence within 5 years of the northern reclamation being completed. As noted in section 8.4.1.2 of the Draft EIS on completion of the southern reclamation '*The previous higher increases observed for Stage 1 between the Project footprint and Cassim Island and extending to the northeast during large spring tides are no longer present. The diversion of the currents to the east results in a reduction of velocity magnitude during ebbing tides to the northeast of the Project and along the mainland shoreline up to Cleveland Point*'. Further discussion on how the minor increase in velocities may impact on Cassim Island is included in section 8.4.4 of the Draft EIS, which states erosion rates predicted around Cassim Island are '*unlikely to cause any change to the low water mark of the Ramsar wetland, since these areas are on the island itself rather than the surrounding mudflat*'. The minor erosion predicted by the modelling may not even occur as '*whether erosion actually occurs in the developed case will depend on whether those areas have available soft material to erode, noting some areas of the seabed are armoured with rubble. If erosion does occur, the bathymetry will gradually adjust to a new equilibrium depth, so the erosion rate will be reduced over time*'.
	ME15	The EIS states that "the project will not have long-lasting sedimentation and erosion effects of a project lasting 15-20 years", however, no quantification is given for such a claim, or other such claims within the document.	
	ME16	The proposed dredging the sea-bed, especially in the approximately 2km long Fison Channel, inevitably would result in current carried dredge spoil polluting much larger areas of the Bay.	
	ME17	The project will increase water velocity and erode the western side of Cassim Island, a crucial site for shorebirds. As reported in Figure 8-14 of the Draft EIS, water velocities west of Cassim Island will be twice as high during large peak floods and four times as high during ebb tide.	

<table>
<tr><th>Theme</th><th>Comment ID</th><th>Comment</th><th>Response</th></tr>
<tr><td></td><td>ME18</td><td>Moreton Bay is a zone that includes sand islands that have been built up, along with K'Gari (Fraser Island), over millennia from sands from southern Australia and even further south. Moreton Bay, and therefore Ramsar, is part of an extraordinarily long contiguous natural feature that must be protected as an inter-generational legacy. Any activity that places this landscape at unnecessary risk must be avoided for future generations.</td><td>Key outcomes from coastal processes modelling described in Chapter 8 and Appendix 2-E of the Draft EIS included:
Current patterns in the vicinity of the Project will be modified, with the diversion of tidal flows generating higher velocity magnitudes to the east of the Project footprint, most notably on spring ebb tides. While localised areas of higher ebb tide velocities are predicted between the Project footprint and Cassim Island and extending to the northeast following construction of the Stage 1 bund, these velocities are reduced following construction of the Stage 2 bund. There is a general reduction in ebb tide velocities immediately to the north of the Project. Importantly, these localised velocity changes are not expected to be severe enough to have any significant effect on Cassim Island.
The significant wave height magnitude is generally reduced in most areas surrounding the Project due to sheltering provided by the new reclamation.
Some areas of net erosion or sedimentation are expected to result from these changes to currents and wave patterns. However, these will be minor and, in particular, the modelled impact to Cassim Island is negligible. Where additional areas of erosion have been identified it is expected that the seabed morphology will adjust and the erosion rate will reduce over time as a new equilibrium is established.
No major changes to shoreline alignment or position are expected as a result of the Project, however, there may be some accumulation of sediment on the protected beach immediately to the north of the Project. Sediment already accumulates in this area and the Project is not expected to significantly add to sediment accumulation.
The model indicates that the Project will not increase the water level or wave impacts associated with extreme events at the site. Rather, it shows that the Project is likely to provide some benefits to adjacent areas during extreme storm events due to reduced wave height in the lee of the Project footprint.
There is no potential for the Project to have any impact on K'Gari or any other island within or near Moreton Bay.</td></tr>
<tr><td>Material Quantities</td><td>ME19</td><td>What is the volume of material required to build this entire development over 3 metres above mean sea level? If this volume of material is sourced from dredging, how can this volume not have a significant impact upon the seabed.</td><td>The volume of material required to build the Development up to a level of 3m above existing mean sea level (3m AHD) is summarised in Table 2-5 of the Draft EIS with further detail included in Table 3-1 of Appendix 1-I.

The total fill volume (compacted) is approximately 1,060,000m^3 which is only partly sourced from dredging of the navigation channel (Fison Channel). The remaining sources of fill material comprise excavation of sediments to create the internal waterways within the reclamation area, excavation of sediments to form the basements within the footprint and imported rock to construct the perimeter bunds. Dredging of the Fison Channel represents approximately 36% of the total compacted fill volume. A breakdown of the sources of the fill volume is provided below.

<table><tr><th>Source</th><th>compacted volume (m^3)</th><th>Percentage of Total</th></tr><tr><td>• Dredging of Fison Channel</td><td>382,000 (refer Note 1)</td><td>36%</td></tr><tr><td>• Excavation for internal waterways</td><td>275,000</td><td>26%</td></tr><tr><td>• Perimeter bunds</td><td>115,000</td><td>11%</td></tr><tr><td>• Excavation for basements</td><td>285,000</td><td>27%</td></tr><tr><td>TOTAL</td><td>1,057,000</td><td>100%</td></tr></table>
Note 1: The estimated insitu volume of dredging, including allowance for overdredging, is approximately 530,000m^3. Due to the generally soft nature of the sediments to be dredged, a significant reduction of the volume occurs when the sediments are dried and compacted for fill (adopted compaction factor 0.72).

It is unclear exactly what is being referred to by the term 'significant impact upon the seabed', however the various impacts on marine ecosystems, water quality and marine fauna are addressed in relevant sections of the Draft EIS and Supplementary Report.</td></tr>
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Theme	Comment ID	Comment	Response
	ME20	The EIS Appendix 2-A report concludes that liming is required; however, at no stage does it estimate the volumes of lime that may be required for the project. This information would give an indication of the massive scale of the disturbance of ASS sediment. Similarly, this calculation would allow a cross check of the number of truckloads of lime required against the number estimated in the traffic report. By my estimate, approximately 125,000 tonne of lime will be required during the earthworks construction to treat the disturbed PASS sediment.	Appendix 2–A of the Draft EIS addresses sediment sampling and analysis carried out for the Project. Table 5.8 and 5.9 of Appendix 2-A lists the outcomes Acid Sulfate Soils analysis including required liming rates (kg $CaCO_3$/t) for individual sediment samples taken from the dredge area and from the reclamation area. The liming rates are based on no acid neutralising capacity (ANC). In the dredge area, the liming rates (no allowance for ANC) varied from 0.1% to 15% (total of 47 samples) with an arithmetic average of 3.7%. In the reclamation area, the liming rates (no allowance for ANC) varied from 0.1% to 6.4% (total of 7 samples) with an arithmetic average of 3.2%. These percentages are not unusual in the management of ASS. In practice, a weighted average approach would be taken matching the liming rate data to the dredging and excavation on a volume basis. Based on the Geotechnical Report within the Draft EIS (Appendix 1-J), the dry density of the dredge material is likely to be in the range 0.9 to 1.3t/m^3. Adopting an average dry density of 1.1t/m^3 and taking the average liming rate of 3.7%, for a dredging volume of 530,000m^3 (583,000t), the quantity of lime required to treat the dredge material would be approximately 22,000t. Assuming that all the material excavated to form the internal waterways and the basements had to be treated for ASS, this total volume would be approximately 650,000m^3 (refer to Table 2-5 of the Draft EIS). Geotechnical Report within the Draft EIS (Appendix 1-J), the dry density of the very soft to soft sediments in the reclamation area ranged from 0.9 to 1.1t/m^3. Adopting an average dry density of say 1.0t/m^3 gives a total mass of sediments to be treated of 650,000t. At an average liming rate of 3.2%, the quantity of lime required to treat sediments in the reclamation area would be approximately 21,000t. Hence the estimated all up quantity of lime would be approximately 43,000t. This is considerably less than the quantity referred to in the comment (about 35% of this quantity) and is in accordance with the predicted level of imported material (approximately 150,000 m^3).
Channel and Basin Design	ME21	Research Information from Marine Log; Shirley Del, (Oct 2016) suggests that if double ended ferries were purchased when the existing vehicular ferries need to be replaced, they would not require a turning circle, and dredging to deepen Fison Channel would not be required.	While it is possible double-ended ferries could be introduced at some point in time, this would be a matter for the ferry operator and could not be guaranteed. In addition, it is a requirement of the Toondah Harbour PDA Development Scheme (Queensland Government and Redland City Council, 2014) that the Scheme allows for two ferry operators to be located in the ferry precinct, each of which may have different views on the optimum ferry design. In any case. a turning circle would be required in the interim for operation of the existing vehicular ferries who could not be forced to purchase new vessels.
	ME22	The EIS suggests that the need for expansion of the Fison Channel arises from the requirement to accommodate current and future demand for ferries servicing North Stradbroke Island (Minjerribah). However, it has not been demonstrated that the extent of capital dredging proposed is required for this purpose.	The extent of capital dredging proposed is based on internationally accepted channel design guidelines to accommodate the assessed future demand for ferries, for a two-way channel, noting that the Toondah Harbour PDA Development Scheme requires consideration of two ferry operators. The channel design guideline adopted is *Harbour Approach Channels Design Guidelines*, PIANC Report No 121 Maritime Navigation Commission (2014). The use of this guideline was supported by the Regional Harbour Master for Toondah Harbour who in correspondence dated 5 November 2019 stated that: *MSQ has reviewed the navigation channel preliminary design dimensions against PIANC using the nominated 80m x 15m x 2m design vessel. The proposed channel dimensions are assessed as being suitable for a two-way channel, subject to a range of traffic management controls. For example:* ▪ *General passing procedures / protocols* ▪ *Restricted passing at the bends in the channel* ▪ *An operational speed limit* ▪ *Adopting a one way traffic flow in adverse environmental conditions* ▪ *Management of interaction with recreational traffic* The adopted channel dimensions are not considered to be conservative in their extent, in fact the Regional Harbour Master has noted that the channel would still need be subject to a range of traffic management controls including adopting a one-way traffic flow in adverse environmental conditions.

Theme	Comment ID	Comment	Response
	ME23	A broader move toward minimizing the need for expanded navigation channels at ports to reduce the generation of dredged spoil from maintenance operations is occurring as evidenced by recent research by the shipping industry. The use of more recent modelling techniques demonstrated that larger vessels could use the Port of Brisbane without the need for additional dredging of the current channels. The EIS should consider the most recent research into shipping channel design which uses more accurate modelling and can demonstrate suitability of existing channels for larger vessels.	Comparison to the Port of Brisbane is not appropriate as the operational requirements and constraints for a large container port and cruise terminal are very different to those at Toondah Harbour, which provides daily vehicle and people ferries and access for recreational vessels. The concept design of for deepening and widening of the existing navigation channel and swing basin has been undertaken in accordance with Harbour Approach Channels – Design Guidelines (PIANC, 2014). The use of these guidelines as the basis for design was supported by the Regional Harbour Master for Toondah Harbour. A detailed description of the design process in included as **Appendix J**, including correspondence from the Harbour Master. The PIANC guidelines are an industry recognised standard for the design of navigational channels. PIANC (2014) has been used as the design basis for numerous guidelines and ports in Australia including Maritime Safety Queensland's (MSQ) Anchorage Area Design and Management Guideline (2019) and the Port of Hastings Concept Channel Design and Channel Development Strategy (AECOM and GHD 2017). MSQs report notes that 'PIANC brings together the best international experts on technical, economic and environmental issues pertaining to waterborne transport infrastructures to provide expert guidance, recommendations and technical advice'. A range of studies have also been carried out reviewing the appropriateness of the guidelines including Jianghao and Degong (2018) and Sunarko and Saunders (2019). Both studies found PIANC (2014) provided appropriate design dimensions and that, if anything, channel widths were too small. It should be noted that the PIANC approach is suitable for the concept design phase of a project and is subject to refinement by fast-time and/or real-time ship manoeuvring simulation ('full-bridge' simulation) to ground truth the proposed channel geometry and layout of navigation aids. This is typically undertaken in the detailed design phase of a project and would result in minor refinement of channel geometry, including consideration of bends and positioning of navigation aids. The detailed design of the navigation channel will also be developed in consultation with the Regional Harbour Master, as part of the detailed design process. The proponent will be guided by the Regional Harbour Master in terms of optimisation of the channel design whilst ensuring navigation safety.
	ME24	Section S2.2.3 also states that 'The turning basin's existing diameter is significantly below the accepted minimum of 1.5 times the maximum vessel length currently utilising the harbou. The current largest vessel is the MV Minjerribah which is 67.68 m long, while the turning basin is approximately 65m wide at its narrowest'. This statement is misleading as, based on the EIS Figure 2-8 the centre of the turning basin >101m in diameter hence meets the required 1.5 times diameter. It is not necessary for a vessel to turn immediately adjacent to its berth. Furthermore, if the existing turning basin was to small and unsafe, Maritime Safety QLD would have implemented the necessary upgrades to meet the relevant maritime safety requirements.	It is agreed that the swing basin depicted on Figure 2-8 of the Draft EIS by the blue dashed lines has a diameter of approximately 100m. However, this area includes a batter from the seafloor to the mudflat which does not achieve navigable depths across all tides. The diameter of the turning basin at a depth suitable for the draft of the MV Minjerribah, which is the largest ship utilising Toondah Harbour, does not exceed approximately 80m. Regardless, the existing basin does not affect design requirements as outlined in PIANC 2014. There is an issue with the existing turning basin in terms of its diameter at the required water depth. Given that the MV Minjerribah is 67.68m long (L), the existing turning basin width is significantly below the diameter of 2 x L recommended in PIANC (2014). Based on the existing largest vessel the turning basin diameter should be at least 135m. A requirement of the PDA Development Scheme infrastructure plan is to 'undertake dredging to straighten and widen the existing Fison Channel'. The land use plan for the PDA also outlines dredging and channel access requirements which include 'extending the swing basin to meet the needs of the existing and future vehicle ferries and contributing to the gradual straightening of Fison Channel'. In accordance with PDA requirements and guidance in PIANC (2014) for the nominal diameter of the turning basin to be 2 x L in the concept design phase, the proposed turning basin diameter for the design 80m vessel length is 160m. The design circle dimension is shown on the port area plan provided in section 5.2 of the Supplementary Report as well as the existing basin and vessel turning circle. It is also agreed that it is not necessary for a vessel to turn immediately adjacent to its berth although the turning basin should be reasonably adjacent to the berth. It is not efficient for harbour operations if vessels have to move long distances to reach turning areas.

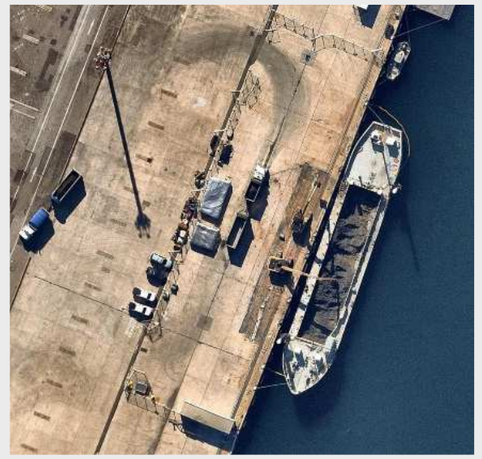
Theme	Comment ID	Comment	Response
	ME25	The current Fison Channel meets all relevant maritime safety requirements, as confirmed by the Queensland Maritime Services Harbour Master.	The current Fison Channel and turning basin would not meet accepted channel design guidelines for a two-way channel for the adopted future design vessel nor the largest vessel currently utilising the Channel, the MV Minjerribah. The channel and turning basin have been designed using the Harbour Approach Channels Design Guidelines, PIANC Report No 121 Maritime Navigation Commission (2014). These guidelines are accepted as best practice throughout the world. The use of these guidelines as the basis for design was supported by the Regional Harbour Master for Toondah Harbour (refer to **Appendix J**).
	ME26	Australian Standard 3962 is not relevant to the design of a commercial shipping channel, only to a marina.	Australian Standard AS3962:2020 has not been adopted for design of the Fison Channel, but rather the PIANC document *Harbour Approach Channels Design Guidelines*, PIANC Report No 121, Maritime Navigation Commission (2014), as agreed with the Regional Harbour within Maritime Safety Queensland.
	ME27	Page 15 of the PIANC (2014) guideline requires that, for Environmental Impact Statements, at least one alternative design is considered. The Toondah EIS has not considered alternative designs for Fison Channel (eg, single land with passing places) and should be amended to include consideration of alternatives.	PIANC (2014) on page 15 states that, at the Concept Design stage, alternatives may exist. It is a requirement of the Toondah Harbour PDA Development Scheme (Queensland Government and Redland City Council, 2014) that the Project allows for two operators to be located within the precinct (Section 3.5.4). A two-way channel is the most appropriate design measure to allow for vessel passing. The general alignment of the channel is also well established through the existing Fison Channel. Locating the entrance channel in an alternate location would result in a significantly larger dredging requirements as the harbour is surrounded by shallow mudflats. It follows that alternative concepts are relatively restricted to the general location of Fison Channel. Entrance channel design looked at a range of options such as removing bends from the channel however this resulted in higher dredge volumes. The proposed channel location balances safety while minimising dredging requirements as much as possible. A one-way channel would have minimal application at this site. It would be necessary to assess the ability for ferries to maintain position within the passing bay during windy conditions. For concept design of horizontal channel dimensions, PIANC (2014) makes reference to the following main factors for straight channels: • 'basic' manoeuvring lane (representing the width required for navigation of a vessel based on its manoeuvrability characteristics, excluding any other environmental factors or clearances). • environmental or other factors, e.g. waves, currents and winds, and aids to navigation, which affect the width of the 'basic' manoeuvring lane to give the actual required width of the manoeuvring lane. • additional width for bank clearance on the sides of the manoeuvring lane. • additional width for passing distance in two-way traffic. • additional width for large tidal range (applies for a tidal range in excess of 4m, which is not a relevant consideration for the Fison Channel). Based on the summation of various contributions to channel width, a reasonable channel width for concept design purposes is considered to be 5B or 75m. Feedback from discussions with the Regional Harbour Master was that the dimensions were assessed as being suitable for a two-way channel, subject to a range of traffic management controls. Further detail on design parameters is included in **Appendix J**. It is noted that, based on the design parameters, the existing Fison Channel does not meet the minimum widths for a safe two-way channel for the existing largest vessel (the MV Minjerribah). This vessel has a beam of 13m, which would result in a channel width of 65m. The current channel has a width of approximately 45m. PIANC does not define what would be considered 'shorter' channel lengths or traffic levels. Whether the Fison Channel could be considered to be a 'shorter channel length with little or no concurrent traffic' would depend on the number of ferry operators (it is necessary to allow for two to meet the Toondah Harbour PDA Development Scheme), the timetable for ferry services, and the recreational vessel traffic from the marina when established. As identified in section 3.1 of the Draft EIS Toondah Harbour is highly trafficked with current passenger and vehicle ferry operations resulting in 76 ferry movements on average weekend days. On peak days and additional 70 recreational vessel movements resulting in up to 146 movements over the day. Assuming usage would occur between 6am and 6pm (daylight hours) a vessel would be entering Fison Channel approximately every 5 minutes.
	ME28	Section 1.4.5 of PIANC identifies that a range of options should be considered in cases where upgrades to existing channels are being proposed. These include the improved manoeuvrability of modern vessels, changes in operational procedures and additional navigational aids all of may allow the safe use of existing channels by vessels larger than those for which they were originally designed. Therefore, the Toondah EIS should consider a range of alternative channel designs as required by PIANC.	
	ME29	Page 13 of the PIANC guidelines identifies that one-way channels are sufficient for shorter channel lengths with little or no concurrent traffic. Given that the examples of shipping channels referenced in the PIANC guidelines largely relate to major channels that accommodate container ships and other bulk vessels accessing major ports, Fison Channel would be described as a 'shorter channel length' harbour approach. On this basis, widening of Fison Channel to permit two-way traffic is not required for current or future ferry operations.	

Theme	Comment ID	Comment	Response
	ME30	S1.4.5 of PIANC confirms that, for muddy channels, a reduction in the required safe depth is permissible and implies that bottoming out can be accepted at times as no damage to the keel would arise. On this basis no increase in the depth of Fison Channel is necessary based on the design guidelines adopted in the EIS.	The Section reference here is not correct. It should be Section 2.1.3.4 in PIANC (2014). The comment made here is an over-simplification of a more complex matter: ▪ The PIANC (2014) document is referring to a fluid mud suspension or a 'black water' layer characterised by a density of 1050 to 1300kg/m^3 (compared to clean seawater of 1025kg/m^3). The document states that contact between the ship's keel and the upper part of the fluid mud layer will most likely not cause damage to the ship. It is <u>not</u> referring to the ship bottoming out on the bed sediments which is what the comment seems to infer is acceptable. The bed sediments have a density in excess of a mud suspension or a 'black water'. ▪ The proposed depth of the Fison Channel is -4.25m AHD (-3.0m LAT) and is a relatively small increase in depth above the existing depths which are typically in the range -3.8 to -4.2m AHD. It is considered appropriate having regard to the design vessel agreed with the existing ferry operator and an allowance for sedimentation. The proposed dimensions of the channel have been assessed by the Regional Harbour Master and considered suitable.
	ME31	In 2008 PIANC published the guideline 'working with nature'. This recommends that channel design should be developed in a way that 'benefits both navigation and nature'. PIANC S4.5.2.1 specifically recommends that 'Dredging should only be conducted if necessary and based on an assessment of the real need for new infrastructure components or port navigation access to create or maintain safe navigations channels'.	The proposed dredging has been identified as necessary to provide and maintain navigation access and safety for Toondah Harbour. The need for new infrastructure, including dredging, at Toondah Harbour is outlined in the Toondah Harbour PDA Development Scheme. The development scheme is the regulatory document that guides planning, carrying out, promoting, coordinating and controlling land development within the Toondah Harbour PDA. A requirement of the PDA Development Scheme infrastructure plan is to 'undertake dredging to straighten and widen the existing Fison Channel'. The land use plan for the PDA also outlines dredging and channel access requirements which include 'extending the swing basin to meet the needs of the existing and future vehicle ferries and contributing to the gradual straightening of Fison Channel'. The current Fison Channel does not meet the accepted channel design guidelines for a two-way channel for the adopted future design vessel. This design vessel was adopted based on discussions with the existing ferry operator. The channel and turning basin has been designed using the Harbour Approach Channels Design Guidelines, PIANC Report No 121 Maritime Navigation Commission (2014). These guidelines are accepted as best practice throughout the world. The use of these guidelines as the basis for design was supported by the Regional Harbour Master for Toondah Harbour.
	ME32	The 2008 PIANC Position Paper 'Working with Nature' states that: 'If the design concept for a project has progressed before environmental issues are considered, the environmental impact assessment necessarily becomes an exercise in mitigation or damage limitation, potentially resulting in sub-optimal solutions and missed opportunities'	The design concept for the channel has sought to minimise environmental impacts while satisfying the PDA Scheme requirements and addressing accepted navigation channel design guidelines. As far as practicable, the proposed channel follows the existing channel alignment to reduce dredging volumes. An options assessment including multi criteria analysis was carried out as part of the dredging design process (refer to Draft EIS Appendix 1-I chapter 5). Five feasible options were identified which were all assessed against a range of criteria including engineering risk, cost, timing, impacts on amenity and existing uses, and impact on the environment. The option selected and assessed in detail through the draft EIS was the one considered to have the smallest impact on the environment. The proposed method of dredging (mechanical dredging by Backhoe Dredger, BHD) and the proposed method of dredge material management (rapid drying, beneficial reuse locally in the reclamation) have been developed having regard to environmental issues, eg. minimising water quality risk and reducing the overall duration of the works.
	ME33	S2.4.1.1 of the Draft EIS states that 'An integral part of the Toondah Harbour Project is capital dredging to widen and deepen the Fison Channel and extend the turning basin. The dredge area has been designed to provide safe, two-way navigation for all vessels, including vehicle ferries'. The basis for requiring a two-way channel is not stated.	A two-way channel has been adopted based on assessment of the requirements of the Toondah Harbour PDA Development Scheme (Queensland Government and Redland City Council, 2014), which states the Scheme must allow for two operators, and consideration of future demand for ferry services. Further detail on Channel design in included in responses to ME15 and ME16 as well as **Appendix J**.

Theme	Comment ID	Comment	Response
	ME34	The EIS should identify that widening of Fison Channel is only necessary to provide safe separation distances between recreational vessels from the new marina and commercial vessels.	Refer to earlier responses. Widening and straightening of the channel is a requirement of the Toondah Harbour PDA Development Scheme. The proposed channel has been designed in accordance with best practice guidelines using a design vessel provided by the current ferry operator. The design process and outcomes were endorsed by the Harbour Master. It is agreed that safe separation distances between recreational vessels from the new marina and commercial vessels is also a factor in consideration of channel width.
	ME35	All current demand (including peak demand, and ad-hoc requirements of emergency services and utility providers etc.) for existing passenger and vehicle ferry services can be serviced within the existing Fison Channel.	The proposed widening and deepening of the Fison Channel and increase in size of the turning basin takes into account future demand (not only existing demand), a larger design vessel agreed with SeaLink, and the requirements of the Toondah Harbour Development Scheme to allow for two ferry operators
	ME36	The Proposed Action location (at/off Cleveland) would see dredging and other works in the eastern side of the channel between Peel Island and Cleveland.	The proposed dredging of the Fison Channel is shown on a range of drawing and plans throughout the Draft EIS. It is not clear the area this comment refers to, but dredging will not occur within 5 km of Peel Island.
	ME37	In relation to disposal of dredged material, there are three key points of relevance: 1. Significant changes to Fison Channel and the turning basin are not necessary to meet current or future ferry traffic demands hence the only requirement is for future maintenance dredging. 2. If the project proceeds as proposed, a larger area requiring on-going maintenance dredging will be created, thus exacerbating the problem of disposal of dredged material in the future. 3. A key location for spoil disposal and marine dredge material disposal, located within 25km of the project site, has not been considered in the EIS. The potential to dispose dredged material from Toondah Harbour to reclaim land at Brisbane Airport has not been considered and would be a win-win situation.	1. Refer to responses to comments ME21 to ME29 relating to the basis for capital dredging of the Fison Channel including the turning basin. It is agreed future maintenance dredging will be required. 2. It is agreed that a larger area will be created that will require maintenance dredging. The increase in maintenance dredging volume has been estimated based on 3D numerical modelling of coastal processes to increase annually by 10,000m^3 to 16,000m^3. The interval of maintenance dredging of five years is not expected to change. A sedimentation allowance has been included in the assessment of the depth of dredging. 3. It is expected that maintenance dredge material from the Fison Channel and turning basin would be disposed of at Mud Island, or another approved dredge material ground when there is no longer sufficient capacity at Mud Island, with necessary approvals sought by Redland City Council and the Queensland Government. The proposed capital dredging of the Fison Channel including the turning basin is a consequence of the adopted design vessel, based on discussions with the existing ferry operator, and the assessed need for a two-way channel to meet the requirements of the Toondah Harbour PDA Development Scheme and future demand. Assessment of Alternate Options for the disposal of dredge material is set out in section 1.5.3 of the Draft EIS with further detail included in Appendix 1-E. It is noted that the action referred is not dredging and disposal of dredged material, it is for dredging, harbour upgrades and creation of a mixed-use precinct. Beneficial reuse of the capital dredge material for reclamation at Toondah Harbour, following improvement of its engineering properties, facilitates implementation of the Toondah Harbour PDA Development Scheme (Queensland Government and Redland City Council, 2014). Reclamation activities at the Brisbane airport have been completed and the second runway is operational. It is unclear where the material would be disposed. Any future reclamations at the Brisbane Airport would be subject to detailed assessment and approval requirements.
	ME38	Options for the size of the design vessel (ferry) have not been adequately considered despite the direct and significant impact this has on the dredge footprint and ongoing costs and environmental impacts of the project.	The design vessel adopted for future ferry operations and design of the Fison Channel was based on discussions with the existing ferry operator. This is considered a reasonable approach having regard to the experience of the existing ferry operator at Toondah Harbour and other sites around Australia. The design vessel (80m x 15m) not significantly larger than the largest existing vessel (67.68m x 13m) and would be appropriate to use at Toondah Harbour.

Theme	Comment ID	Comment	Response
Maintenance Dredging	ME39	Future responsibilities for maintenance dredging (and consequent environmental impacts) have not been resolved. Issues that need to be resolved include: ▪ Minimising environmental impacts, including the additional quantities of maintenance spoil that will be generated and disposed of compared to current circumstances; and ▪ Responsibility for the costs of ongoing maintenance dredging, especially with the increase in the size of the channel and turning basin that is proposed and additional spoil quantities that are likely to be encountered.	Maintenance dredging of the Fison Channel will continue to be the responsibility of Redland City Council and the Queensland Government. Dredge material would be disposed of outside of the Project footprint at the approved regional disposal ground (Mud Island material disposal area) or other approved locations. Maintenance dredging of internal waterways will be the responsibility of the Proponent. This material will be disposed of within a dredge material disposal area located along the eastern foreshore (peninsula) of the Project footprint. All maintenance dredging events would be subject to investigation, environmental assessment, and regulatory approvals.
	ME40	The EIS states the ongoing Spoil from de-silting requires a spoil site of 10,000m^3 capacity. As a comparison, a football field 100m long x 50m wide when filled 1m deep =5000m^3 c/- the 10,000m^3 required. However you visualise this the spoil site is huge, will stink and will be a permanent visual fixture, requiring yearly emptying.	The maintenance dredge material from internal waterways would be treated (mixed) with lime to neutralise any acid generating capacity due to the existence of acid sulfate soils and to facilitate rapid dewatering (drying) of the material. The addition of lime also has the beneficial effect of reducing odour generation. Accordingly, it is not expected the disposal area would 'stink'. The anticipated annual maintenance dredging volume within the internal waterways is expected to range between 1,200m^3 and 2,240m^3, as noted in section 3.2 and the Executive Summary to the Draft EIS. As such, for the proposed capacity of the disposal area (10,000 – 15,000m^3), the life of the area before emptying of accumulated material would be approximately 10 years and not one year.
	ME41	The maintenance dredging disposal pond is intriguing for its good intent in this respect, but the same is arranged for the existing level of Toondah Harbour maintenance dredging. This settling basin still remains having been used once and then abandoned. These type of slow settlement ponds for dredging fines are hazardous to human and animal life, and are hopeless unless rainfall is very low.	The maintenance dredging disposal area within the Project site would be subject to an operational environmental management plan (OEMP). The design of the area would also be subject to a Safety in Design (SiD) process to address and manage the risk to human and animal life. The addition of lime to the maintenance dredge material would provide for neutralisation of any ASS, rapid drying, and odour control. Similar ponds have been implemented successfully around the world with local examples including at Manly Boat Harbour and the Newport Canal Estate.
Navigation	ME42	It is acknowledged that some widening of the Fison Channel might assist operations and contribute to efficiencies in providing ferry services to North Stradbroke Island now and into the future. However, the proposed works and the introduction of recreational marine facilities (including a 200 berth private marina) will introduce new (or increase) operational and navigational risks and the full extent to proposed dredging is probably not required.	It is unclear what is meant by 'some widening'. The proposed widening is based on the accepted PIANC (2014) document Harbour Approach Channels Design Guidelines and underlying assumptions regarding design vessel size and two-way operations. The relevant authorities, including the Regional Harbour Master, have not expressed concern regarding the mix of recreational vessels and commercial vessels utilising the Fison Channel. However, a range of navigation traffic management controls would be introduced to manage potential risks, as noted in Section 3.3.2 of Appendix 1-I of the Draft EIS. Potential measures may include: ▪ *General passing procedures / protocols* ▪ *Restricted passing at the bends in the channel* ▪ *An operational speed limit* ▪ *Adopting a one way traffic flow in adverse environmental conditions* ▪ *Management of interaction with recreational traffic* Section 2.6.5 of the Draft EIS also outlines navigational lighting requirements for the harbour and marina. Proposed lighting measures were developed in consultation with MSQ, who would be further consulted as part of the detailed design process. It should be noted that there is currently a boat ramp for small recreational vessels at Toondah Harbour so the operators are already required to manage interactions with recreational vessels.

Theme	Comment ID	Comment	Response
	ME43	The safety and operational impacts of the proposed dredging on current operations have not been adequately addressed at this time and are matters that require further investigation and discussion.	An options assessment including multi criteria analysis (MCA) was carried out as part of the dredging design process (refer to Draft EIS Appendix 1-I chapter 5). One of the five criteria included in the MCA was 'Impacts on Existing Amenity and Uses', in particular the potential to impact on ferry operations. The preferred dredging option (use of a BHD) consistently scored better than the alternative dredging methodology of a cutter suction dredger (CSD), as noted in the Dredging and Reclamation Options Assessment and Design Report. It is also stated in this Report that dredging equipment would always give way to ferries. Dredge plant for the proposed capital dredging is similar to that used for maintenance dredging events which has minimal impact on ongoing operations at the harbour. Specific operational requirements would be discussed with the ferry operator/s prior to dredging occurring and be incorporated into contractual information with the dredge contractor.
	ME44	The site is difficult for a marina. The southern and inshore location is characterised by high turbidity and silt accumulation - which is why the area is already so shallow.	Development of a recreational boating marina is a requirement of the Toondah Harbour PDA Development Scheme (Queensland Government and Redland City Council, 2014). It is feasible to develop a marina in this location by means of excavation in the dry, design of tidal flows, and the development of construction and operational environmental management plans (CEMP and OEMP). Prediction of sedimentation rates within the internal waterways have shown that maintenance of navigation depths is manageable. It is noted that most marina and boat harbours located on western Moreton Bay are required to deal with similar issues. Boat harbours and at Scarborough, Cabbage Tree Creek and Manly all require regular maintenance dredging to provide safe navigational depths within their marinas and entrance channels. This also applies to most marina's throughout the Gold and Sunshine Coasts.
Constructability	ME45	The likelihood that construction of the project will be able to be undertaken within the stated timeframe is extremely low. It is considered that an overall development timeframe exceeding 20 years is probable.	No details are provided in the comment as to why it is considered that the likelihood of the project being able to be completed within 20 years is extremely low, hence it is difficult to respond in specific terms. It is nevertheless noted that selection of the dredging method (BHD) and method of dredge material management, specifically the dewatering (drying) processes, have been selected among other reasons to manage schedule risk. Since the method of dredging is mechanical rather than hydraulic, extensive setting ponds are not required, and the operation is not sensitive to settling rates of fine sediments and residence time in ponds. Turbidity would be managed by a silt curtain at the dredging site and a silt curtain at the unloading wharf. The production rate of the BHD equipment would be selected to match the dredge material treatment and drying times. Any extended periods of drying, should they occur, would not extend the period of turbidity generation as the BHD would have ceased dredging operations to await drying. Project team members involved in the design of the dredging and reclamation methodologies have more than 30 years' experience in the field and have worked on a range of similar projects.
	ME46	Its probable that the dredging campaign will take far longer than planned, given the high likelihood that dredge material handling and compaction will prove extremely difficult and be delayed. The resulting extended period of elevated turbidity presents a significant ecological risk.	
	ME47	There is no indication in the EIS of how the initial pad will be developed in order to commence compaction and associated environmental controls such as potential acid sulfate soil (PASS) treatment.	Firstly, prior to the initial pad being developed, a rock bund incorporating a sheet pile cut-off wall would be constructed. In advance of the rock bund and sheet pile wall construction, a silt curtain would be installed to mitigate turbidity associated with this construction activity. The initial pad would be developed through a combination of the rock fill imported for the rock bund and the excavation, treatment, drying and compaction of the insitu very soft and soft clays. The depth of these materials in the western/north-western portion of the project is relatively shallow, less than 1.0 to 1.5m, as shown on Drawing PA2060-RHD-00-3022 in Appendix 1-I of the Draft EIS. As such, the excavation, treatment, drying and compaction process would be reasonably straightforward. It is acknowledged that the Draft EIS does not provide a high level of detail on how the initial pad will be formed or the upper very weak layer of material will be removed from under the perimeter sheet pile wall. A technical memo has been developed and included as **Appendix K** outlining the proposed construction method.

Theme	Comment ID	Comment	Response
	ME48	Most material to be excavated/dredged comprises very 'soft' and dispersive clays/silts that will present major challenges for handling and treating with lime to mitigate the acidity risks. Substantial time delays are likely if treatment is to be effective. In addition, treating this material on the dredger (as is proposed as an option in the EIS) prior to on-shore placement and compaction is likely to be extremely difficult and potentially ineffective due to the material quality. There is no evidence provided in the EIS to demonstrate that this material can be treated and will not result in environmental harm during and post construction.	The material to be excavated/dredged is very soft to soft silty clays. Excavations within the reclamation would take place in the dry within rock bunds, which also incorporate sheet pile walls to cut off tidal waters and groundwater. The drying process for excavated material would involve spreading the material in thin layers, typically 300mm maximum loose, liming as necessary to manage acid sulfate soils (ASS) and to facilitate rapid drying. Treatment of the dredge material on the dredger (BHD) is <u>not</u> proposed, but rather initial treatment within the transport barge when alongside the unloading wharf. Here it is proposed that lime and/or an inorganic polymer would be mixed into the dredge material to facilitate drying, using a long-reach excavator located on the wharf. This is a well-established process and has been utilised, for example, in the land-based disposal of material dredged by BHD at the Garden Island naval facilities in Woolloomooloo, Sydney Harbour (refer photos below). A silt curtain will be employed around the barge when located alongside the wharf as an environmental control during the mixing activity and subsequent dredge material unloading activity.  Plate 3 Mixing of inorganic polymer and dredge material within a barge for rapid drying (Garden Island, Sydney Harbour)  Plate 4 Unloading of dredge material from a barge by shore-based excavators, direct into trucks, following treatment with inorganic polymer (White Bay, Sydney Harbour) Addition of lime is a proven process for ASS management and for drying of fine-grained materials. Trials would be conducted to optimise the work method. Inspection and Test Plans (ITPs) and an Environmental Management Plan (EMP) would be utilised to ensure neutralisation of ASS and achievement of the required reduction in moisture content. The proposed method of dredging (mechanical method; BHD and barging) has been selected to reduce the risk of managing the very soft to soft silty clays. The method maintains the insitu moisture content of the dredge material (does not add water) and allows addition of lime and/or inorganic polymers for rapid dewatering in the barge prior to removal of the material from the barge and beneficial reuse in the reclamation. Use of a BHD and the addition of lime and/or inorganic polymers for drying of fine-grained dredge materials is a well-established technique when dredge material is to be disposed of to land.

Theme	Comment ID	Comment	Response
	ME49	It is noted in the Draft EIS that ' ….. to satisfactorily advance the bund may require removal of the upper very weak sediment layer. The strength of this layer is such that it will likely be displaced by the rock as 2m to 3m depth of rock fill will cause failure of the very weak sediment layer resulting in a mud wave.' there has been no assessment of the means to remove, place, compact and treat this material for Potential ASS. This raises the critical questions of: • How will this material be extracted/handled on site given there will be no perimeter bund at that time to prevent discharge of sediments to areas external to the project site? • How will treatment of PASS be undertaken for this material as there will be no pad available to undertake this activity? • Where will this material be placed as, like above, it will not be able to be used for compacted fill?	The upper very weak sediment layer will be removed in advance of construction of the rock bund by long-reach excavator working from the bund, loaded into trucks situated on the crest of the rock bund, and transported to the initial pad constructed in the western/north-western area of the site. At this location the material would be treated, dried to the optimum moisture content, and compacted. If necessary, the long-reach excavator working from the bund could be augmented by a barge-mounted long-reach excavator working the tides, loading skips or loading a hopper feeding a solids-handling pump. In terms of the three questions: • The risk of discharge of sediments to areas external to the project site during construction of the perimeter bund would be managed by the prior installation of a silt curtain beyond the bund alignment, and by aligning the bund inside the project boundary. Due to the shallow water depths, the silt curtain may need to be suspended between temporarily installed piles. • The initial pad would be constructed prior to perimeter bund construction. • Following treatment and drying to the optimum moisture content the material would be used as fill on site. It would not be trucked off site. It is acknowledged that the Draft EIS does not provide a high level of detail on how the initial pad will be formed or the upper very weak layer of material will be removed from under the perimeter sheet pile wall. A technical memo has been developed and included as **Appendix K** outlining the proposed construction method.
	ME50	There are concerns there may be problems with foundation stability in the area. Raby Bay Marina, consisting of 500 acres of development established in 1984, is extremely close by to Toondah Harbour, and has ongoing structural problems requiring revetment of the walls. Preloading is typically undertaken for projects involving major volumes of 'soft' material to be used for fill. Its absence would be likely to greatly extend the construction timeframe and/or result in inadequate compaction for engineering purposes. It is noted that other major recent fill projects in the Moreton Bay area such as the Brisbane Airport expansion and Brisbane Port development have required extensive preloading to gain a suitable degree of settlement of placed dredge material. As another example, the nearest and most recent equivalent urban development project located in a coastal /intertidal environment in the Moreton Bay area – the Pacific Harbour Project on the western foreshores of Bribie Island- involved extensive preloading.	Appendix 1-J of the Draft EIS outlines geotechnical analysis carried out within the reclamation and dredge areas. A range of geotechnical investigations have been carried out on the mudflats at Toondah Harbour since 2013 which were used in conjunction with project specific surveys. In total 12 geotechnical boreholes and 14 cone penetrometer tests (CPTs) were completed within or near the reclamation area (refer to Appendix A of Appendix 1-J) of the Draft EIS). This information was used to create a geotechnical model of the reclamation area (refer to Figure 2 of Appendix 1-J and drawing PA2060-RHD-00-3022 from Appendix 1-I). This assessment found a relatively shallow thickness of very soft and soft sediments in the western area of the Project site with depths ranging from 1m to 2m in most locations. Once below those depths the materials transition quickly to firm, stiff, very stiff, and hard clay layers. The existence of these much more competent layers below the very soft to soft layers provides certainty for maximum settlement and stability. The reclamation process involves construction of a perimeter bund to allow internal construction to be undertaken in the dry. Areas to be covered by structural filling will have weak surface materials removed to expose firm to stiff soils across the base, providing construction platforms to allow preparation of materials for placement and compaction. The soil profile at the Toondah Harbour site is significantly different to profiles encountered at the Brisbane Airport expansion, the Brisbane Port development and Pacific Harbour Project on Bribie Island. Each of the three referenced projects had significant depths of compressible marine clay within their soil profiles. The marine clay is characterised by very low insitu shear strength and very high compressibility under load. Typically, preloading of the compressible clay is undertaken to improve strength and accelerate settlement of the clay. Preloading is not required for the Toondah Harbour development due to removal of soft surface sediments from below areas of structural filling. With reference to the Raby Bay development, problems that have been and are being experienced relate to several issues. Instability during early construction and some later phases related to excavations into the stiff to very stiff natural clay profile to form the canals, where extremely fissure clays were intersected with very low effective stress strength parameters. Other observed movement has occurred as a result of compaction issues and construction sequencing and staging during estate construction.

6.3. Air Quality Public Comments and Responses

Comments received on Air Quality have been compiled and responded to in Table 6-3 using either direct wording from a single submission or an amalgam of comments encompassing the same issue. A total of 21 issues on air quality were raised through public submissions. These issues were categorised into eight themes being air quality goals and criteria, sensitive receptors, hydrogen sulfide sampling;, terminology, emissions modelling, background data, management and monitoring and risk assessment.

The table should be read in conjunction with Chapter 11 of the Draft EIS and associated technical appendices. Cross referencing to the Draft EIS has been included where appropriate and additional investigations included in appendices to this Supplementary Report.

Table 6-3: Air Quality Public Comments and Responses

Theme	Comment ID	Comment	Response
Air Quality Goals and Criteria	AQ1	Consider the air quality goals defined in the Redland City Council Planning Scheme Policy 6 – Environmental Emissions.	The EIS Guidelines do not specifically mention air quality and did not require assessment against any specific criteria or guideline. The assessment was required to address whether there was any potential for MNES to be impacted by air quality emissions from the Project. While the EIS Guidelines required minimal assessment a range of appropriate legislative, policy and planning instruments were selected in accordance to address potential health and amenity issues for nearby sensitive receptors. These are outlined in section 11.1 of the Draft EIS. The legislative, policy and planning instruments utilised for the assessment include: ▪ The Environmental Protection Regulation 2019 (OQPC, 2019b); ▪ The National Environment Protection (Ambient Air Quality) Measure (Australian Government, 2003) (often referred to as the NEPM) is a standard (or set of standards) air quality limits that set quantifiable ▪ The National Environment Protection (Air Toxics) Measure (Australian Government, 2011) (often referred to as the Air Toxics NEPM) is a standard (or set of standards) that set quantifiable ▪ The Guideline: Odour Impact Assessment from Developments (DEHP, 2013) ("the odour guideline") is the principal guidance document used in Queensland for assessing odour impacts. RCC Planning Scheme Policy 6 does not contain any criteria however refers to the document, *Application requirements for activities with impacts to air* (DES, 2021). The methodology and criteria applied in in the air quality assessment are consistent with the requirements of DES (2021) and therefore achieve the purpose of Planning Scheme Policy 6.
	AQ2	Compare the air quality modelling results and assessment to the current Commonwealth air quality goals as defined in the 2021 National Environmental Protection Measure (Ambient Air Quality) variation.	NEPM (Ambient Air Quality) 2021 had not been released at the time the Draft EIS was completed therefore was not included in the assessment. Modelling was compared to the NEPM (Ambient Air Quality) 2003 as well as variations proposed to NEPM in 2015 and 2019. The variation to the NEPM in 2021 saw minor changes to the NO_2 criteria compared to that proposed in 2019, in that NO_2 criteria decreased from 188 and 39 to 164 and 31 ug/m3 for the 1 hour and annual averaging periods respectively. Refer to **Appendix N** Table 2-1. The model results shown in the Air Quality report indicate that compliance is still predicted for all receptors (as modelled for Stages 1 and 2) when considering the proposed changes, with the exception of the annual average PM2.5 which used and was dominated by Cannon Hill background data. As shown in **Appendix N** Table 2-11, the Cannon Hill background data had much higher annual average and 70th percentile 24 hour concentrations than the more representative Wynnum North site, and therefore the background used was conservative. With a more realistic background concentration taken from Wynnum North, compliance is still predicted.
	AQ3	Compare the air quality monitoring results for all construction stages that could occur from 2025 onwards to the new Commonwealth air quality goals, as defined in the 2021 National Environmental Protection Measure (Ambient Air Quality) variation, that come into force in 2025.	As outlined in the response to AQ2, compliance is still predicted for the 2025 goals. Management measures for the Project will include real time air quality monitoring during construction (refer to section 11.5.1 of the Draft EIS). Results from the air quality monitoring station will be compared against all air quality objectives applicable at the time of construction and operation.
	AQ4	Consider the additional vehicular related pollutant emissions criteria – formaldehyde and, in particular, benzo(a)pyrene as a marker for PAH's – defined in the National Environmental Protection Measure (Air Toxics).	The emission estimation methods in the Draft EIS included total volatile organic compounds with speciation of compounds based on the report *Speciation Profiles and Toxic Emission Factors for Non-road Emissions* (USEPA, 2015).

Theme	Comment ID	Comment	Response
			Based on USPEA (2015), the fraction of Formaldehyde for a non-road diesel vehicle based on Tier 2 and Tier 3 is 0.292 and Benzo(a)pyrene, which is used as a marker for PAH emissions, has a fraction for Tier 2 and Tier 3 non-road diesel engines of 6.67E-06. The Monitoring investigation levels in the Air Toxics NEPM for formaldehyde and Benzo(a)pyrene and predicted concentrations for Stage 1 and Stage 2 are shown in **Appendix N** Table 2-2. The predicted ground level concentrations including background for Stage 1 and Stage 2 are summarised in **Appendix N** Tables 2-9 and 2-10. All concentrations are expected to be well below with the air quality objectives for all sensitive receptors.
	AQ5	Complete odour monitoring, modelling and assessment of mangrove and dredged spoil related odour in accordance with the Department of Environment and Heritage Protection (DEHP), 2013, Guideline – Odour Impact Assessment from Developments.	As discussed in section 11.4.3 of the Draft EIS, sediment analysis carried out in 2019 indicates that there are no significant organics present the dredge material, and the operations are not expected to generate odour. It is possible that during dredging, short term H_2S generation can occur as a result of Potential Acid Sulfate Soils in the dredged material being exposed to the air and oxidising, however this material will be treated immediately after it is dredged as part of the drying process with ongoing monitoring to ensure no acidification occurs (refer to **Appendix L** of the Supplementary Report for the Draft ASS Management Procedure). No odour issues are anticipated as a result of the project, however if complaints are received the dredging process will be reviewed as part of the adaptive management strategy. It is noted that dredging will be carried out over two stages and is expected to take 2 – 4 months per stage.
Sensitive Receptors	AQ6	Assess the potential reverse amenity impacts of air emissions from the harbour operations on the new sensitive receptors that will be constructed as part of the development project. This assessment should include emission monitoring of the existing ferry fleet for all operational and, if relevant, engine maintenance and run-up scenarios.	People purchasing or moving into dwellings in this area would be doing so with the full knowledge that it is an operational boat harbour. While it is reasonable to assume residents would expect some effects, a selection of sensitive receptors has been modelled in adjacent future residential areas at elevated heights above ground to assess the potential impact of the vehicle ferries on buildings within the development. The locations are shown in **Appendix N** Figure 2-1. The following conservative assumptions were included in the modelling: ▪ Two large vehicular ferries each assumed to have two 1000 KW diesel engines. ▪ Emissions have been modelled at idle continuously from 7 am to 5 pm. ▪ Idling emissions are approximately 70% higher than emissions at 2000 rpm (idling emissions are higher than when underway). ▪ In accordance with the ASMA Marine Notice 5/2017, NOx emissions rates (3.4 g/kwh) comply with MARPOL Annex VI which is known as Tier III. ▪ All other modelled pollutants have been based on the emissions from the NPI Manual for Combustion Emissions Table 43 using 200 KW as the output of each ferry. ▪ Each receptor has been modelled in increments of 5 m above ground level to a maximum height of 40 m to represent a 10 storey development. ▪ No construction emissions from other areas have been modelled as harbour upgrades will be completed prior to the southern reclamation commencing. If there were any construction impacts from other sources they would be temporary. Modelling results are presented in **Appendix N** Table 2.3 and 2.4. The concentrations for the elevated receptors are predicted to comply with the relevant criteria for all pollutants modelled and assessed with the exception of the $PM_{2.5}$ for the annual average for the 2021 and 2025 NEPM and also the 24 hour criteria for the 2025 NEPM. Similar to modelling outputs for other sensitive receptors, the predicted annual average exceedance is dominated by a high background of 7.4 µg/m^3, from the DES monitoring station at Cannon Hill with the contribution of the idling ferries being low. With a more representative background taken from Wynnum North (see **Appendix N** Table 2-8), the 2025 criteria are expected to be met. The worst case 24 hour average concentration of $PM_{2.5}$ with background is below the current guideline requirements however above the 2025. As the receptor is elevated this can be addressed by modifying the current layout or validating the emissions used or a combination of both. The predicted concentrations using the ozone limiting method for NO_2 is also predicted to comply with the current air quality objective in the EPP Air of 250 µg/m^3 and also the future Air NEPM concentration of 164 µg/m^3.

Theme	Comment ID	Comment	Response
	AQ7	The air dispersion modelling for construction Stage 2 should be repeated to take account of the new sensitive receptors (residential, park, hotel, educational and commercial workplaces) that are to be constructed during stage 1 – both as downwash structures and as receptor points (ground level and elevated).	The modelling for the Draft EIS air quality assessment assumed: ▪ At worst a Euro III A/B vehicle fleet; ▪ Stage 1 and Stage 2 are discrete events; and ▪ Stage 1 and Stage 2 both occur over 1 year. Concerning the vehicle fleet, European Stage III A/B standards, these were phased in from 2006 to 2013, with Stage IV entering into force in 2014. Relevantly Stage IV engines have NOx emissions which are 88% lower (on a g/kWh basis) for smaller engines (56-130 kW) and 80% lower for larger engines (130-560 kW). It is expected that by the time the construction work begins, and over the life of the project, that the fleet will contain newer vehicles with engines newer than the assumed Stage III A/B ones, and as such the NOx emissions, as an example, will be lower. The construction assumptions are unrealistic as the stages would be built over time, and rather than over two years, would more likely occur over numerous years, for example Stage 2 may take eight years. As such, the emissions are likely to be lower than modelled as the volume of material processed and moved will be less than modelled, and cover a smaller area, moreover, the emissions can be managed on site using the measures outlined in section 11.5 of the Draft EIS. Real time monitoring can be used to inform on site practices. For example, TSP concentrations could be compared to the nuisance benchmark detailed in NZMFE (2016). While some receptors may be constructed as the site progresses, the assumption that Stage 1 will be completed and fully developed while Stage 2 is constructed over a short period is overly conservative and management measures, including monitoring, will be used to inform the construction process over time.
Hydrogen Sulphide Sampling	AQ8	Any hydrogen sulphide (H_2S) sampling completed during the construction and operational phase should use an instrument with an upper range of no more than 50 ppb.	It is agreed that if H_2S monitoring occurs it should have a suitable lower detection limit. Threshold of the unit should be within a relevant range.
	AQ9	Future hydrogen sulphide monitoring should use a sensitive low range instrument with a recommended range of 0 – 50 ppb.	
Terminology	AQ10	Remove all reference to the construction emissions being 'conservative' because they are based on emissions from mining equipment.	The use of the term conservative was applied primarily due to the wet nature of the dredged material. The dust emissions from the handling of wet spoil are vastly different to the mining of dry, silty overburden from where the equations originated. As such it is reasonable to state that construction emission predictions are conservative. The word could be removed, however it doesn't change the material outcome of the air quality assessment.
Emissions Modelling	AQ11	Provide additional information in Section 3.4 and Appendix A to allow the emission calculations to be verified as accurate and appropriate for use in the air dispersion modelling.	As identified in comment AQ11 section 3.4 of Appendix 2-I of the Draft EIS outlines information adopted for the emissions modelling. Locations of emissions sources are shown on **Appendix N** Figure 2-2 and Figure 2-3. Further relevant information is provided below: ▪ The dredging excavator has not been modelled for dust emissions as the material is wet and the potential for nuisance impact is low. ▪ The basic outline of the operation includes the excavation/dredging, drying, treating and compaction of approximately 1,200,000 m^3 over a number of years. This amount was determined to be the equivalent of 5,045 tonnes per day for a total of approximately 1,844,000 tonnes per year. Further information for the equipment modelled is provided in **Appendix N** Table 2-7. Other specific modelling parameters are as follows: ▪ An assumed silt content of 5% with a moisture content of 20% which applies to the two Swamp dozers. ▪ Wind erosion occurring over 23 hectares. ▪ Roads leading onto the reclaimed area will be sealed and watering will occur on all other areas. ▪ Exhaust emissions occur from each of the equipment in **Appendix N** Table 2-5 for the same hours per day. ▪ The same methodology and number of equipment was modelled for Stage 2.
	AQ12	Provide drawings showing the assumed locations for all emission points/areas included in the air dispersion modelling.	
	AQ13	Provide details of the size and location of dredged material placement areas, quantities of dredged spoil, working hours for placement, number of plant operating, quantities of dredged material extracted and placed per hour.	

Theme	Comment ID	Comment	Response
	AQ14	Amend air quality modelling for Stage 1 and Stage 2 to include wheel generated sources for heavy and light vehicles modelled as line sources using the line source function provided in the CALPUFF model.	It is assumed that the "line source" is referring to the Road Source function added to the Version 7 of the CALPUFF Modelling System and not the "buoyant line source" developed for line emissions from aluminium plants. The road source approach simulates line sources such as roadways using the concept of rod-like puffs, or simply "rods". Emitting rods follow the same rules as emitting horizontally symmetric Gaussian puffs (Exponent, 2019). It is unclear if this source is applicable to unsealed roads or exhaust emissions emitted from a roadway with several road-links. In 2009 the USEPA Haul Road Workgroup (USEPA, 2011) formed a response to recommend a technically supportable approach for modelling haul road re-entrained dust for AERMOD. The review focused on the advantages and disadvantages of modelling haul roads as both volume sources and area sources. One major disadvantage of using area sources is considered to be computational times are longer, however this is not a consideration from a technical standpoint. However, a relevant recommendation for using area sources is as follows: "*Area sources explicitly simulate a uniform emission density across the roadway*", which is more realistic for slow moving traffic on unsealed roads as is modelled here. As such the adopted methodology is considered appropriate.
	AQ15	Include the assumption that all off-road diesel construction plant will – as a minimum - comply with Europe III A/B standards for non-road diesel engines as an operational requirement for the construction phase.	As the assessment is based on European III A/B standard it will be an operational requirement for the construction equipment on site. Due to the age of the A/B standards, the operational fleet on site is likely to comply with the Tier 4 standard, meaning that the modelled engine emissions could be significantly lower (i.e. 50% or more) subject to how many vehicles were at Tier 4.
Background data	AQ16	Complete a screening assessment for nitrogen dioxide (NO_2) by assuming 100% conversion of NO to NO_2. In the event that the screening assessment indicates a risk of non-compliance, a more detailed assessment using contemporaneous background ozone data representative of the project site should be completed.	As a 100% conversion is unrealistic, we have used the USEPA's Ozone Limiting Method (OLM) as recommended by the NSW Approved Methods (NSW EPA, 2016). The equation for this method is: $[NO_2]_{total} = \{0.1 \times [NO_x]_{pred}\} + MIN\{(0.9)x[NO_x]_{pred}$ or $(46/48) \times [O_3]_{bkgd}\} + [NO_2]_{bkgd}$ Where: ▪ $[NO_2]_{total}$ = the predicted concentration of NO_2 in µg/m³ ▪ $[NO_x]_{pred}$ = the dispersion model prediction of the ground-level concentration of NO_x in µg/m³ ▪ MIN = the minimum of the two quantities within the braces ▪ $[O_3]_{bkgd}$ = the background ambient O_3 concentration in µg/m³ ▪ (46/48) = the molecular weight of NO_2 divided by the molecular weight of O_3 ▪ $[NO_2]$ = the background ambient NO_2 concentration µg/m³ The exhaust emissions for the Stage 1 and Stage 2 were modelled with CALPUFF for the sensitive receptors only. The hourly background data from the DES monitoring Station at Springwood was then included as a second step in the OLM method to provide the contemporaneous prediction of NO_2. The results are shown in **Appendix N** Table 2-6 and 2-7. Compliance is achieved for both the EPP (Air) and 2021 NEPM criteria at the maximum predicted concentrations at any of the receptors.
	AQ17	Provide background air quality data for benzo-a-pyrene (BaP) and formaldehyde, and complete dispersion modelling of emissions of benzo-a-pyrene and formaldehyde from the construction and operational phases and compare to the NEPM criteria.	DES operates several monitoring stations throughout Queensland, however only one site at Memorial Park in Gladstone, Central Queensland monitors for Formaldehyde. DES does not monitor for PAHs. The only publicly available sources of data considered relevant are from a twelve month campaign in Francis Street Melbourne (VIC EPA, 2013) and an Ambient Air Quality Research Project from 1996–2001 in NSW (DEC, 2002). The average winter concentrations of BaP from a number of different regions in NSW ranged from 0.07 (ng/m³) on the South Coast to 4.21 (ng/m³) in Lithgow. From the strong regional and seasonal variation, it is concluded that the domestic use of solid fuels for heating was a significant source of PAH particles in the atmosphere (DEC, 2002). The results for the Illawarra region have been selected for the project given a similar location to the coastline and also regional influences of industry. It is considered to represent a higher background concentration of BaP than at Toondah Harbour given the reduced number of wood fired heaters in use in Queensland compared to New South Wales due to the warmer climate. Refer to **Appendix N** Table 2-8.

Theme	Comment ID	Comment	Response
			Dispersion modelling has been performed for Formaldehyde and BaP for both the Stage 1 and Stage 2 construction activities. The emissions estimates were based on the Speciation Profiles and Toxic Emission Factors for Non-road Emissions (USEPA, 2015) and compared against the Air Toxics NEPM (refer to **Appendix N** Table 2-2). The predicted ground level concentrations including background for Stage 1 and Stage 2 are summarised in **Appendix N** Tables 2-9 and 2-10. All concentrations are expected to be well below with the air quality objectives for all sensitive receptors.
Management and monitoring	AQ18	Adopt all feasible particulate management measures to minimise the project contribution to predicted exceedances of the $PM_{2.5}$ NEPM air quality goal.	A range of management and monitoring measures to be implemented by the Project to minimise emissions are outlined in section 11.5 of the Draft EIS. However, a relevant consideration is the existing background concentrations. As previously addressed a range of DES monitoring stations were selected to provided background data to be used in a cumulative assessment. The Cannon Hill site is located approximately 20 km to the northwest was selected for the data for TSP, PM_{10} and $PM_{2.5}$. As part of the comment response further analysis on the $PM_{2.5}$ annual average and 24 hour concentrations was performed for both Cannon Hill and the more relevant Wynnum North site. **Appendix N** Table 2-11 shows that the adopted background concentrations are conservative. As demonstrated in the modelling, the background concentrations dominated the predicted concentrations. A range of best practice controls will be implemented including use of water on site, limiting vehicle speeds and drop heights via an air quality management plan during the construction phase of the project.
	AQ19	Complete continuous $PM_{2.5}$ monitoring is completed at a minimum of 2 positions for the duration of the construction project.	The proposed air quality monitoring program is outlined in section 11.5.1 of the Draft EIS and includes: ▪ Real time measurement methods complying with Australian Standards for TSP and PM_{10}; and ▪ Six impact dust deposition gauges and one background location in line with Australian Standards for measurement of dust fall out. The location selected for continuous monitoring of TSP and PM_{10} should, to demonstrate compliance with the air quality goals, be co-located with a continuous monitor for $PM_{2.5}$ and H_2S. Two stations will initially be installed in the community, and once Stage 1 is complete, one of the units will be moved into the Stage 1 area to monitor while Stage 2 is being constructed. This may also see dustfall monitoring locations being moved or added to the program subject to the findings through stage 1.
	AQ20	For construction Stage 2, provide one additional continuous PM_{10} monitoring position, one additional continuous $PM_{2.5}$ monitoring position and two additional dustfall gauges at locations representative of the new sensitive receptors developed during Stage 1.	
Risk Assessment	AQ21	Update the risk assessment when the revised modelling and assessment has been completed.	Based on the results above, the project risk summarised in section 11.6 of the Draft Eis has not changed. The Project presents a low risk to ambient air quality.

6.4. Noise and Vibration Public Comments and Responses

Comments received on ambient and underwater noise and vibration have been compiled and responded to in Table 6-4 using either direct wording from a single submission or an amalgam of comments encompassing the same issue. A total of 30 issues on noise and vibration were raised through public submissions. These issues were categorised into ten themes being ambient background monitoring, underwater background monitoring, Noise and vibration criteria, Impacts to residences within the development, further information on predicted noise and vibration levels, ambient noise assessment, underwater noise assessment, mitigation measures, Inconsistencies between the technical report and Draft EIS chapter and road traffic noise.

The table should be read in conjunction with Chapter 12 of the Draft EIS and associated technical appendices. Cross referencing to the Draft EIS has been included where appropriate and additional investigations included in appendices to this Supplementary Report.

Table 6-4: Noise and Vibration Public Comments and Responses

Theme	Comment ID	Comment	Response
Ambient Background monitoring	NV1	The background noise monitoring presented in Appendix 2j does not comply with the DES requirements for an EIS. Therefore, it is recommended that the background noise monitoring is repeated to include the following: ▪ Monitoring for a minimum of 1 week continuously at the 3 receptor positions and, if practical, at Cassim Island during (1) the winter months and (2) the summer months; ▪ Contemporaneous weather monitoring at one position during each set of measurements; ▪ Provide details of the monitoring instrumentation used, including pre- and post-measurement calibrations and annual accredited instrument calibration; ▪ Report results and weather data and confirm whether any data has been excluded from the assessment due to the influence of prevailing weather conditions.	Background noise monitoring for the Draft EIS is not required to address DES requirements. It is only required to address the EPBC Act EIS Guidelines. The relevant sections of the guidelines are outlined in section 12.1.1 of the Draft EIS. Background noise monitoring undertaken for the Project are outlined in section 12.2.1 of the Draft EIS and include attended monitoring carried out over various time periods between 11 June 202 and 21 March 2022. Sites where background monitoring was completed included GJ Walter Park and Cassim Island. These sites were selected as they represent sensitive environmental receptors for koalas and migratory shorebirds respectively. Additional unattended background noise monitoring has been undertaken in response to comments on the Draft EIS. An unattended background noise survey was undertaken over the period 15 Feb 2023 to 20 Feb 2023. The noise logger was situated at the rear of the overflow carpark (refer to **Appendix O** Figure 14 and Figure 15). The site was away from public areas and traffic. Noise from ferry exhausts was audible. The site was generally free from winds with screening provided by nearby mangroves and more distant trees and buildings. The measured noise levels are presented graphically in **Appendix O** Figure 16 and numerically in Table 4. Compared with the monitoring carried out for the Draft EIS, the Rating Background Noise (RBN) level at the unattended monitoring site obtained in February 2023 are higher, in some cases by a margin of more than 10 db(A), despite the protected location. This was expected as the attended measurements were designed to be conservative and bias the background noise levels low. For example, when vehicles or other potential noise sources approached the monitoring location the noise monitoring was suspended and recommenced once the noise had passed. Hence, the noise goals developed for the Draft EIS are considered to be conservatively low and appropriate for the assessment of impacts on MNES. That is, the predicted increase in noise levels as a result of the Project are expected to be greater than what will actually occur as existing site noise is generally louder than levels used in the Draft EIS. A range of management actions have been committed to by the Proponent in section 12.5 of the Draft EIS to minimise the impact of construction noise sources including development of a construction noise and vibration management plan. It is expected that this will include further detailed background monitoring to be carried out at sensitive receptors prior to commencement of construction activities. The noise monitoring is expected to continue through the construction process as a way to confirm noise exposure, demonstrate compliance with limits and undertake adaptive management responses.
	NV2	The revised baseline noise monitoring should include monitoring locations representative of the habitat for MNES such as koalas.	
Underwater Background monitoring	NV3	No measurements of background underwater noise levels have been completed. The following are recommended to address this issue: ▪ Complete background underwater noise monitoring for a minimum of 1 week continuously at a minimum of 2 positions during (1) the winter months and (2) the summer months; ▪ Provide details of the monitoring instrumentation used, including pre- and post measurement calibrations and annual accredited instrument calibration.	Underwater monitoring is generally only required if the project involves construction of significant underwater structures using energetic methods, for example explosives or impact pile driving etc. Apart from a several piles to be installed using impact piling close to the existing ferry terminal there will not be any significant number of impact pile driving. Sheet piles will be installed using vibratory methods with works mostly completed in no or very shallow levels of water minimising underwater noise generation. Background underwater monitoring is not usual for dredging projects. Similar (and significantly larger) dredging and reclamation projects such as the Port of Townsville Expansion Project and Port of Gladstone Gatcombe and Golding Channel Duplication have not carried out background monitoring but included a list of typical underwater noise sources that may be present. A description of ambient background underwater noise sources is included in section 12.3.2 of the Draft EIS including a Figure showing typical underwater noise sources in Australian waters.

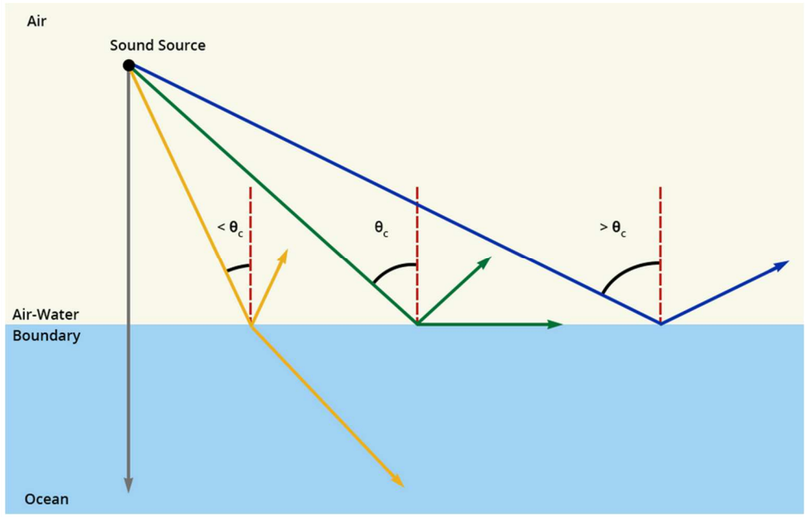
Theme	Comment ID	Comment	Response
	NV4	Previous work by JASCO in 2008 in relation to the Hornibrook Bridge (Erbe 2009) has been relied on in detail. We submit that this historic work is not appropriate, and site-specific measurements of an appropriate scale to the development should have been obtained.	To assist with understanding the range of likely noise levels experience near Toondah Harbour, a table showing the typical range of underwater noise has been included in the revised underwater noise modelling. If during the detail design phase high energy impact methods are proposed either in the water or close to the water, then it may be appropriate to undertake background underwater sound measurements. Additional noise sources are also included in **Appendix O** Table 1. Given Toondah Harbour is already an operational ferry terminal, the ambient noise near the site would be expected to range between 60 dB and 140 dB depending on boat traffic, wind and wave action.
Noise and Vibration Criteria	NV5	The approach adopted for the construction noise criteria, with more stringent criteria adopted for the longer-term activities, and less stringent criteria for activities carried out over shorter time periods is considered reasonable. However, as the construction works is longer than 6 months the most stringent noise measures should apply for all noise receptors. The following additional clarification is recommended to ensure the criterion are applied correctly during the construction phase: ▪ Amend Table 9 to show the criteria for >6 month construction operations only; ▪ Define the relevant time periods for the noise level goals (day: 7 am – 6 pm, evening: 6 pm – 10 pm, night: 10 pm – 7 am); ▪ Define that, for the purposes of assessing compliance, measured construction noise levels must be adjusted for character (impulsiveness, tonality etc as defined in Table 10 – Adjustment Factors) prior to comparing with the appropriate criterion; ▪ Confirm the minimum measurement time of 10 minutes for the purposes of completing construction noise compliance monitoring and comparison to the adopted criterion; ▪ Revise Table 9 to take account of the results of the revised background noise monitoring to be completed over a minimum of 1 week at each of the three receptors for a winter and a summer period.	It is overly simplistic to imply since the project takes many years to complete only the >6month noise goals should apply. Construction activities will occur at a range of locations and for a range of periods affecting different receptors. Allowing higher noise generating activities for short periods of time may result in more optimal outcomes. For example, sheet piling will occur in two discrete stages lasting up to 30 weeks and 20 weeks for the northern and southern reclamations respectively. These will be separated by a period of approximately 5 years. To minimise the length of the disturbance two work faces could be established at either end of the sheet pile wall effectively halving the construction timeframe. While this may create more noise, the significant reduction in length of time the noise is generates may have a smaller impact on sensitive receptors. A Construction Noise and Vibration Management Plan (CNVMP) will be developed prior to construction commencing as part of the environmental management framework. The CNVMP will address the following at a minimum: ▪ Marine fauna monitoring for marine turtles, cetaceans, pinnipeds, dugongs and instances of shoaling fish up to a distance of 500 m from active dredging areas prior to start up and throughout dredging works. ▪ Noise generation limits to comply with performance indicators at sensitive receptors ▪ Limits with respect to hours of operation and the process involved ▪ Maintenance of equipment ▪ Slow start up measures for all construction activities that generate underwater noise to ensure any noise-sensitive marine fauna are able to move away from the noise source ▪ Piling operations to comply with target noise limits (both in the air and underwater) ▪ Monitoring of piling operations underwater and in the air ▪ Out of hours works to require specific assessments and approvals and community engagement ▪ Noise level limits on dredging works ▪ Implement periodic breaks in undertaking high noise generating works. ▪ Reporting requirements, from the contractor to the federal Department of Environment and other State and Local entities ▪ The dates and outcomes of marine fauna monitoring ▪ Immediate reporting of exceedances ▪ Corrective action processes including design of noise and vibration mitigation measures.
	NV6	A detailed Construction Noise and Vibration Management plan is developed and included in Appendix 2j of the EIS, in accordance with the requirements of the DES Noise and Vibration – EIS information guideline.	As the Project is located within the Redland Council LGA, any development works that occur must abide by any conditions set for the Project, the Redland City Plan and associated policies, and the Queensland *Environmental Protection (Noise) Policy 2019*, which includes acoustic quality objectives. Other edits/amendments suggested in these comments may be included in the CNVMP, however, they do not affect any outcomes or impacts presented in the Draft EIS.
	NV7	At least one recent underwater EIS report for underwater noise piling in Queensland over recent years noted the Standards addressed in Chapter 12 of the Draft EIS but also highlighted the following that the Toondah Harbour EIS – Chapter 12 did not reference: ▪ McPherson et al (2017) Great Barrier Reef Underwater Noise Guidelines: Discussion and options paper. ▪ ISO 18405 Underwater Acoustics – terminology (ISO 2017).	These standards were utilised for the assessment of impacts to MNES in the Marine Ecology chapter of the Draft EIS. Refer to section 16.5.1.11 of the Draft EIS and 8.1.11 of Appendix 2-M to the Draft EIS.
	NV8	Important considerations for underwater noise standards is that:	At the time the Draft EIS was completed none of the documents identified were available for public review. At the time of writing (November 2023) they are still unavailable. The Project cannot be assessed against guidelines that do not exist or are not available when the assessment is carried out.

Theme	Comment ID	Comment	Response
		▪ Government of South Australia's Underwater Piling Noise Guidelines (2012) have been rewritten and are currently under Review. ▪ The Australian Government Underwater Noise Guidelines are being rewritten. ▪ It is anticipated that current Guidelines will be assessed in the light of recent ISO Standards for underwater noise but also recent advances and inclusions in the scale of impact on biota other than just charismatic megafauna.	
Impacts to residences within the development	NV9	The following should be adopted for residences within the development while construction is still ongoing: ▪ The external to internal noise reduction of 7 dB(A) defined in the DES Noise and Vibration –EIS Information Guideline should be defined for the purposes of predicting internal noise levels; ▪ Adopting the 7 dB(A) façade reduction results in external LAeq,1 hour noise limits of 42 dB(A) –daytime and 37 dB(A) – night-time.	While its something that would obviously be avoided, impacts to buildings are outside the scope of the Draft EIS as it is not an MNES. Further assessment of the potential to impact buildings within and surrounding the development will be required as part of the State assessment. Building damage from any of the construction activities occurring onsite would be an extremely rare occurrence, even accounting for the building and construction phasing. It is noted that building damage due to vibration is unlikely to be a significant issue for the Project as most works that will result in vibrations (i.e. installation of sheet piles and impact piling) will be completed prior to residences being constructed for the Project. Some residential development may occur on the northern reclamation while works are ongoing at the harbour however these will be separated from harbour works by more than 500m. Separation distances to existing buildings higher than 2 stories is more than 400m. There is a possibility of interference with human activities since this occurs at relatively low vibration levels. This is addressed through the human comfort criteria included in the Draft EIS (Table 12-3 of the Draft EIS). The assessment is not required to address DES guidelines. Modelling for the Draft EIS focused on potential impacts to MNES, in particular the adjacent Cassim Island which is a roosting site for some migratory shorebird species. A more detailed assessment of impacts on amenity, including a range of management measures, will be addressed through the State assessment process. A range of management measures have been identified in section 12.5 of the Draft EIS that will minimise impacts from noise on all sensitive receptors. A Construction Noise and Vibration Management Plan (CNVMP) will be developed prior to construction commencing as part of the environmental management framework. The CNVMP will address the following at a minimum: ▪ Marine fauna monitoring for marine turtles, cetaceans, pinnipeds, dugongs and instances of shoaling fish up to a distance of 500 m from active dredging areas prior to start up and throughout dredging works. ▪ Noise generation limits to comply with performance indicators at sensitive receptors ▪ Limits with respect to hours of operation and the process involved ▪ Maintenance of equipment ▪ Slow start up measures for all construction activities that generate underwater noise to ensure any noise-sensitive marine fauna are able to move away from the noise source ▪ Piling operations to comply with target noise limits (both in the air and underwater) ▪ Monitoring of piling operations underwater and in the air ▪ Out of hours works to require specific assessments and approvals and community engagement ▪ Noise level limits on dredging works ▪ Implement periodic breaks in undertaking high noise generating works. ▪ Reporting requirements, from the contractor to the federal Department of Environment and other State and Local entities ▪ The dates and outcomes of marine fauna monitoring ▪ Immediate reporting of exceedances ▪ Corrective action processes including design of noise and vibration mitigation measures.
	NV10	Details of the current licence conditions for the ferry operators should be presented. Where noise limits are defined in the licences, a reverse amenity noise assessment should be completed to confirm whether the permitted levels will result in exceedance of the EPP noise goals at the future residential development. If impacts are predicted, acoustic control measures should be defined and mitigation modelling completed.	
	NV11	It is recommended that building damage criteria are presented as works with potential to exceed building damage criteria should be subject to receptor monitoring. This is particularly relevant to Stage 2, as residential buildings will have been constructed as part of Stage 1. Information should include: ▪ Specification of vibration monitoring locations for sensitive receptors. ▪ Vibration assessment and prediction for all work with a potential to cause vibration prior to commencement of that work stage. ▪ Develop specific vibration mitigation measures for each construction stage where vibration levels could exceed criteria. ▪ Require that all construction work resulting in vibration impacts cease immediately upon vibration criteria being exceeded.	
	NV12	The Draft EIS states for the future residential areas (to be constructed during Stage 1), *'it is proposed to incorporate noise control in the*	

Theme	Comment ID	Comment	Response
		building envelope to ensure the internal noise level goals will be met'. Based on this approach, it is recommended that: ▪ Predicted façade noise levels for Stage 2 construction for each activity are predicted for the new receptors (residential, commercial buildings and school). Typically a façade correction of +2.5 dB(A) would be applied to determine these levels; ▪ Identify the required acoustic insulation for each building component, particularly windows; ▪ Identify which facades are expected to require treatment and specify the rooms which require windows/doors to be closed and hence must be provided with air conditioning. ▪ Identify who will be responsible for the cost of the façade mitigation measures and air conditioning (the proponent or the developer of the buildings, recognising that this may be a different entity).	As the Project is located within the Redland Council LGA, any development works that occur must abide by any conditions set for the Project, the Redland City Plan and associated policies, and the Queensland Environmental Protection (Noise) Policy 2019, which includes acoustic quality objectives.
Further information on predicted noise and vibration levels	NV13	To comply with the requirements of the DES EIS guideline, further information and additional acoustic modelling scenarios are required. This includes additional information on noise sources, equipment requirements, additional modelling scenarios to better understand non-compliances, etc	The Draft EIS is not required to address DES guidelines. The EPBC Act EIS Guidelines state: *The EIS must include an assessment of the impacts of noise and vibration associated with the construction (for example pile driving and dredging), and ongoing operations of the development (e.g., noise from residents, businesses and visitors to the site) on all matters of national environmental significance (MNES)*. The assessment, including the scenarios modelled, were focused on providing sufficient detail to address potential impacts to MNES. While noise modelling was focused on addressing MNES it should be noted that it was designed to provide a conservative estimate of noise generation. For example, neutral meteorology was adopted for the modelling. The site is generally subject to daytime sea breezes which, if anything, would lower the noise levels on Moreton Bay where environmentally sensitive receptors are located (and is a receptor itself). The key high noise generating activities have been considered for all stages and presented in an easy-to-understand format. It is overly simplistic to imply since the project takes many years to complete only the >6month noise goals should apply. Construction activities will occur at a range of locations and for a range of periods affecting different receptors. Allowing higher noise generating activities for short periods of time may result in more optimal outcomes. For example, sheet piling will occur in two discrete stages lasting up to 30 weeks and 20 weeks for the northern and southern reclamations respectively. These will be separated by a period of approximately 5 years. To minimise the length of the disturbance two work faces could be established at either end of the sheet pile wall effectively halving the construction timeframe. While this may create more noise, the significant reduction in length of time the noise is generates may have a smaller impact on sensitive receptors. A CNVMP will be developed prior to construction commencing as part of the environmental management framework. The CNVMP will address the following at a minimum: ▪ Marine fauna monitoring for marine turtles, cetaceans, pinnipeds, dugongs and instances of shoaling fish up to a distance of 500 m from active dredging areas prior to start up and throughout dredging works. ▪ Noise generation limits to comply with performance indicators at sensitive receptors ▪ Limits with respect to hours of operation and the process involved ▪ Maintenance of equipment ▪ Slow start up measures for all construction activities that generate underwater noise to ensure any noise-sensitive marine fauna are able to move away from the noise source ▪ Piling operations to comply with target noise limits (both in the air and underwater) ▪ Monitoring of piling operations underwater and in the air ▪ Out of hours works to require specific assessments and approvals and community engagement

Theme	Comment ID	Comment	Response
			▪ Noise level limits on dredging works ▪ Implement periodic breaks in undertaking high noise generating works. ▪ Reporting requirements, from the contractor to the federal Department of Environment and other State and Local entities ▪ The dates and outcomes of marine fauna monitoring ▪ Immediate reporting of exceedances ▪ Corrective action processes including design of noise and vibration mitigation measures. As the Project is located within the Redland Council LGA, any development works that occur must abide by any conditions set for the Project, the Redland City Plan and associated policies, and the Queensland Environmental Protection (Noise) Policy 2019, which includes acoustic quality objectives.
Ambient Noise Assessment	NV14	Update results to include the predicted noise levels during hammer driven piling, and the revised acoustic modelling (which will include application of the relevant Adjustment Factors).	Impact piling for wharf, harbour etc hammer piling, was not specifically modelled. These activities will only take place during the period 9am to 3pm with respite periods of at least 15 minutes every hour. Only a small number of piles will be impact driven and hence these activities were not considered a significant noise source for assessing impacts on MNES. Modelling and amenity assessment will be carried out as part of the comprehensive CNVMP.
	NV15	The impact assessment identifies that only the > 6 month noise limit is relevant for assessment of the predicted noise levels. Contrary to this statement, Table 15 compares the predicted noise levels to noise criteria for a range of construction time periods.	The assessment is based on construction taking longer than 6 months, with levels provided for this period. However, providing comparison limits for shorter periods provides the construction team with useful information to modify the works program to lessen the impacts by shortening the construction periods. Although the construction phase is to take place over many years, there will be long periods of time with no significant noise producing activities taking place and the noise from construction would be indistinguishable at the sensitive receptors from the normal noise environment. If this outcome can be achieved, then it may be reasonable to adopt limits for shorter construction periods.
	NV16	Despite the extensive predicted non-compliance, specific mitigation measures have not been defined and assessed through revised modelling to confirm that compliance with the assessment criteria can be achieved.	The impact assessment is focused on MNES, therefore modelling outputs and mitigation measures are focussed on minimising noise on Moreton Bay, and in particular Cassim Island. As outlined in previous responses impacts to existing and future residences within the development will be addressed as part of the State application requirements. A CNVMP will be developed prior to construction commencing as part of the environmental management framework. Future mitigation options will focus on meeting appropriate noise goals at the existing sensitive receptors. Table 12-11 of the Draft EIS highlighted a range of management measures including the use of low-noise plant, high performance mufflers and mechanical control measures for the plant. Construction activities will also make extensive use of stackable transportable barriers (i.e. similar in design and size to shipping containers). Alternatively, other sites have made use of scaffolding close to machinery with the scaffolding supporting a noise reducing membrane. These types of noise control are mobile and can achieve noise reductions between 5dB(A) and 20 dB(A). The CNVMP will detail the most appropriate noise mitigation measures.
	NV17	The assessment of the impacts of predicted construction noise levels on MNES and the marine environment should be revised when the construction noise assessment has been revised as recommended in this review.	The modelling undertaken in the noise assessment is appropriate for carrying out the assessment of impacts on MNES. The modelling focused on activities in locations that were likely to have the highest potential for impacting on ecologically sensitive receptors such as Cassim Island. The inputs and assumptions used in the modelling were conservative and would likely overestimate potential impacts from noise. The modelling has addressed the high noise producing activities and the suggested remodelling will be carried out during the development of the CNVMP.
	NV18	It is recommended the following assessment is completed to address the potential reverse amenity effects associated with the proposed development: ▪ Complete source noise measurements of existing ferry vessels. ▪ Determine expected noise levels from the larger vessels proposed to be used in the future to service the harbour.	The impact assessment is focused on MNES, therefore modelling outputs and mitigation measures are focussed on minimising noise on Moreton Bay, and in particular Cassim Island. The suggested reverse amenity assessment is a reasonable suggestion and will be reviewed as part of the of the CNVMP. It is noted that Schedule 1 of the *Environmental Protection Act 1994* (EP Act) addresses exclusions relating to environmental nuisance or environmental harm. The following is listed under Part 1, Section 1 – Safety and transport noise: *noise necessary for the safe operation of a ship, or noise from the operation of a ship in a port, including noise from—* *(i) machinery and equipment; or*

Theme	Comment ID	Comment	Response
		▪ Determine the likely number of vessel movements – ferry and other marine traffic – expected to use the harbour and marina. ▪ Predict noise levels at sensitive receptors (existing and future) associated with noise from vessel operations in the harbour and marina including vessel maintenance and assess whether the noise nuisance requirements under the Environmental Protection Act will be met. ▪ Predict noise levels at sensitive receptors (existing and future) associated with noise emissions from the vessel operations and activities from moving marine vessels and assess whether sleep disturbance requirements will be achieved. ▪ Where there is potential to cause environmental nuisance or exceed the sleep disturbance guidelines, recommend control solutions to address the potential impacts for existing receptors and acoustic design measures for future sensitive receivers. ▪ The necessity of providing acoustic façade treatments and forced ventilation on acoustic grounds is directly in conflict with the sustainability objectives stated in the EIS. All references to sustainability in the EIS should be amended so that the need for mechanical ventilation is clearly identified and included in the analysis of economic costs.	*(ii) shore and ship based port operations for loading onto a ship, or unloading from a ship, items other than bulk goods; or* *(iii) ship to shore communications relating to safe berthing and cargo handling; or* *(iv) a ship's horn* The EP Act recognises some noise from transportation will occur and consequently control of these noises is usually addressed at the receptor. The proposed noise control at future residences to address construction phase noise will also control noise from transport related noise
Underwater Noise Assessment	NV19	The assessment incorrectly states that modelling of impact pile driving cannot be completed using numerical models	The underwater noise and vibration assessment has been updated to include a simple geometric spreading modelling assuming a reflective seabed and accounting for depth of water. The modelling process is described in **Appendix O** and summarised in section 5.4 of this Supplementary Report. The methodology utilised is expected to provide a conservatively high estimate of the likely sound levels in the water and resulted in an increase in predicted underwater vibration levels in comparison to the Draft EIS. The updated underwater noise contours have been used to update the assessment of impacts on Marine Ecology (refer to section 5.4.3 of the Supplementary Report). The additional assessment of underwater noise and vibration found underwater noise levels would be elevated in comparison to the Draft EIS however, the increases are minor and would not be expected to result in additional or more intense impacts. The updated modelling includes outputs using the SEL metric.
	NV20	Statements around the frequency content generated by vibratory pile driving are incorrect and will significantly alter the assessment of effects. The assessment needs to be completed.	
	NV21	The modelling methodology applied is not detailed, and no information is provided about the inputs used. A fit-for-purpose propagation loss model coupled to appropriate source models, or using justified source representations, and considering site-specific factors, is required to be used.	
	NV22	Due to the issues and gaps in the underwater noise modelling, it is not possible to assess the veracity of the predictions included within the Draft EIS.	
	NV23	The assessment does not use the metric Sound exposure level (SEL) which is a measure of energy that takes into account both received level and duration of exposure.	
	NV24	The Draft EIS assumes that anthropogenic noise will not propagate through substrate to either benthic habitat or propagate back into the water. This is equivalent to saying that standard seismic survey	Anthropogenic noise may either originate in the air or in the water. Impacts from noise in the water (vibration) have been addressed in section 12.4.2 of the Draft EIS with further information included in response to public comments (section 6.4 of this Supplementary Report).

Theme	Comment ID	Comment	Response
		activity would not work as the acoustic signal must go through the substrate.	Noise generated in the air and then entering back into the water was not discussed in the Draft EIS as it was determined that airborne noise does not readily enter the water. Sound energy only enters from air to water at angle smaller than the critical angle (see figure source (https://dosits.org/) For the air interface the critical angle is approximately 15°. So, in practice, the noise source needs to be over water for the noise to enter water. There are not any noise sources associated with construction or operation or the site that are over the water other than the proposed dredge and dredge work boats and a small amount of piling at the harbour. These are likely to be short-term noise sources rather than the chronic long-term noise source identified in the paper Wale et al (2019). 
	NV25	Wale et al. (2019) looked at the impact of low frequency shipping noise on marine macroinvertebrates that are bioturbators (organisms that contribute to the rearrangement and aeration of marine sediments) and bioirrigators (organisms that flush their burrows with water) that contribute to sediment reworking where any decline could have major consequences for ecosystem functioning. The propagation of water borne noise into substrate, and propagation through the substrate requires investigation for the Toondah Harbour EIS.	
Mitigation measures	NV26	To comply with the requirements of the EPBC EIS guideline and the DES guidelines, further information in relation to the assessment of potential impacts and the proposed acoustic mitigation works and noise and vibration management is required as follows ▪ Identification of all potential acoustic mitigation options; ▪ Selection of the most optimum mitigation measures (based on effectiveness and practicability) for each activity; ▪ Revised acoustic modelling to account for the mitigation measures; ▪ Where the mitigation modelling demonstrates that the acoustic goals cannot be met, define alternate mitigation solutions; ▪ Clearly document the necessary mitigation measures to be adopted for each construction stage and activity.	The assessment is not required to address DES guidelines. Modelling for the Draft EIS focused on potential impacts to MNES, in particular the adjacent Cassim Island which is a roosting site for some migratory shorebird species. A more detailed assessment of impacts on amenity, including a range of management measures, will be addressed through the State assessment process. A range of management measures have been identified in section 12.5 of the Draft EIS that will minimise impacts from noise on all sensitive receptors. A Construction Noise and Vibration Management Plan (CNVMP) will be developed prior to construction commencing as part of the environmental management framework. The CNVMP will address the following at a minimum: ▪ Marine fauna monitoring for marine turtles, cetaceans, pinnipeds, dugongs and instances of shoaling fish up to a distance of 500 m from active dredging areas prior to start up and throughout dredging works. ▪ Noise generation limits to comply with performance indicators at sensitive receptors ▪ Limits with respect to hours of operation and the process involved ▪ Maintenance of equipment ▪ Slow start up measures for all construction activities that generate underwater noise to ensure any noise-sensitive marine fauna are able to move away from the noise source ▪ Piling operations to comply with target noise limits (both in the air and underwater) ▪ Monitoring of piling operations underwater and in the air ▪ Out of hours works to require specific assessments and approvals and community engagement ▪ Noise level limits on dredging works ▪ Implement periodic breaks in undertaking high noise generating works. ▪ Reporting requirements, from the contractor to the federal Department of Environment and other State and Local entities ▪ The dates and outcomes of marine fauna monitoring ▪ Immediate reporting of exceedances

Theme	Comment ID	Comment	Response
			▪ Corrective action processes including design of noise and vibration mitigation measures. As the Project is located within the Redland Council LGA, any development works that occur must abide by any conditions set for the Project, the Redland City Plan and associated policies, and the Queensland Environmental Protection (Noise) Policy 2019, which includes acoustic quality objectives.
	NV27	It is noted that the need to use air conditioning to prevent noise impacts for the Stage 2 construction works (and possibly Stage 1 for some existing receptors) is relevant from a greenhouse gas emission perspective, for the climate change considerations for the project and is contrary to the Economic Development Queensland PDA Guideline 14 climate change strategies for minimization of Greenhouse Gas Emissions	It is unclear what this comment is referring to. Air conditioning is not proposed as a management measure to prevent noise impacts in the Draft EIS.
Inconsistencies between the technical report and Draft EIS chapter	NV28	There are some inconsistencies between Appendix 2-J (Noise Technical Report) and Chapter 12 of the Draft EIS that should be addressed including: 1. Table 12-5 of the Draft EIS omits sound power level information for drop hammer piling. The sound power level for this source should be provided as per Table 13 of Appendix 2-J. 2. Table 12-5 of the Draft EIS has a typographic error – 'Franner Crane' has a noise level of 198 dB(A) as a sound power level; this should be 98 dB(A) as per Table 13, Appendix 2-J. 3. Section 12.4.1.5 of the Draft EIS states that 'the acoustic quality objectives will be exceeded for brief periods during construction'. This is inconsistent with Appendix 2-J which gives an example of 'Phase 1 Sheet Piling will require 133 days to complete with one machine'. 4. Chapter 12 of the Draft EIS does not discuss the noise impacts associated with hammer driven piles, which will be required for construction of the harbour and marina.	1. This is a clerical error. Drop hammer piling was included in the Draft EIS noise assessment. 2. This is a clerical error and had no effect on the impact assessment in the Draft EIS. 3. The statement in the Draft EIS refers to noise sources occurring intermittently over the 15 – 20 year construction lifespan. During long periods over this timeframe there will be very little construction activity or noise generated. Appendix 2-J states '*Although the noise modelling has revealed high noise levels at the nearby sensitive receptors it will not be maintained at the modelled levels throughout the entire construction period*'. It uses the example of sheet piling which may take up to 133 days if installed using one work face. Appendix 2-J also states '*Although the bund wall construction is one of the main noise generating sources during Phase 1 it is unlikely to operate concurrently with the excavator, since the perimeter bund needs to be complete prior to dewatering and drying of the fill*'. Ambient noise monitoring includes an excavator operating at the same time as bund wall construction, which is considered a conservative estimate of noise generation. In addition, bund wall construction is not a static workface and will move as work progresses reducing the time sensitive receptors are affected by works. 4. Hammer driven vibrations are discussed in detail in section 12.2.3.1 of the Draft EIS. Ambient noise is addressed more broadly in Appendix 2-J and states '*Impact piling comprises a power pack and an impact hammer. The power pack would be running continuously (different revs when hammering/not hammering). From an airborne noise perspective respite periods would apply for the impact hammer. It is expected no impact driving would take place before 9am or after 3pm. Respite periods would be at least 15 minutes every hour*'. The power pack for the impact piling will depend on the size of the pile to be driven. A hydraulic power pack usually comprises a skid mounted diesel engine in an acoustic enclosure. In critical situations it is possible to effectively acoustically mitigate noise from the power pack. For a typical prestressed concrete hydraulic hammer the L_{aeq} noise level is 122 dB(A) and the power pack without any noise control. This is equivalent to a sound pressure level of 82 dB(A) at 30m. This implies there is an occupational hearing protection zone close to the hammer (i.e. not desirable for construction staff). A partial enclosure of the pile hammer and pile cap area would provide noise reductions of 8dB to 10 dB. Higher noise reductions are possible for full enclosures if required.
	NV29	The risk assessment has not been based on acoustic modelling that takes account of the proposed mitigation measures identified in Table 12-11 of the Draft EIS. This is problematic as the effectiveness of some of the proposed acoustic mitigation measures is likely to be limited and may not achieve the required noise reductions. Therefore, it is recommended that: ▪ Acoustic mitigation modelling is completed for the proposed construction mitigation measures to determine whether the acoustic criteria can be met at existing and future noise sensitive receivers.	It is correct that modelling has not incorporated the proposed management measures. Management measures are aimed at minimising impacts on ecological receptors and include actions such as avoiding carrying out construction activities that may affect Cassim Island during winter when less migratory birds are present and monitoring and modifying works in real time to minimise disturbance to these receptors. The modelling is intended to show 'worst case' scenarios for the assessment of impacts on these ecological receptors. Detailed assessment of impacts on Marine Ecology (Chapter 16 of the Draft EIS) and Migratory Shorebirds (Chapter 17 of the Draft EIS) found impacts will be minimal. The Draft EIS has highlighted that the noise exposure at sensitive receptors from the various construction phases is expected to vary substantially over time as the construction works progress and works concentrated at different locations within the site. The Draft EIS includes the most effective type of noise control in this type of dynamic environment (Table 12-11), namely that low-noise plant be selected for the site and be fitted with high-performance mufflers and other specific noise control for the engine and drive train to substantially reduce noise from equipment that are predominantly engine noise, and high, but short term, noise sources are completed is as short a timeframe as possible.

Theme	Comment ID	Comment	Response
		▪ The risk assessment should be updated based on quantitative analysis and, where the recommended acoustic criteria cannot be achieved, measures to address the remaining impacts should be identified.	Additional modelling to identify whether acoustic criteria can be achieved will be completed as part of the State assessment process which will deal more directly with amenity issues. This information would also be included in the CNVMP.
Road traffic noise	NV30	The noise assessment has not considered the potential noise impacts of these traffic movements. For the construction phase, peak traffic movements of up to 520 construction vehicle trips per day are noted and up to 15,827 daily traffic movements for the operational phase. It is recommended that: ▪ Acoustic modelling of construction traffic is completed in accordance with the 'Transport Noise Management Code of Practice: Volume 2 - Construction Noise and Vibration' including assessment of night-time sleep disturbance impacts for phases where night-time works are expected to occur. ▪ Acoustic modelling of operational traffic is completed in accordance with the 'Transport Noise Management Code of Practice: Volume 1 – Road Traffic Noise.	In Queensland, traffic generating developments are not required to assess traffic impacts on public roads. The Transport Noise Management Code of Practice: Volume 2 - Construction Noise and Vibration is used to assess noise from the construction of roads and railways, not from a construction site. The CNVMP will address transport routes to the site as well as the times of heavy vehicle movements. However, the traffic noise from a fully developed site is not required to be assessed. The daily traffic movements identified in the comment are for the final development which will not occur for 15 – 20 years post the commencement of initial construction. It is difficult to predict traffic noise this far into the future as vehicles and transport preferences rapidly change. For example, to the end of April 2023 electric vehicles (EVs) made up approximately 7% of new cars sold in Australia. In the 2022 calendar year they accounted for just 3.1% of new car sales. The uptake of EVs is expected to increase significantly over the next decade as more (and cheaper) options become available. EVs generate almost no noise meaning traffic generated noise would be minimal. As a general guide a doubling of traffic flow on existing roads leads to a 3 dB(A) increase in traffic noise and the additional 520 construction vehicles is a small fraction of the total vehicles currently accessing the site. DMR's guidelines for existing roads without road works is that priority for noise investigations and acoustic treatments is given to cases where there is a sudden increase in traffic volumes (at least double) or a high percentage of heavy vehicles (greater than 20%) particularly at night. The construction phase, nor the future use of the site is expected to lead to these outcomes, necessitating an acoustic study.

6.5. Koala and Terrestrial Ecology Public Comments and Responses

Comments received on koala and other terrestrial ecology matters have been compiled and responded to in Table 6-5 using either direct wording from a single submission or an amalgam of comments encompassing the same issue. A total of 21 issues on terrestrial ecology were raised through public submissions 19 of which were koala related. Koala-related issues were categorised into six themes being the proposed underpass, movement in Cleveland, population, habitat impacts, management measures, and genetic diversity. The remaining two issues were categorised as 'other fauna'.

The table should be read in conjunction with Chapter 15 of the Draft EIS and associated technical appendices. Cross referencing to the Draft EIS has been included where appropriate and additional investigations included in appendices to this Supplementary Report.

Table 6-5: Koala and Terrestrial Ecology Public Comments and Responses

Theme	Comment ID	Comment	Response
Koala Underpass	TE1	The proposed underpass cannot work as unbroken fauna exclusion fencing is required to make these crossings effective. Attempting such a mitigation measure in a built-up urban environment is problematic due to high volumes of pedestrian traffic and multiple driveways etc. Koalas will simply walk around the end of fencing or through open gates.	Fencing can be installed immediately adjacent to the pavement, or at ground level at the bottom on the batter, for the entire distance of the raised road section. There is no traffic ingress or egress to this section of road from the adjacent properties. The crossing location is provided between the existing habitat north and south of Middle Street, deliberately located to minimise interruption to natural movement. The dimensions of the fauna underpass will be finalised during detailed design however at a minimum it will meet the requirements of the Queensland Government's Koala Sensitive Design Guideline (DES 2022). Refer to Draft EIS Figure 3-4 for concept design of the fauna crossing and exclusion fencing locations. Section 6.1.2 of Appendix 2-L (Terrestrial Ecology Report) and Draft EIS Sections 15.4.2.2 and 15.5 provide detail on the anticipated traffic impacts and the proposed underpass and fencing. In addition to this, post-construction, a speed limit of 50 km/h will be applied to Middle Street, which will reduce the potential for Koala strikes at either end of the fencing. This will be accompanied by signage and pavement marking to promote awareness of the fauna crossing area.
	TE2	The use of traffic controllers during construction is supported however we are unsure of the efficacy of the proposed underpass in Middle Street. The exclusion fencing which is essential to ensure the usage by koalas, is limited in urban situations by driveways and pedestrian usage. It is hard to imagine a barrier to koalas that is also not a barrier to pedestrians and vehicles. Even if blocked, koalas become confused and disoriented when they cannot reach their accustomed trees. The other major defect in this plan is the exclusion fence in GJ Walter Park along the rear of the properties fronting Shore Street East. This is the koalas' much-used route to reach their favourite trees along Shore Street East.	Driveways and pedestrian usage are not anticipated to be an issue due to the raised road design (refer to Section 15.4.2.2). The barrier to koalas entering the road surface put forward is the raised road. Pedestrians would use the underpass. There are no driveways affected in the area adjacent to the raised road. There is no exclusion fencing proposed for GJ Walter Park along Shore Street East. Refer to Draft EIS Figure 3-4 for concept design of the fauna crossing and exclusion fencing locations.
Koala Movement in Cleveland	TE3	Shore St East will be heavily impacted during the first stage of development being the northern residential precinct and foreshore/lagoon pool area. This alone will be enough to severely impact koalas, considering the tracking study showed most of the Toondah koalas cross this currently narrow road on many occasions each month to access habitat. The EIS fails to state how this threat to koalas will be mitigated and omitted from the habitat mapping the critically important koala habitat trees on the footpath along Shore St East. It is inevitable that this street will require widening and will result in the loss of some or all of these vital habitat trees.	This potential impact has been addressed in the Draft EIS. As described in the Draft EIS Section 15.4.2.2, and the BAAM Terrestrial Ecology Report (Appendix 2-L): *Prior to construction, Shore Street East will be designated as a 40 km/hr road and fitted with electronic signage to indicate vehicle speed and warn of the potential for Koalas crossing. All companies/workers providing services to the Project that will use this road will be inducted with content addressing the importance of observing road speed limits, designated routes, and being alert for Koalas on the road. Operational traffic (residential/retail/ commercial) generated by the development will be discouraged from using Shore Street East. The road will maintain the 40 km/hr speed limit, retain Koala awareness signage, and include slow points created by chicanes and/or speed bumps. Koala food trees will be planted within chicanes where branches will eventually meet across the road. Dense roadside plantings at ground level will be avoided to ensure Koalas on the roadside can be easily seen by motorists.*

Theme	Comment ID	Comment	Response
	TE4	The greatest immediate threat to the survival of the koalas at Toondah Harbour is vehicular strike. Construction traffic and eventual residential traffic movements will profoundly change the present circumstances. Shore Street East will become a conduit for the northern part of this development which will become operational in only five years after the beginning of construction.	All construction traffic will be required to access the site via Middle Street with speed limits and designated routes contractually required to be followed. All construction traffic will be 'walked' through the section of Middle Street adjacent to GJ Walter Park to ensure no koala strikes occur. The data in the EIS on vehicle strikes along Middle Road shows one vehicle strike in 2020 and another injured koala in 2018 with the cause of the injury not detailed in the data (refer to Draft EIS Figure 15-4). All data on injured koalas and vehicle strike was obtained through DES WildNet and includes all times of the day and night. There are barge and passenger ferry movements at dawn and dusk and after dark throughout the year, so the traffic movements associated with these ferry times are incorporated into the data. No widening or tree removal is proposed on Shore Street East as a result of the development. There is significant capacity within the road reserve in this area to avoid clearing of any Koala trees if road widening is carried out in the future by the State of Local government. We note that the Toondah Harbour development will implement mitigation responses which would otherwise not be achieved while properties along Shore St East are subject to high density developments in the future (as per allowances under the City Plan) without any requirement to address broader issues for safe koala passage through Shore St East. The Toondah Harbour Project will not restrict movement between existing Koala food trees within the entirety of GJ Walter Park. Koala resources in GJ Walter Park and the Trade College grounds will remain connected via the proposed underpass. The Toondah Harbour area already contains a number of roads and is highly utilised by pedestrians and dog walkers. A range of incidents have been reported along Shore Street East at the interface with GJ Walter Park including illness and vehicle strike. Proposed management measures including signage, speed limits and community programs will minimise the potential for impacts in this area.
	TE5	As the EIS reports, there have been no koala vehicle strikes reported on Middle Street between January 2015 and June 2021. This could be explained by the traffic not being through traffic with cars travelling slowly, often looking for car parks. Additionally, most barge and ferry traffic is within daylight hours.	
	TE6	The tracking study showed koalas move extensively along the length of GJ Walter Park, across to both sides of Shore St East and across Middle St to the Trade College grounds. The proposed development will sever these movement corridors by increases in traffic, as will the road through GJ.	
Koala Population	TE7	The Toondah koalas could be of great scientific interest because they are not only persisting in an urban environment but appear to be holding their own, in sustaining their breeding rate and being relatively healthy.	The proposed impact mitigation and monitoring measures reflect the importance of maintaining and understanding this subset of the local Koala population. Refer to Draft EIS section 15.5.
	TE8	The EIS correctly quotes sources saying the density of koalas in the Cleveland area was found in 2015 to be double that of bushland areas. However, the EIS then goes on to quote Rhodes et al., also in 2015: *that koala densities increase …. around some sites due to the crowding of koalas in areas when local habitat loss occurs and where low amounts of habitat are present in the surrounding landscape.* This does not explain the above normal koala density in the Toondah situation as urbanisation occurred there over one hundred years ago (unlike many other parts of the Redlands) and there has been little habitat loss in recent times.	Koala population trends are discussed in Section 15.3.2.2 of the Draft EIS and 4.2.3.3 of Appendix 2-L to the Draft EIS. The impacts of development trends in Cleveland on Koalas are discussed in detail in Section 4.2.3.5 of Appendix 2-L. It states that: *Under these pressures, the long-term maintenance of a stable number of healthy Koalas in the PDA and parkland habitats within, north and south of the PDA is not certain. Maintenance of these habitats and increasing their connectivity to bushland habitats may be critical to the survival of the Koala Coast population*. The above-normal Koala density in Toondah Harbour reflects the process of urbanisation resulting in crowding and this may not sustainable in the longer term as habitat trees are lost from within the urban matrix (through redevelopment and infill development) and suitable connections to other habitat nodes are lessened through broader urbanisation. Mitigation and management measures proposed for the Project address this issue.
Koala Habitat Impacts	TE9	The EIS claims to be only removing one primary food tree of the 215 koala food trees and 18 secondary food trees recorded within the PDA. This only seems to include the trees on some road reserves and some private properties. Figure 15.1 clearly shows the PDA including significant trees along the road reserve both sides of Shore Street East. Many of these trees do not seem to have been included.	An identified in the comment the Project will result in the removal of a very small number of koala habitat trees, most of which are located in and around existing car park areas. Four food trees on the northern footpath of Shore St East were surveyed. No works are proposed anywhere near these trees and none will be removed as a result of the Project so they have not been shown in the Draft EIS.
	TE10	Once the koalas 'home' trees are removed they do not return.	
	TE11	Planting koala food trees will be unlikely to overcome the additional stresses and losses of animals that will occur with increased population, dogs and traffic.	These issues are the focus of Chapter 15 and Appendix 2-L of the Draft EIS. Koala impact avoidance, mitigation and management are addressed in detail in Table 15-9 of the Draft EIS and have been developed in response to impacts identified through the EIS process.

Theme	Comment ID	Comment	Response
	TE12	The direct and consequential impacts of decades of site works and building construction will disturb koalas for "generations". Human activity is not just the reclamation process but the ongoing impacts of human activity that will displace and disturb koalas as a result of traffic, urban lighting, littering, pets, socialising, recreation, commuting, construction, and servicing 3600 dwellings.	These impacts have been addressed in section 15.4.2 of the Draft EIS and management actions to address the potential impacts are outlined in section 15.5 of the Draft EIS. Management measures proposed will result in a net gain of habitat for Koalas. Actions to mitigate and manage impacts on Koalas outside of the PDA, such as the proposed Cleveland koala safe neighbourhood program, will also address the current and ongoing Koala habitat modification that is a consequence of increasing urban density within the surrounding urban matrix.
Koala Management Measures	TE13	Proposed mitigation measures mentioned include: • Planting of koala habitat trees in GJ Walter Park through to Nandeebie Park; • Fauna friendly and koala exclusion fencing if required to guide fauna to the underpass; • Climbing structures and refuge poles; • Intersection, signage, landscape and pavement treatments to reinforce slow speed/shared environment; and • Community awareness and driver education programs. These measures are not dependent on the Toondah Harbour development going ahead. Some of these are already happening as RCC initiatives in their Koala Plan and there is no reason for others not to continue to occur with normal road upgrades.	The mitigation measures recommended are specific to, and appropriate for, the proposed development. Investment by the Proponent will bring forward a number of actions that specifically impact the PDA area and surrounds. There are no current Redland City Council management plans or programs that will deliver any of the management actions proposed through the Toondah Harbour Draft EIS. The proposed supplementary tree planting areas are outside of locations where there are existing Koala food trees, or where Koala food trees currently occur in low densities. The proposed planting densities are not designed to recreate a regional ecosystem that incorporates a proportion very large old-growth trees, but to provide maximum roosting and feeding opportunities for koalas in as shorter time as possible, account for natural attrition, and ultimately allow for food tree succession. Some will grow to be large trees, and some will remain smaller due to competition associated with planting density, with both forms providing valuable Koala forage and shelter. The detailed plan for replanting has not yet been prepared and will be developed in consultation with Redland City Council. Figure 15-11 of the Draft EIS shows the locations of proposed planting. Tree planting will occur very early in the development process. Traffic volumes will build over the 18-year development program. As a small number of existing food trees will be lost, the availability of feeding resources will not diminish during this period. The Proponent is confined to actions within the PDA – it has no ability to carry out management actions outside of this area. Potential external impacts have been addressed by committing to funding and otherwise supporting Redland City Council initiatives where Council determines the resources will be most effectively deployed. A new Koala Safe Neighbourhood area for Cleveland has been identified in consultation with Council to respond to the broader Koala issues in eastern Cleveland with a focus on the Toondah Harbour Koala population and nearby habitats.
	TE14	The EIS claims that 1,000 koala food trees will be planted in GJ Walter Park to compensate for the removal of one primary food tree and 18 secondary food trees. This is improbable given that most plantable areas in GJ Walter Park are already treed. The density of planting 1,000 trees in an area of 1 ha would be very close – approximately 3 metres apart which does not allow for existing tree shade and root area.	
	TE15	There is another claim made in the EIS that the "mitigation measures proposed for the Project will double available food resources for the local Koala population". There is no mention of a time frame but it is generally accepted that koala tree plantings will not be useful for about 10 years.	
	TE16	The EIS does not mention any mitigation measures for any of the other streets in or around the Toondah Precinct that will all experience substantial increases in traffic volume and will negatively impact other koalas that move around many areas of Cleveland.	
Genetic Diversity	TE17	The EIS Terrestrial Ecology report quotes the National Recovery Plan for Koalas in which the genetic health of a population is mentioned. The Coastal foreshore corridor is a vital corridor for koala connectivity as it is not crossed by major roads. It also links the creek corridors which come down from large areas of protected bushland habitat. The proposed Toondah Harbour development would sever this link with high-volume roads.	The proposed development would not sever any links between the PDA and other small patches of habitat. The proposed fauna crossing at Middle Street will provide for safer movement through this area than the current situation. The location of the PDA in relation to other habitat patches is addressed in the Draft EIS in Section 15.3.3.2 and Appendix 2-L Section 4.2.3.3.
	TE18	Assessment of the impact of the proposed Toondah residential development on koalas should consider the consequential impacts on a regional scale including the risk that Redland City's koalas would be	Assessment of impacts of the development on koalas outside of the PDA has determined that there is no significant residual impact on koalas (as defined under the EPBC Act) subject to the implementation of the proposed mitigation and management measures. Refer to section 15.4.2 of the

Theme	Comment ID	Comment	Response
		pushed below a critical threshold of genetic resilience if their population continue to fall.	Draft EIS and 6.1 of Appendix 2-L for a detailed discussion on the impacts at the Project and wider scale. Section 24.2.1 of the Draft EIS addresses significant impacts to koalas against the relevant criteria under the EPBC Act.
	TE19	The survival of koalas in the future is also threatened by climate change. Large areas, in the inland and to the north, that presently host koalas will not provide for them in the future because of predicted temperature changes and less rainfall. The well-watered coastal areas will be the koalas' best chance of survival.	This comment is speculative and provides no supporting scientific evidence. The proposal to plant an additional 1ha with koala food and shelter trees is in response to an understanding of the future significance of coastal koala habitat in the face of climate change.
Other Fauna	TE20	Lace Monitor - In the area around G.J. Walter Park we have observed and photographed on multiple occasions a Lace Monitor (Goanna) (*Varanus varius*). We have also observed and photographed Lace monitors at or near Oyster Point Park a few hundred metres south of Toondah Harbour on multiple occasions. The Draft EIS contains no mention of this species and no acknowledgement of its existence in the Toondah Harbour Priority Development Area.	Both Lace Monitor and Striped Honeyeater are common species and are not listed under the EPBC Act or the NC Act. Nevertheless, their presence contributes to the biodiversity of the PDA; neither species will lose available habitat as a result of the development.
	TE21	Striped honeyeater- We have reviewed the Draft EIS to see which birds have been identified as possible to be found in the Toondah Harbour Priority Development Area. One species not listed in the Draft EIS is the Striped honeyeater (*Plectorhyncha lanceolata*).We have observed and photographed this species in the Toondah harbour Priority Development Area at G.J. Walter Park on one occasion. We have seen this species on other occasions near foreshore areas in the Redlands	

6.6. Migratory Shorebirds Public Comments and Responses

Comments received on migratory shorebirds have been compiled and responded to in Table 6-6 using either direct wording from a single submission or an amalgam of comments encompassing the same issue. A total of 39 issues on migratory shorebirds were raised through public submissions. Issues were categorised into seven themes being carrying capacity, bird counts, direct habitat loss, indirect impacts, habitat connectivity, cumulative impacts and international agreements and conservation plans.

The table should be read in conjunction with Chapter 17 of the Draft EIS and associated technical appendices. Cross referencing to the Draft EIS has been included where appropriate and additional investigations included in appendices to this Supplementary Report.

Table 6-6: Migratory Shorebirds Public Comments and Responses

Theme	Comment ID	Comment	Response
Carrying Capacity	MS1	Carrying capacity constitutes a central part of the core logic of the developer and therefore warrants examination. Assumption 1: Shorebird habitat in other areas of Moreton Bay will remain unchanged - this is a highly uncertain and will be affected by such factors as climate change, sea level rise, severe weather events, increased human activity, pollution, algal blooms and further development. Assumption 2: Carrying capacity is a valid concept that can be applied overall without qualification - Ongoing work by QWSG indicates areas of lesser usage may well be critical for juvenile birds before they progress to richer feeding areas later in life. Assumption 3: Displaced shorebirds will simply move to habitat elsewhere without negative repercussions - This assumption is not adequately addressed in the EIS. Assumption 4: We can't reverse threatened shorebird decline as the root causes are outside Australia - The EIS refers to shorebird threats in the Yellow Sea and other areas however, Australia is not powerless in addressing matters outside of its territory. Assumption 5: The decline of threatened shorebird species will not be reversed - The EIS does not explore the scenario of a recovery of threatened shorebird species populations.	Background to the assessment of carrying capacity was outlined Section 17.4.3.4 of the Draft EIS with further detail provided in Section 4.2, 4.4 and 5.4 of Appendix 2-N. It was not a central part of the logic of the developer or impact assessment for the Project. It applies a known ecological theory to suggest a potential outcome to the loss of habitat at Toondah Harbour. The Draft EIS has acknowledged the loss of foraging habitat as a significant residual impact on several threatened shorebird species. Assumption 1: There is no published information to suggest that the carrying capacity of Moreton Bay for shorebirds has declined, nor is there published information on predicted future changes in carrying capacity, or how the factors that could affect future carrying capacity in Moreton Bay will also affect habitats elsewhere on the flyway, both being critical to shorebird populations. Thus, commentary on changing carrying capacity falls within the realm of speculation. The assessment of impacts for an EIS is required to be based on assessment of the likelihood of events occurring, substantiated with published or field-derived evidence. Assumption 2: This comment appears to be informed by an unpublished report by Bush et al. (2022) *Growing capacity to support migratory shorebird resilience at three of Queensland's coastal Ramsar sites*). Based on satellite tracking of juvenile Bar-tailed Godwit, the authors found that juveniles tended to have smaller feeding home ranges during the summer months when adults were also present and expanded their feeding home ranges in the winter months at the time that adults have departed on migration. They interpreted this pattern as suggesting that the increased ranging behaviour of juveniles in winter reflected a decrease in competition as a result of more dominant adult birds being absent, but referenced no published studies that would support such a conclusion. The authors also failed to consider and control for alternative explanations for such a pattern. One alternative is that food could be less abundant in winter than in summer, so the birds expand their foraging ranges in winter to compensate for this. Zharikov & Skilleter (2004a) examined seasonal changes in food availability for Eastern Curlew and found a seasonal decline in the abundance of both Trypaea shrimps and Mictyris crabs from spring through to winter in Moreton Bay, suggesting lower food abundance in winter. Furthermore, if competition with adults was really forcing the juveniles in more marginal feeding habitat areas in summer, an opposite pattern could also be predicted of foraging range size changes to what Bush et al. (2022) observed. Birds should have larger foraging ranges in summer when forced into marginal habitats due to the influence of competition – marginal habitats have less food so the birds must range more widely, but contract their ranges in the absence of competition in winter since they can then focus on the best areas. Zharikov & Skilleter (2004b) showed that foraging territory size of Eastern Curlew in Moreton Bay increases as prey density decreases. Assumption 3: The assessment of impacts is required to be based on assessment of the likelihood of events occurring, substantiated with evidence. Highly mobile shorebirds were considered more likely to adjust their foraging ranges in an adaptive way, if not constrained by foraging resource limitation linked to carrying capacity, since satellite telemetry shows that they are highly mobile within Moreton Bay and use a number of interconnected foraging habitats across local home ranges. Assumptions 4 and 5: The extent to which the Project could interfere with the recovery of threatened species was dealt with in the impact assessment for each of the relevant species. The assessment of impacts is required to be based on assessment of the likelihood of events occurring, substantiated with evidence. No published literature predicts a reversal of the loss of foraging habitat at key stop-over sites in south-east Asia. The loss of habitat in this area is widely considered to be the root cause of the population declines of the threatened shorebird species addressed in the EIS. It has been estimated that over 731,000 ha of tidal flat has been lost in the Yellow Sea alone over the past 50 years (Murray et al. 2014), and the abundant published literature shows that many of the pressures that originally led to the habitat loss are still present. Thus, the likelihood of further habitat loss, stabilisation of habitat area, or, at best a slight reversal in habitat loss is substantially greater than the likelihood of large-scale increase in tidal flat area in south-east Asia sufficient to restore the populations of threatened species to their original sizes. While it is not the Proponent or the project team's place to comment on international politics, the federal government has no legal ability to influence matters outside of its territory. The extent to which the Project could interfere with the recovery of threatened species was dealt with in the impact assessment for each of the relevant species.

Theme	Comment ID	Comment	Response
	MS2	There are no studies that support the assertion that declines of shorebird populations across their flyway mean the carrying capacity of Moreton Bay specifically can accommodate birds displaced by the Project.	Background to the assessment of carrying capacity was outlined Section 17.4.3.4 of the Draft EIS with further detail provided in Section 4.2, 4.4 and 5.4 of Appendix 2-N. The assessment is based on foundational ecological theory that is well supported in the published literature. The assessment of impacts is required to be based on assessment of the likelihood of events occurring, substantiated with evidence. No published literature predicts a reversal of the loss of foraging habitat at key stop-over sites in south-east Asia that is the root cause of the population declines of the threatened species addressed in the EIS.
	MS3	Satellite Telemetry of shorebirds using Moreton Bay suggest that shorebird movement patterns and home ranges are incredibly complex. The impacts of removing habitat are difficult to estimate.	Background to the assessment of carrying capacity was outlined Section 17.4.3.4 of the Draft EIS with further detail provided in Section 4.2, 4.4 and 5.4 of Appendix 2-N. The results of satellite telemetry of shorebirds, to the extent that it has been published, was reviewed and summarised in section 17.3.1 of the Draft EIS and section 4.2.1 and relevant sub-sections of Section 4.5 of Appendix 2-N. The EIS shorebird assessment reviewed evidence showing that shorebird foraging densities vary greatly across Moreton Bay, and provided extensive field data that show that the foraging densities of threatened shorebird species are comparatively low within the project area. It is agreed that predicting how migratory shorebirds will react to the loss of habitat is difficult, which is why the EIS has identified it as a significant residual impact.
	MS4	The Healthy Land and Water Report Card 2022 for the environmental condition of south east Queensland is poor. Removing any part of the ecosystem can only compound the issues identified by the report card. The presence of mud does not equate with quality foraging areas for migratory shorebirds. This will also put upwards pressure on the ability of juvenile birds to compete for food resources.	There is no published link between the Healthy Land and Water Report Card metrics and shorebird habitat condition. Increased nutrients and expansion of mud in Moreton Bay may have positive impacts on migratory shorebird food availability. Murray et al. (2014) provide evidence of how sediment deposition in the estuaries of the Yalu and Chongchon rivers in North Korea, which was linked to increased soil erosion caused by abrupt land clearing, led to an increase in tidal flat area for shorebirds. Thompson (1990) provided evidence demonstrating that organic enrichment originating from the main Brisbane sewage outflow at Luggage Point in the early years of its operation led to large increases in the standing crop of benthic macro-infauna such as polychaete worms that provide food for shorebirds including Bar-tailed Godwits, and attracted densities of foraging Bar-tailed Godwit that were much higher than surrounding areas. O'Mara et al. (2021) found that nutrients from a large cyclone-driven flood of the Logan River stimulated benthic primary production that was transferred through the food web, with positive impacts on condition of Brown Tiger Prawn, a benthic invertebrate.
Bird Counts	MS5	The data underestimates the importance of the project site to threatened species. QWSG counts at Oyster Point on 18 October 2022 found 129 Eastern Curlews. The highest number recorded by the EIS studies 45.	The assessment of the importance of habitats at the project site and surrounds was based on extensive field surveys and review of all QWSG data. Assessment methods are outlined in section 17.2 of the Draft EIS with results reported in section 17.3.3 and 17.3.4. Further detail is provided in sections 3.3 and 4.2.3 of Appendix 2-N. The Draft EIS identified the maximum count recorded for Eastern Curlew from all data was identified as 130. This aligns with recent counts carried out by QWSG and other groups. The maximum counts recorded from all data have been 1,645 Bar-tailed Godwit, 70 Whimbrel, 130 Eastern Curlew, 22 Great Knot, 26 Red Knot, 20 Curlew Sandpiper, 36 Sharp-tailed Sandpiper, 45 Terek Sandpiper, 116 Grey-tailed Tattler, 4 Common Greenshank, 3 Ruddy Turnstone and 2 Red-necked Stint; these are generally greater than the counts reported by Wild Redlands. The assessment carried out for the Draft EIS showed that the use of Oyster Point by migratory shorebirds is variable, with no evidence of a change in average numbers or frequency of use in summer over the 20-year period since 2000 and that Oyster Point is a nationally significant roost site for Eastern Curlew (supporting over 0.1% but less than 1% of the flyway population). Surveys completed in October 2023 included sighting of up to 239 Eastern Curlew and up to 411 Bar-tailed Godwit, as well as up to 13 Red Knot. The observation of 239 Eastern Curlew during a single survey represents the largest number of Eastern Curlew recorded roosting at Oyster Point over the past 23 years (refer to Appendix 2-N of the Draft EIS) and equates to 0.68% of the flyway population of the species. The increased use of Oyster Point is also broadly consistent with community reports over the past year. This increase has coincided with the loss of the offshore sandbank roost site located 2 km east of Toondah Harbour which has been eroded over the previous 12 months by natural hydrological processes to the point that it now does not remain exposed during high tides. Further, the Project is not expected to impact on birds roosting at Oyster Point as it is more the 450m from the Project footprint, which is nearly double the maximum flight initiation distance identified through review of published literature (refer to Table 17-8 of the Draft EIS). It is also more than 550m from the reclamation area or harbour upgrade works. Noise (Draft EIS Chapter 12) and lighting (Chapter 13) modelling also demonstrated levels would be well below thresholds to disturb migratory shorebird species. A range of management measures will also be put in place to further minimise indirect impacts from the Project, such as only allowing loud noise sources to occur at certain times of year.
	MS6	Count data in the draft EIS for Eastern Curlew in the direct vicinity of the development is inaccurate. Recent surveys conducted by BirdLife Australia counted between 160 and 180 Eastern Curlew at Oyster Point.	
	MS7	Wild Redlands' records for Oyster Point since 2016 have seen larger numbers of several migratory shorebird species than the maximum numbers reported in the Toondah Harbour Draft EIS. Maximum numbers for Oyster Point have been 54 Whimbrels, 20 Great knots, 100 Grey-tailed tattlers, 12 Terek sandpipers and 10 Pacific Golden plovers.	

Theme	Comment ID	Comment	Response
	MS8	The EIS does not indicate that there are many birds, including resident shorebirds and other birds which are not classified as shorebirds (waders) which regularly can be seen at Toondah Harbour mudflats.	The total numbers of all waterbird species were recorded during all field surveys undertaken for the project and the details of all field survey data were included in Appendix 4 of the shorebird technical report (Appendix 2-N of the Draft EIS). The EIS addresses species and matters listed under the EPBC Act. Shorebird species listed under the EPBC Act that are not migratory species are addressed in the Terrestrial Ecology section of the Draft EIS (refer to section 15.3.7 and 15.4.6).
	MS9	The EIS states that Nandeebie Claypan is not being utilized by the shorebirds anymore. This is at odds with the description of birds seen.	The results of all surveys pertaining to Nandeebie Claypan are summarised in section 17.3.3.2 of the Draft EIS and detailed in Section 4.3.1.2 of Appendix 2-N. Surveys were completed as far back as 2014 when migratory birds were still observed utilising the site. No migratory shorebirds were observed utilising the site between December 2019 and March 2022. Recent surveys in October 2023 found migratory shorebirds were utilising Nandeebie Claypan again. Results and discussion of these surveys are included in section 5.6.1 of this Supplementary Report. Notwithstanding the recent survey results, the ongoing encroachment of mangroves establishing across the Nandeebie roost site is still expected to continue to decrease the suitability of the site as a shorebird roost, including for Eastern Curlew, consistent with overall trends reported for Moreton Bay (Fuller et al. 2021).
	MS10	Cassim Island is identified as internationally significant for migratory shorebirds. It is specifically noted that the critically endangered Far Eastern Curlew roosts in this area too, as well as feeding locally.	Cassim Island was identified as internationally significant for Grey-tailed Tattler. It did not meet the thresholds for any other species based on the overall number and diversity of shorebirds. The use of roost sites and feeding habitat by Eastern Curlew was detailed in section 17.3.3 of the Draft EIS and section 4.5.1 of Appendix 2-N. Eastern Curlew does not roost at Cassim Island.
Loss of Habitat	MS11	The population of critically endangered Eastern Curlews has declined by over 80% in the past 30 years. Eastern Curlew feeding habitat cannot be replaced or offset. The destruction of any of their feeding habitat will result in a net loss of habitat for the species and is thus a significant impact.	As detailed in section 17.3.1 of the Draft EIS and section 4.5.1 of Appendix 2-N, the decline of Eastern Curlew is strongly linked to the loss of intertidal feeding habitat at key migration staging sites in the Yellow Sea that Eastern Curlew is highly reliant on (TSSC 2015a, Studds et al. 2017).
	MS12	The site incorporates approximately 28.9 ha of tidal flat used as feeding habitat by migratory and resident shorebirds however the EIS says that there is approximately 40 ha of intertidal mudflat at low tide. This is all area that can be used by birds for foraging for food.	The approximately 40 ha refers to the tidal flat habitat within and adjacent to the PDA that was surveyed for foraging shorebirds at low tide. The direct impact of the project footprint is 28.9 ha of tidal flat.
	MS13	Destruction of a feeding habitat at the site is unable to be traded-off for sites elsewhere. The site-loyal waders return to almost the same spot each year.	Published results of satellite telemetry, reviewed and summarised in sections 4.2.1 and relevant sub-sections of Section 4.5 of Appendix 2-N of the Draft EIS, demonstrate that migratory shorebirds move around with local home ranges, generally using more than one site. The EIS has acknowledged the loss of foraging habitat as a significant residual impact on threatened shorebird species.
	MS14	The shocking but unstoppable loss of roosting habitat at the Port of Brisbane does not make the loss of a smaller area of foraging habitat at Toondah Harbour acceptable.	No such rationale was included in the Draft EIS. The Cumulative Impact Assessment (CIA - Chapter 26 of the Draft EIS) is required to assess impacts from all known future actions or activities in additional to the predicted impacts from the Toondah Harbour Project. The ongoing development of the Port of Brisbane Expansion (PoBE) has been approved for several years and is currently being implemented therefore must be addressed by the CIA. Fuller et al. (2021) identified that approximately one third of all migratory shorebirds in Moreton Bay utilise the PoBE for roosting and foraging. The tidal flats at Toondah Harbour supports well under 1% of shorebirds within Moreton Bay. Therefore, the loss of habitat at PoBE was identified as a larger impact on migratory shorebirds than the Toondah Harbour Project. The EIS has acknowledged the loss of foraging habitat as a significant residual impact on threatened shorebird species.
	MS15	The Draft EIS does not address the interconnectivity of tidal feeding habitat within the MBRS.	The Draft EIS addresses the interconnectivity of tidal flat feeding habitat within the MBRS. The results of satellite telemetry of shorebirds, to the extent that it has been published, was reviewed and summarised in section 17.3.1 of the Draft EIS and sections 4.2.1 and section 4.5 of Appendix 2-N.

Theme	Comment ID	Comment	Response
	MS16	The focus on the small area (percentage of Ramsar site) which will be affected is misleading, because the analysis uses the total Ramsar area, not the area actually used by shorebirds.	All references to shorebird habitat area percentages in the Migratory Shorebird Draft EIS Chapter (Chapter 17) are made based on the estimated total area of 10,000 ha of tidal flat foraging habitat in Moreton Bay reported in Fuller et al. (2021).
	MS17	If these feeding areas were not valuable, these threatened species would not be using them. The presence of several nearby roost sites is evidence that the surrounding intertidal areas do provide valuable foraging resources.	As outlined in the Draft EIS, the tidal flats at Toondah Harbour support foraging habitat for shorebirds, including migratory shorebirds. To assess the relative importance of foraging habitat at Toondah Harbour in the context of representative foraging habitats elsewhere in south-western Moreton Bay, surveys of shorebirds foraging at low tide were conducted across an additional 567 ha of tidal flat foraging habitat along the mainland coastline north and south of Toondah Harbour. The surveys of foraging shorebird densities found substantial variation in the shorebird species composition and foraging densities across the different tidal flat areas sampled at low tide in south-western Moreton Bay. Tidal flats in the Project footprint had the lowest total migratory shorebird summer foraging density of all the areas sampled- an average of 10.0 birds per 10 ha over the past five years compared with the average densities of 13.9 to 116.6 birds per 10 ha recorded across other tidal flat areas both north and south of the Project footprint in south-western Moreton Bay. As a further assessment of the migratory shorebird foraging densities at Toondah Harbour, they were also compared with surveys from the central western portion of Moreton Bay on the western edge of Bramble Bay (Lloyd et al. 2021). This comparison confirmed that the tidal flats at Toondah Harbour support a low total migratory shorebird foraging density, an average density of eastern curlew and terek sandpiper, and relatively low densities of bar-tailed godwit, whimbrel and grey-tailed tattler—the five most common migratory shorebird species using the Toondah Harbour tidal flats. The EIS has acknowledged the loss of foraging habitat as a significant residual impact on threatened shorebird species. However, overall shorebird usage of the Toondah Harbour mudflats is actually much lower than nearby locations and mudflats near the Brisbane River and other areas of Moreton Bay.
	MS18	Not all coastal areas have tidal mudflats that have the exact food (molluscs, crabs, worms etc) and mud consistency for the birds to forage. Different birds require varying types of mudflats. Toondah Harbour meets the criteria required by many birds.	
	MS19	Each species of migratory shorebird requires its own particular niche, its own specific type of intertidal mudflat, on which to feed or rest. Eastern curlews are no different.	
	MS20	A species likely to be affected by the Project is the Pied Oystercatcher. In Moreton Bay the eastern Cleveland foreshore is now critical to the species for feeding, with similar feeding habitat elsewhere in the Bay having been lost.	Average and maximum numbers recorded feeding at Toondah Harbour were also included in Table 17-6 of the Draft EIS. Section 4.3.4 of Appendix 2-N of the Draft EIS noted that the Project area and the immediately adjacent areas between Cleveland Point and Oyster Point support relatively high foraging densities of Australian Pied Oystercatcher, averaging 6.5 to 12.9 birds per 10 ha in summer. Pied Oystercatchers are not protected under the EPBC Act therefore a significant impact analysis as not completed for this species.
Indirect Impacts	MS21	The configuration of the development and increased vessels activity will bring human activity closer to the Cassim roost site disrupting wader feeding and resting; such disturbance can be critical for migrating birds.	Indirect impacts from light, noise and human presence were addressed in section 17.4.3 of the Draft EIS and section 5.3 of Appendix 2-N. The assessment found that implementation of a range of management measures to reduce indirect disturbance, such as fauna friendly lighting strategies and avoiding high noise generating construction activities during periods when shorebirds are most active (Nov – March), will minimise potential impacts on areas outside of the Project footprint. <u>Lighting</u> The Project's lighting strategy has been developed specifically to avoid impacts to fauna, including migratory shorebirds. Management measures implemented during design, construction and ongoing uses will include: ▪ Lighting design will adhere to AS 4282 - Control of the obtrusive effects of outdoor lighting and the National Light Pollution Guidelines for Wildlife Including marine turtles, seabirds and migratory shorebirds. ▪ Luminaires selected for street and park lighting are to be dark sky compliant. ▪ Light downwards and not horizontally or vertically. ▪ Avoid excessively bright points of light being directed towards Moreton Bay. ▪ Avoid illumination of large vertical surfaces visible from Moreton Bay. ▪ Park and open space planting planning to assist with screening ground level visibility and avoid light spill onto surround areas.

Theme	Comment ID	Comment	Response
	MS22	Noise, lights, human presence etc. from a 20-year construction will likely displace birds that use the Toondah Ramsar site.	Modelling demonstrated that light spill will be kept to 1 Lux within the Project footprint and therefore light levels in the receiving environment of the tidal flats and Cassim Island roost site will substantially less than 1Lux (refer to section 13.5 of the Draft EIS). Given a full moon under clear conditions provides light levels of 0.1-0.3 Lux (Gaston et al 2013) there is minimal potential for Project lighting to impact on migratory shorebirds outside the Project footprint. <u>Noise</u> Seabirds exhibit alert behaviours to most levels of noise exposure, but begin to take flight in response to noise exposure levels greater than 85 dB(A) (Brown 1990), consistent with observations that sound levels of 43-87 dB(A) have limited effects on foraging shorebirds, but sound levels of 84-100 dB(A) cause most shorebirds in a habituated population to leave the area of disturbance (Smit and Visser 1993). A study examining the responses of shorebirds roosting at a site close to several industrial power plants to experimentally generated impulse noise found that the probability of birds taking flight but returning to the roost increased in response to noise levels of 60-70 dB(A) while the probability of all birds taking flight and leaving the roost site increased exponentially from a probability of approximately 10% at 65 dB(A) to 30% at 70 dB(A) and 100% at 90 dB(A) (Wright et al. 2013). The EIS assessment concluded that noise generated during construction phases of the Project will also be accompanied by visual disturbance therefore it is likely that noise disturbance exceeding 60 dB(A) in the receiving environment during some construction activities would cause shorebirds roosting along the western edges of the roost site to take flight from time to time. To mitigate the risk of this impact, works that will result in noise levels exceeding 60 dB(A) at the Cassim Island roost will be restricted to the winter months (mid-April to August) when few migratory shorebirds are present. Section 17.3.3.1 of the Draft EIS defines Cassim Island: "Cassim Island is not a true island but instead comprises a large and dispersed area of mangrove trees, dominated by Grey Mangrove (*Avicennia marina*), that grow on and around an intertidal sand bar adjacent to the eastern boundary of the Project area". The full extent of the mangrove trees comprising the shorebird roost site are also mapped on Figure 17-4 and 17-6 amongst others. It is acknowledged that noise modelling outputs were difficult to review in the context of sensitive receptors surrounding the Project footprint in the Draft EIS. Updated plans are provided in section 5.6 of this document. <u>Visual and Human</u> Published information on flight initiation distances (FID) was reviewed and presented in Table17-8 of the Draft EIS. This information informed the assessment of impacts. Construction activities including the installation of sheet piling and placement of rock armouring will occur within the FIDs for some shorebird species utilising Cassim Island. These activities will be short term (2-4 months) and will be carried out during breeding season in the northern hemisphere (April – August), when few shorebirds will be using the Cassim Island roost site, thereby minimising the risk of disturbance roosting shorebirds. Dredging will generally be carried out outside of the FIDs for most shorebird species that utilise Cassim Island, however at its closest point will be approximately 150m from the edge of the mangroves. Dredging in these areas will be carried out between April and August and with equipment similar to that used for maintenance dredging, which has not been reported to impact on roosting birds. Fison Channel will also be relocated south and will be further from Cassim Island than the existing channel (refer to Figure 1-2 in this document). The development is expected to increase use of the public walkway/cycleway and Oyster Point Park recreational facilities that are located within 50-70 m of the Nandeebie Claypan and Oyster Point roost sites. These areas are already public spaces used by residents in an area that continues
	MS23	The potential mitigations proposed during works are unproven and the impacts of the work on local hydrology and benthos can only be guessed at with little true data available to assess.	
	MS24	The noise report has assessed noise levels likely to be experienced at Cassim Island and thus, by association, roosting shorebirds. However, the report completely fails to describe what constitutes 'Cassim Island', and as a consequence, for the purposes of establishing noise contours, this site boundary is not presented with any accuracy.	
	MS25	The shorebird reporting has described the effects of varying noise levels on roosting shorebirds but there is no description of noise levels and the potential effect on feeding/foraging shorebirds in open areas near the construction site.	
	MS26	Shorebirds adjacent to the site will take flight at visual disturbance, even from in excess of 150 metres in the case of Eastern Curlews for even relatively low key human intrusion.	
	MS27	It is stated that only building of a few storeys would be permitted closer to roosts but fails to address the light and noise pollution and rubbish from the site both during and post construction would impact birds nor does it explain how a significant increase in boat traffic from the enlarged marina will impact roosting birds.	
	MS28	In addition to the intrusion of noise, the development footprint essentially abuts Cassim Island's mudflats, which is likely to enable people to walk or canoe out to the island. Drones may also be used to disturb the shorebirds at Cassim Island.	
	MS29	Whilst the EIS acknowledges lighting impacts and considers the project's impact by outlining a 'low, long and shielded' lighting plan for the duration of the project, it appears to be silent as to how lighting post construction will affect migratory birds who still habituate the area.	

Theme	Comment ID	Comment	Response
	MS30	The buffer zones required to protect roosting and nearby foraging sites are inadequate, and do not meet the requirements of the targeted Guidelines. Specifically: ▪ The roost site of Cassim Island will be subject to significant and unavoidable disturbance from an increase in water traffic that will pass within the 250 metre buffer zone. ▪ Other critical roost sites, including the Oyster Point roost site, lack any form of buffer from human disturbance. ▪ The increase in non-motorised and motorised watercraft will also increase disturbance across all adjacent roosting and foraging sites where there is direct water access.	to experience population growth from ongoing residential housing development. As a contributor to this population growth, there is potential for the Project to increase the risk of disturbance to shorebird species using these roost sites. Migratory shorebirds roosting at Oyster Point have habituated to public use of the recreational facilities. Potential impacts will be mitigated through the use of educational signage and other measures within Oyster Point Park. While the Project includes a marina with up to 200 wet berths, the existing public boat ramp will be decommissioned, resulting in no net change to the quantity of small recreational boat traffic in the harbour. The boat traffic lanes are well marked either side of the sandbank and are located sufficiently far from the sandbank that passing boats do not cause disturbance to the birds. Realignment of the Fison Channel to the south of the existing channel will further reduce potential impacts. During the high tide surveys, a person was observed fishing on the sandbank offshore of Cassim Island on one occasion, having accessed it in a kayak. The risk of such disturbance may increase slightly as the Project includes a boat ramp for non-motorised recreational vessels, although it is noted that GJ Walter Park is already considered a canoe and kayak launch point by RCC. This risk will be mitigated by information signage at the boat ramp. Mitigation measures outlined in section 17.5 of the Draft EIS include designating the area within 100 m of the outer edge of the mangroves surrounding Cassim Island as a sensitive shorebird habitat area, prominent information signage to this effect will be erected at the boat ramp for non-motorised vessels and entry of watercraft within the Cassim Island sensitive shorebird habitat area during high tide will be discouraged. While measures such as signage and prohibition areas are subject to human behavioural response, the assessment of impacts assumed that this most people would follow the directions provided. As outlined in section 17.5.1 of the Draft EIS proposed mitigation measures were informed by *EPBC Act Policy Statement 3.21—Industry guidelines for avoiding, assessing and mitigating impacts on EPBC Act listed migratory shorebird species*, *National Light Pollution Guidelines for Wildlife Including Marine Turtles, Seabirds and Migratory Shorebirds*, and a review of published literature. While a range of site-specific factors have the potential to impact the effectiveness of management measures, using industry best practice guidelines and peer reviewed literature ensures the best possible outcomes are achieved. Further, the Project will utilise an adaptive management regime to modify and refine management protocols and techniques to achieve the best environmental outcomes. Monitoring programs may find impacts differ from what has been predicted. New information on species and habitat including improved management techniques are also likely to become available over the duration of the Project. As a result, it is imperative that site management is flexible and can be modified during the construction period. An adaptive management approach will be adopted which will allow future research and best practice development can be included and integrated into the management, mitigation, and monitoring of the Project. <u>Drones</u> A recent study by Wilson *et al* 2023 had mixed results for disturbance of migratory shorebirds. It concluded that '*drones can be an effective, low-disturbance tool for shorebird surveys; however, they can also be a significant source of disturbance for bird flocks containing highly sensitive species*' and that '*most species are unlikely to take flight when approached by a small drone at vertical distances above 60 m, except the endangered Eastern Curlew, which is extremely sensitive to drone-induced disturbance*'. The drone manufacturer JOUAV website (<u>https://www.jouav.com/</u>) identified common ranges for mid-level drones are 400 m to 3 km while toy drones can fly 50 – 100 m. At its closest point mangroves fringing Cassim Island are 75 m from any parkland areas. This would be at that maximum extent for most cheap toy drones. Fringing mangroves from Cassim Island are also approximately 500 m from the closest point in GJ Walter Park, well within the range of most mid-level drones. Given the above, the Toondah Harbour Project is not expected to increase this existing risk of disturbance to shorebirds by drone use. It is noted that Eastern Curlew, the species identified as being most susceptible to disturbance by drones, do not use the Cassim Island roost site.

Theme	Comment ID	Comment	Response
	MS31	The dimensions presented that have defined separation distances and buffer effects are misleading in the EIS. Distances should be measured both from the point of regular human activity in the construction phase and from human activity areas when the completed development is in place.	Section 17.4.3.1 of the Draft EIS states construction activities including reclamation sheet piling and the rockwall breakwater are proposed to be undertaken at distances of 70-130 m from the closest mangrove trees around Cassim Island. The rockwall breakwater will be constructed in the winter months and will be gated and not open to the public once completed. No buildings will be constructed within 250 m of the Cassim Island roost site. It is acknowledged that buffer distances were difficult to review in the context of sensitive receptors surrounding the Project footprint in the Draft EIS. Updated plans are provided in section 5.4 of this Supplementary Report.
Habitat Connectivity	MS32	The number of shorebirds – including Eastern Curlews - utilising nearby roosting sites exceed the thresholds for nationally- and internationally-important wetland sites under the EPBC Act. While these roost sites are outside of the direct Project area, a key reason the birds roost there is because of the proximity to nearby feeding grounds. The loss of intertidal foraging habitat within the Project area will therefore impact the shorebirds that use the wider network of roosting and feeding sites.	As outlined in section 17.3.25 of the Draft EIS shorebird habitats within or adjacent to the Project footprint occur within the MBRS therefore are automatically considered to be important habitat for migratory shorebirds under the EPBC Act. However, when assessed against criteria based on number and diversity of shorebirds Cassim Island and the tidal flats at Toondah Harbour are only considered important for Grey-tailed Tattler. Oyster Point and the sandbank offshore of Cassim Island are both considered nationally important for Eastern Curlews. Neither of these sites are expected to be impacted by the development. As clearly outlined in Chapters 24 and 25 of the Draft EIS and Appendix 2-N, the loss of 28.9 ha of tidal flat feeding habitat, which corresponds to 0.29% of the approximately 10,000 ha of tidal flat habitat within Moreton Bay is likely to have a significant residual impact on: ▪ Eastern Curlew, listed as critically endangered and migratory under the EPBC Act, by adversely affecting feeding habitat used by an average of 3 (maximum of 7) birds over the past five years and reducing the area of occupancy of the species in feeding habitat by 0.29% within Moreton Bay; ▪ Great Knot, listed as critically endangered and migratory under the EPBC Act, by adversely affecting feeding habitat used rarely by up to one individual; ▪ Lesser Sand Plover, listed as endangered and migratory under the EPBC Act, by adversely affecting feeding habitat used rarely by up to two individuals; ▪ Bar-tailed Godwit (Western Alaskan), listed as vulnerable and migratory under the EPBC Act, by adversely affecting feeding habitat used by an average of 12.9 (maximum of 24) birds over the past five years and reducing the area of occupancy of an important population of the species in feeding habitat by 0.29% within Moreton Bay; ▪ Grey-tailed Tattler, listed as migratory under the EPBC Act, by destroying feeding habitat used by an average of 12.5 (maximum of 78) birds over the past five years and disrupting the feeding behaviour of an ecologically significant proportion of the population; ▪ Whimbrel, listed as migratory under the EPBC Act, by destroying feeding habitat used by an average of 7.6 (maximum of 14) birds over the past five years; ▪ Terek Sandpiper, listed as migratory under the EPBC Act, by destroying feeding habitat used by an average of 4.6 (maximum of 36) birds over the past five years; ▪ Red-necked Stint, listed as migratory under the EPBC Act, by destroying feeding habitat used rarely by small numbers of the species; and ▪ Common Greenshank, listed as migratory under the EPBC Act, by destroying feeding habitat used rarely by small numbers of the species.
	MS33	The Eastern Curlew needs a very large area for feeding so every area where it feeds in Moreton Bay is essential as these birds are faithful to particular sites. Juveniles in particular overwinter in the Toondah Harbour area. This area is only a few hundred metres to the Oyster Point Roost site.	As outlined in sections 17.3.3 and 17.3.4 of the Draft EIS, surveys of foraging habitat in winter found no Eastern Curlew foraging within or immediately adjoining the Project area in even though they have been observed roosting at Oyster Point. An average of 3 and maximum of 7 have been observed on the Toondah Harbour mudflats during summer months in the five years from 2017 to 2022. This is approximately 0.3% of the average number seen in Moreton Bay between 1978 and 2006. While these individuals may be affected by the Project it is a very small percentage of the overall population. The EIS has acknowledged the loss of foraging habitat as a significant residual impact on threatened shorebird species.

Theme	Comment ID	Comment	Response
	MS34	Within Moreton Bay, the average distance individual Eastern Curlews travel between feeding and roosting habitat is 4.7km (with a range of 0-26 km) (Lilleyman et al. 2020). Based on the draft EIS, this means that approximately 3.8% of critically endangered Eastern Curlew feeding habitat within 5 km of the project area will be destroyed. The draft EIS is misleading in its presentation of this data, stating instead that "The direct impact of the Project on 28.9 ha of tidal flat feeding habitat to accommodate the Project footprint corresponds to 0.29% of the approximately 10,000 ha of important tidal flat habitat within Moreton Bay.	The 10,000 ha of tidal flat habitat within Moreton Bay reported by Fuller et al. (2021) is a reasonable comparison for assessing impacts to highly mobile species such as the Eastern Curlew. Lilleyman et al. 2020 found the core home range of Eastern Curlews in Moreton Bay was up to 128.6 km^2 suggesting they are able to cover significant distances to find foraging habitat.
Cumulative Impacts	MS35	The cumulative destruction of one or more sites where Eastern Curlew regularly feed places further pressure on individual birds, reducing their range and increasing competition for limited resources and thus potentially contributing to local population declines. The EIS does not determine whether there are appropriate alternate foraging sites that could accommodate displaced birds through benthic studies and other peer reviewed literature.	Refer to response to MS1. The assessment of impacts is required to be based on assessment of the likelihood of events occurring, substantiated with evidence. Highly mobile shorebirds were considered more likely to adjust their foraging ranges in an adaptive way, if not constrained by foraging resource limitation linked to carrying capacity, since satellite telemetry shows that they are highly mobile within Moreton Bay and use a number of interconnected foraging habitats across local home ranges.
	MS36	Increased competition particularly affects juvenile birds, which are not as strong or experienced enough to compete with adult birds.	Refer to response to MS1. As outlined in sections 17.3.3 and 17.3.4 of the Draft EIS, surveys of foraging habitat in winter found no Eastern Curlew foraging within or immediately adjoining the Project area. If juveniles were utilising the area, it is expected they would be present over winter months before making their first migration.
	MS37	Approximately 400 metres to the north of the proposed development is the Raby Bay canal estate, developed in the 1990s and into the 2000s. The area supported close to 5,000 migratory shorebirds, which fed and roosted locally. Given the local proximity many of these were likely displaced to roosting and feeding sites further south including the area under discussion here, putting it already under already additional pressure.	The review of threats and trends in shorebird habitat condition in Moreton Bay included in section 17.3.1.1 of the Draft EIS and section 4.4 of Appendix 2-N included the history of roost site loss in the Cleveland area, including Raby Bay. The Cumulative Impact Assessment addresses predicted future impacts to shorebird habitat from projects currently approved or are considered reasonable likely to approve. Raby Bay was constructed nearly 30 years ago therefore is not considered in this assessment as it is now part of the existing environment. As described throughout the Draft and Supplementary Report the number of migratory shorebirds that utilise Toondah Harbour is considerably less than the 5,000 at Raby Bay as identified by the commenter.

Theme	Comment ID	Comment	Response
International Agreements and Conservation Plans	MS38	The Project is in conflict with many objectives, actions or priorities in various international treaties and conservation planning documents for migratory shorebirds including: ▪ The Ramsar Convention on Wetlands of International Importance ▪ The Bonn Convention on Migratory Species of Wild Animals ▪ Bi-lateral migratory bird agreements with: Japan (JAMBA), China (CAMBA), and the Republic of Korea (ROKAMBA) ▪ The Australian Government's Wildlife Conservation Plan for Migratory Shorebirds (2015) ▪ The International Single Species Action Plan for the Conservation of Far Eastern Curlew ▪ Threatened Species Action Plan 2022-2032 ▪ Conservation advices, including for the Eastern Curlew.	International agreements and conventions and their relevance to the Project are addressed in table 4-2 of the Draft EIS. Their direct relevance to migratory shorebirds is also addressed in section 17.1.2. The relevance of the Project to the Ramsar Convention is addressed in detail in chapter 27 of the Draft EIS. The EPBC Act protects matters of national environmental significance (MNES) and provides the legal mechanism for ensuring Australia meets its obligations under the Ramsar Convention and other international agreements relating to conservation of migratory shorebird species. The EPBC Act allows for significant residual impacts on MNES to occur if they are considered 'acceptable'. Significant Residual Impacts are offset in accordance with the EPBC Act Environmental Offsets Policy. Conservation advice and management plans relevant to the threatened species potentially impacted by the Project are addressed for each species in Chapter 24 of the Draft EIS. Generally, these plans apply to Commonwealth and State government managing protection of the species and not individual projects. The threatened species action plan 2022 – 2032 was published after the completion and public release of the Draft EIS. The plan outlined three targets for threatened species: ▪ All priority species are on track for improved trajectory ▪ Implementation of priority actions for priority species is tracked and published ▪ Species at high risk of imminent extinction are identified and supported to persist These actions and targets are aimed at public policy and are not applicable at the Project level. It is noted that Toondah Harbour, and Moreton Bay more broadly, have not been identified as 'priority places' by the strategy. It is noted that DCCEEW are currently considering moving Eastern Curlew from critically endangered to endangered due to a slowing in population decline.
	MS39	The draft EIS implies several times that the shorebird habitat within the Project Footprint is not as important compared to other habitat in Moreton Bay. However, all habitat areas used by shorebirds within a listed Ramsar site are considered internationally important under the Ramsar Convention, regardless of the number of shorebirds that use the habitat area.	In sections 17.2.4 and 17.3.5 of the Draft EIS it is explicitly stated that "Habitat areas used by shorebirds within a listed Ramsar site are considered internationally important regardless of the number of shorebirds that use the habitat area". However, when assessed against criteria based on number and diversity of shorebirds Cassim Island and the tidal flats at Toondah Harbour are only considered important for Grey-tailed Tattler. Oyster Point and the sandbank offshore of Cassim Island are both considered nationally important for Eastern Curlews. Neither of these sites are expected to be impacted by the development.

6.7. Marine Ecology and Water Quality Public Comments and Responses

Comments received on Marine Ecology and Water Quality have been compiled and responded to in Table 6-7 using either direct wording from a single submission or an amalgam of comments encompassing the same issue. A total of 35 issues on marine ecology and water quality were raised through public submissions. Issues were categorised into six themes being dredge plume and water quality impacts, habitat loss, mega fauna impacts, dolphin species, indirect and Cumulative Impacts and carbon sequestration.

The table should be read in conjunction with Chapter 9 and 16 of the Draft EIS and associated technical appendices. Cross referencing to the Draft EIS has been included where appropriate and additional investigations included in appendices to this Supplementary Report.

Table 6-7: Marine Ecology and Water Quality Public Comments and Responses

Theme	Comment ID	Comment	Response
Dredge Plume and Water Quality Impacts	MEW1	The EIS notes that '….the changes to turbidity are unlikely to negatively impact the seagrass, rubble, coral and mangrove areas in the vicinity of the proposed works. These communities are already adapted to high and variable turbidity'. Given that the areas mentioned may already be stressed or near their survival limits in regard to the existing ambient turbidity levels it is quite possible that any further increase in turbidity will result in impacts. Other excavation projects in Moreton Bay that were dealing with coarser material had substantially higher and longer-lasting plumes than the modelled results presented in the Draft EIS.	Detailed modelling of dredge plumes was undertaken for the Project with outcomes detailed in section 8.4.6.3 of the Draft EIS. It should be noted that modelling did not incorporate the use of silt curtains, which are expected to reduce turbidity plumes to almost nothing outside of the Project footprint. Coastal processes and dredge plume modelling was peer reviewed by two independent experts who concluded that the approach was thorough and robust and allowed for detailed assessment of potential marine and coastal environmental impacts (refer to Appendix 2-F of the Draft EIS). The modelling indicates that: ▪ the turbidity associated with the proposed works will not be significantly higher than turbidity already experienced in the area. Nearshore areas at Toondah Harbour experience turbidity levels in excess of 100 NTU regularly with dredging expected to generate plumes of less than 10 NTU outside of the Project footprint. ▪ peaks in turbidity due to the project coincide with natural peaks (i.e. turbidity plumes during dredging will occur during peak tidal movement when natural turbidity is already high) ▪ the period of high turbidity is not significantly altered. Seagrass growing in the vicinity of the proposed development are already adapted to low light environments, with both physical (morphological) and physiological adaptations. For example, in low light conditions the concentration of chlorophyll can increase, maximising light capture, and leaf length and width may also increase (Maxwell et al. 2014). Further, acclimation to prior low light conditions can promote persistence following severe events, such as floods (Maxwell et al. 2014) or in this case, slightly increased turbidity due to dredging. It is noted that following the severe floods in 2011 noted there was no mortality of the dominant seagrass in the western bay, *Zostera muelleri* (Maxwell 2014) and no decrease in the depth range of this species in the vicinity of Toondah Harbour following the 2021 floods (HLW 2022). These studies support the outcomes of the impact assessment in the Draft EIS. It is not clear which other excavation projects in Moreton Bay are being referred to in this comment. Turbidity plumes can be affected by a number variables such as location and dredge methodology and is not just a factor of material characteristics. As previously noted, given dredge plumes will be significantly smaller than the modelling predicts due to the use of silt curtains, impacts to seagrass and other benthic communities outside the Project footprint are expected to be minimal.
	MEW2	It is stated in the EIS that silt curtains are to be employed 'wherever practicable'. In reality, this will likely only be done if there is to be an imminent inspection by regulators and/or tidal conditions and dredge workings at any particular time are suitable.	The use of silt curtains will be mandated through the Dredge Management Plan which will form part of the contract for the dredge operator. A draft silt curtain procedure has been developed and included as **Appendix Q**. Silt curtains will be required unless certain conditions are met, such as a request from the existing harbour operators to avoid installation as they will impact navigational safety.

Theme	Comment ID	Comment	Response
	MEW3	The dredging environmental monitoring program will rely primarily on visual assessment of the dredge plume with reduced or stopped dredger activity if turbidity levels become excessive. Given that dredging is proposed to be carried out over a 6 day/24 hour operation for its duration, such visual assessment can only be undertaken during clear daylight hours (ie not undertaken during low light conditions/night time and during inclement weather) thereby potentially leading to a failure in the implementation and/or effectiveness of controls.	A framework of the proposed water quality monitoring program during dredging is provided in section 9.5.1.1 of the Draft EIS. Turbidity will be monitored during dredging. This is done in real time using a turbidity meter and is not a visual assessment. Monitoring of other parameters will also be carried out. The water quality monitoring program includes 'early warning' and sensitive receptor monitoring and trigger criteria for some parameters. Given dredging will not be carried out for several years additional baseline monitoring will be completed before setting specific trigger criteria for the dredge management plan. Dredging will not be carried out during inclement weather such storms due to health and safety risks. The water quality monitoring program is composed of three components: ▪ monitoring plumes associated with dredging ▪ monitoring water quality within the marina, and ▪ monitoring water quality at key habitats, at potentially impacted and reference sites. The monitoring program is based on the monitoring required for maintenance dredging of Toondah Harbour and Fison Channel as stipulated in Environmental Authority (EA) EPPR0618513 issued under the Queensland *Environmental Protection Act 1994*. The proposed dredge plume monitoring includes the monitoring of pH and turbidity as per the EA, with the addition of measuring the percent saturation of dissolved oxygen. This monitoring is for the 'relevant activity' of dredging between 100,000 and 1,000,000 tonnes per year. Proposed capital dredging would sit within this range. The proposed monitoring is similar to that required at a number of other sites, including the Burnett River and Rosslyn Bay, neither of which utilise silt curtains as part of the dredging process. As outlined in section 9.1.5.3 of the Draft EIS background water quality, including Secchi depth, BPAR (Benthic Photosynthetically Active Radiation), turbidity, temperature, electrical conductivity, and percent saturation of dissolved oxygen will be monitored for approximately 14 months prior to the commencement of dredging.
	MEW4	There has been no assessment of turbidity effects of constructing the bund walls including excavation of seabed material to be undertaken prior to the construction of the perimeter rock walls partly to avoid the 'mud wave'. Silt curtains will not be effective in most circumstances due to tidal range interference factors during construction. This also raises the question of where this material will be placed and contained to prevent adverse environmental impact.	The bund wall will be constructed on tidal mudflats with most construction activities carried out during low tide when no water is present for sediment to become suspended. There will be minimal opportunity for suspended sediment plumes to occur and where they do occur it will be short term, highly localised and within already highly turbid water. Further detail of the construction process is provided in section 4.2 of this Supplementary Report. Excavation of seabed material underneath the bunds will only occur during low tides when the mudflat area is above the water level. Material will be transferred to a raised pad that will sit above the tidal limit immediately after excavation where it will be treated for potential acid sulfate soils and dewatered prior to being used as fill within the enclosed reclamation area. This material will not interact with tidal waters in Moreton Bay once excavation has been completed. Sheet pile installation including vibration and mechanical piling may occur while there is some water present however this will be short term and will only occur for piles that have already breached the upper layers therefore there will be minimal disturbance of surface sediments that would result in turbidity plumes. Where works may occur within tidal waters temporary piles will be installed with silt curtains to ensure turbidity plumes do not extend outside of the works area.

Theme	Comment ID	Comment	Response
	MEW5	The past Toondah maintenance dredging episodes need to be seen in the light of causing serious impacts beyond the site. It may be that in these episodes the prevailing winds were of importance in where the damage occurred - and this might be important for conditioning of such activity in EIS assessments. In the 2005, the last pair of *Cypraea tigris* (the large tiger cowry) died amongst the thick mud deposited throughout a kilometre of the intertidal area and around the structure where the species had existed for around 15 years.	There is no evidence in the form of peer-reviewed literature or outcomes from monitoring programs that support the claims in this comment that maintenance dredging has resulted in 'thick mud deposited throughout a kilometre of the intertidal area' nor the presence of the tiger cowry anywhere near Toondah Harbour. The Draft EIS addresses MNES and assesses these impacts using the relevant Significant Impact Guidelines. The tiger cowrie is not listed as an MNES, and consequently was not specifically addressed. It is noted that the tiger cowrie (*Cypraea tigris*) is widely distributed in the Indo-Pacific region, from the eastern coast of Africa to the waters of Micronesia and Polynesia, the Coral Sea and around the Philippines. Along the Australian coast it is found from northern New South Wales to northern Western Australia, as well as Lord Howe Island (Poutiers, 1998). Active during the day, it is found between depths of 10 and 40 metres, on reef areas, on sand among rocks or corals, in tidal pools or on branched corals, such as *Acropora* (Poutiers, 1998; (Davison et al. 2008). While there is some coral and rocks in the vicinity of the proposed works, it is unlikely to be key habitat or support large populations of this species. There have been a number of significant events, including significant floods that may have impacted the distribution of this species in Moreton Bay, with over 1,000,000 tonnes of sediment flushed into Moreton Bay in the 2022 floods (HLW 2022). Detailed modelling of dredge plumes was undertaken for the Project with outcomes detailed in section 8.4.6.3 of the Draft EIS. It should be noted that modelling did not incorporate the use of silt curtains, which are expected to reduce turbidity plumes to almost nothing outside of the Project footprint. Coastal processes and dredge plume modelling was peer reviewed by two independent experts who concluded that the approach was thorough and robust and allowed for detailed assessment of potential marine and coastal environmental impacts (refer to Appendix 2-F of the Draft EIS).
	MEW6	The muds of the Toondah area are known to be contain high levels of ammonia and this means flow on pollution and eutrophication would not be addressed by physical barriers in the water column (like silt curtain netting) during construction disturbance.	Sediments were assessed according to the National Assessment Guidelines for Dredging (NAGD). These guidelines are designed to determine whether or not sediments have contaminants in them that may be harmful to the marine environment, and whether the sediment is sufficiently benign to be disposed of at sea (noting that in this case the sediment will not be disposed of at sea, but will be confined within the reclamation area). Sampling and analysis were completed for the Project in accordance with the NAGD. The sampling and analysis process are outlined in Chapter 7 of the Draft EIS with results summarised in section 7.3.1. The assessment found that sediment in the proposed dredge and reclamation areas is not contaminated. Further, as the proposed reclamation area, where all dredge material will be transported for beneficial reuse, will be bunded during works there is minimal risk that the sediment will mix with the surrounding water. The proposed dredging method (backhoe dredge) will also minimise the release of suspended sediment during the dredging process. The sediment was also assessed according to the National Environment Protection (Assessment of Site Contamination) Measure 1999 (ASC NEPM; Australian Government 2013) soil guidelines (refer to section 7.3.1.5 of the Draft EIS). These guidelines are designed to determine whether there is a risk to human or ecological health from the sediment. According to this guideline the sediment is not considered to be contaminated and is of low risk to human and ecological health, and therefore is appropriate for use as residential, public and/or commercial land-use. The toxicity of ammonia in sediment from Toondah Harbour was previously modelled and investigated (WBM 2005; 2006; BMT WBM 2013). It was concluded that: ▪ ammonia in estuarine/marine sediments is almost always in the dissolved form, consequently it is likely to disperse into the water column, rather than settle into the sediment. ▪ the key processes during dredging that reduce the concentration of ammonia in the porewater are dilution and oxidation ▪ The action of dredging was anticipated to dilute the ammonia by a factor of 1:5 ▪ sediments in Toondah Harbour are highly reducing, where ammonia will be stable ▪ the dissolved oxygen level in the water in the vicinity of the dredging is relatively high (even at depth) ▪ mixing of the reduced sediment with oxidised water during dredging will provide an opportunity for the ammonia in the sediment to be converted into oxidised forms, that are not toxicants. Tidal mixing of the water will continue this process. Further, at the offshore disposal site (WBM 2005; 2006; BMT WBM 2013) the concentration of ammonia in the water column was measured, and was close to background within 10 minutes, and at background levels within one hour of placement of the dredged material. In the proposed development, there is only a risk from ammonia dispersing into the water at the site of dredging (as the dredge spoil will be contained within the reclamation area). It is anticipated, that as at the disposal site in the above study, if released into the water column the concentration of ammonia is likely to rapidly reduce to background levels as the dredge moves from site to site.

Theme	Comment ID	Comment	Response
	MEW7	The recent Healthy Land and Water annual Report Card, 2022, downgraded the health of Redlands to a D+ and noted 'protecting and managing existing values from the pressures of population growth' must be a key priority for Redlands if it is to improve. Similarly, the Report Card downgraded the Central Bay (marine area of the Toondah footprint). Key priorities for protecting the marine values include 'protect and enhance wetlands… that support biodiversity and provide important ecosystem services, including sediment and nutrient retention and carbon sequestration' and 'protect and enhance coastal and marine habitats (seagrass, coral reefs, intertidal flats) by managing pollution, development, use, and access.' The Toondah development would be directly opposed to these priority actions.	The downgrading of health in the Redlands catchments was due to very high rainfall, and river flows experienced over the summer months, transporting pollutants from peri-urban and urban areas downstream. Major floodings in the catchment also delivered mud and nutrients to Moreton Bay (HLW 2022). The report card score for the Central Bay was B+ in 2015 and 2016, A- from 2017 to 2020, A+ in 2021, and A- in 2022. In the 2022 report card it was noted that while water quality had slightly declined it remained excellent (despite the floods in early 2022). The annual report card also recommended increased erosion and sediment controls and compliance for new development, which the Project has committed to through management actions in the Draft EIS (Table 9-8). The Project will also implement stormwater treatment above what is currently considered best practice for urban developments (refer to section 9.4.3 of the Draft EIS and section 6.3 of Appendix 2-E). The Toondah Harbour Project will not result in a degradation in water quality in Central Moreton Bay or any other region outside of the Project footprint. Measures implemented through the offset strategy (refer to **Appendix U**) will also result in an overall improvement in water quality in Moreton Bay.
Habitat Loss	MEW8	The northern central part of this PDA and the resulting development proposal covers an area that had large colonies of more than five species of hermatypic coral. It was largely destroyed after the 2014 dredging of Fison Channel, but if dredging was better managed then this reef can be expected to recover.	No records could be found of reefs being present in this area in 2014 and detailed surveys carried out as part of Draft EIS (refer to section 16.2.2 of the Draft EIS and section 4 of Appendix 2-M) did not identify any corals in this area. As per the HLW report cards, there has been improvement in the water quality of this area. As catchment management improves, and with improved dredging practices, it is likely that water quality will continue to improve, which may result in recolonisation of some areas by coral.
	MEW9	The EIS further states that the project footprint contains low densities of seagrass for dugongs and turtles, citing higher density areas outside of the project area which can be used for food and nurseries. The insinuation is that due to the seabed's currently degraded state, any measures to conserve or act to reestablish a thriving seabed environment should be ignored.	This comment has misinterpreted the Draft EIS. Dugong prefer low biomass stands of seagrass. The seagrasses that would be disturbed by the proposed development are not low biomass. The low biomass stands of seagrass in Moreton Bay are on the Eastern Banks. The seagrasses on the Eastern Banks are predominantly a different species than those near the proposed development. The insinuation referred to was not stated or intended by the Draft EIS.
	MEW10	One issue that has received scant attention is the vast unvegetated inter-tidal areas that will be lost if the development is allowed to proceed. These areas contribute to the biodiversity of the Bay and should not be lost.	The loss of unvegetated tidal flats is addressed in section 16.5.1 of the Draft EIS and 24.2 of Appendix 2-M as well as the Ramsar Impact Assessment (Chapter 27 of the Draft EIS). Table 27-5 of the Draft EIS identified that the area unvegetated inter tidal habitat to be lost is approximately 0.18% of similar habitats within the Moreton Bay Ramsar Site and less than 1% of similar habitat in Western Moreton Bay ranging between the Brisbane River in the north and Logan River in the south. These habitats are included as a significant impact to the Ramsar Site and have been addressed in the Projects offsets strategy (refer to **Appendix U**).
	MEW11	Piling noise will impact on the ability of Cassim Island coral reef and oyster reefs facilitating fish and invertebrate larvae settlement.	There are no coral or oyster reefs known to be present at or near Cassim Island. The area is dominated by sub tidal and inter tidal mudflats and seagrass.

Theme	Comment ID	Comment	Response
	MEW12	The removal of 37 ha of seagrass habitat as proposed by this development would have significant impacts on local dugong and green turtle populations, both of which are listed as vulnerable to extinction in Queensland. Removal of such a large amount of seagrass habitat would also be detrimental to fish and prawn populations in the Bay, given that seagrass is an important nursery habitat for many species of commercial and recreational significance.	The Draft EIS addresses MNES and assesses these impacts using the relevant Significant Impact Guidelines. Dugongs are not listed as threatened under the EPBC Act however are recognised as a migratory species. Green turtles are listed as vulnerable under the EPBC Act. Under the EPBC Act significant impact assessment criteria for migratory species relate to whether the habitat to be disturbed is important habitat for this species, and to whether the life cycle of an ecologically significant proportion of the population will be disrupted. According to the Guidelines, important habitat is habitat that: supports an ecologically significant proportion of a population; is of critical importance to particular life stage; is the limit of a species range; or is habitat in an area within which the species is declining. In Moreton Bay, most dugong are found on the eastern side of the Bay, with a few individuals using the area around Toondah Harbour. The area around Toondah Harbour is not a significant breeding, feeding, migratory or resting area. Medium densities of dugong are found further south in the Broadwater (Sobtzick et al 2017), and surveys indicate the abundance of dugong in this area is not decreasing (Sobtzick et al 201). That is, according to the Guidelines, the area around Toondah Harbour area is not important habitat for dugong. EPBC Act significant impact criteria for vulnerable species such as the green turtle state that in order for a significant impact to occur actions must: ▪ lead to a long-term decrease in the size of an important population of a species ▪ reduce the area of occupancy of an important population ▪ fragment an existing important population into two or more populations ▪ adversely affect habitat critical to the survival of a species ▪ disrupt the breeding cycle of an important population ▪ modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline ▪ result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat ▪ introduce disease that may cause the species to decline, or ▪ substantially with the recovery of the species. According to the Guidelines, important populations are: ▪ key source populations either for breeding or dispersal ▪ populations that are necessary for maintaining genetic diversity, and/or ▪ populations that are near the limit of the species range. Green turtles in and around Toondah Harbour are a small subset of the population in Moreton Bay. The population of green turtles in Moreton Bay has not been identified as an important population in a recovery plan and is not a key source population for breeding or dispersal. While the Project will result in the direct loss of foraging habitat for these turtles, this is a small proportion of the total area of seagrass in Moreton Bay and would not be expected to result in a significant impact. Detailed significant impact assessments for dugong and green turtle are included in sections 25.4.3 and 24.4.4 of the Draft EIS respectively.
Mega Fauna Impacts	MEW13	Marine fauna listed under the EPBC Act 1999, including the Loggerhead and Hawksbill turtles, dugong and Australian humpback dolphin along with protected species including the Indo-Pacific bottlenose dolphin, utilise the PDA. Activities of the proposed development during the construction (including dredging, vessel activities, pile driving, potential exposure to contaminants and acid sulphate soils), increased turbidity and operational phases (including increased vessel activities) of the development are likely to directly and indirectly impact these vulnerable marine species.	Significant impact species under the EPBC Act have been completed for the loggerhead turtle, hawksbill turtle, dugong and humpback dolphin in sections 24.4.2, 24.4.5, 25.4.3 and 25.4.2 of the Draft EIS respectively. Each assessment was species specific and takes into account impacts listed in this comment. In general, the Project was considered unlikely to result in a significant impact to these species as Toondah Harbour and its does not contain important habitat for these species nor would individuals that pass through that area from time to time be considered an important population. While the Project will result in the direct loss of foraging habitat for these species, this is a small proportion of the total area in Moreton Bay and would not be expected to result in a significant impact. Dredge plume modelling completed for the Draft EIS (section 8.4.6.3) shows the area potentially impacted by Project related dredging and construction is also not core habitat for humpback dolphin and other megafauna species, although they do use nearby areas. Similarly,

Theme	Comment ID	Comment	Response
	MEW14	The increase in vessel activities during the construction and operational phase has the potential to increase vessel collisions and noise that can affect marine megafauna.	vibration and noise modelling (refer to section 5.5 of the Supplementary Report) shows that the area impacted by noise and vibration is not a core area for these species, although they do occur nearby. It is noted that modelling did not incorporate the use of silt curtains which will significantly reduce the extent of plumes. Pirotta *et al* 2013 indicate that dolphins are likely to leave the area during periods of high intensity dredging, only returning when dredging time decreases. Further, they suggested this movement away was likely to be a result of a combination of the irregular nature of the disturbance (unlike the constant presence of commercial boats in the area studied), which may have elicited a response analogous to the risk of predation; the high noise and suspended sediment levels impairing their sight and communication ability; and also as a result of impacts to their prey (Pirotta 2013). A range of monitoring and management measures have been outlined in Table 16-6 of the Draft EIS in accordance with recommendations in the National Strategy for Reducing Vessel Strike on Cetaceans and other Marine Megafauna (Commonwealth of Australia 2017) and the National Guidelines for whale and dolphin watching (Commonwealth of Australia 2017b). These measures will ensure best practice monitoring and management for marine megafauna is implemented during dredging and other marine construction activities. The indo-pacific bottlenose dolphin is not protected under the EPBC Act therefore a significant impact assessment has not been completed in the Draft EIS, however potential impacts would be similar to those listed for the Australian humpback dolphin. In addition to the assessment carried out for the Draft EIS, further detail has been provided on the potential for boat traffic collisions with marine fauna in **Appendix S** to this Supplementary Report. Additional details on dolphin distribution in Moreton Bay is included in response to specific comments on the Draft EIS (see comments MEW19 – 22).
	MEW15	Proposed dredging activities (24hrs over 6 days over 250-500 days) and pile driving during the construction phase expose surrounding biota to intense noise over a prolonged period and could lead to detrimental impacts to dolphins and other species. The Draft EIS states that dolphins are 'likely to avoid' areas of dredging activity, increased noise and turbidity. Dredging activities can result in displacement of dolphins from habitats (e.g. Pirotta et al. 2013). Such disturbances must be monitored and mitigated to avoid long-term consequences for both species of resident dolphins of which Moreton Bay is a key habitat.	
	MEW16	I have seen grazing dugongs near the mangrove foreshore and this development will therefore impede their travel in the bay.	Dugongs are not listed as threatened under the EPBC Act however are recognised as a migratory species. Under the EPBC Act significant impact assessment criteria for migratory species relate to whether the habitat to be disturbed is important habitat for this species, and to whether the life cycle of an ecologically significant proportion of the population will be disrupted. According to the Guidelines, important habitat is habitat that: supports an ecologically significant proportion of a population; is of critical importance to particular life stage; is the limit of a species range; or is habitat in an area within which the species is declining. In Moreton Bay, most dugong are found on the eastern side of the Bay, with a few individuals using the area around Toondah Harbour. The area around Toondah Harbour is not a significant breeding, feeding, migratory or resting area. Medium densities of dugong are found further south in the Broadwater (Sobtzick et al 2017), and surveys indicate the abundance of dugong in this area is not decreasing (Sobtzick et al 2017). That is, according to the Guidelines, the area around Toondah Harbour area is not important habitat for dugong. Detailed significant impact assessment for dugong is included in section 25.4.3 of the Draft EIS.

Theme	Comment ID	Comment	Response
	MEW17	The 8 surveys over 1 year that were completed as part of the Draft EIS are insufficient to assess the presence and absence of marine megafauna (dolphins, turtles and dugong) in the immediate and surrounding likely impact zone of the construction and operational area of the PDA.	Marine fauna surveys completed for the Draft EIS were consistent with surveys completed for similar projects. Sampling methods were based on those used by researchers in previous boat-based megafauna surveys of the Moreton Bay area (e.g., Ansmann 2013). Project specific surveys were utilised to support the considerable amount of published information on mega fauna distribution within Moreton Bay. The outcomes of the project specific surveys and review of published information is included in section 16.4 of the Draft EIS. In these large-scale surveys dugong and turtle abundance were estimated using survey methods which take into consideration both turtle and dugong diving behaviour and surveyor perception bias (Fuentes et al. 2015; Sobtzick et al. 2017). Dolphin were surveyed in 86 surveys using boat-based methods., with the surveys designed to optimise coverage of all areas and habitat types with Moreton Bay (Ansmann et al. 2013). Marine turtles (loggerhead and green turtles) were the most commonly sighted megafauna in the seasonal surveys of the Marine Investigation Area (MIA). Up to nine turtles were sighted in each survey, with most sightings in the southern half of the MIA in depths ranging from 1-5 m. All turtles were sighted while on the surface. Dugong, in groups of at least two individuals, were sighted in two locations during the spring surveys, one group on the southern edge of the Fison Channel and the other in the far southern half of the MIA. A pod of at least six Australian humpback dolphins was observed travelling through the MIA north of Cassim Island during one of the summer surveys, and two bottlenose dolphins were sighted feeding at the south-east end of Fison Channel and in the far southern MIA (possibly the same individuals) during a spring survey. Additional details on dolphin distribution in Moreton Bay is included in response to specific comments on the Draft EIS (see comments MEW19 - 22).
	MEW18	The existing habitat within the PDA is suitable for the endangered White's seahorse as there is the potential for this species to occur in the vicinity of the Project footprint.	White's seahorse was listed as endangered by the Commonwealth in December 2020. The EPBC Act requires proponents to address matters listed at the time the decision was made on the approval process, i.e., at the time of the referral decision (s158A of the EPBC Act). The Toondah Harbour Project was made a controlled action on 23 July 2018. As a result the Draft EIS is not required to address significant impacts on White's Seahorse, however an assessment was still completed as part of the Draft EIS for completeness (refer to section 24.4.3 of the Draft EIS). Further analysis has determined White's seagrass is unlikely to occur in at the Project site. While the known range is from St Georges Basin in NSW to Hervey Bay, the vast majority of records for this species are from Sydney Harbour and Port Stephens. White's seahorse has been recorded in seagrass beds near a jetty at Wynnum, and at Victoria Point (Burfiend pers comm) and there are records of it near Moreton Island, Stradbroke Island and the Gold Coast Seaway. White's seahorse does not occur in inter tidal areas and is also unlikely to occur in the shallow sub-tidal areas (Harasti pers comm 2023). Most of the seagrass within the PDA is intertidal and consequently they are unlikely to occur in the Project area. It is also considered unlikely they would be in the channel that is currently dredged every two years (removing structure), or on bare sand or mud. Males often have home ranges of approximately 1m^2, whereas their female partners may have home ranges around 100 times larger, with juveniles settling relatively close to their parents. Sex differences in areas of occupancy may serve to reduce competition for food between the partners (Lourie et al., 1999). In seagrass beds with H. whitei, individuals preferentially select deeper areas with dense seagrass, more epiphytic prey types and fewer predators (Manning et al. 2018). While White's seahorse can occur in seagrass beds, in an extensive study in Port Stephens and Port Jackson (Harasti 2014), no adults or juveniles used sand or seagrass beds dominated by *Zostera muelleri* (the dominant species in the PDA, and one of the dominant seagrasses in the MIA) or *Halophila ovalis*. A detailed assessment of the likelihood of the Project to impact on White's Seahorse is included as **Appendix R** to this Supplementary Report.

Theme	Comment ID	Comment	Response
Dolphin Species	MEW19	The Southern Moreton Bay region (including the area adjacent to the PDA) provides important habitat for breeding, feeding and resting activities for both species of resident dolphins.	In addition to published information reviewed for the Draft EIS, Dolphin Research Australia provided a report published post release of the Draft EIS (Hawkins 2023) that summarises results from 270 vessel-based surveys carried out in Moreton Bay from 2014 to 2022. We note from this report that: • The spatial density of dolphins was highest at the mouth of the Brisbane River, in the central-northern Bay, Bribie Island in the far north, Peel Island, and Amity Point in the southern reaches of Moreton Bay. • While Australian humpback dolphin were observed to the north and east of the PDA and dredge channel, they do not appear to have been observed within these areas, although they were observed close to the end of the dredge channel. • The proposed development is not in a hot spot for Australian humpback dolphin, however the existing ferry route passes through / close to a hot spot. The report also by Dolphin research Australia states: *Similar to other coastal dolphins, the humpback dolphin population of Moreton Bay is characterised by high levels of site fidelity and residency (Hawkins et al., 2020; Meager and Hawkins, 2017; Meager et al., 2018). Areas of higher dolphin density in the present study, equate to areas of core habitat outlined in (2018) located in the northern bay adjacent to Bribie Island, middle bay adjacent to Middle Banks, western bay adjacent to the Brisbane River entrance and Port, and in the eastern bay adjacent to Amity Point, North Stradbroke Island. The importance of these core areas for foraging and other essential behaviours critical to the survival and persistence of this population are potentially critical habitat (Di Sciara et al., 2016; Hoyt, 2011). The humpback dolphin population is also socially fragmented, with core areas also used by different resident communities (Hawkins et al., 2020)."* *Pollution and habitat degradation were also considered among the highest threats to humpback dolphins, particularly those inhabiting the western and southern regions of Moreton Bay where runoff and discharge from the four main river systems is greatest (Gibbes et al., 2014). Over recent decades, shifts away from areas of core use by humpback dolphins, particularly in the western regions of Moreton Bay (Bramble and Deception Bay's), have been attributed to changes in habitat quality and likely declines in prey availability (Meager et al., 2018). The long-term use of core habitat around the mouth of the Brisbane River and Port of Brisbane has remained stable and a key foraging site for humpback dolphins, despite shifts in water quality and increased human activities (including the expansion of the Port of Brisbane in 2008-2011, Meager et al. 2018). This suggests flexibility in response to changing habitats and prey availability, however, the long-term persistence to inhabit areas of high human use and degradation, has the potential for an 'ecological trap' and 'could have consequences for the health and survival' of dolphins exposed to stressors and subsequent detrimental effects (Meager et al., 2018).* A previous study by Meagher *et al* 2018 shows core habitat in Moreton Bay (refer to **Appendix S** of the Supplementary Report for further details of humpback dolphin distribution in Moreton Bay). This indicates that between 2003 and 2011 there was some core habitat to the east of the proposed development, but this area was not core habitat between 1992 and 1999, nor between 2012 and 2016. The 7 conservation priority areas for humpback dolphin in Moreton Bay as reported by Meager and Hawkins 2015 are generally located at the mouth of the Brisbane River or north with one location between Peel Island and Minjerribah (North Stradbroke Island). These changes in core habitat areas also suggest dolphin species show flexibility to changing conditions.
	MEW20	While there has been one core area consistently used by humpback dolphins over multi-decades (adjacent to the Port of Brisbane), there are presently numerous core areas for this species in Moreton Bay, (which the Draft EIS did not represent correctly).	
	MEW21	The population of humpback dolphins in Moreton Bay is highly socially fragmented, with five resident communities identified (Bribie Island, Brisbane, North, South and Stradbroke) (Hawkins et al. 2021). Each of these communities have different core areas of use associated with different habitat types (Hawkins et al. 2021). The area immediately adjacent to the PDA, is part of the core habitat for the Southern humpback dolphin resident community.	

Theme	Comment ID	Comment	Response
	MEW22	Vessel activities and anthropogenic noise have been highlighted as a key threat to both coastal dolphin species in Moreton Bay and throughout the species' range (Hawkins et al. 2022; Meager & Hawkins 2017; Woinarski et al. 2014). Over 6% of dolphins in Moreton Bay have injuries from boat strikes (Hawkins et al. 2022). The extent of vessel strike injuries differs between communities, with over 26% of individuals in a Southern Moreton Bay dolphin community having injuries from vessel strikes (Hawkins 2022). This prevalence is comparably one of the highest reported globally. The extent of mortalities from vessel strike is likely to be underrepresented. The impact of vessel activities during construction and operational phases has not been sufficiently assessed in the Draft EIS.	In summary, while the Project site itself is not a hot spot for dolphin activity adjacent areas have at times seen high levels of usage by resident dolphin species. The existing ferry route passes through or close to some hotspots suggesting the largest potential impact from the Project on dolphins will be additional boat traffic during construction and ongoing use of the harbour. During operations the likely risk of boat strike will be significantly reduced by the mitigation measures outlined in Table 16-6 of the Draft EIS, and by ensuring all vessels involved with construction restrict their speed to less than 10 knots, do not operate in a planning or non-displacement mode, and do not operate in a way that could reasonably be expected to result in striking a marine mammal or reptile. That is, vessels involved with construction will follow the requirements for go-slow areas. In addition to the assessment carried out for the Draft EIS, further detail has been provided on the potential for boat traffic collisions with marine fauna in **Appendix S** to this document.
Indirect and Cumulative Impacts	MEW23	The increase in vessel traffic, despite the plan to construct a 200-berth marina and an upgraded ferry terminal which will result in increased tourist visitation, has not been addressed.	The risk of boat strike to marine megafauna was assessed in detail by the Draft EIS (Sections 16.5.1.4, 16.5.3.2, 16.6.1 and Table 16.6, with further detail in Appendix 2-M (Sections 5.10, 5.11, 8.1.4, 8.3.2, 9.3.2, 10.1 and 10.2). In addition to the assessment carried out for the Draft EIS, further detail has been provided on the potential for boat traffic collisions with marine fauna in **Appendix S** to this document. In summary, the increase in vessel traffic as a result of the Project is likely to be limited to an increase in ferry traffic of 10%, and an increase in the size of the ferries. This has the potential to impact individuals of some threatened and migratory species. A range of management measures will be put in place to minimise this potential impact. With the implementation of these mitigations measures, it is unlikely that the Project will result in a significant residual impact to these species.
	MEW24	Dredging is not acceptable considering the flow through of sediment that will threaten the demersal habitat of the southern half of the Bay.	Detailed modelling of dredge plumes was undertaken for the Project with outcomes detailed in section 8.4.6.3 of the Draft EIS. It should be noted that modelling did not incorporate the use of silt curtains, which are expected to reduce turbidity plumes to almost nothing outside of the Project footprint. Coastal processes and dredge plume modelling was peer reviewed by two independent experts who concluded that the approach was thorough and robust and allowed for detailed assessment of potential marine and coastal environmental impacts (refer to Appendix 2-F of the Draft EIS). The modelling indicates that: ▪ the turbidity associated with the proposed works will not be significantly higher than turbidity already experienced in the area. Nearshore areas at Toondah Harbour experience turbidity levels in excess of 100 NTU regularly with dredging expected to generate plumes of less than 10 NTU outside of the Project footprint. ▪ peaks in turbidity due to the project coincide with natural peaks (i.e. turbidity plumes during dredging will occur during peak tidal movement when natural turbidity is already high) ▪ the period of high turbidity is not significantly altered.

Theme	Comment ID	Comment	Response
	MEW25	Roberts and Elliot (2017) indicate activities on the seabed, such as drilling and pile-driving, produce a significant vibration likely to impact benthic invertebrates. The vibration may be used by marine species for the detection of biotic and abiotic cues and physical modification of the environment. Exposure to vibration may elicit behavioural or physiological change, or even physical damage at high amplitudes or particular frequencies.	While Roberts and Elliot (2017) confirm that responses of benthic invertebrates to vibration are detectable, they conclude that further evidence is needed to determine the extent to which anthropogenic activity on the seabed effects benthic invertebrates. The responses cited in this paper were predominantly behavioural (e.g. siphon elongation or valve closure in molluscs, movement and postural changes in crustacea). While benthic invertebrates provide food for MNES species such as shore birds, they are not MNES species themselves. While widespread mortality of benthic invertebrates would reduce food availability, behavioural changes of benthic invertebrates are unlikely to reduce food availability to the extent it would have a significant impact on any MNES. The underwater noise assessment carried out for the Draft EIS, and additional assessment carried out for the Supplementary Report (refer to section 5.4), indicate typical vibration velocities in the seabed will be approximately 0.25mm/s at 20m from the impact source. This velocity is well below the thresholds reported in Roberts and Elliot (2017). If any behavioural changes occur to benthic invertebrates it will only be in areas in close proximity to the site.
	MEW26	The EIS fails to properly address the impact of noise on marine animals, and only provides some very broad auditory ranges for pooled groups of whale and dolphin species, most of which do not even occur in Moreton Bay. Despite the large body of available data on marine mammal hearing/hearing loss, established exposure functions or onset levels of temporary and permanent hearing threshold shift (TTS and PTS, respectively) are not mentioned let alone compared to expected noise levels.	Marine fauna response to noise sources from the proposed development are addressed in section 16.5.1.11 of the Draft EIS with more detailed provided in Appendix 2-M. The assessment included a comparison of Project noise sources to the PTS and TTS of a range of species potentially occurring in the study area including southern right whale, Australian humpback dolphin, dugong and green turtle. The outcome of this assessment included: ▪ Underwater noise from dredging may cause some temporary behavioural change, however is unlikely to have a significant impact on the marine mammals, turtles and fish that are in the vicinity. Marine mammals are likely to avoid areas that are being dredged and return once dredge activities have ceased. ▪ Underwater noise associated with sheet piling will be limited to when piling occurs in water, that is, approximately 3.25 hours either side of high tide when piling away from the shore, and for a shorter time in shallower water near the shore. Noise levels from sheet piling would be less than the level for behavioural change, and well below the permanent and temporary threshold shifts for marine mammals, turtles and fish outside a 40m buffer around the work area. ▪ The highest underwater noise levels resulting from the Project will be generated during the impact pile driving of circular piles associated with the ferry terminal development. These piles will be driven in by hammering, which produces an intense impulsive underwater noise which last less than 1 second. Modelling indicates hammering will produce noise levels with the potential to result in behavioural change in some marine fauna up to 1 km from the noise source. It should be noted that the model outputs do not incorporate the high level of attenuation from the mudflats surrounding the ferry terminal which will effectively keep any impacts to within the turning basin and inner Fison Channel. ▪ Overall, while noise may cause some minor behavioural changes for some species, such as turtle temporarily moving away from nearby low value foraging areas, this is not anticipated to have a significant impact on any individuals or populations of threatened marine fauna. This is due to the relatively small size of the area impacted, the temporary nature of the impact, the distance to the seagrass beds, and the large area of other available foraging grounds. The additional assessment of underwater noise and vibration completed for the Supplementary Report (refer to sections 5.4 and 6.4) indicated elevated underwater noise levels in comparison to the Draft EIS however the increases are minor and would not be expected to result in additional or more intense impacts to those outlined in the Draft EIS.

Theme	Comment ID	Comment	Response
	MEW27	The application of obsolete criteria for the assessment of effects on marine mammals, and no criteria has been recommended for sea turtles, fish or invertebrates.	See responses to MEW 25 and 26. The criteria used in the assessment was based on the following as outlined in section 16.5.1.11 of the Draft EIS and 8.1.11 of Appendix 2-M to the Draft EIS: ▪ McPherson, C, Yurk, H, McPherson, G, Racca, R & Wulf, P (2017) Great Barrier Reef Underwater Noise Guidelines: Discussion and Options Paper, Townsville. ▪ McQueen, AD, Suedel, BC & Wilkens, JE (2019) Review of the Adverse Biological Effects of Dredging-induced Underwater Sounds', Journal of Dredging, vol. 17, no. 1. ▪ National Marine Fisheries Service. 2018. 2018 Revisions to: Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing (Version 2.0): Underwater Thresholds for Onset of Permanent and Temporary Threshold Shifts. U.S. Dept. of Commer. A relevant source of noise criteria identified by several comments on the Draft EIS was: ▪ Southall B L, Finneran J J, Reichmuth C, Nachtigall P E, Ketten D R, Bowles A E, Ellison W T, Nowacek D P, Tyack P L (2019). Marine Mammal Noise Exposure Criteria: Updated Scientific Recommendations for Residual Hearing Effects. Aquatic Mammals 2019, 45(2), 125-232. The Southall *et al* (2019) and National Marine Fisheries (2018) reports were reviewed by subacoustech environmental who found: *March 2019 saw the publication of new marine mammal exposure criteria from Southall et al. The paper utilises research from the NMFS (2018) study that introduced the weightings and criteria that…. the underwater noise industry currently use. After thoroughly analysing the new report we found that the weightings and criteria presented in Southall's paper are actually identical to those from NMFS, with a one minor difference; the naming of the marine mammal groupings*. Underwater noise modelling has been updated in response to various comments and included in section 5.4 and 6.4 of this Supplementary Report.
	MEW28	The proposal to build multi-level unit dwellings along the precinct is not conducive with preventing light sources from being visible from the ocean and beaches, and goes against the intention of the National Light Pollution Guidelines for Wildlife.	The impacts of artificial light have been addressed in section 16.5.3.5 of the Draft EIS and the Project lighting strategy is outlined in Chapter 13 of the Draft EIS. External lighting for the Project will be designed in accordance with Australian Standard 4282 - Control of the obtrusive effects of outdoor lighting, and the National Light Pollution Guidelines for Wildlife Including Marine Turtles, Seabirds and Migratory Shorebirds. The lighting strategy included a conceptual lighting model that showed light spill outside of the Project footprint would be less than 1 lx, which would not impact on any external sensitive receptors.
	MEW29	It is not clear how the EIS addresses the impact on water quality and sea life when one of these two narrow channels would be changed in depth and shape (removing and redistributing sea floor materials over many years of dredging).	Detailed modelling of dredge plumes was undertaken for the Project with outcomes detailed in section 8.4.6.3 of the Draft EIS. It should be noted that modelling did not incorporate the use of silt curtains, which are expected to reduce turbidity plumes to almost nothing outside of the Project footprint. Coastal processes and dredge plume modelling was peer reviewed by two independent experts who concluded that the approach was thorough and robust and allowed for detailed assessment of potential marine and coastal environmental impacts (refer to Appendix 2-F of the Draft EIS). The modelling indicates that: ▪ the turbidity associated with the proposed works will not be significantly higher than turbidity already experienced in the area. Nearshore areas at Toondah Harbour experience turbidity levels in excess of 100 NTU regularly with dredging expected to generate plumes of less than 10 NTU outside of the Project footprint. ▪ peaks in turbidity due to the project coincide with natural peaks (i.e. turbidity plumes during dredging will occur during peak tidal movement when natural turbidity is already high) ▪ the period of high turbidity is not significantly altered. The modelling incorporates alterations to the sea floor as a result of dredging.

Theme	Comment ID	Comment	Response
	MEW30	While the Draft EIS commendably integrates adaptive management frameworks (an element of best-practice), it fails to take into consideration the contribution to the cumulative impacts on vulnerable and/or threatened species and/or populations.	Cumulative and consequential impacts have been addressed in Chapter 26 of the Draft EIS. The cumulative and consequential impact assessment CIA addresses all MNES with the potential to be impacted by the Project.
	MEW31	Accumulated impact of dredging is not addressable. The concept of chronic impacts having a cumulative and thereby greater effect on the ecological and lifestyle surrounds is seen in many shoreline 'developments' and a significant hidden factor in the proposal. Waterfront works require continual regular maintenance dredging that cannot be disposed of as easily on land because of the larger watery component than the initial capital dredging.	Cumulative and consequential impacts have been addressed in Chapter 26 of the Draft EIS. Section 26.3.5.1 specifically addresses the cumulative impacts to water quality from the Toondah Harbour Project and a range of other actions that may impact on water quality including future maintenance dredging at Toondah Harbour and other locations within southern Moreton Bay. This assessment found that the risk of potential cumulative impacts to water quality from other dredging is considered to be very low for the following reasons: ▪ Impacts from sediment suspension (plumes) and settlement (sedimentation) from the Toondah Harbour Project are expected to be minor outside of the immediate Project footprint. ▪ Impacts from sediment suspension and settlement from nearby sites that undergo regular maintenance dredging (Raby Bay and Weinam Creek) would be smaller than those predicted for Toondah Harbour as the amount of material dredged is significantly lower than the Project. ▪ Sediment plumes from capital dredging associated with the Toondah Harbour Project or future maintenance dredging events are unlikely to overlap with sediment plumes from maintenance dredging at nearby sites spatially or temporally. The comment suggesting maintenance dredging has a 'larger watery component than the initial capital dredging' is inaccurate. The water component dredged material is mostly a function of the dredging technique and plant rather than sediment characteristics.
	MEW32	There have been two significant, devastating floods in the last 11 years. These floods cause significant increases to sedimentation leading to mass mortality of dugongs and turtles as they starve due to the loss of feeding grounds. As climate change effects intensify, such events are likely to be more frequent and/or more intense. Every seagrass meadow in Moreton Bay is vital.	There was no mortality of the dominant seagrass in the western bay (*Zostera muelleri)* following the 2011 floods (Maxwell 2014), and no decrease in the depth range of this species in the vicinity of Toondah Harbour following the 2021 floods (HLW 2022).
	MEW33	Recent studies with anthropogenic impacts of constant noise comparable to vibration piling and impulsive pile driving noise on benthic organisations has demonstrated a positive interaction effect (in a mathematical sense not an environmental sense) between noise and cadmium, a component of acid sulphate soils. Stenton et al. (2022) observed an interaction effect between pile driving sounds and acid sulphate soil chemicals with the early life of the Norway lobster. There are clearly no Norway lobsters in the Toondah Harbour Ramsar site however in the slightly deeper waters off the Ramsar site is a major settlement area for juvenile sand crabs.	Stenton et al. (2022) does not reference ASS and instead is an experimental study looking at the combined impacts of cadmium in the water column and noise from pile driving on Norway Lobster. Water quality and sediment analysis at the site has not identified cadmium at levels that would result in environmental impact. In all but one sample cadmium was not identified above the limit of reporting (i.e. the level detectable by laboratory analysis). As noted in the comment, Stenton et al. (2022) identified a mathematical, not environmental interaction between noise and cadmium. The paper states '*Exposure to piling playbacks and cadmium caused a wide range of physiological effects on larval Nephrops, with the drivers each having individual effects, but also demonstrating various interactions when co-occuring. The multifaceted nature of these effects makes direct assessment of risk and harm of these drivers on the species difficult to judge. In some scenarios, exposure to piling playbacks could be considered beneficial, promoting larval survival and growth rates in cadmium-contaminated waters, however the opposite is also true for more pristine environments'.* Given the uncertainty in the outcomes of the study and differing environmental conditions it is considered to have limited applicability to the Toondah Harbour Project.

Theme	Comment ID	Comment	Response
Carbon Sequestration	MEW34	Coastal wetlands which include mangroves forests, saltmarshes and seagrass meadows are one of the most powerful natural climate solutions. Mangroves absorb and hold more carbon than land forests. Removal of mangroves will cause that stored carbon to be released back into the atmosphere.	Approximately 3.4 ha of mangroves, no saltmarsh, and 37 ha of seagrass will be removed by the Toondah Harbour Project. Blue carbon is both captured and stored by coastal ecosystems. The removal of mangroves and seagrass will prevent further capture of carbon by these plants. In coastal ecosystems carbon is predominantly stored in the sediments, with 50% to 99% of carbon stored up to 6 m deep below the surface (The Blue Carbon Initiative 2019). Most of the sediment within the disturbance footprint will be buried by the proposed development. Burial of the sediment will prevent the release of carbon to the atmosphere or ocean. Further, in areas where the sediment is not buried, anaerobic conditions are likely to limit the rate of decomposition of organic carbon and its consequent release to the atmosphere (Macreadie et al. 2019). The mangrove plant material that is removed can be chipped and composted, with composting a recognised method of carbon sequestration (Biala 2011). The Project's offset strategy will include measures to increase seagrass and mangrove habitats within Moreton Bay. A requirement of the offset strategy is to provide an overall conservation benefit for the matters impacted, however this would also provide benefits for carbon sequestration.
	MEW35	The draft EIS states "The Project itself will not generate significant amounts of carbon," which in my eyes indicates that they have not properly addressed the unearthing of the harbours stored carbon. Globally, wetlands are estimated to store over a third of the world's terrestrial carbon with blue carbon (from mangroves, marshes, and sea grasses) being one of the most important stores in Australia. Their destruction will result in major releases of greenhouse gases to the atmosphere.	Meta analysis indicates that organic carbon (C_{org}) stocks in the sediment of seagrass communities dominated by species such as *Zostera* and *Halophila* is in the range of 12-21 Mg C_{org} ha^{-1}. (Mazzarrasa et al 2021). Approximately 37 ha of seagrass in the project footprint will be disturbed, equating to approximately 444 to 777 Mg C_{org}. All of this sediment will be buried in the reclamation area, and consequently this carbon will be sequestered, and consequently will not be released to the atmosphere. However, continued sequestration originating from the seagrass itself will stop in the area the seagrass is removed from. In tropical estuarine seagrass meadows (Moreton Bay in this study is included in this category) C_{org} deposits are mainly allochthonous (i.e. did not originate from the seagrass) (Mazzarrasa et al 2021), as such C_{org} may continue to accumulate in the proposed marina. The proposed offset strategy will include measures to increase seagrass and mangrove habitats within Moreton Bay. A requirement of the offset strategy is to provide an overall conservation benefit for the matters impacted, however this would also provide benefits for carbon sequestration.

6.8. Moreton Bay Ramsar Site Assessment Public Comments and Responses

Comments received on the Moreton Bay Ramsar Site Assessment have been compiled and responded to in Table 6-8 using either direct wording from a single submission or an amalgam of comments encompassing the same issue. A total of 22 issues on the Moreton Bay Ramsar Site were raised through public submissions. Issues were categorised into five themes being ecological character, Ramsar obligations, precedents, impacts to the Ramsar site and offsets.

The table should be read in conjunction with Chapter 27 of the Draft EIS and associated technical appendices. Cross referencing to the Draft EIS has been included where appropriate and additional investigations included in appendices to this Supplementary Report.

Table 6-8: Ramsar Assessment Public Comments and Responses

Theme	Comment ID	Comment	Response
Ecological character	RA1	There has been no formal assessment of the ecological character of the Moreton Bay Ramsar site. As a result, it has failed to meet one of the most significant Targeted Guidelines.	The EIS Guidelines require the document to provide '*a description of the ecological character of the Moreton Bay Ramsar Wetland*'. There is no mention of a 'formal assessment'. It would be inappropriate for an individual proponent to carry out a formal Ecological Character Description of the Moreton Bay Ramsar Site. That is the responsibility of the managing authority, in this case the Queensland Government. Chapter 27 of the Draft EIS addresses potential impacts to the Moreton Bay Ramsar Site. Section 27.4 specifically provides a description of Ecological Character at the whole of Ramsar site and Project site scales.
	RA2	The draft EIS does not provide adequate information or scientific certainty that if the Proposed Action is approved the ecological character of the Ramsar Site will be maintained.	Chapter 27 of the Draft EIS addresses potential impacts to the Moreton Bay Ramsar Site (MBRS). The impact assessment was informed by a range of studies at Toondah Harbour and throughout Moreton Bay. All information sources used for the MBRS and Project footprint assessments were evaluated for their validity, reliability and accuracy. At a minimum all of these studies, or data used within the studies, were supported by robust evidence and/or has strong agreement with the outcomes of published studies and/or data from other sources. The Ramsar Convention identifies ecological character as *the combination of the ecosystem components, processes, benefits and services that characterise the wetland at a given point in time* (Ramsar Convention 2005). Intuitively, a change in ecological character would only occur if ecosystem components, processes, benefits and services are considerably impaired by an action. Impacts that do not result in a change in ecological character may still be both significant and acceptable under the EPBC Act. The assessment found that The Project will result in the loss of wetland habitat including mangroves, saltmarsh, seagrass and unvegetated mud/sand. The area of wetland habitat being lost is relatively small and in most cases marine habitats impacted by the Project are 0.2% or less of their representation in in the MBRS. Potential for impacts outside of the Project footprint, including on adjacent high tide roost sites, is considered to be minimal with any minor impacts expected to be short term (e.g. construction noise) or activities that shorebirds will habituate to over time (e.g. increased pedestrian use of foreshore public open space and walking/cycle paths). The potential for disturbance will be further minimised through careful placement of designated walking tracks, use of exclusion fencing and educational signage. As the Project is unlikely to have any significant impact on critical components and processes outside of its footprint, impacts to services will only occur at the local scale. Impacts to these services are expected to be minor and the Project will provide a range of benefits in the context of sustainable development to balance these minor impacts. Accordingly, a change in ecological character of the MBRS as defined by the Ramsar Convention will not result from the Toondah Harbour Project.
	RA3	It is not possible to mitigate the impacts on the ecological character of the Moreton Bay Ramsar site where the components of the wetland, including foraging habitat for migratory shorebirds, is permanently destroyed through land reclamation and construction of the marina.	
	RA4	The draft EIS is misleading because it acknowledges that a significant impact to the Ramsar Site is likely due to an area of the wetland being substantially modified while postulating that this impact is 'acceptable' due to the "unlikely" change to the ecological character of the site. Without an Ecological Character Description or management plan that is definitive for Moreton Bay, this claim is fundamentally problematic and unsupportable.	It is acknowledged that a final ecological character description (ECD) and Management Plan for the MBRS is a limitation for the assessment. The proponent has no ability to influence this limitation as ECDs and Management Plans for Ramsar sites are the responsibility of the Commonwealth and State Government. The EPBC Act Draft EIS Guidelines required the Proponent to use the Ramsar Information Sheet (RIS) and the 2008 Draft ECD in characterising wetland values and assessing impacts on the MBRS. Further consultation with the State Government indicated that they consider the RIS to be the ECD for the MBRS.

Theme	Comment ID	Comment	Response
			Section 27.2 of the Draft EIS acknowledged that it can be difficult to accurately assess potential impacts to the ecological character of a Ramsar site without a final or up to date ECD or management plan. For example, two Ramsar sites in Victoria, Western District Lakes and Gippsland Lakes, have potentially undergone human induced change to their ecological character, however it has been difficult to assess the level of change due to a lack of up-to-date ECDs, and in particular relevant Limits of Acceptable Change (LACs) for these sites (Parliament of Victoria's Inquiry into Auditor-General's Report No. 202: Meeting Obligations to Protect Ramsar Wetlands (2016)). As a result, the method for assessing the impacts of the Project on the ecological character of the MBRS adopted the precautionary principle in its assessment and drew from reviews of current best practice management of Ramsar sites, rather than relying entirely on the RIS and the draft ECD for the MBRS.
Ramsar Obligations	RA5	The Proposed Action is inconsistent with Article 2.5 of the Ramsar Convention as it would delete/restrict the boundary of the Ramsar Site without proving it is in the "urgent national interest."	The Project does not propose to delete or restrict the boundary of the Ramsar site therefore Article 2.5 of the Ramsar Convention does not apply. The Toondah Harbour Project will occur partly within the boundaries of the MBRS. The proposed reclamation areas overlap the MBRS by approximately 36.4 ha and the dredge area within Fison Channel overlaps the MBRS by a further 22.3 ha. Combined this represents 0.048% of the MBRS.
	RA6	The Ramsar Convention is clear that matters of urgent national interest are solely a matter for the national government who has signed up to the Convention. It seems completely incongruous that this development could be considered in the national interest given its purely commercial focus.	
	RA7	Section 138 of the Act 1999 (EPBC), makes it clear that in relation to any decision impacting on a Ramsar wetland, "the Minister must not act inconsistently with Australia's obligations under the Ramsar Convention".	As a Contracting Party to the Ramsar Convention, Australia has made a commitment to: ▪ designate suitable wetlands for inclusion on the List of Wetlands of International Importance; ▪ formulate and implement planning to promote conservation of listed wetlands and as far as possible the wise use of all wetlands; ▪ arrange to be informed at the earliest possible time if the ecological character of any listed wetland has changed, is changing or is likely to change as a result of technological developments, pollution or other human interference, and report any such changes to the Ramsar Convention; ▪ promote the conservation of wetlands and waterfowl by establishing nature reserves on wetlands; ▪ encourage research and exchange of data and publications; ▪ promote the training of personnel in the fields of wetland research and management; ▪ consult with other contracting parties to the Convention to review and promote the implementation of the Convention; and ▪ represent Australia at the triennial Conference of the Contracting Parties, collating the National Report for these meetings and other reporting to the Convention. Approval of the Toondah Harbour Project would not be inconsistent with any of these obligations.
	RA8	The Proposed Action does not meet the definition of "wise use" of the Ramsar Site as it would result in the permanent and irreversible destruction of part of the Ramsar Site impacting the Ramsar Site's ecological character.	The Ramsar convention does not prohibit development in Ramsar wetlands, but they must demonstrate that they maintain or enhance the ecological character of the site and be in accordance with the principles of wise use. The wise use of wetlands is *the maintenance of their ecological character, achieved through the implementation of ecosystem approaches, within the context of sustainable development* (Ramsar Convention 2005). The wise use concept requires ecological character to be maintained, while at the same time delivering services and benefits now and into the future for human well-being. Wise use of Australia's wetlands involves achieving a balance of uses which will deliver ecosystem, economic and social/cultural benefits over the long term. While this was addressed in Chapter 27 of the Draft EIS a more direct review of the Toondah Harbour Project against the definition of wise use has been completed as part of the Supplementary Report. The location of the Project, within less than 0.1% of the MBRS, is a reasonable and proportional means of achieving significant economic, social, cultural, educational and conservation benefits and services.

Theme	Comment ID	Comment	Response
			The Project as currently designed is capable of satisfying each of the three elements of 'wise use' of the listed Ramsar site. The key elements of wise use as applicable to the Project focuses: ▪ firstly on ecological character through a combination of ecosystem components and other related benefits that characterise a wetland; ▪ secondly that integrated land, water and living resources are promoted within the ecosystem; and ▪ thirdly that sustainable development is capable of preserving the environment through resource use that actively promotes longevity. The Master Plan adopts an ecological approach to the design of residential, commercial, educational and conservation facilities for the MBRS, an approach that seeks to preserve and improve the ecological character of the site and to ensure sustainability in the future. The Project also shows how the Project can promote economic, social, cultural, research and educational benefits and thereby promote the objectives of the Ramsar Convention. Some elements of the Project can readily and reasonably meet the test of 'wise use' and add value to a site's ecological characteristics, including parklands, recreational facilities, car parking and ferry terminal and entrance channel upgrades. The existing port facility is currently within the ecological character of the site and its redevelopment is likely to contribute significantly to tourism and recreational values. Roads can be 'wise use' if they enable access to 'wise use' features. Marinas and harbours are an existing ecological characteristic and new facilities, sensitively designed, are capable of being 'wise use'. By developing infrastructure and marine services for Minjerribah (North Stradbroke Island), the Project will also enable financially sustainable eco-tourism. When applying the 'wise use' test, it is reasonable to assess a wetlands project as an integrated whole, rather than by taking each component individually. Residential and retail developments can be considered by reference to how they contribute to achieving the wider objectives of the Project. Therefore, residential and hotel accommodation and retail facilities that may promote and facilitate economic, social, cultural, research and educational services and benefits – and the Concept Plan indicates that this is intended- would subsequently meet the principles pertaining to the 'wise use' test. A breakdown of Project uses within the Ramsar site and how they contribute to wise use is included as **Figure 5-12**.
Precedents	RA9	The EIS identifies a few areas where development had occurred successfully in Ramsar areas. There were three examples - each of which, when researched, were found to have problems. The Australian Gippsland Ramsar example (ref Ellen Maybery, Senior Environmental Justice Australia lawyer). Gippsland Lakes faces a broad range of threats, including pollution from activities like mining and agriculture, residential and commercial development, invasive species and bushfires. In addition, the report finds it is abundantly clear that climate changes and sea-rise that could occur in coming decades could change the ecology of the system and challenge the site's Ramsar listing.	The Draft EIS did not comment on the success or otherwise of developments within other Ramsar sites. It stated that a range of developments have been approved or are located within Ramsar sites both in Australia and internationally. This indicates that both the Australia and other signatories to the Ramsar Convention consider sustainable development can occur within the boundaries of a Ramsar site. The reference sited in the comment was reviewed as part of the assessment of potential impacts to the Ramsar site (refer to section 27.2 of the Draft EIS). The Auditor-General's Report found that the Gippsland Lake Ramsar Site had potentially undergone human induced change to their ecological character, however it was difficult to assess the level of change due to a lack of up-to-date ECDs, and in particular relevant Limits of Acceptable Change (LACs). The Auditor General's report did not make any reference to the Riviera Harbour Project (EPBC 2002/732) which is one of the examples provided in section 4.3.2 of the Draft EIS nor did any of the 16 recommendations from the review require development to be excluded from the Ramsar site. Any assertion that the Riviera Harbour Project had any impact on the ECD of the Ramsar site is conjecture not supported by scientific evidence.
	RA10	To my knowledge endorsing this proposal would be unprecedented in the developed world if an application of this type proceeded, resulting in the destruction of part of a Ramsar site and it would set an unacceptable precedent for the future.	As identified in section 4.3.2 of the Draft EIS, a range of developments have been approved or are located within Ramsar sites both in Australia and internationally. For example, the Riverwalk development (EPBC 2006/3176) in Victoria was approved to deliver 2,200 residential lots and other urban uses over a 197 ha area within the Port Phillip Bay (Western Shoreline) and Bellarine Peninsula Ramsar Site. While the development is within the boundaries of the Ramsar site the area was considered degraded and approval conditions required a range of measures to be implemented to protect the ecological character of the site including improving habitat values for the Growling Grass Frog.

Theme	Comment ID	Comment	Response
			Riviera Harbour (EPBC 2002/732) in the Gippsland Lakes Ramsar site in Victoria was also approved to carry out works within the boundaries of the Ramsar site. The works included dredging, dredge material disposal and a canal estate with urban lots covering 0.042% of the Gippsland Lake Ramsar site. Further examples have been identified as part of studies for the Supplementary Report. These include: ▪ Vineyards Estate Residential Development, Werribee, Victoria (EPBC 2003/960) - In 2005, the Federal Government approved a 190 lot residential subdivision within the Port Phillip Bay (Western Shoreline) and Bellarine Peninsula Ramsar site. The 24ha site was originally part of the Western Treatment Plant but was sold and used for grazing. ▪ Sweetwater Canal Housing Development, Meningie, South Australia (EPBC 2004/1422) - The project entailed the construction of a 300-lot residential canal development adjacent to Lake Albert, South Australia. It included dredging of a 500m entrance channel for the estate through The Coorong, Lake Alexandrina and Albert Ramsar Wetlands Site. ▪ Point Grey Marina Project, Western Australia (2010/5515) - Point Grey Marina Project is a 300 to 400-boat onshore marina project created through excavation at Point Grey, adjoining the Peel-Yalgorup Ramsar Site. In 2014, the Federal Government approved the dredging of 2.5km, 50m wide (5ha) navigation channel within the 26,677ha Ramsar Site due to the shallow depths of some areas of the Harvey Estuary. Internationally, Ramsar sites include a range of tourism and urban infrastructure within their boundaries. Examples include several marinas, apartments and hotels located within the Etang de Salses-Leucates Ramsar site in France, and a resort and mixed-use residential development within the Sungai Pulai Ramsar site in Malaysia.
Impacts to the Ramsar site	RA11	Please note that the area of mangroves, seagrass and other areas impacted, is not the same as reported in Chapter 22 – Sustainability (page 22-6): "Direct loss of wetland habitat due to the construction of the Project, comprising: • 3.4 ha of mangroves; • 37 ha of seagrass, including 11.8 ha in the Fison Channel; and • 8.8 ha of unvegetated sandbanks and mudflats, excluding 16.2 ha in the Fison Channel which will be retained post dredging.	The impact areas identified in Chapter 2 of the Draft EIS align with impacts identified throughout the document including marine ecology (refer to section 16.5). These values differ to those in the Ramsar Impact Assessment and Offsets Strategy (Chapters 27 and 29 of the Draft EIS respectively) as they only refer to impacts on habitats within the Ramsar site. In the Draft EIS these are identified as 2.5 ha of mangroves, 34.8 ha of seagrass, including 10 ha in the Fison Channel, and 7.5 ha of unvegetated sandbanks and mudflats, excluding 16.2 ha in the Fison Channel which will be retained as unvegetated mud/sand post dredging. While it is stated clearly in the Draft EIS when impacts are referring to the Ramsar site only it is acknowledged that the difference in the impact areas listed in the Draft EIS may have caused some confusion. A summary of impacts to marine habitats is included in section 5.7 of this Supplementary Report for clarity.
	RA12	Ecosystem health depends on populations of animals existing in the right proportions and abundance. An internationally significant wetland that recently hosted abundant birdlife is as critically important today as it was when the birds were abundant. The only difference is that Toondah no longer supports the number of birds needed to keep it 'alive' and functioning well.	It is assumed the internationally significant wetland referred to in the comment is the MBRS. Toondah Harbour itself is not a wetland – it is located within the 120,654 ha MBRS. It is agreed that the MBRS has and continues to provide habitat for abundant bird life. Project specific shorebird surveys have been carried out at the Toondah Harbour mudflat since 2014. Total migratory shorebirds varied substantially between years, between an average of 98 in 2014/15 and an average of 29 in 2021/22, largely due to variation in the numbers of grey-tailed tattler and bar-tailed godwit. The extent to which the Project could interfere with the recovery of threatened species was dealt with in the impact assessment for each of the relevant species. The assessment of impacts is required to be based on assessment of the likelihood of events occurring, substantiated with evidence. No published literature predicts a reversal of the loss of foraging habitat at key stop-over sites in south-east Asia. The loss of habitat in this area is widely considered to be the root cause of the population declines of the threatened shorebird species addressed in the EIS. It has been estimated that over 731,000 ha of tidal flat has been lost in the Yellow Sea alone over the past 50 years (Murray et al. 2014), and the abundant published literature shows that many of the pressures that originally led to the habitat loss are still present. Thus, the likelihood of further habitat loss, stabilisation of habitat area, or, at best a slight reversal in habitat loss is substantially greater than the likelihood of large-scale increase in tidal flat area in south-east Asia sufficient to restore the populations of threatened species to their original sizes. While it is not the Proponent or the project team's place to comment on international politics, the federal government has no legal ability to influence matters outside of its territory. The extent to which the Project could interfere with the recovery of threatened species was dealt with in the impact assessment for each of the relevant species.

Theme	Comment ID	Comment	Response
	RA13	The EIS does not address the impact of the proposed development on ecological functioning of both marine and terrestrial ecosystems through fragmentation, edge effects and increased anthropogenic disturbance.	Impacts to MNES as a result of fragmentation, edge effects and anthropogenic disturbance are addressed in detail throughout the Draft EIS. These impacts are summarised against the MNES significant impact criteria throughout chapters 24 and 25 of the Draft EIS.
	RA14	Wetlands contribute with essential ecosystem services that we need to be resilient facing climate change now, and in the future. This is fully explained in the Working Group II contribution to the IPCC Sixth Assessment Report. This must be taken into consideration when making decisions concerning vulnerable habitats.	An assessment of impacts from the Toondah Harbour Project on the critical services and biological processes provided by the MBRS is included in section 27.5.3 of the Draft EIS. The assessment concluded that as the Project is unlikely to have any significant impact on critical services and components outside of its footprint, impacts to services will only occur at the site level. Impacts to recreational and commercial fisheries are expected to be minor and will not impact on broader fisheries in Moreton Bay. The Project is expected to improve access and the existing facilities at Toondah Harbour for recreational fishers. The Proponent will work with QYAC, as the registered cultural heritage body for the area, to identify, protect and manage the Aboriginal cultural heritage values of Toondah Harbour under a cultural heritage management plan (CHMP) for the Project. Indigenous heritage will also be highlighted through cultural heritage interpretation and awareness raising, land and sea country management activities and opportunities for cultural and nature-based tourism to be provided out of the education centre. The Project will dramatically improve the existing tourism and recreational services Toondah Harbour provides to the MBRS and will add significantly to the Redlands' economy. The Project itself will not generate significant amounts of carbon and will not contribute to drivers of future climate change. The Project will result in the loss of approximately 3.4 ha of mangroves, no saltmarsh, and 37 ha of seagrass will be removed by the Toondah Harbour Project. The removal of mangroves and seagrass will prevent further capture of carbon by these plants. In coastal ecosystems carbon is predominantly stored in the sediments, with 50% to 99% of carbon stored up to 6 m deep below the surface (The Blue Carbon Initiative 2019). Most of the sediment within the disturbance footprint will be buried by the proposed development. Burial of the sediment will prevent the release of carbon to the atmosphere or ocean. Further, in areas where the sediment is not buried, anaerobic conditions are likely to limit the rate of decomposition of organic carbon and its consequent release to the atmosphere (Macreadie et al. 2019). The mangrove plant material that is removed can be chipped and composted, with composting a recognised method of carbon sequestration (Biala 2011). The Project's offset strategy will include measures to increase seagrass and mangrove habitats within Moreton Bay. A requirement of the offset strategy is to provide an overall conservation benefit for the matters impacted, however this would also provide benefits for carbon sequestration.
	RA15	The draft EIS does not adequately account for the increasing threat of climate change and the impacts the Proposed Action would have on the Ramsar Site's current capability to sequester carbon.	
	RA16	Habitat surrounding Cassim Island and the claypan and intertidal mud flats to the southwest of the PDA provide important roosting and feeding habitats for migratory and resident shorebirds. Any suitable habitat used by threatened species must be protected and enhanced with ecological character and function maintained as per the Ramsar signatory agreement.	Indirect impacts from light, noise and human presence were addressed in section 17.4.3 of the Draft EIS and section 5.3 of Appendix 2-N. The assessment found that implementation of a range of management measures to reduce indirect disturbance, such as fauna friendly lighting strategies and avoiding high noise generating construction activities during periods when shorebirds are most active (Nov – March), will minimise potential impacts on areas outside of the Project footprint. See response to comments MS21 – MS30 (section 6.6 of this Supplementary Report) for further details.
	RA17	A Ramsar site with so few remaining shorebirds, can only be on the verge of ecosystem collapse. The wise would realise that a site so heavily compromised is unlikely to withstand even minor threats.	There is no scientific or peer reviewed information provided to support the comment that the MBRS is on the verge of ecosystem collapse or that the decline in shorebirds would impact on the overall resilience of Moreton Bay. The Project will result in the loss of wetland habitat including mangroves, saltmarsh, seagrass and unvegetated mud/sand. The area of wetland habitat being lost is relatively small and in most cases marine habitats impacted by the Project are 0.2% or less of their representation in in the MBRS. Potential for impacts outside of the Project footprint, including on adjacent high tide roost sites, is considered to be minimal with any minor impacts expected to be short term (e.g. construction noise) or activities that shorebirds will habituate to over time (e.g. increased pedestrian use of foreshore public open space and walking/cycle paths). The Toondah Harbour Project is not expected to result in an overall decline in shorebirds in Moreton Bay.
	RA18	What impact does the continuing rapid decline in shorebirds have on current resilience or the ability to maintain the Ramsar Site's resilience in future, if declines continue at their current rate? How is the site's ecological character likely to change?	
	RA19	the EIS focuses on the small percentages of the entire MBRS that the direct project would touch. It is important that, even though the percentage of the total of the MBRS that might be subject to this project is small, the location of that small percentage is in a critical part of the wider system – in one of the two channels that separates	A key component of the Moreton Bay Ramsar Site Impact Assessment (Chapter 27 of the Draft EIS) was outlining the critical components, processes and services of the MBRS, identifying whether they are present at Toondah Harbour and assessing how impacts associated with the Project might affect these components, processes and services.

Theme	Comment ID	Comment	Response
		the northern part of the MBRS from the southern part – and this importance demands that the full force of the MBRS protections.	The Project will result in the loss of wetland habitat including mangroves, saltmarsh, seagrass and unvegetated mud/sand. The area of wetland habitat being lost is relatively small and in most cases marine habitats impacted by the Project are 0.2% or less of their representation in in the MBRS. Potential for impacts outside of the Project footprint, including on adjacent high tide roost sites, is considered to be minimal with any minor impacts expected to be short term (e.g. construction noise) or activities that shorebirds will habituate to over time (e.g. increased pedestrian use of foreshore public open space and walking/cycle paths). The potential for disturbance will be further minimised through careful placement of designated walking tracks, use of exclusion fencing and educational signage. Accordingly, a change in ecological character of the MBRS as defined by the Ramsar Convention will not result from the Toondah Harbour Project. While impacts will be localised and not result in a change to the ecological character of the MBRS.
	RA20	Attachment 3 of the draft EIS- Assessment of Potential Impacts on the Ecological Character of the Moreton Bay Ramsar Wetland from the Toondah Harbour Project states that hydrological changes have not been assessed as part of the investigations but that any changes have the potential to result in impacts to parts of the wetland up and downstream of the project area.	It is assumed this comment refers to Appendix 3-B of the Draft EIS – Moreton Bay Ramsar Site Assessment. This assessment does not state hydrological changes have not been assessed as part of the investigations. Hydrological changes are addressed in section 1.5.1.1 of Appendix: Background sampling and conceptual modelling was carried out to identify existing groundwater values at the Project footprint. Key potential impacts to groundwater and management measures include: ▪ Installation of a sheet pile wall has the potential to cause a build-up of groundwater (mounding) behind the inland side of the wall. Without mitigation, this may cause impacts such as further saturation and mobilisation of metals within the rehabilitated landfill in GJ Walter Park. Impact analysis found that any mounding would be highly localised in areas adjacent to the sheet pile walls which could be dealt with easily through ongoing monitoring and immediate remediation in response to any exceedances. ▪ Dewatering of the reclamation can potentially lower the groundwater table and thus desaturate the Quaternary sediments and Petrie Formation. The extent is anticipated to be minimal and localised to underneath the reclaimed areas of the Toondah Harbour PDA, as groundwater availability is primarily controlled by replenishment from seawater. The sheet piling and bund wall will contain any impacts and ongoing monitoring will be implemented to ensure impacts do not occur outside the footprint. Modelling shows that impacts to the hydrological regime are expected to be minimal and highly localised around the Project footprint.
	RA21	The Impact Assessment does not address the listing criteria for the Moreton Bay Ramsar site.	The listing criteria for the MBRS was addressed as part of the impact assessment carried out in Chapter 27 of the Draft EIS. When listed, the MBRS was identified as meeting six of the nine Ramsar listing criteria (criterion 1 through 6). The 2019 version of the RIS has been updated to now show the site meeting all nine criteria (criterion 7 through 9). The nine Ramsar listing criteria are: 1. The wetland contains a representative, rare or unique example of a natural or near-natural wetland type found within the appropriate biogeographic region. 2. The wetland supports vulnerable, endangered or critically endangered species or threatened ecological communities. 3. The wetland supports populations of plant and/or animal species important for maintaining the biological diversity of a particular biogeographic region. 4. The wetland supports plant and/or animal species at a critical stage in their life cycles, or provides refuge during adverse conditions. 5. The wetland regularly supports 20,000 or more waterbirds. 6. The wetland regularly supports 1% of the individuals in a population of one species or subspecies of waterbird. 7. The wetland supports a significant proportion of indigenous fish subspecies, species or families, life-history stages, species interactions and/or populations that are representative of wetland benefits and/ or values and thereby contributes to global biological diversity. 8. The wetland is an important source of food for fishes, spawning ground, nursery and/or migration path on which fish stocks, either within the wetland or elsewhere. 9. The wetland regularly supports 1% of the individuals in a population of one species or subspecies of wetland dependent non-avian animal species. The chapter goes on to identify the critical services outlined in the Draft ECD (Table 27-4) and representation of these services at the Project site and surrounding areas (Table 27-5). Section 27.5 of the Draft EIS assesses the potential for the Project to impact on those services. Further detail of this assessment is included in Appendix 3-B.

Theme	Comment ID	Comment	Response
			Listing criteria were considered in the identification of critical services and were represented through the following services: ▪ Contains a diversity of wetland habitat types that are representative of a major coastal wetland aggregation and in many areas show a high degree of connectivity between habitat types. ▪ Contains several critical wetland habitat types. ▪ Supports an assemblage of vulnerable or endangered marine/aquatic fauna. ▪ Supports an assemblage of vulnerable or endangered wetland dependant terrestrial fauna species. ▪ Supports significant populations (more than 20,000 in total and over 1% of the population size) of shorebirds. ▪ The tidal fish habitats and fish and invertebrate populations of the MBRS support valuable recreational and commercial fishing activities.
Offsets	RA22	The Ramsar Convention states that compensation (through restoration or creation of wetlands) is required to counterbalance instances of impacts to wetlands. The current approach in the EIS appears to be that of following some vague principles pertaining to urban design and wetland conservation; however, 'water sensitive urban design', an education centre and signage, and claims that impacts on sensitive areas will be "avoided" through siting are not sufficient restitution for what will be the permanent and irreversible destruction of over 40 ha of a Ramsar site.	While the Draft EIS notes a range of benefits to the MBRS from the Project, these are not considered to be compensation for impacts. Compensation would be provided through the offset strategy. An updated Offset Strategy has been provided as **Appendix U**. Offsets projects must be able to demonstrate a conservation outcome for the matter being impacted. A review of key threats and conservation priorities for the matter impacted must be carried out including national guidelines, conservation advice, recovery plans and recent peer reviewed literature. Offsets will be provided through an Environmental Trust Fund (ETF) which will be funded by the proponent. The delivery approach and basis for the calculation of the financial contribution are outlined in section 1.3. A total financial payment of $9,041,401 is required to offset SRIs on MNES, including impacts on habitats within the MBRS.

6.9. Environmental Offsets Public Comments and Responses

Comments received on the Environmental Offsets Strategy have been compiled and responded to in Table 6-9 using either direct wording from a single submission or an amalgam of comments encompassing the same issue. A total of 21 issues on the Environmental Offsets Strategy were raised through public submissions. Issues were categorised into five themes being policy and guidelines, financial contribution, feasibility and delivery, habitats being offset and net benefits.

The table should be read in conjunction with Chapter 29 of the Draft EIS. Cross referencing to the Draft EIS has been included where appropriate and additional investigations included in appendices to this Supplementary Report.

Table 6-9: Environmental Offsets Public Comments and Responses

Theme	Comment ID	Comment	Response
Policy and Guidelines	EO1	The Offsets Strategy does not comply with the EPBC Offset Policy or Tailored Guidelines and does not provide sufficient proof that the proposed offsets will be successful in providing permanent, positive impacts to listed threatened and/or migratory species and the Ramsar Site.	An updated Offset Strategy has been provided as **Appendix U** of this Supplementary Report. The EPBC Act EIS Guidelines outline details that need to be addressed by the offset strategy for the Toondah Harbour Project. All of the guideline requirements have been addressed by this strategy however it is noted that some details, such as the completion of an offsets guide, are not applicable. Table 3 of the updated Offset Strategy outlines a series of criteria any offset project must meet in order to be selected. Offsets projects must be able to demonstrate a conservation outcome for the matter being impacted. A review of key threats and conservation priorities for the matter impacted must be carried out including national guidelines, conservation advice, recovery plans and recent peer reviewed literature. Offsets will be provided through an Environmental Trust Fund (ETF) which will be funded by the proponent. The delivery approach and basis for the calculation of the financial contribution are outlined in section 1.3 of **Appendix U**. A total financial payment of $9,041,401 is required to offset SRIs on MNES. Funds will be legally secured through a bank guarantee or similar process. A detailed examination of potential projects will be carried out to determine which are the highest priority and will provide the most value for habitats in Moreton Bay. The outcome of this process will be an ETF Project Delivery Strategy that will outline at least 5 years worth of projects including budget requirements. This process will be run by the Independent Advisory Group (refer to section 1.5.4 of the updated Offset Strategy) which is proposed to include representatives from the relevant Federal, State and Local government departments. The ETF Project Delivery Strategy will include the following information at a minimum for each offset project: ▪ A delivery schedule for each offset project outlining when conservation outcomes will be achieved. ▪ A draft management plan outlining key measures, parties responsible for delivering those measures and timing of delivery. ▪ A review of peer reviewed scientific literature demonstrating conservation outcomes can be achieved.
	EO2	'No net loss', which is one of the key requirements of the EPBC Act in relation to Matters of National Environmental Significance (MNES), cannot be delivered.	
	EO3	The outcomes of the offset strategy need to be specific, measurable and achievable, based on robust baseline data and demonstrate with a high degree of certainty that predicted outcomes will be achieved.	
	EO4	Neither the executive summary nor chapter 29, which details the "Environmental Offsets Strategy", contains any reference to an "offsets guide".	The approach to delivering offsets is outlined in section 1.3 of the updated Offsets Strategy (**Appendix U**). Offset projects are particularly challenging to implement in coastal and marine environments where most available natural areas are under council or state government ownership. As a result of these difficulties, it is proposed to deliver a suite of direct and indirect offsets through a fund managed by a third party with the ability to access public land and obtain approvals not available to a commercial entity such as the Proponent. The fund will be established so that offset projects undertaken meet the principles outlined in the EPBC Act Environmental Offsets Policy, including the need to provide conservation benefit for the matters impacted. There are no tools under the EPBC Act to calculate funds for offset delivery, therefore the QEOFC has been used to identify an appropriate financial contribution. The QEOFC was 'reverse engineered' by DES from the EPBC Act Offsets Guide. Estimates for the 15 individual inputs in the guide were developed by experts for each conservation matter. Specific assessment against the offset guide is not applicable to a Trust Fund.

Theme	Comment ID	Comment	Response
	EO5	The draft EIS offset strategy does not include specific discussion of actions and achievable outcomes.	Project specifics will be addressed through the ETF Project Delivery Strategy (refer to section 1.5.5 of **Appendix U**). The Project Delivery Strategy will be completed and approved by the relevant authorities prior to any works commencing on site. The Project Delivery Strategy will include a program to identify and review potential projects will be undertaken on a yearly basis. From this review projects will be selected for funding based on the following criteria: 1. Does the project align with regulator policy and/or offset requirements? 2. Is there a clear environmental benefit to the identified protected matter (MNES/MSES)? 3. Is the project cost effective and can it be undertaken in accordance with the SMART principles? 4. Is the project lead a responsible and trustworthy entity (will they complete the project as described)? 5. Is there sufficient expertise within the project team to deliver the project? 6. Will the benefits of the project be sustained and long lasting? Table 3 of the updated Offsets Strategy outlines a series of requirements any offset project must meet in order to be selected. These criteria will ensure offset project's meet the key outcomes required by the EPBC Act Environmental Offset Policy. Offsets projects must be able to demonstrate a conservation outcome for the matter being impacted. A review of key threats and conservation priorities for the matter impacted must be carried out including national guidelines, conservation advice, recovery plans and recent peer reviewed literature.
	EO6	The offset strategy lacks specific objectives. Should the EIS be approved, the proposed offset strategy objectives can be achieved without any achieving any positive outcomes for the threatened species impacted by this proposal.	Offsets will be delivered through an Environmental Trust Fund (ETF). The objectives of the ETF are addressed in section 1.5.2 the updated Offsets Strategy (**Appendix U**). The primary objective of the ETF is to provide conservation benefits to the Moreton Bay Ramsar Site through effective and practicable delivery of actions that compensate for residual significant impacts caused by the Toondah Harbour Project under the EPBC Act.
Financial Contribution	EO7	This amount of $4.5 million to be set aside for offsets needs to be challenged by environmental scientists. It seems to be a miniscule amount.	The offset funding amount was based on significant residual impacts (SRIs) to MNES which were assessed against the Significant Impact Guidelines 1.1 in Chapters 24, 25, and 27 of the Draft EIS. These impacts have been updated in the Supplementary Report in response to a range of comments from the public and state and commonwealth agencies. Key changes to the outcomes of the SRI assessment that need to be reflected in the Offset Strategy are: ▪ Previously the dredge area was not considered an SRI as it would only result in the depth of already sub tidal areas being increased and recolonised by a range of marine flora and fauna. While marine habitats, such as seagrasses, are expected to recolonise sections of the dredge area the types of communities cannot be predicted and may differ from those that are currently present. As a result, dredge areas are now considered an SRI. ▪ Some substrates within the Project footprint, such as rocky rubble, were not considered to provide habitat for threatened species therefore were not considered to contribute to the ecological character of the Moreton Bay Ramsar site. It is acknowledged that all habitats within the MBRS provide some value to the ecological character therefore these have been included as a SRI. Based on the outcomes of detailed assessments the Project is considered likely to have a significant residual impact on the following MNES: ▪ The loss of 28.9 ha of foraging habitat for a range of threatened and migratory shorebird species which will reduce the potential area of occupancy for these species within Moreton Bay by 0.29%. ▪ The area of the MBRS within the Project footprint (reclamation and dredge areas) will be substantially modified impacting on a range of wetland habitats including seagrass, mangrove, rocky rubble and unvegetated sand and mud substrate. The Project will result in the permanent modification of 58.7 ha of the MBRS including:

Theme	Comment ID	Comment	Response
	EO8	The calculation of the fee is not clear, and there are factual errors in the offset calculations i.e. only one bird species is mentioned (White-throated needletail, which is not a shorebird), compared to the nine species of shorebirds listed as affected within the immediate development footprint.	○ 2.5 ha of mangroves (approximately 0.03% of all mangroves in the MBRS); ○ 35 ha of seagrass (approximately 0.2% of all seagrass in the MBRS); ○ 1.1 ha of rocky rubble; and ○ 19.4 ha of unvegetated sand and mud substrate (approximately 0.2% of mudflats within the MBRS).
	EO9	The use of the Queensland offset calculator rather than the EPBC calculator is likely ineffective in this case Intertidal habitat is not considered to be offsetable in the marine offset calculator for the Great Barrier Reef as we lack data on costs, actions, and outcomes, which are required as inputs. Although the Queensland offset calculator has allowed offset of 'marine wetlands', this broad categorisation is inappropriate, as there are significant differences between offset of intertidal habitats such as seagrass, which is challenging to offset, and mangroves, which may be easier to offset.	There are no tools under the EPBC Act to calculate funds for offsets delivery, therefore the Queensland environmental offset financial calculator (QEOFC) has been used to identify an appropriate financial contribution to offset impacts from the Project. The QEOFC was 'reverse engineered' by the Department of Environment and Science (DES) from the EPBC Act Offsets Guide. Estimates for the 15 individual inputs in the guide were developed by experts for each conservation matter. That information was then used to identify the multipliers on which the financial offset amount is calculated. The QEOFC calculates financial offsets based on three components: on ground costs, landholder incentive costs and administrative costs. A multiplier is also applied to the calculation to ensure additionality based on the size and scale proportionate to the significant residual impact. For habitats comparable to the MNES being impacted (i.e. marine plants and wetlands) a multiplier of four is applied. That is, the financial calculation assumes that for every 1 ha of habitat impacted the financial equivalent of 4 ha of a similar habitat will be delivered through the offset funds. The QEOFC has been used to calculate the financial contribution. Attributes from the QEOFC applied to the calculation are as follows: ▪ All threatened animals have a 4x multiplier applied to calculate the offset area. This has been utilised as the multiplier for impacts to migratory shorebird species. ▪ There is no specific multiplier for Ramsar sites. All marine based matters, including marine parks, have a 4x multiplier. In recognition of the higher protection attributed to Ramsar site a premium 5x multiplier will be applied which aligns with the multiplier for conservation parks and nature refuges. ▪ An on-ground cost of $30,000 per hectare of offset area is applied by the QEOFC to marine areas within Moreton Bay (i.e. if a 5x multiplier is used an on-ground cost of $150,000 is applied for very hectare impacted). ▪ To account for economies of scale for large offsets, a sliding scale of per hectare costs is applied to the financial settlement amount. For marine habitat there is a 25% reduction for offsets over 25 ha and 50% reduction for offsets over 100 ha. Sliding scale calculations are included as Attachment 1. ▪ The maximum administrative cost of $1 million has been added to the total. Using the above areas and calculation method provided in Appendix 4 of the Queensland Environmental Offsets Policy a total financial payment of $9,041,401 is required to offset SRIs on MNES. Further detail on the offset delivery approach and financial calculation are included in sections 5.14.2 and 5.14.3 of the Supplementary Report.
Feasibility and Delivery	EO10	Wetlands have been found to be exceptionally difficult to recreate or replace.	How conservation gains will be achieved by the ETF is outlined in Section 1.7 of the updated Offsets Strategy (**Appendix U**). In western Moreton Bay, one of the most important conditions limiting the distribution of seagrass is water quality, and in particular the amount of light reaching the sediment. Critical conservation gains can be made from improving the health and distribution of seagrass throughout the western areas of the Bay. While new habitat can be created for seagrass to grow on, this is at the expense of another habitat, and may cause some damage to the donor seagrass bed if seagrass is transplanted. Consequently, the most effective measures to offset the disturbance of seagrass in western Moreton Bay are ones that relate to improving the water quality. Scientific studies have shown that significant gains to reducing sediment runoff can be made by restoring riverbank vegetation and landforms that stabilise banks and help capture paddock and urban runoff (Saunders et al 2017). Gains can be as high as a 97% reduction in sediment flows.

Theme	Comment ID	Comment	Response
	EO11	Eastern Curlew feeding habitat cannot be easily replaced or offset, hence the loss of any known feeding habitat results in significant negative impacts on populations.	A recent report prepared by the University of Queensland for Healthy Land and Water has assessed the key threats to migratory shorebirds in Moreton Bay and prioritised a set of recommended management actions to address these threats. A key threat identified by this report is the low number, distribution and management of roost sites in Moreton Bay, with 15 roost sites having been lost and 95% of roost sites impacted by one or more threats, particularly disturbance, development and mangrove encroachment. The report prioritised a number of important actions to mitigate threats to migratory shorebirds and their habitats in Moreton Bay, including: 1. Implement threat management at existing roost sites, including threats from disturbance and mangrove encroachment, with management of ongoing disturbance at Toorbul and Kakadu Beach (located either side of Pumicestone Passage) identified as the most urgent priority. 2. Design and implement strategies to reduce disturbance to migratory shorebirds foraging at low tide, particularly from dogs being walked off leash on tidal flats. There are multiple examples of measures such as the construction of artificial roost sites has resulted in use by large numbers of migratory shorebirds. In fact, several of the major current roost sites in Moreton Bay are artificially constructed. This includes areas of the reclamation at the Port of Brisbane, which provides roosting habitat for about 8,000 migratory shorebirds, and disused dredge disposal ponds at Manly boat harbour which regularly contain 2,000 to 4,000 migratory shorebirds. A study by Lilleyman et al. (2018) at the Port of Darwin also found that most of the 329 Eastern Curlews identified by the survey in Darwin Harbour roosted within a dredge pond created at the east arm wharf. Offset projects will ultimately be selected by Independent Advisory Group (refer to section 1.5.4 of the updated Offsets Strategy (**Appendix U**), however there are a range of management plans and strategies that could be utilised for an initial tranche of projects. These plans have been developed by various government departments, not for profit organisations and initiatives. A small number of these documents are described below including a list of unfunded projects that may be implemented through the ETF. Project specifics will be addressed through the ETF Project Delivery Strategy (refer to section 1.5.5 of **Appendix U**). The Project Delivery Strategy will be completed and approved by the relevant authorities prior to any works commencing on site.
	EO12	If critical Eastern Curlew habitat is destroyed, it is removing both the ecosystem values and the mechanism to maintaining and restoring wetland ecosystem function.	
	EO13	Offsets must be demonstrably linked to achieve a gain of ecological equivalence to the values lost. However, since ecological systems such as wetlands, intertidal zones, seagrass meadows and marine systems (as are in place in the Toondah Harbour area) are ecologically complex systems, it is extraordinarily difficult to achieve this requirement.	
	EO14	Before this development can be approved, a serious and detailed plan as to what offsets will be put in place, how they will deliver benefits to shorebirds and how they will be maintained and funded in the long term needs to be articulated and independently reviewed.	An updated Offset Strategy has been provided as **Appendix U**. Section 1.7 outlines how conservation benefits can be achieved through the ETF. Offset projects will ultimately be selected by Independent Advisory Group (refer to section 1.5.4 of the updated Offsets Strategy (**Appendix U**), however there are a range of management plans and strategies that could be utilised for an initial tranche of projects. The offset funds will be legally secured prior to the commencement of any site works through a bank guarantee or similar process. Funds will then be released in stages aligning with impacts associated with dredging and reclamation stages. The release of funds will occur prior to the works commencing on the following components of the development: ▪ Stage 1 reclamation (~40% of impact) - $3,616,564 ▪ Stage 1 Dredging (~25% of impact) - $2,260,353 ▪ Stage 2 reclamation (~25% of impact) - $2,260,353 ▪ Stage 2 dredging (~10% of impact) - $904,141 Table 3 of the updated Offsets Strategy outlines a series of requirements any offset project must meet in order to be selected. These criteria will ensure offset project's meet the key outcomes required by the EPBC Act Environmental Offset Policy.
	EO15	There is no indication of what these offsets may be in order to independently assess if they will or will not be "beneficial projects."	
	EO16	Offset funding models that rely on the provision of a dollar amount do not produce 'like for like' outcomes.	
Habitats being offset	EO17	The main offsets referred to are roosting sites. Roosting sites are very different from feeding habitats. Mud flats are needed for feeding.	A recent report prepared by the University of Queensland for Healthy Land and Water has assessed the key threats to migratory shorebirds in Moreton Bay and prioritised a set of recommended management actions to address these threats.

Theme	Comment ID	Comment	Response
	EO18	The offsets section suggests that offsets associated with roosting habitat would be adequate and assumes that there is sufficient feeding habitat (and food) for shorebirds to support the proposed loss from Toondah Harbour. There is no support for this assumption and in fact goes against the findings of Clemens et al. 2012 that found declining shorebird prey in western Moreton Bay.	A key threat identified by this report is the low number, distribution and management of roost sites in Moreton Bay, with 15 roost sites having been lost and 95% of roost sites impacted by one or more threats, particularly disturbance, development and mangrove encroachment. The report prioritised a number of important actions to mitigate threats to migratory shorebirds and their habitats in Moreton Bay, including: ▪ Implement threat management at existing roost sites, including threats from disturbance and mangrove encroachment, with management of ongoing disturbance at Toorbul and Kakadu Beach (located either side of Pumicestone Passage) identified as the most urgent priority. ▪ Design and implement strategies to reduce disturbance to migratory shorebirds foraging at low tide, particularly from dogs being walked off leash on tidal flats. There are multiple examples of measures such as the construction of artificial roost sites has resulted in use by large numbers of migratory shorebirds. In fact, several of the major current roost sites in Moreton Bay are artificially constructed. No indirect impacts on migratory shorebirds or the MBRS are anticipated as a result of a range of management measures that will be put in place for the Project. Examples of these management measures include: ▪ High noise generating activities near sensitive areas will be restricted to periods when migratory species are unlikely to be present. ▪ Dredging will be restricted to periods when migratory species are unlikely to be present. ▪ Silt curtains to be used where possible during dredging to reduce turbidity plumes. ▪ The lighting strategy will keep construction and operational lighting contained to the site. ▪ Implementation of an adaptive water quality monitoring program focused on sensitive receptors. ▪ Capture, treatment, and reuse of all tailwater. ▪ Continual testing and treatment of PASS during dredging and reclamation work. ▪ Rockwall breakwater to be brought forward in construction schedule if erosion near Cassim Island occurs. ▪ Further Relevant management measures are listed in sections 9.5, 10.5 and 16.6 and 17.5 of the Draft EIS.
	EO19	The draft EIS offset strategy does not account for the indirect and cumulative impacts of the proposed action. There will likely be indirect impacts to migratory shorebirds due to increased disturbance through a significant increase in the local population and recreational users to the area, including users to the proposed foreshore park.	
	EO20	It is also noted that in the revocation of a part of the Marine Park there is no discussion in the EIS about an offset for the area of Marine Park to be impacted.	The Moreton Bay Marine Park is not a matter of national environmental significance therefore is not governed by the EPBC Act. Any specific offsets required for the Marine Park will be addressed as part of the State application process.
Net Benefit	EO21	Federal government guidelines for compiling the EIS stipulate it has to "demonstrate how a net benefit will be achieved" for the internationally recognised wetlands and other areas of national environmental significance in Moreton Bay. A word search of the 953-page draft EIS failed to find any reference to providing a "net benefit" for those designated areas.	The terminology used in the EPBC Act Environmental Offsets Policy to describe improvement or 'net benefit' for a matter impacted is 'conservation outcome' or 'conservation gain'. A word search found these terms referenced within only the offsets strategy chapter of the Draft EIS (Chapter 29), and used a total of 26 times.

6.10. Project Description, Assessment Framework and EIS Document Public Comments and Responses

Comments received on the Project Description, Assessment Framework and Draft EIS document and process in general have been compiled and responded to in Table 6-10 using either direct wording from a single submission or an amalgam of comments encompassing the same issue. A total of 72 issues on the project description and assessment framework were raised through public submissions. Issues were categorised into ten themes being assessment framework, EIS Document and project description, project alternatives, traffic, project need, urban design, harbour facilities, cumulative impacts, Independent Advisory Panel and EPBC Act criteria.

The table should be read in conjunction with Volume 1 (Chapter 1 through 4) of the Draft EIS. Cross referencing to the Draft EIS has been included where appropriate and additional investigations included in appendices to this Supplementary Report.

Table 6-10: Project Description, Assessment Framework and EIS Document Public Comments and Responses

Theme	Comment ID	Comment	Response
Assessment Framework	PD1	Under normal procedures, an EIS for a project without a PDA designation would be subject to intense scrutiny by key state regulators such as the Department of Environment and Science (DES) and the Department of Primary Industries (DPI) as well as the local authority. In the case of this PDA, this typical level of scrutiny is likely to be substantially reduced or absent as Economic Development Queensland (EDQ) has an overriding interest in expediting the development approval in order to greatly shorten the approval timeframe before which construction can commence.	It is assumed the 'normal procedure' referenced in this comment is an EIS declared a 'coordinated project' under the *State Development and Public Works Organisation Act 1971* and assessed under the EPBC Act through the assessment bilateral agreement. It is noted that under this process the State assessment is overseen by the Office of the Coordinator General (OCG). The OCG is also the assessment manager and sole decision maker with other state regulatory agencies providing advice where appropriate. The assessment process under the Toondah Harbour Priority Development Area (PDA) Development Scheme is similar however Economic Development Queensland (EDQ) is the decision maker. It should be noted that a range of State agencies have provided comments on the Draft EIS, including DES and the Department of Agriculture and Fisheries (DAF). Five meetings/workshops were held with the various State agencies to discuss the comments provided and address keys issues raised. Comments and responses are addressed in Chapter 7 of this Supplementary Report. In addition, the relevant state agencies, including DES and DAF, will have the opportunity to provide further comments on the Project as part of the PDA application process and any applications under the *Marine Parks Act 2004*.
	PD2	The proponent has proposed a Technical Assessment Panel to be in place for the duration of construction program. This panel would have no legislative powers or control and, indeed, given the extremely tight (and unrealistic) construction timeframe proposed in the EIS (and seasonal timing constraints to certain operations such as dredging), such a panel would be loathe to request a stop-work or decisively act on other shortcomings (thus causing timing delays) should unacceptable impacts be demonstrated to be present or likely.	It is acknowledged the Technical Advisory Panel (TAP) is not a legislative requirement. It is a process the Proponent has voluntarily proposed and committed to through the EIS in order to provide the most rigorous management process possible. If approval is obtained all commitments made through the EIS process will legally be required to be implemented otherwise the Proponent would be in breach of their conditions of approval.
	PD3	Much of the southerly channel realignment is outside of the PDA and so falls directly under normal State legislation. It also lies mostly within the Ramsar and Marine Park zones. Under current Queensland legislation the developers should not be able to claim they are employing tidal works (legitimate dredging of shipping channels, replacing old wharves etc) because: 'tidal works does not include the reclamation of land under tidal water'.	Dredging outside of the PDA may require a permit for an Environmentally Relevant Activity and operational work that is tidal work. It is unclear what the comment is referencing in regard to the reclamation as all reclamation works will occur within the PDA. The dredging may also be considered PDA-associated development.
	PD4	In considering the further role of the State of Queensland to supervise management plans for the site, should there be a decision to approve, we note that the Moreton Bay Management Plan statutory review is long overdue and that the findings of this review, when it eventually commences, may well indicate a higher level of management is required	Comment noted. The Project can only be assessed under the legislative and approval framework I place at the time the application is made.
	PD5	If the precedent is set for revoking marine park for suburban development, then this places all protected estate across the Commonwealth into a similar argument.	The Moreton Bay Marine Park is protected through State legislation, not Commonwealth.

Theme	Comment ID	Comment	Response
			As stated throughout the Draft and Supplementary Report, Toondah Harbour is a PDA declared by the State government in June 2013. There are no other PDAs I the south east Queensland region located partially over tidal waters. The proposed redevelopment of Toondah Harbour is not a market led proposal – it did not originate from the private sector or from the Proponent specifically. In June 2014, Economic Development Queensland (EDQ) and RCC called for expressions of interest (EOI) from the private sector to redevelop public lands in the Toondah Harbour PDA. In September 2015, the Proponent was announced as the preferred development partner to redevelop the public landholdings in the PDA. Under the development agreement, the Proponent is responsible for designing, financing and delivering the Project, including obtaining environmental and development approvals.
EIS Document and Project Description	PD6	For huge developments like this proposal, the environmental impact assessment process has not been an efficient way to examine the range of impacts, unless given sufficient time to study seasonal variations in prevailing winds and consequent current patterns prior to construction approval, and to determine major weather event exacerbation and conduction of outflowing sediments and pollutants.	Comment noted. The Proponent has no control over the assessment processes set out through Commonwealth and State legislation.
	PD7	The draft EIS does not present "indisputable evidence" that their Toondah Harbour Proposal would not cause irreversible harm to the environment, and the draft EIS has not demonstrated that it will not have an adverse impact on the Eastern Curlew.	As outlined in the Draft EIS the Toondah Harbour Project avoids and manage environmental impacts by: ▪ Protecting the environment by implementing the project design principles to avoid and minimise impacts on MNES including the Cassim Island and Nandeebie Claypan high tide migratory shorebird roost sites. While some direct impacts to marine wetland habitats are unavoidable design features such as the placement of culverts and a non-navigable channel through the eastern arm of the development minimise indirect impacts outside of the project footprint. ▪ In addition to management through design the proposed adaptive environmental management framework will include constant review of project activities to ensure best practive measures are utilised and indirect impacts are minimised. Management measures such as the use of silt curtains around the dredge will further minimise the potential for indirect impacts to MNES. The Draft EIS concluded that the Project is likely to have a significant residual impact on eastern curlew by adversely affecting feeding habitat and reducing the area of occupancy of the species in feeding habitat by 0.29% within Moreton Bay (refer to section 24.3.1 of the Draft EIS). Habitats used by eastern curlew within or adjacent to the Project footprint include tidal flat feeding habitat and two roost sites: Nandeebie Claypan located 100 m south-west of the Project footprint and Oyster Point located 400 m south-west of the Project footprint. Eastern curlews also roost on a sandbank 2 km east of the Project footprint. Eastern curlews do not roost at Cassim Island. Tidal flat habitat within or adjoining the Project footprint was used by an average of 3.5 (maximum of 7) eastern curlew at any point in time for feeding during the summer months within the past five years. Over the past five years, eastern curlew was recorded roosting at Oyster Point on 21% of summer high tide surveys, with an average of 13 and a maximum of 45 birds when present.
	PD8	In its current Referral, with a referral area of 56 hectares, the public was misled by the (much reduced) referral area and the "detailed description of the proposed action" in 1.2 of the Referral form. The proposed extensive widening and other alteration of the (approximately) 2km long Fison Channel, which is now detailed in the Draft EIS, is not mentioned at all in the "detailed description" in the Referral form.	The upgrade of the Fison Channel was addressed in the referral documentation (EPBC 2018/8225). The detailed description of the Project states: '*capital dredging to deepen and widen the channel to a target depth of -3 m LAT with a base width of 75 metres is proposed, however this will be subject to detailed design and operational considerations. For example, greater target depths in areas of high sedimentation, such as channel bends, will be considered to reduce the frequency of maintenance dredging*'. The referral also states: '*Preliminary engineering analysis indicates that a minimum of 500,000 cubic metres of material would need to be removed from the channel*'. Channel dimensions and dredging volume are identical to those included in the referral. The masterplan included in referral (Plan 2) also shows an indicative entrance channel width of 75m with and annotation stating that the channel will extend until the minimum navigable depth is achieved. The full length of the entrance channel could not be shown at the time as detailed bathymetry had not been completed. Section 1.3.2 of the Draft EIS summarises changes to the footprint between the referral and EIS. Refinements have occurred to the Project master plan since submission of the referral documentation, primarily in response to feedback from technical consultants and stakeholders. These minor changes have not altered the key Project components or uses outlined in the referral and do not result in impacts upon MNES additional to those described in the referral. Most changes are aimed at minimising direct and indirect impacts upon MNES from the Project. The marina, internal waterways and reclamation landforms were reduced by a total of 12.1 ha between the referral and Draft EIS.

Theme	Comment ID	Comment	Response
	PD9	The time provided for comment on such a major document is far too short to ensure the public can have their say in providing comments.	Comment noted. The Proponent has no control over the assessment processes set out through Commonwealth and State legislation.
	PD10	There is a possibility that, having completed dredging and created new dryland will on-sell all or parts of this to other investors. It is possible these sales would relieve Walker of obligations for future environmental mitigation and management responsibilities?	In 2015/16, the Minister for Economic Development Queensland (MEDQ), RCC, Redland Investment Corporation and the Proponent entered into binding commercial agreements for the Project, including a development agreement and an infrastructure agreement. Under the development agreement, the Proponent is responsible for designing, financing and delivering the Project, including obtaining environmental and development approvals. If approval is received the Proponent will be legally responsible for the implementation of all conditions and requirements.
	PD11	Section 2 of the draft EIS "Detailed Description of the Site and Action" appears to make little or no mention of the Building Construction process. The omission of any mention of foundation construction, which if driven piling is used is likely to be extremely disruptive, is considered a failing of the draft EIS.	The project description outlined in section 2 of the Draft EIS as a focus on coastal works, including dredging, reclamation and piling, as these construction activities have the most potential to impact on MNES. Section 2.3.5 addresses the urban design concepts including building heights, interface with existing urban areas, community focal points, street network, open space network and public spaces. Potential impacts from building works are mostly related to amenity rather than MNES. Amenity issues will be addressed in detail as part of the State application process. Building construction activities have been addressed where appropriate in the environmental impact assessment, for example the Air Quality (Chapter 11 of the Draft EIS and section 6.3 of this Supplementary Report) and Terrestrial and Underwater Noise (Chapter 12 of the Draft EIS and section 6.4 of this Supplementary Report) assessments.
	PD12	There is no comprehensive Management Plan in the EIS.	The Environmental Management Framework is explained in detail in Chapter 28 of the Draft EIS and Draft Management Plans addressing specific MNES are included as Appendix 3-C. The EM Framework provides an outline of processes, procedures and actions to be utilised through all stages and areas of the Project, identifies MNES and activity-specific management plans (MPs) that sit within the Framework and provides consistent protocols for environmental management, mitigation and monitoring of relevant impacts of the Project, including any provisions for independent environmental auditing. Final MPs will be require sign off from DCCEEW as a condition of approval. All management measures included in the Draft and Supplementary Report will be required to be incorporated into the MPs. This will also allow for measures identified through the State assessment process to be incorporated into the MPs.
	PD13	Maintenance dredging for the internal waterways and marina basin. Sufficient pond capacity for 10 years but after that will need to be trucked. Who will these costs be borne by?	It is acknowledged that the maintenance dredging pond will eventually need to be emptied and material will likely have to be trucked. This is unlikely to be needed for at least 20 years post commencement of construction as the small amount of material generated could be accommodated within the reclamation footprint during construction. While responsibility for maintenance dredging of the marina and internal channels has not been discussed at this point in the Project, in general, marina operators are responsible for maintaining safe navigation.
	PD14	This EIS does not adequately address recovery strategies for impacted wildlife	Recovery strategies and conservation advice for every threatened species considered to have any potential to be impacted by the Project are addressed in section 24 of the Draft EIS. It is noted that management actions outlined in these strategies are generally targeted at Government agencies and have no relevancy at a Project level.
	PD15	The IAP recommended the recognition of ecological tipping points. The EIS does not articulate these in any of the chapters.	As noted in the Independent Advisory Panel's (IAPs) finale recommendations letter (Appendix 1-G) in relation to ecological tipping points '*Detailed review comments to augment the above recommendations have been provided already*'. These comments have been incorporated throughout the Draft EIS. Many of the comments were in relation to seagrass, which has been addressed directly in section 16.3.4 of the Draft EIS. Tipping points have been acknowledged in many other ways throughout the Draft EIS, such as the commitment to collect additional water quality and marine habitat baseline data to feed into monitoring and management programs for the Project.
	PD16	The current EIS considers the project impacts in isolation and does not consider the cumulative impacts of development across the MBRS.	Cumulative and Consequential impacts are addressed specifically in Chapter 26 of the Draft EIS. Impacts on the MBRS are addressed in addressed in Chapter 27 of the Draft EIS.
	PD17	S2.2.3 states that 'Vehicle ferries travelling to and from Minjerribah (North Stradbroke Island) are regularly observed 'bottoming out' in the channel, generating turbidity plumes and risking damage to the vessels (refer to Plate 2-2)'. Plate 2-2 does not show a ferry bottoming	Plate 2-2 shows a ferry generating a turbidity plume due to its interaction with the seafloor in the channel. Plate 2-2 is titled 'Turbidity Plume Generated by Vehicle Ferry'. This description is accurate.

Theme	Comment ID	Comment	Response
		out, it shows a ferry boat in transit so this description should be amended.	
	PD18	The EIS does not address the impact of the proposed development on ecological functioning of both marine and terrestrial ecosystems through fragmentation, edge effects and increased anthropogenic disturbance.	Impacts to MNES as a result of fragmentation, edge effects and anthropogenic disturbance are addressed in detail throughout the Draft EIS. These impacts are summarised against the MNES significant impact criteria throughout chapters 24 and 25 of the Draft EIS.
Project Alternatives	PD19	In 2020 Maritime Safety Queensland advised the former independent candidate for the local State seat of Oodgeroo, Claire Richardson, that there were no current safety issues and that widening the channel, from 45m to 75m.	It is unclear what discussions were held between Claire Richardson and MSQ as no correspondence or record of the conversation has been released. As stated in several locations through the Draft and Supplementary Report the channel design guideline adopted is *Harbour Approach Channels Design Guidelines*, PIANC Report No 121 Maritime Navigation Commission (2014). The use of this guideline was supported by the Regional Harbour Master (MSQ) for Toondah Harbour who in correspondence dated 5 November 2019 stated that: *MSQ has reviewed the navigation channel preliminary design dimensions against PIANC using the nominated 80m x 15m x 2m design vessel. The proposed channel dimensions are assessed as being suitable for a two-way channel, subject to a range of traffic management controls. For example:* ▪ *General passing procedures / protocols* ▪ *Restricted passing at the bends in the channel* ▪ *An operational speed limit* ▪ *Adopting a one way traffic flow in adverse environmental conditions* ▪ *Management of interaction with recreational traffic* Project design sought to achieve a mass balance between dredging and reclamation so that no dredged material is required to be disposed outside of the reclamation area. Importation of material to stabilise the landform will be minimised through construction methods and staging of the reclamation and dredging process. That is, the size of the reclamation is a function of the dredging. The PDA Development Scheme requires capital dredging to straighten and widen the Fison Channel and extend the swing basin. Project alternatives are addressed in detail in section 1.5 of the Draft EIS. This includes an assessment of only carrying out dredging and upgrading harbour facilities.
	PD20	The proponent must satisfy the minister that there are no suitable alternatives to the proposed major works. The current draft EIS has not considered the most suitable alternative – redevelopment of the harbour on the existing land. The EIS should be amended to consider this alternative option. The volume of material that would be dredged from the bay closely matches the volume needed to create some 35 ha of new dryland. Moreover, there is no logical or practical linkage between improving transport facilities in an existing harbour and dredging 530,000 m^3 of material from a Ramsar site to create land for 3,600 luxury apartments and other structures.	
	PD21	A thorough investigation of alternative sites for housing and the other non-port components of the proposed Toondah Harbour development does not appear to have been carried out as part of the EIS.	Project alternatives are addressed in detail in section 1.5 of the Draft EIS. This includes an assessment of only carrying out dredging and upgrading harbour facilities. Upgrading the existing marine facilities at Toondah Harbour, including the Fison Channel, to meet current and future needs requires the following activities at a minimum: ▪ Expansion of hardstand and car parking areas; ▪ Incorporation of a transport interchange in the ferry precinct designed to relevant standards, which will connect the new ferry terminal with Cleveland CBD and the Cleveland Rail Station by public transport, taxis and private vehicles; ▪ Construction of new commercial facilities to provide offices and storage for ferry operators; ▪ Upgrading loading and unloading facilities for vehicle and passenger ferries: ▪ Offering berths for tourism and charter operators—these businesses are currently unable to access the harbour due to capacity constraints: ▪ Dredging to widen and deepen the Fison Channel and turning basin to meet minimum navigational safety standards for a two-way channel and allow for the anticipated growth of ferry operations and increasing ferry sizes. Without land reclamation, an alternative dredge material disposal method would be required. A range of issues were identified with this option including the feasibility of other disposal options and cost, which would be expected to be $90+ million.
	PD22	The Draft EIS does not canvass alternative locations – a requirement of the EPBC Act.	
	PD23	There is an overdue need for improvements to the port infrastructure and facilities to support regular users as well as tourists. Improvements to the port itself are capable of being carried out as a	Urban Development has always formed part of the required outcomes of the PDA Development Scheme. The intent of the PDA is to revitalise the harbour, improve the transport function by better integrating ferry and bus services and managing car parking, and establish Toondah Harbour as a high-quality urban environment that capitalises on the high amenity of Moreton Bay.

Theme	Comment ID	Comment	Response
		standalone project including: vessel berthing, reception/ticketing, waiting areas/shelter, bus/coach terminal and vehicle parking.	Additional assessment on housing requirements and existing supply has been completed for the Supplementary Report and is included as **Appendix H**.
Traffic	PD24	Local Access Roads will experience traffic increases very similar to the congestion currently experienced in Shore St / Wellington St Roundabout near McDonalds which is about 12000vpd. No upgrade of the adjacent road network has been mentioned nor who will pay for the upgrades in the future.	As stated in section 3.3 of the Draft EIS the scope of the Traffic engineering was preliminary assessment of traffic generation, link traffic volumes, intersection pinch points, car parking and street and movement network advice. The level of assessment carried out was aimed at identifying any 'fatal flaws' with the road network and provide sufficient detail on traffic generation to inform environmental impact assessment. Further detailed traffic modelling and assessment will inform detailed design as part of future State-level development approval processes.
	PD25	No traffic mitigation measures have been suggested for other streets in or around the Toondah Precinct that are all likely to experience the same estimates of traffic increases.	
	PD26	The Traffic Generation Report does not include any analysis of the performance of intersections within the site, intersections in close proximity to the site, nor those on the principal road network linking with the proposed development. No details of construction phase nor fully competed traffic operations are provided.	
Project Need	PD27	Modest increases to future demand for ferry services can be accommodated within the existing Fison Channel, having regard to projected population and tourism growth on North Stradbroke Island (Minjerribah).	The proposed dredging has been identified as necessary to provide and maintain navigation access and safety for Toondah Harbour. The need for new infrastructure, including dredging, at Toondah Harbour is outlined in the Toondah Harbour PDA Development Scheme. The development scheme is the regulatory document that guides planning, carrying out, promoting, coordinating and controlling land development within the Toondah Harbour PDA. A requirement of the PDA Development Scheme infrastructure plan is to 'undertake dredging to straighten and widen the existing Fison Channel'. The land use plan for the PDA also outlines dredging and channel access requirements which include 'extending the swing basin to meet the needs of the existing and future vehicle ferries and contributing to the gradual straightening of Fison Channel'. The current Fison Channel does not meet the accepted channel design guidelines for a two-way channel for the adopted future design vessel. This design vessel was adopted based on discussions with the existing ferry operator. The channel and turning basin has been designed using the Harbour Approach Channels Design Guidelines, PIANC Report No 121 Maritime Navigation Commission (2014). These guidelines are accepted as best practice throughout the world. The use of these guidelines as the basis for design was supported by the Regional Harbour Master for Toondah Harbour.
	PD28	The current proposal is for a pleasure-craft marina and associated channels be dredged and constructed. This is not integral to the placement of dredge spoil from the expanded Fison Channel. The marina and associated channels will be dug out of the placed channel dredged spoil to occupy an area of approximately 10.5 ha. Thus, the marina makes the development footprint considerably larger than it needs to be.	The marina is a requirement of the PDA Planning Scheme. It is acknowledged that excavations associated with the marina and internal channels results in an increase in the size of the reclamation. A breakdown of material volumes associated with the different components of the Project are included in the response to comment ME7 (refer to section 6.1).
	PD29	The ferry timetables for the two current operators demonstrate that there is plenty of scope for additional trips to be added to the existing ferry schedules. Comparison of the timetables for the passenger ferries confirms that the majority of scheduled arrivals and departures at Toondah Harbour are at identical times and many of the vehicle ferry arrivals/departures are within 5 minutes of the passenger ferries. This demonstrates that typically existing operations use Fison	As identified in section 3.1 of the Draft EIS Toondah Harbour is highly trafficked with current passenger and vehicle ferry operations resulting in 76 ferry movements on average weekend days. On peak days and additional 70 recreational vessel movements resulting in up to 146 movements over the day. Assuming usage would occur between 6am and 6pm (daylight hours) a vessel would be entering Fison Channel approximately every 5 minutes. This comment also ignores a range of factors that need to be incorporated into the timetables. This includes: ▪ Time spent docked unloading and loading vehicles, a process that can take 10 – 20 minutes depending on the number of passengers. ▪ Vessel 'downtime' o carry out routine maintenance throughout the day.

Theme	Comment ID	Comment	Response
		Channel for approximately 10 – 15 minutes in every hour, leaving the opportunity to double or perhaps triple the existing ferry movements.	▪ An increase in vessel movements would result in queuing at the entrance to Fison Channel increasing trip times. Discussions with existing operators indicated no additional trips could be added to the timetable (in particular during peak times) without compromising safety.
	PD30	The size of the larger vessels is identified in the EIS as 16 m wide (beam) and 80 m long. The current ferry fleet includes vessels that are 16.67 m wide (beam) and 67 m long. Therefore, there would be no need to widen Fison Channel on the basis of the proposed new vessels as they are narrower than one of the currently used vessels.	The Draft EIS identifies the design vessel as having a length of 80m and beam of 15m. The existing largest vessel is the MV Minjerribah which is 67.68m long and has a beam of 13m. The current Fison Channel does not meet the accepted channel design guidelines for a two-way channel for the adopted future design vessel or the current largest vessel. The channel and turning basin has been designed using the Harbour Approach Channels Design Guidelines, PIANC Report No 121 Maritime Navigation Commission (2014). These guidelines are accepted as best practice throughout the world. The use of these guidelines as the basis for design was supported by the Regional Harbour Master for Toondah Harbour.
	PD31	Given the arguments in the EIS around the limitations on increasing traffic in the Fison Channel, introducing marina traffic would seem contrary to supporting the safe and efficient use of the harbour to support tourism.	There is currently a boat ramp for small recreational vessels at Toondah Harbour, so the operators are already required to manage interactions with recreational vessels. As identified in section 3.1 of the Draft EIS on peak days up to 70 recreational vessel movements occur in Fison Channel. The relevant authorities, including the Regional Harbour Master, have not expressed concern regarding the mix of recreational vessels and commercial vessels utilising the Fison Channel. However, a range of navigation traffic management controls would be introduced to manage potential risks, as noted in Section 3.3.2 of Appendix 1-I of the Draft EIS. Potential measures may include: ▪ *General passing procedures / protocols* ▪ *Restricted passing at the bends in the channel* ▪ *An operational speed limit* ▪ *Adopting a one way traffic flow in adverse environmental conditions* ▪ *Management of interaction with recreational traffic* Section 2.6.5 of the Draft EIS also outlines navigational lighting requirements for the harbour and marina. Proposed lighting measures were developed in consultation with MSQ, who would be further consulted as part of the detailed design process.
	PD32	There is no evidence presented in the draft EIS that confirms that the existing ferry operators support the proposed redevelopment as currently proposed, and no evidence of the current ferry operators have concerns about the width or depth of Fison Channel and the turning basin.	Discussions were held with the ferry operators early in the design process for the turning basin and entrance channel. As noted numerous times throughout the Draft and Supplementary Report the design vessel was supplied by the current operator. The proposed dredging has been identified as necessary to provide and maintain navigation access and safety for Toondah Harbour. The need for new infrastructure, including dredging, at Toondah Harbour is outlined in the Toondah Harbour PDA Development Scheme. The development scheme is the regulatory document that guides planning, carrying out, promoting, coordinating and controlling land development within the Toondah Harbour PDA. A requirement of the PDA Development Scheme infrastructure plan is to 'undertake dredging to straighten and widen the existing Fison Channel'. The land use plan for the PDA also outlines dredging and channel access requirements which include 'extending the swing basin to meet the needs of the existing and future vehicle ferries and contributing to the gradual straightening of Fison Channel'. The current Fison Channel does not meet the accepted channel design guidelines for a two-way channel for the adopted future design vessel. This design vessel was adopted based on discussions with the existing ferry operator. The channel and turning basin has been designed using the Harbour Approach Channels Design Guidelines, PIANC Report No 121 Maritime Navigation Commission (2014). These guidelines are accepted as best practice throughout the world. The use of these guidelines as the basis for design was supported by the Regional Harbour Master for Toondah Harbour.
	PD33	The EIS does not demonstrate that the proposed relocation and redevelopment of the ferry terminal 200m to the south of the current location will be adequate to service existing and future demand (including capacity for future upgrades or expansion as required).	As the Redlands primary marine facility, the size, design and functionality of the harbour facilities and infrastructure (both on land and in-water) have been designed to accommodate the predicted increase in ferry patronage and deliver a world class facility. This includes capacity for an additional vehicle ferry berth (Ro-Ro) at the harbour.

Theme	Comment ID	Comment	Response
			The ferry terminal is relocating south by 100m, not the stated 200m, it will also remain operational throughout the works period.
	PD34	There is no dispute that the present barge and ferry terminal needs a facelift. There is a need for a user-pays multi-storey car park that would cater more efficiently for the numbers of cars using the area. This would provide room for an apartment building similar to what is allowable in Cleveland. There is room for new cafes and restaurants on the waterfront within the footprint of the present area.	There is a provision to build an additional 343 free carparks at no cost to the public, with an option for an additional 500 based on demand. It was strongly advised through various consultation processes that a user- pays or paid car parking was not acceptable to current users of the ferry terminal. The required capital upgrades also require dredging of the channel and harbour to accommodate a two way channel, growing demand and future frequency of services to Minjerribah (North Stradbroke Island) and other Bay Islands. There is no feasible alternative for disposal of the capital dredged material aside from a reclamation (refer to 1.5.3 of the Draft EIS).
	PD35	RCC's Tourism Strategy and Action Plan 2015-2020. Put simply, this Plan is no longer relevant as it is out of date.	The project masterplan was developed to respond to this strategy and many others, from its inception in 2015. The current "Redlands Coast Destination Management Plan 2023–2028" provides a strategic vision and direction for the local tourism industry, including 27 actions across five key areas. The Toondah Harbour proposal continues to reflect this vision and the aspirations for the Redlands future tourism potential.
	PD36	The EIS ,ES8, states that Tourist Growth is restricted due to Lack of Jetty and Boating Infrastructure. Yet on ES13, it states "Existing Public Boat Ramp in Emmett Dve which is used for motorised and non-motorised recreational vehicles will be DECOMMISSIONED".	The Emmett Drive boat ramp will be decommissioned, in order to provide a safer harbour area for all users. The Proponent will contribute to the upgrade of the Redlands primary boat ramp and facility at William Street, in its place. This is the preferred outcome of DTMR.
	PD37	It assumes there is a need to expand tourism numbers on the island when that is unnecessary and unwanted, particularly in the absence of a whole of Island environmental and cultural heritage management plan.	The North Stradbroke Island Visitor Research Program (Queensland Government 2018) found that, between 2011 and 2018, annual growth in tourist visitations (day trippers and overnight) averaged around 10% each year. Accordingly there is a need to upgrade the harbour infrastructure, both on land and in-water. Walker will continue to consult with QYAC as the Registered Prescribed Body Corporate (PBC) created under the *Native Title Act 1993* to manage the recognised Native Title rights and interests of the Quandamooka People following the determination, 4th of July 2011.
	PD38	Walker told the Ramsar Secretariat at a meeting on 7 September, 2017 in relation to a very similar proposal that "they could possibly reconfigure their plan so that it follows a sustainable and wise-use approach that substantially minimizes the physical and ecological impacts of the project on the Ramsar Site. This could involve restricting the development to the parts of the PDA that lies outside of the Ramsar Site boundary". Walker now claims that a 2016 development agreement (which is secret) with the Queensland Government rules out alternatives.	In response to years of research, fieldwork and surveys, the plans and scheme set out in the Draft EIS is the only feasible option to fund, treat and beneficially reuse the dredged material from the channel and harbour, at no cost to the public. This approach avoids transporting or disposing of it in an untreated and uncontrolled alternative location in Moreton Bay, in water or on land via trucks. Many other ports and harbours have also beneficially reused the material from capital upgrades to create additional landform.
	PD39	S3.1.5 of the EIS states that: 'The existing operator has investigated acquiring larger vessels to increase capacity, however expenditure on repairs to hulls and propellers are already significant due to vessels bottoming out in the shallow channel'. This statement is not substantiated with evidence from the operators.	The statement was made based on discussions with the existing ferry operator. Current target depths of Fison Channel (-2.5m LAT) do not meet the minimum requirements outlined in *Harbour Approach Channels Design Guidelines*, PIANC Report No 121 Maritime Navigation Commission (2014). For further details on channel design refer to section 2.4 of the Draft EIS and comment responses in section 6.2 of this Supplementary Report.
	PD40	The boating has seen growth in total revenue over the past year of 8.1% and across the last five years, that growth has been 15%, with the challenges of COVID included. This growth reflects demand and participation. The increase in participation has resulted on increased pressure on infrastructure at the land-water interface. Our waterfronts are finite are in hot demand, and need careful and considered planning. As an example of demand, two leading builders on the Gold Coast increased their workforce over the last two years.	Toondah Harbour reflects the need, growth and opportunities in local and regional boating and provides over 200 new marina berths in a strategic and already working waterfront location, with direct access to Moreton Bay.

Theme	Comment ID	Comment	Response
	PD41	The current Toondah Harbour proposal includes development of a large number of residential apartments. The economic analysis identifies that a significant number of construction jobs will be created by the project, and these jobs would largely relate to the construction of the residential component of the project. Construction jobs will be greater than forecast in the EIS for Toondah Harbour for the existing approved development only and are likely to be significantly greater in the future as the current development is likely to act as a catalyst for future expansion.	Toondah Harbour will deliver and sustain a pipeline of local employment, jobs and training across a number of sectors over the coming decades. Local business, workers and families will benefit from the building, construction, tourism and hospitality opportunities that will be created and the catalysing effect this will have in the local economy.
	PD42	New marina berths and facilities, such as those proposed at Toondah Harbour will address future local demand.	Toondah Harbour will deliver a 200 marina berth to the boating and fishing community.
Urban Design	PD43	Will the proposed building of 3,600 units in Toondah Harbour be net-zero carbon "embodied and operational emissions - will it have green building certification?" Concrete is a notoriously carbon emissions intensive product. Will the buildings be built sustainably with suitable climate change adaptations such as solar panels, and appropriate walls and roofing materials? 3,600 units equates to 80 high rise towers.	Future buildings across the site will incorporate industry best practise architectural, landscape, energy, water and sustainability initiatives. The Project does not include in the construction of 80 high rise towers. Building numbers are dependent on final designs but will be closer to 50. The majority of buildings will be lower than existing apartment buildings located within a kilometre of Toondah Harbour. Many of these will be at a height of 3-4 storeys. Only 3 buildings are planned to be built to a height of 10 storeys, which will all be located adjacent to the harbour area.
	PD44	Walker Group has consistently advertised false artists impressions of the project, never showing the true extent of the high-rise residential component of the development therefore many residents across the Redlands do not understand the massive scale of the proposal and the impacts of additional traffic.	This statement is incorrect. Multiple images and videos of the project from various angles, including a contextual aerial shot showing the full extent and scale of the project, have been publicly available for a number of years. The Proponent has displayed these images at the EIS project information centre in Bloomfield Street Cleveland, over 35 project 'pop up sessions' in local shopping centres, in prime time television news stories, Local and State Newspapers, project marketing materials, social media, the Toondah Harbour project and EIS websites and within the Draft EIS.
	PD45	The most pressing problem with the terminal is the lack of parking whereby the nearby streets are overflowing into residential areas from people parking (at no cost) for however long they like. The proposed development is to only give the community an extra 300 car parks.	The project has been designed to accommodate an additional 343 free carparks above the current availability, exclusively for ferry users. The project design also allows for an additional 500 carparks to be delivered by Council in a raised parking structure, if future demand requires them.
	PD46	'An additional 343 public car parks' will not serve the parking needs of an additional 8,000-10,000 residents moving into the area.	The additional 343 free public carparks will be regulated for Ferry users. Each new building will accommodate appropriate resident and visitor parking, in accordance with local town planning requirements. Additional short term on street parking will also be provided.
	PD47	The "Water Park" is located in a way to cause most loud noise and human activity for wading bird species utilising the intertidal feeding areas.	A buffer zone of two times that of world's best practice has been incorporated between Cassim Island and urban development; the surrounding areas will not be intertidal.
	PD48	The touted 3.5 ha of "new" open space is a net loss of about 46 ha of public park, the area is well below the Council planning requirements. An explanation of how the minimalistic allocation of open space is reconciled with contemporary planning needs explanation.	The 3.5 ha foreshore park is a requirement of the Toondah Harbour PDA Development Scheme and will complement and connect with GJ Walter Park. It is proposed within the context of Cleveland and the Redlands other open space, sporting and recreation facilities to ensure an appropriate level of service and maintenance can be sustained across the local area. It also considers the demographics of the Cleveland area and the activities and use of open space by existing and future residents.
	PD49	The ESD Strategy - Volume 2, section 21.1.2 outlines a number of measures to address sustainable development criteria. These are minimal and in no way represent world's best practice.	The proposal represents a sustainable balance of Environmental, Economic and Social needs in context of the working port, the local Cleveland area and the future growth and needs of the Redlands Coast. Future buildings across the site will incorporate industry best practise architectural, landscape, energy, water and sustainability initiatives.
	PD50	With a focus on medium density residential development adjacent to Moreton Bay and around a marina, it is hard to see this including "affordable housing."	Toondah Harbour will deliver and contribute towards delivering housing diversity across the Redlands offering a mix of size, pricing, quality and offerings that are currently lacking and under supplied in the Redlands (refer to **Appendix H**).
	PD51	Of serious concern is the expected domination of 3600 dwellings, many in high rise buildings, in close proximity to the Cleveland	The majority of future buildings will be of a lower scale than the new and existing buildings currently being developed within 1km of Toondah Harbour.

Theme	Comment ID	Comment	Response
		Heritage Precinct at a scale and mass that will completely dominate the existing character and the heritage fabric of the locality.	
	PD52	During consultation staff for the Proponent discussed the longevity of the contracted buildings. The response was 32 years before the Project would need to be refurbished. While alarming, that idea revealed there were no plans for a legacy building surviving the long term. If confirmed, this approach is at odds with leaving meaningful legacies for future generations.	This comment was not directed to 'buildings' needing to be refurbished or replaced. Rather the discussion referenced places such as Southbank being partly refurbished and upgraded after 30 years of operation. Similar upgrades, maintenance and refurbishments occur in many public places, streets and parks after decades of use.
	PD53	With regard to greenhouse gas emissions, the EIS gives only cursory coverage in the sustainability section where some energy efficiency and renewable energy use is proposed, but no details are given.	Industry leading best practise building and construction practices will be undertaken where possible and incorporated into the future detailed design of the project.
	PD54	The proposal in the Draft EIS includes provision of a small waterpark in the northern precinct. Since the Toondah Harbour proposal was developed by the proponent, an alternative project including a water play park and swimming facility has been planned at the Birkdale Community Land. As an alternative water play park is being provided for the community in Redlands, the incorporation of a water park in the Toondah Harbour proposal is no longer necessary.	Provision of a Waterplay park has been included in the current design based on community feedback and demand. It is envisaged to be delivered and maintained in a similar way to many other Queensland Coastal towns, for the benefit of locals and visitors alike. It will be considered in context of other facilities and activities at the time of its implementation.
Harbour Facilities	PD55	An immediate concern is that the existing infrastructure at the ferry terminal is at or is approaching end of life and is in need of upgrade to sustain current operational requirements and support future growth. The uncertainty regarding the Toondah Harbour project (including the proposal to relocate the ferry terminal) is also directly impacting the renewal and term of Stradbroke Ferries' lease of the existing terminal from the State, and investment into upgrades of terminal infrastructure.	A project approval will provide significant certainty, business confidence and prosperity across for the Redland Coast, across a number of industries and sectors.
	PD56	The proposed ferry terminal appears smaller than the current terminal footprint and does not appear to provide for an equivalent level of existing 'water side' frontage or infrastructure compared to the existing ferry terminal. It is critical that the relocated ferry terminal has the capacity to accommodate future demand.	The current design offers a significantly more efficient, modern and accessible Harbour frontage. Current commercial operations to Minjerribah (North Stradbroke Island) consist of passenger and vehicle ferries, which are Roll-on Roll-off (Ro-Ro) type vessels. These vessels incorporate a trafficable ramp, which is lowered to allow cars to embark and disembark. The upgraded ferry terminal will consist of three Ro-Ro berths (one more than the current terminal), a fixed wharf and several berths for servicing or commercial operations. It will also incorporate open space and 343 additional car parks.
	PD57	In providing a facility for fit for purpose ferry services to North Stradbroke Island (Minjerribah) it is critical that there is, amongst other things, adequate: ▪ access, manoeuvring and parking areas for large vehicles (i.e. semi-trailers up to 35m in length) and other 'land side' operations; ▪ road networks to safely and efficiently support 2,500+ vehicle movements per day to and from the ferry terminal,; ▪ vehicle queuing (loading) areas for at least 100 vehicles at any time (including large vehicles, passenger vehicles with trailers etc);	The final design will be coordinated with the operators to ensure a functional port precinct allowing for current operations and future growth.

Theme	Comment ID	Comment	Response
		▪ 'sea side' infrastructure to accommodate operational requirements and vessel mooring; and ▪ capacity for future expansion – to accommodate growth in demand and changes in the needs of the North Stradbroke Island (Minjerribah) community and visitors.	
	PD58	The project will result in the following benefits for boating: ▪ The shallow and narrow Fison channel will be straightened and increased in depth and width (to approx. 75m) to increase ferry capacity and efficiency whilst accommodate recreational vessels. ▪ The internal waterways will connect to the Fison Channel seaward of Cassim Island's turning basin and landward. The upgraded rock wall breakwater will protect the internal waterways while providing safe navigation and mooring for recreational vessels. ▪ The existing Emmett Drive boat ramp will be decommissioned to remove the conflict from small recreational vessels being launched into the harbour basin. ▪ A public pontoon will be provided enabling short term mooring with access to the port, marina hub and Grandview Hotel. ▪ Additional mooring opportunities within an expanded port will allow space for future charter, tour or ferry operators. ▪ Navigation aids, lights and signage will also be delivered as part of the harbour upgrades.	The capital works required to create a larger and wider harbour and navigation channel, a marina and public pontoon responds to the increase in ferry use, patronage and boating in the Redlands and broader SEQ region.
	PD59	The demand for electricity by the boating industry will increase over time because of the transition from fossil fuelled engines to electric engines and hybrid engines for both motor vehicles and boats. The existing electrical infrastructure needs to be addressed.	Provisions for all types of energy generation, storage and reuse will be incorporated into the project in accordance with leading industry best practice and the emergence of new technologies.
	PD60	Opportunities to increase the extreme weather resilience include: • Increased investment in maintenance of the marina pontoon system to maintain near-new performance in the longer term. • Implement a program of maintenance dredging that maintains navigable waters and uses dredged material to guide flow in extreme weather events to the channel and away from infrastructure. • Review slopes upward of at-risk infrastructure to ascertain risk and take preventative action Review trees upward of at-risk infrastructure to determine the risk and impact of tree fall and take preventative action.	The reclamation design level has been calculated using the *Queensland Coastal Hazards Technical Guide – Determining Coastal Hazard Areas* and will be above predicted sea level rise to 2100. All activities and development on land designed in accordance with the technical guide are considered to be at very low risk of storm tide inundation for the next 100 years

Theme	Comment ID	Comment	Response
Cumulative Impacts	PD61	There is no consideration of cumulative impacts of the proposed development on the environment. The proposed development will bring a significant increase in boat traffic and day visitors to the area, which will lead to increased incidence of boat strike for marine mammals and turtles, increased underwater noise, and a decrease in water quality.	Cumulative and consequential impacts have been addressed in Chapter 26 of the Draft EIS. The cumulative and consequential impact assessment CIA addresses all MNES with the potential to be impacted by the Project. In addition to the assessment carried out for the Draft EIS, further detail has been provided on the potential for boat traffic collisions with marine fauna in **Appendix S** to this Supplementary Report.
	PD62	Terrangerri has a unique Moreton Bay Ramsar aquifer system, and currently supplies approximately 60% of the Redland City Council's freshwater needs via a pipeline from the Island. The existing Eastern Pipeline Interconnector currently connects Redlands to the South East Queensland Water Grid and has the capacity to supply no more than half of the Redland's current water needs. The Leslie Harrison Dam has limited capacity to contribute to Redland's water supply. Currently, no existing data identifies the specific impact that water extraction from Terrangerri is having on our environment and cultural resources, yet we have witnessed the impact over the last few decades. In accordance with your social license, you are required to examine the impacts of taking additional fresh water from the Terrangerri aquifer.	As stated in section 2.5.2 of the Draft EIS water supply will be provided from the Alexandra Hills reservoir (located 5.5 km from the site) via a connection to the existing water main and requiring the provision of a new water main. That is, like most developments, the Toondah Harbour Project will be utilising water supplied by the local authority. The North Stradbroke Water Treatment Plant is operated by the Queensland Bulk Water Supply Authority under an environmental authority (permit number EPPR00881713) that allows for the treatment of >10ML of raw water per day. An analysis of housing supply for the Redland City area completed for the Supplementary Report (**Appendix H**) found that apartment approvals are well below the targets in the Redland Housing Strategy 2011-2041 (RHS). An average of 110 apartments have been approved per annum since second quarter 2020 where the RHS has a target of 200 new apartments delivered per annum. This target is expected to be increased once the Department of State Development's review of the housing RHS has been completed. The Toondah Harbour Project will contribute to meeting Redland Council and State Government housing objectives by increasing accommodation diversity within the broader Redland LGA. Dwellings will not be over and above what has been and will be planned for the region.
	PD63	The draft EIS includes no details on the many structures planned – i.e. 3,600 apartments, 200 bed hotel and retail complex, 400 berth marina, roads and parking for a projected 8,000 residents plus visitors. Nor are details on essential infrastructure (electricity, water, gas, communications), waste management (sewage, dry and wet solid waste) or pollution control (contaminated and accidental runoff, carbon emissions) - or anticipated environmental impacts during construction and operation provided.	The project description outlined in section 2 of the Draft EIS as a focus on coastal works, including dredging, reclamation and piling, as these construction activities have the most potential to impact on MNES. Section 2.3.5 addresses the urban design concepts including building heights, interface with existing urban areas, community focal points, street network, open space network and public spaces. Potential impacts from building works are mostly related to amenity rather than MNES. Amenity issues will be addressed in detail as part of the State application process. Building construction activities have been addressed where appropriate in the environmental impact assessment, for example the Air Quality (Chapter 11 of the Draft EIS and section 6.3 of this Supplementary Report) and Terrestrial and Underwater Noise (Chapter 12 of the Draft EIS and section 6.4 of this Supplementary Report) assessments. Details on civil infrastructure such as electricity, gas, telecommunications, water supply and sewerage are addressed in section 2.5 of the Draft EIS. Impacts to MNES associated with this infrastructure is addressed in Chapter 26 of the Draft EIS. As civil infrastructure will generally link with existing infrastructure networks within an a highly urbanised area, environment impacts are expected to be minimal.
	PD64	The existing urban interface to the Ramsar area (and Cassim island) is between 400m to 1 km west of the Island. As a result of the planned urbanisation of the waters of the Bay the buffering of Cassim Island is reduced to 250m. The change in buffer distance will negatively impact the MNES and other species in the area.	The boundary of the Moreton Bay Ramsar site occurs at tidal limits along GJ Walter Park (including the existing dog beach) and borders the existing boat harbour to the south and west. Apartment buildings are currently located less than 20m from the boundary of the Ramsar site. See responses to MS21 – MS30 (section 6.6 of this document) for an assessment of the risk of impact to Cassim Island from the Project.
	PD65	Recreation use and users will advance into the Bay by at least the same distance and given the density of future users the disturbance of MNES will be beyond the PDA boundary.	Cumulative and consequential impacts have been addressed in Chapter 26 of the Draft EIS. The cumulative and consequential impact assessment CIA addresses all MNES with the potential to be impacted by the Project. In addition to the assessment carried out for the Draft EIS, further detail has been provided on the potential for boat traffic collisions with marine fauna in **Appendix S** to this Supplementary Report. Potential impacts from building works are mostly related to amenity rather than MNES. Amenity issues will be addressed in detail as part of the State application process. Building construction activities have been addressed where appropriate in the environmental impact assessment, for example the Air Quality (Chapter 11 of the Draft EIS and section 6.3 of this Supplementary Report) and Terrestrial and Underwater Noise (Chapter 12 of the Draft EIS and section 6.4 of this Supplementary Report) assessments.
	PD66	The planned artificial lagoon at the new foreshore of the Bay will induce more users and higher impact users to the area. This will adversely impact the existing environment in the Bay.	
	PD67	Urban development as planned will lead to significantly more artificial lighting, vehicle movements, noise, fumes, vibrations, pets (especially	

Theme	Comment ID	Comment	Response
		dogs and cats) will be enabled and impacts will extend well into the Bay.	
	PD68	The EIS avoids discussion of the consequential impacts of the Project on the Cleveland area. The EIS should do more than postulate economic outcomes as benefits without a triple-bottom-line methodology.	
	PD69	Consequential impacts extending to Cleveland Point, Victoria Point, and Coochiemudlo Island. NSI, Cleveland CBD, and Middle, Passage, Long, and Shore Streets are not fully explored. No plans have been developed nor communicated on the construction impact. In fact most of what will eventuate is unlikely to be communicated to the public.	
	PD70	Impacts of an expanded tourism industry should be examined including MNES, groundwater, disturbance, ecological character, listed threatened communities and their habitats, migratory species and their habitats arising from the expanded development footprint on the NSI. The EIS does not assess this despite tourism being a key premise for dredging.	
Independent Advisory Panel	PD71	The Walker Corporation promise of a transparent process has not been met. Its omission to declare its actual relationship to its 'independent' scientific panel demonstrates that this is not true; and The entire community consultation process, the development approvals process, and contractual agreements are all clouded in a cloak of secrecy.	Significant and wide-reaching consultation on the project has occurred over the past 8 years and is reflected in local submissions on the project. The independent scientific panel is not a requirement of the EIS process but was established to provide oversight and input into the EIS consultants, ecologists, scientific teams and their studies. The panel reflects eminent and leading experts in their respective fields.
EPBC Act Criteria	PD72	The Environmental Impact Statement and the Project do not meet the objectives of the EPBC Act: a) protects the environment especially the Matters of National Environmental Significance b) Promotes ecologically sustainable development c) Promotes conservation of biodiversity d) Promotes a cooperative approach to the protection and management of biodiversity e) Assists in the cooperative implementation of Australia's international environmental responsibilities.	The Draft EIS addresses the EPBC Act objectives directly in section 30.5. The Toondah Harbour Project addresses these objectives by: ▪ Protecting the environment by implementing the project design principles to avoid and minimise impacts on MNES including the Cassim Island and Nandeebie Claypan high tide migratory shorebird roost sites. While some direct impacts to marine wetland habitats are unavoidable design features such as the placement of culverts and a non-navigable channel through the eastern arm of the development minimise indirect impacts outside of the project footprint. ▪ In addition to management through design the proposed adaptive environmental management framework will include constant review of project activities to ensure best practive measures are utilised and indirect impacts are minimised. Management measures such as the use of silt curtains around the dredge will further minimise the potential for indirect impacts to MNES. ▪ Toondah Harbour is an ecologically sustainable use of an existing marine facility already considered the 'gateway to Straddie'. There is a need for these facilities to allow residents and tourists to safely travel to and from the Island as well as future proofing the regional gateway to the island. Previous studies carried out by RCC have not identified a viable alternative location for similar facilities. The harbour has been operational since the 1970s and is subject to regular maintenance dredging events to maintain navigational depths to and from the ferry terminal therefore is already subject to disturbance from the existing uses. The facilities at the harbour have become dilapidated and there is a need to widen and deepen the entrance channel to provide safe passage. The intent of the Project is to revitalise the existing harbour, provide improved infrastructure including an upgraded entrance channel and provide a high-quality urban environment. ▪ The Project will not affect Australia's international environmental responsibilities or agreements as impacts to these matters have been avoided where possible. Residual impacts that cannot be avoided will be offset through beneficial actions implemented via the proposed environmental offsets fund to provide an overall benefit to the Moreton Bay Ramsar Site and Migratory Birds. ▪ QYAC is the body responsible for determining ongoing risks to cultural heritage and have been consulted throughout the Project's lifecycle. Indigenous cultural heritage will be managed under a cultural heritage management plan (CHMP) specific to the Project.

6.11. Social and Economic Assessment Public Comments and Responses

Comments received on the Social and Economic Assessments have been compiled and responded to in Table 6-11 using either direct wording from a single submission or an amalgam of comments encompassing the same issue. A total of 34 issues on the social and economic assessments were raised through public submissions. Issues were categorised into five themes being social impacts, economic assessment, Minjerribah, adjacent properties and heritage and visual amenity.

The table should be read in conjunction with Chapters 20 and 21 of the Draft EIS and associated technical appendices. Cross referencing to the Draft EIS has been included where appropriate and additional investigations included in appendices to this Supplementary Report.

Table 6-11: Social and Economic Assessment Public Comments and Responses

Theme	Comment ID	Comment	Response
Social Impacts	SE1	The future macro infrastructure building of upgraded roads, utilities provision, schools, emergency services and hospital will be a financial burden for most of the Redlands residents. Emergency services, Police, Ambulance and SES, the State Emergency Service, made up of volunteers, is not adequate to deal with the extra population this development will bring to our Redlands area.	The Project is expected to introduce an eventual residential population of approximately 5,700 people. While this represents a considerable number of people, this population will be staged over a period of 15 to 20 years in line with the proposed construction timeline. As there are no hospitals or schools proposed in the development of the Toondah Harbour PDA, incoming residents are expected to use Cleveland's existing health and education facilities. Any Project specific requirements or contributions for improving these services will be addressed during the State application process. Consultation with Queensland Metro Health South carried out as part of the Draft EIS (refer to section 20.6 of the Draft EIS) indicated that, based on health benchmarks, the Project is unlikely to create a significant demand increase for hospital beds. It was recognised that given the existing undersupply of beds and planned hospital upgrades to improve this, the Project is unlikely to present significant challenges for Queensland's health forward planning. The Queensland Schools Planning Reference Committee (QSPRC) advises the QLD Department of Education of the need for new schools across the state based on expected population growth and the timing of planned growth areas. On 20 May 2020, the QSPRC met and assessed the demand for new schools across the Redland City LGA. The QSPRC assessed that, based on expected population growth and available enrolment capacity, no new schools would be required in Cleveland over the next 20 years (2021 – 2041).
	SE2	3600 units and the thousands of people who will live in these (plus visitors, dogs, cars) put enormous pressure on the local community with regards to water supply, sewerage, medical care at the hospital plus local health services from GPs etc, public transport in the area, traffic on surrounding roads.	
	SE3	Urban areas around Toondah Harbour will be severely affected by the constant heavy truck-trailers carrying rocks, excavated material and cement which will pollute the air with noise, road dust and diesel fumes.	Amenity issues will be addressed in detail as part of the State application process. While primarily focussed on environmental impacts amenity issues were also assessed in the Air Quality (Chapter 11 of the Draft EIS and section 6.3 of this Supplementary Report) and Terrestrial and Underwater Noise (Chapter 12 of the Draft EIS and section 6.4 of this Supplementary Report) assessments. The air quality assessment found that no sensitive receptors would be affected by the Project as long as standard management measures were employed. The noise assessment indicated some short term increases in noise levels for sensitive receptors. A range of management actions have been committed to by the Proponent in section 12.5 of the Draft EIS to minimise the impact of construction noise sources including development of a construction noise and vibration management plan. It is expected that this will include further detailed background monitoring to be carried out at sensitive receptors prior to commencement of construction activities. The noise monitoring is expected to continue through the construction process as a way to confirm noise exposure, demonstrate compliance with limits and undertake adaptive management responses. As outlined in section 20.6 of the Draft EIS the Project will expand the current provision of open space around Toondah Harbour by providing new foreshore parkland, urban plazas, boardwalks, pedestrian and cycle linkages and recreational opportunities such as kayaking and land based recreational fishing activities. Existing open space will be protected, with the Project preserving GJ Walter Park. Public access to GJ Walter Park will be maintained via Middle Street and Shore Street East. A new boardwalk promenade will also connect GJ Walter Park to the Toondah Harbour.
	SE4	The Redlands community will suffer negative impacts from the proposal such as constant noise, dust, acid sulphate odour, construction fumes, additional traffic, loss of amenity and access to greenspace, including the much-loved dog park for a duration of construction (20+ years).	
	SE5	The loss of the Emmett Drive boat ramp is an issue not sufficiently addressed. The William St ramp and car parking is regularly congested now and cannot support additional use.	Boat ramps, entrance channels and recreational boating access are managed by the Department of Transport and Main Roads (DTMR). Removal of the existing boat ramp at Toondah Harbour and providing funds to upgrade the ramps at William Street were considered the best outcome by DTMR. Consultation with recreational fishing bodies also indicated this would be a good outcome as the existing boat ramp at Toondah Harbour is not well utilised and Toondah Harbour itself has little value to recreational fisheries (refer to section 18.3.8 of the Draft EIS).
	SE6	We have grave concerns about the impact on our (Coochiemudlo) beaches and our precious Emerald Fringe of such a large population hub within jetski reach.	The existing public boat ramp will be decommissioned, resulting in no net change to the quantity of small recreational boat traffic in the harbour. The new boat ramp will provide access for non-motorised vessels only. There is no reason jetski use would increase as a result of the Project.

Theme	Comment ID	Comment	Response
	SE7	The extensive barge mounted backhoe (BHD) operating 24/6 for an extended period of time (years) is considered unreasonable for adjoining residential areas	As outlined in section 2.4.1 of the Draft EIS dredging will be carried out over two campaigns using a backhoe Dredge. Campaign one will last four months and campaign two will last two months. Dredging will not last 'years' as incorrectly suggested in the comment. The dredge plant used will be similar to that used for recent maintenance dredging programs which were approved to dredge 24/6. Redland City Council have never received a noise complaint for maintenance dredging noise.
	SE8	A further social and economic aspect that does not seem to have been considered is the likelihood that, over the 20 year period of development, community perspectives around coastal developments such as this will change in relation to climate change and sea level rise such that demand is just as likely to fall as rise, reducing prices and perhaps even endangering the economics of the whole development itself.	Modelling of the impact of extreme storm events was carried out as part of studies for the Draft EIS. The modelling results are discussed in section 8.4.5 of the Draft EIS with further detail provided in Appendix 2-E. Modelling showed that the Project would remain above storm surge in all but the worst storms after a 1.5 m sea level rise.
	SE9	Building heights as proposed at this site are a spoiling factor of the natural viewshed of the Bay. Anything above several stories is changing the natural landscape of the southern end of the bay into a high rise rim.	The majority of future buildings will be lower than the new and existing buildings currently being developed within 1 km of Toondah Harbour.
	SE10	Would love to see a pier similar to Redcliffe	An additional 1.5km of publicly accessible foreshore will be created for the community, creating better access for locals to enjoy fishing, relaxing and recreation with more access to views and the waters edge.
	SE11	In all GJ Walter Park looks like being subjected to a development that will significantly change its historical recreational setting.	Heritage buildings, parks and places are commonly integrated, celebrated and maintained in perpetuity in many new and successful developments, worldwide.
	SE12	GJ Walter Park design and promise to Redland community (19 March 2014 council minutes) to keep park as public open space has been ignored.	GJ Walter park will retain its historical setting and amount of public open space.
	SE13	The future of GJ Walter Park as open space serving the new residents of the proposed development will surely involve higher density use, higher impacts and a major change of the recreational setting of the Park. The community has an expectation that its needs will be foremost in any plans to develop GJ Walter Park.	
	SE14	Further, the scenic amenity from the numerous public viewpoints in the Park are highly regarded but the rating of these vistas will be diminished significantly if the off shore areas are developed.	
	SE15	Large greenspace areas will be fenced off for construction. The dog park will also be closed.	The area and size of GJ Walter Park will remain and benefit from significant investment being made by the Proponent to the park's facilities, improvements to drainage, security, lighting, play equipment, BBQ shelters, dog off-leash park, pathway connections and amenities. Future detailed design and community consultation will guide the range, location and standard of potential upgrades. Any park works will be staged to ensure users can still enjoy the playground, oval, dog off leash parks and amenities.
	SE16	The EIS shows a proposed sand beach in the Canal near the GJ Walker Park. This would be impossible to include given the change in elevation.	Establishment of a beach park at the location within the development is feasible. The beach would slope to the waters edge.
	SE17	Apartment buildings up to six and eight storeys high along the eastern edge of GJ Walter Park would cast shadows across a good part of the park in the mornings and block bay breezes from reaching into the park.	The majority of buildings that will front GJ Walter Park are 2 – 3 stories in height with some to the north being 100+ metres from the park. A 100 m wide waterway also sits perpendicular to the pine and fig trees with open views to the north and east.

Theme	Comment ID	Comment	Response
	SE18	Initial consultation involved 800 units on land, not 3,600.	All Project descriptions publicly released by the Proponent since 2015 have included dwelling of 3,000+ in the description. A total number of up to 3,600 dwelling was included in the EPBC Act referral.
Economic Assessment	SE19	It is highly likely the Economic Cost-Benefit Analysis in the draft EIS' underestimates the environmental cost of the Toondah Harbour development as the direct and indirect impacts to the habitat and carbon sequestration/storage services that the Ramsar Site provides are not considered.	The economic cost benefit analysis has been completed in accordance with the requirements of the Federal and State governments using industry best practice methods (refer to Chapter 21 and Appendix 2-R of the Draft EIS). This included a detailed literature review which was conducted to identify studies that have estimated the economic value of wetlands. The economic value of wetlands includes services such as carbon sequestration. It is noted that the removal of mangroves and seagrass will prevent further capture of carbon by these plants. In coastal ecosystems carbon is predominantly stored in the sediments, with 50% to 99% of carbon stored up to 6 m deep below the surface (The Blue Carbon Initiative 2019). Most of the sediment within the disturbance footprint will be buried by the proposed development. Burial of the sediment will prevent the release of carbon to the atmosphere or ocean. Further, in areas where the sediment is not buried, anaerobic conditions are likely to limit the rate of decomposition of organic carbon and its consequent release to the atmosphere (Macreadie et al. 2019). The Project's offset strategy will include measures to increase seagrass and mangrove habitats within Moreton Bay. A requirement of the offset strategy is to provide an overall conservation benefit for the matters impacted, however this would also provide benefits for carbon sequestration.
	SE20	The harbour precinct comprises 9 ha (90,000 m^2) of existing land hence has sufficient land area for provision of the ferry terminal and transport hub, boardwalks and recreational plaza as well as in excess of 7,500 m^2 of retail and commercial development. Given the building heights expected in the precinct are up to 10 storeys, there is also opportunity for inclusion of a residential component in the harbour precinct.	While land does exist around the harbour there are a range of uses that must be provided in these areas including parking, public transport interchanges, access to roll on roll off berths, etc. that account for the bulk of the land. This also does not account for the 530,000m^3 of dredge material. As outlined in section 1.5.3 of the Draft EIS there is no feasible alternative to reclamation for the placement of the dredged material.
	SE21	The confidential Development Agreement should be made available to the Commonwealth in order to assess the basis for this project. The economic assessment should provide a breakdown of who receives the economic benefit for each component of the project.	The development agreement is not relevant to the assessment of impacts to MNES or the EIS process.
	SE22	Section 1.1 states that the objective of a PDA is to 'provide significant benefits to the community'. Based on the economic analysis presented in Appendix 2-R of the EIS, the benefits to the community from the project are an $18 million ferry terminal (including bus interchange and car parking), $9.1 million increased tourism expenditure, public recreation and park areas (the latter are not costed). The proponent benefits are significantly greater with land sales valued at $1,241 million plus marina sales of $9.1 million.	As outlined in the economic analysis (Appendix 2-R of the Draft EIS) economic benefits form the development include: • Value of reclaimed land for retail, commercial, and residential use. • Value of marina berths. • Economic benefit derived from increased tourism expenditure on Minjerribah. • Avoided maintenance dredging costs incurred under the base case. • Catalytic benefits for the region attributable to the development. • Economic benefit derived from enhanced common-use facilities to be provided as part of the development (e.g. plaza and parklands). These benefits are valued at $1.2 Billion which does not include the catalytic benefits the project will have for tourism, property prices, etc. The Project will include significant investment in public infrastructure, most of which will be delivered within the first five years of works commencing. Further detail is provided in section 4.1.5 of this Supplementary Report. Approximately $100 million will be directly invested in infrastructure including major upgrades of sub-tidal and on land-based infrastructure at the boat harbour, foreshore parks and promenades, and community buildings. It should be noted that this does not include smaller parks and open space areas around buildings, or retail, cafes and other public spaces which will provide benefits to the community as well as the proponent.
Minjerribah	SE23	Just housing the projected equivalent of 357 additional Full-Time Employees at the three villages on Minjerribah – Dunwich/Gumpi, Amity Point/Pulan and Point Lookout/Mulumba – is an	Many of these workers may move or transition from unemployment, casual or part time roles. Some may also be based on the mainland and commute to Dunwich/Goompi. Similar to many other areas additional appropriate future housing types may have to be created to address the affordability and lack of rental accommodation raised in this comment.

Theme	Comment ID	Comment	Response
		insurmountable challenge. There is practically no affordable housing or rentals available on the island.	
	SE24	The assumption of increased tourism in the Draft EIS projects the fallacy that more visitors is good for Minjerribah. More visitors put more pressure on the island's prime natural attractions and rich cultural heritage, the beaches, bushland, fauna, and peaceful way of life.	Many other mainland destinations such as Cairns, Townsville and Port Douglas have a similar relationship with their surrounding islands (ie Rottnest, Magnetic Island and GBR). These places have similarly addressed a balance between tourism and the natural environment through management plans, zonings and tourism strategies whilst bringing significant employment, opportunities and benefits to the local community. The Woppa/GKI draft masterplan is a recent example.
	SE25	The Draft EIS ignores the lack of infrastructure on Minjerribah to cope with expanded tourism – which a 'gateway' development at Toondah Harbour would do nothing to improve.	Additional infrastructure and services have been highlighted in The South East Queensland City Deal including an initial investment of $41 million to upgrade a ferry terminal at Dunwich (Goompi). It is expected further upgrades and infrastructure will be committed to reflect the existing growth in patronage and visitation over the coming years.
	SE26	The Draft EIS fails to acknowledge multiple negative outcomes for Minjerribah that would stem from a showy, environmentally unsustainable high-rise urban development that acts as a billboard for Minjerribah.	Similar to many other Queensland coastal locations, a mainland destination and natural island and bay attractions can be successfully managed and sustained.
Adjacent Properties	SE27	As a landowner in Cleveland there are concerns we'd like to raise which include but are not limited to: ▪ Adjoining Build Form: General concern as a local neighbour with years of ongoing of construction movement and noise. ▪ Adjoining Height of Land/Future Revetment Wall: We would like to understand the transition of the future heights between existing land and the proposed new land heights. ▪ Outlook/Perspective: Once this development has commenced, we have concerns of the tree line and how far Stage 1 stretches in terms of a visual aspect. ▪ Security/Adjoining Park: how will the property join to the park as we have concerns regarding the increase of foot traffic near existing dwellings. ▪ Waterflow and Integrity of Basin: We're concerned with regards to the immediate vicinity of the bay, water quality and flow in relation to our rear yard. These are general concerns which we'd like to discuss further as the project progresses.	Many of these issues have been discussed in person with the submitters. If approved, regular newsletters, briefings and consultation will occur with local residents advising them of the development status and progress, including further advice on detailed design, views and contextual issues
Heritage and Visual Amenity	SE28	The Toondah Harbour PDA abuts and could be said to partially include, the locally important Cleveland Heritage Precinct (CHP). Within the Precinct are many historic and heritage buildings.	The Cleveland Heritage Precinct is not a Matter of national Environmental Significance therefore is not directly addressed in the Draft EIS. The Cleveland Heritage trail incorporates a range of sites. Many are located along Shore Street North (Cleveland Point) and Middle Street. A range of modern buildings, including many several story high apartment developments, are currently located within this area. The Toondah Harbour Project will not impact on existing heritage sites.
	SE29	Arguably, the history surrounding the Toondah shipwreck qualifies it as a heritage place. It will not only be impacted during the dredging and construction phases, but also later by its closer proximity to urban facilities.	The Toondah shipwreck is not listed as a heritage place. The Project will not have any impact on the shipwreck, which is located amongst the mangroves that make up Cassim Island. The upgraded dredge channel is further from Cassim Island, and therefore the shipwreck, than the existing channel.
	SE30	Insufficient weight given to the loss of vistas from Fernleigh homestead and the Grand View Hotel: While the EIS mentions the loss	These impacts have been assessed in section 19.2.7 of the Draft EIS. As identified in the assessment the views from the township towards the hotel will not be obstructed by the Project. The views from the hotel are not regarded as having aesthetic significance. While the views will be modified as a result of the Toondah Harbour Project these sites will still overlook foreshore park land and Moreton Bay.

Theme	Comment ID	Comment	Response
		of outlook these places will suffer under the development Proposal, the significance of that loss is dismissed.	
	SE31	St Paul's Anglican Church is only a few hundred meters outside of the PDA. While both weekday and Sunday services, at either the historic or the newer church will doubtless be impacted by noise, odour, vibrations from dredging and construction and traffic, the integrity of the historic structure could also be of concern	Ambient air and noise assessment carried out for the Project (Chapters 11 and 12 of the Draft EIS respectively) demonstrate there will be negligible impact on the church. No works will occur on Sundays when most services are held.
	SE32	Under the Australian Heritage Commission's Historical Themes, it could be argued that Toondah Harbour is itself a place of heritage significance.	Toondah Harbour is not listed on any heritage register. The function of the harbour will not be diminished, and in fact will be enhanced by the proposed upgrades. There will be significant opportunity to highlight the harbours history as part of the re-development.
	SE33	A separation of heritage properties from works and the mass of new buildings needs thorough investigation. The Heritage Act require a separation of 75 m and that should be applied to all heritage listed buildings irrespective of the source of the listing.	All heritage building, including Fernleigh, The Grandview Hotel and St Paul's are located at least 75m from the closest building associated with the Project.
	SE34	Cultural value to residents, goes further than formal "listings" and should include historical family linkages, social gatherings, (eg New Years Eve), dog walking, community sports, gatherings, family events (weddings etc).	It is acknowledged that the Project will result in significant changes to the amenity and overall feel of the Cleveland area. That is the intent of the PDA and is the goal of a project intended to catalyse a number of industries. As outlined in the social and economic assessment sections of the Draft EIS (Sections 20 and 21, respectively) these changes are anticipated to provide significant benefits to the suburb and broader region including improved recreation, employment and tourism.

7. State and Federal Agency Comment Response

7.1. Department of Climate Change, Energy, the Environment and Water (DCCEEW)

Additional information was requested by the Department of Climate Change, Energy, the Environment and Water (DCCEEW) post release of the Draft EIS. Additional information requests included:

- Further investigation of potential land contamination issues at the site as identified by the Preliminary Site Investigation (Appendix 2-C of the Draft EIS).
- Additional information on how the Offsets Strategy will address the EPBC Act Environmental Offsets Policy including demonstrating all impacts to MNES are addressed by the strategy.
- Evidence that Indigenous cultural heritage has been addressed in accordance with legislative requirements.
- Clarification around the implementation of some of the mitigation measures identified in the Draft EIS, in particular the use of the silt curtain around the dredge and management of early works for the reclamation.

Additional studies and details completed for this Supplementary Report to address the DCCEEW requests are summarised below.

7.1.1. Contaminated Land Detailed Site Investigation

A preliminary site investigation (PSI) was completed by Environmental Earth Sciences International (EESI) as part of the Draft EIS. While the PSI identified a number of potential contamination issues, as would be expected at an operational harbour, it concluded that these issues could be managed on site and that further testing and analysis would be required prior to works commencing to define any issues and develop specific management measures. The PSI identified the additional investigations that a Detailed Site Investigation (DSI) should include:

- Identifying the extent of historical landfilling activities within GJ Walter Park, particularly in the southern part of the park, including assessment of the types of waste disposed in the landfill.
- Analysis of the area of historical ponds associated with the landfill area.
- Contamination status of groundwater down gradient from landfilling areas and former ponds.
- Contamination status of soil or groundwater in vicinity of fuel storage and supply infrastructure.
- Contamination status of fill materials used in raising the level of the Toondah Harbour area.
- Contamination status of dredge material within the dredge sediment pond.
- Status of fuel storage (and other potentially contaminating activities) within the trade college lot.
- Extent, and neutralising capacity, of ASS materials beneath the site (covered natural material), within fill materials and in dredge spoil.

Additional sampling and analysis was carried out as part of the DSI between 13 February and 4 April 2023. A summary of DSI studies and key outcomes is included in section 5.1 of this Supplementary Report with the full DSI included as **Appendix M**. The DSI concluded that '*The current understanding of the contamination present on-site informed by investigation works completed to date have not identified any risk to human health or the environment that could not be managed on site within the development process*'.

7.1.2. Environmental Offsets Strategy

A Draft Environmental Offsets Strategy was included as Chapter 29 of the Draft EIS. The strategy outlined residual significant impacts resulting from the Project the approach to delivering the offset. As identified in the Draft EIS, offset projects are particularly challenging to implement in coastal and marine environments where most available natural areas are under council or state government ownership. The complicated tenure arrangements and overlapping rights and interests make it difficult for non-government organisations to access these areas to undertake physical works or research activities. As a result of these difficulties, the Proponent proposed to deliver a suite of direct and indirect offsets through a fund managed by a third party with the ability to access public land and obtain approvals not available to a commercial entity such as the Proponent. The offset would be delivered through an established and experienced third party not-for-profit or government supported organisation.

While the mechanism for delivery of the offset has not changed between the Draft and Supplementary Report the Offset Strategy has been updated to include further information on residual significant impacts, additional details on how the financial contribution has been calculated, the delivery framework and how the offset strategy addresses the EPBC Act Environmental Offsets Policy. The updated assessment has resulted in a significant increase in the environmental offset financial contribution. These changes have been made in consultation with DCCEEW including meetings held on 24 November 2022, 28 March 2023 and 22 June 2023.

A summary of the updated offset strategy is included in section 5.9 of this Supplementary Report and the full updated offset strategy is included as **Appendix U**. The updated assessment of significant residual impacts and modifications to attributes included in the financial calculator resulted in the financial contribution increasing from $4.75 million to $9.04 million.

7.1.3. Aboriginal Cultural Heritage

Refer to section 5.10 of this Supplementary Report.

The Proponent is currently consulting with the Quandamooka Yoolooburrabee Aboriginal Corporation (QYAC) in regard to current and future native cultural heritage requirements at the site including the preparation of a Cultural Heritage Management Plan (CHMP). These discussions are confidential and convened on a 'without prejudice' basis. The Proponent is bound by its obligation to keep these discussions in confidence. The Proponent remains committed to meet its Duty of Care and will continue to work in consultation with QYAC for the benefit of Quandamooka in the preparation of a CHMP and other commitments agreed by the parties.

The assessment of Indigenous cultural heritage for the Project has been designed to avoid and/or mitigate any impacts to Indigenous cultural heritage. A site specific Indigenous cultural heritage assessment was prepared by Everick Heritage and includes assessment of site data through a range of sources including databases, discussions, public and unpublished resources, studies and onsite investigation.

7.1.4. Mitigation Measures

The Draft EIS states that silt curtains will be used around the dredge area 'wherever practicable' and 'whenever conditions and dredge location allow'. These statements were included as it is difficult to commit to silt curtains being used at all times during the dredging process due to the shallow nature of the mudflat areas and need to maintain existing ferry operations while the dredging is completed.

Further analysis has been carried out and, if implemented correctly, silt curtains should be able to be employed in most situations. A silt curtain deployment procedure has been developed for the dredging component of the Project and is

included as **Appendix Q** to this Supplementary Report. The procedure outlines the requirement for the dredge contractor to implement silt curtains is all situations unless it can be shown there is a health and safety or navigational risk and the site manager agrees that the risks outweigh the benefits. Silt curtains have been demonstrated to reduce suspended sediment from a grab dredge by over 80% where selected and implemented appropriately (Francingues and Palermo 2005).

It is acknowledged that the Draft EIS does not provide a high level of detail on how the initial pad will be formed or the upper very weak layer of material will be removed from under the perimeter sheet pile wall. A technical memo has been developed and included as **Appendix K** outlining the proposed construction method.

Firstly, prior to the initial pad being developed, a rock bund incorporating a sheet pile cut-off wall would be constructed. In advance of the rock bund and sheet pile wall construction, a silt curtain would be installed to mitigate turbidity associated with this construction activity. The initial pad would be developed through a combination of the rock fill imported for the rock bund and the excavation, treatment, drying and compaction of the insitu very soft and soft clays. The depth of these materials in the western/north-western portion of the project is relatively shallow, less than 1.0 to 1.5m, as shown on Drawing PA2060-RHD-00-3022 in Appendix 1-I of the Draft EIS. As such, the excavation, treatment, drying and compaction process would be reasonably straightforward.

7.2. Queensland State Agencies

A number of Queensland's State assessment agencies contributed to a submission on the Draft EIS. The Draft EIS is being assessed under the Commonwealth EPBC Act therefore the State Government has no legislative role in the assessment process. As identified in section 4.5 of the Draft EIS if an approval is issued for the Project under Part 9 of the EPBC Act, a range of requests and applications to the State Government will be made by the Proponent, including:

- Request to the Queensland Minister for the Environment seeking designation of a new works area in the Moreton Bay Marine Park under the Moreton Bay Marine Park Zoning Plan 2019.
- Application under the *Marine Parks Act 1994* (MP Act) to the DES for permission to carry out the reclamation.
- Request to Economic Development Queensland (EDQ) to consider declaration of PDA-associated development under the *Economic Development Act 2012* (ED Act).
- Development application under the ED Act to EDQ for approval of a material change of use (MCU), reconfiguring of a lot (ROL) and operational works, with a Plan of Development (PoD).
- Development application under the *Planning Act 2016* for a MCU for an Environmentally Relevant Activity (ERA) for the dredging component of the Project.
- Request to DES for the revocation of the reclaimed land from the marine park under the MP Act.
- Compliance assessment under the ED Act – as required.

While no State level applications have been lodged at this point, the release of the Draft EIS presented an opportunity for relevant State agencies to provide feedback on the assessment process to this point. The submission included inputs from the following State Government agencies:

- The Department of State Development Infrastructure, Local Government and Planning (DSDILGP)
- The Department of Seniors, Disability Services and Aboriginal and Torres Strait Islander Partnerships (DSDATSIP)
- The Department of Environment and Science (DES)
- The Department of Agriculture and Fisheries (DAF)
- The Department of Resources (DoR)
- The Department of Transport and Main Roads (TMR)

Five meetings/workshops were held with the various State agencies to discuss the comments provided and address keys issues raised. Responses generally fell into three categories:

1. Issues that have been addressed in the Draft EIS but require further clarification or minor additional details.
2. Issues that have not been addressed in the Draft EIS and further information.
3. Issues that deal with State matters which are not required to be assessed by the EPBC Act EIS process and will be dealt with by the various State level applications.

Regarding point 3, many State matters were deliberately excluded from the Draft EIS to avoid confusion on the matters being assessed and approved through the EPBC Act EIS process. The matters being assessed are the MNES listed as the EPBC Act controlling provisions for the Project, being:

- Wetlands of international importance.
- Listed threatened species and communities under the EPBC Act.
- Listed migratory species under the EPBC Act.

While State matters are not specifically addressed in the EPBC Act EIS process, assessment methodologies generally incorporated Queensland Government guidelines and survey methods to ensure the outcomes would address future State level applications. For example, while the ambient noise assessment focussed on potential ecological receptors such as the Cassim Island roost site, it also addressed the potential for the Project to exceed the Queensland *Environmental Protection (Noise) Policy 2019*, which seek to protect the amenity of an acoustic environment.

A summary of key issues raised by State Government agencies and discussed over the various meetings along with responses to those comments, including references to more detailed information in previous chapter of the Draft EIS, is included in the below sub sections. Departments represented at each of the meetings are included in Table 2-3 of this Supplementary Report.

7.2.1. Project Need, Alternatives and Priority development Area Requirements

1. ***The need to reflect relevant outcomes and initiatives from the Queensland Housing Summit that highlight the pressing need for more affordable and diverse housing options in the Redlands and the acknowledgment of the Ministerial Direction issued by the Deputy Premier which has led to the state government preparing a new Housing Strategy for the Redlands.***

A housing and demand study for the Redland LGA has been completed by Urbis as part of the Supplementary Report and is included as **Appendix H**. A summary of the strategy is also provided in section 4.1.6 of this Supplementary Report. The study found that the Project will play a pivotal role in achieving the following strategic objectives:

- Development of predominantly multiple dwellings within Cleveland Principal Activity Centre (Redland Housing Strategy 2011-2041).
- Delivery of 200 new apartments per year through 2031 (Redland Housing Strategy 2011-2041).
- The Draft Redland House Strategy 2023-2046 (released October 2023) specifically identifies the Toondah Harbour PDA as an area to accommodate population growth solely in the form of attached high rise development.
- It is noted that the Draft Redland Housing Strategy 2023-2046 identified the need to deliver 6,000 apartments or 'smaller dwellings' by 2046. This would equate to delivering 400 new apartments per year, doubling the goals of the previous strategy. Of significance to achieve this ambition of delivering 400 new apartments annually, the report found that on average across the last 3 years there were only 110 apartments approved per year a shortfall of 72.5% of the target based only on approvals. The ongoing shortfall equation compounds even further when looking at actual delivered supply only as 65% of approved projects progress to construction.
- 12,500 new consolidation dwellings in Redland LGA (SEQ Regional Plan 2017), equating to 500 'infill' dwellings per year.

Cleveland, where the Project is located, is also identified as a Principal Activity Centre under the SEQ Regional Plan 2017, identifying it for primarily multiple dwelling development. It should be noted that the recent draft Shaping SEQ 2023 update has revised the dwelling supply targets to approximately 70% consolidation dwellings. This will require established areas and Principal Activity Centre such as Cleveland to deliver a greater amount of consolidation dwellings to meet the current housing crisis and ongoing housing diversity and supply, over the next two decades.

2. ***Provide further details of the proposed beneficial community infrastructure and services needs to be offset by the construction and sale of a quantum of mixed uses and residential development.***

Toondah Harbour is positioned uniquely, in that much of its proposed infrastructure is of regionally significant scale. Opportunities are scarce at other locations within the Redland LGA to facilitate comparable development. This is particularly true with respect to the port upgrade, alterations to the channel, and the significant public foreshore parklands.

The upgrades to the port are anticipated to unlock a greater degree of water-based commercial, recreational and lifestyle benefits to the region; it is expected that it will hold a high social value. The additional free public parking spaces to be provided by the Proponent complement the port upgrade, increasing the community use social value.

Given that Toondah Harbour's current functionality has deteriorated to the extent that the ferry terminal is classified as dilapidated, the port upgrade will offer high social value, underpinned by the Harbour's role as the main ferry access point to popular tourist destination Minjerribah (North Stradbroke Island).

The Project will include significant investment in public infrastructure, most of which will be delivered within the first five years of works commencing. Further detail is provided in section 4.1.5 of this Supplementary Report. Approximately $100 million will be invested in infrastructure including major upgrades of sub-tidal and on land-based infrastructure at the boat harbour, foreshore parks and promenades, and community buildings. It should be noted that this does not include smaller parks and open space areas around buildings, or retail, cafes and other public spaces which will provide benefits to the community as well as the proponent.

3. ***Clearly identify that the PDA development scheme was approved by the state government sending clear signals that alternative locations had been fully considered and that the state government considered that the land uses as depicted in the PDA Structure Plan, whilst subject to development approvals, should be supported.***

An assessment of the Project against the Toondah Harbour PDA Development Scheme has been carried out by Clayton Utz and included as **Appendix F**. The key outcomes of this assessment are:

- The Master Plan is not in conflict with the Structure plan, as it contains the core elements and land uses contemplated by the Structure plan as described in section 3.3.2 of the Development Scheme.
- Notwithstanding some differences from the spatial layout of the Structure plan elements, the Masterplan does not conflict with the PDA vision of the Development Scheme particularly given that the Development Scheme sets the broad planning principles but does not restrict the Development to any particular form.
- The variance of the spatial layout under the Structure plan when considered against the whole of the Development Scheme does not compromise the PDA vision. While the Structure plan identifies preferred "indicative" locations for the key land reclamation and marina opportunities, language of the Development Scheme does not preclude other designs and their respective technical, engineering and environmental inputs from being considered.

- As a result of the detailed planning process it was determined that the configuration of the reclamation and marina as depicted in the Structure plan is not technically or environmentally practicable and would not necessarily support the PDA Vision or the provisions of the Development Scheme.

Redland Investment Corporation (RIC) have also carried out a study on the history of development proposals for Toondah Harbour and more broadly to provide access from the mainland to Minjerribah (North Stradbroke Island) which is included as **Appendix I**.

The study found that proposals and investigations for infrastructure providing access from the mainland to Minjerribah (North Stradbroke Island) have been in the public forum since the early 1900s. Proposals originally included a potential bridge crossing; however, after several tenders and government announcements of impending construction dating back to 1946, this concept was finally abandoned in 1986 as it was considered unviable.

A boat haven and landing point at Toondah Harbour was first proposed by local council in 1937 with various concepts investigated over several decades. Detailed development plans from as early as 1966 have been identified by this review. Investigations included review of locating the port at Raby Bay however it was decided it would not be suitable due to the additional travel distance and congestion with private boating in the area.

All plans for development at Toondah Harbour have included dredging and some form of reclamation with one proposal in 1988 showing a reclamation area stretching east of Cassim Island. The Queensland Government provided a lease for this work however it did not progress. Further planning studies were completed throughout the 1990s and 2000s leading to the establishment of the Toondah Harbour Priority Development Area in June 2013.

The long history of proposals at Toondah Harbour and other locations in the Redland coast show the need to provide improved boating facilities and access to North Stradbroke Island has existed for several decades. Many of these proposals have been supported by Local and State government with several going to public tender. The inability to progress any of the past options were due to the prohibitive costs to the public to upgrade the port, harbour and channel and the inability to provide buffers and appropriate interfaces to the surrounding environment.

4. ***Further detail on how impacts to tidal habitats and matters of state environmental significance have been avoided and minimised in the PDA and Redland coast. This includes presenting alternate options to deliver community benefits while minimising impacts and an explanation of why the development has not been limited to a port upgrade only and a review of alternative options for dredge spoil disposal.***

The Project is not just a port upgrade or capital dredging project, it is a partnership between the Proponent and the State and Local government carried out within a PDA declared specifically for that purpose. Both reclamation and urban development are supported by the Toondah Harbour PDA Development Scheme and are key components of the PDA vision. Details of the PDA and project need are outlined in section 1.1 and 1.4 of the Draft EIS respectively. A more detailed assessment of how the Project addresses the PDA Development Scheme is included as **Appendix F** to this Supplementary Report.

Alternate options to the Project have been addressed in section 1.5 of the Draft EIS. This included discussion on how the master plan was optimised to minimise impacts while achieving the required outcomes of the Toondah Harbour Development Scheme, which includes widening and straightening the entrance channel, swing basin extension, marina, harbour upgrade and mixed-use development. Further detail on how the Project footprint has been progressively reduced through design optimisation is included in section 4.1.2 of this Supplementary Report. Reclamation areas within the tidal zone have reduced by approximately 35% (57.72 ha to 37.43 ha) since the initial design in 2015. This has occurred

through a reduction in the size of the marina and optimisation of the dredge channel and basin, minimising the volume of dredge material used to form the reclamation areas.

The iterative re-design of the Project masterplan and footprint since the initial proposal in 2015 demonstrates how the Project has responded to site constraints and ongoing consultation with relevant experts and DCCEEW. This has resulted in a significant reduction of the footprint on tidal lands while still achieving the required outcomes of the Toondah Harbour PDA Development Scheme. The redesign efforts are consistent with the environmental mitigation hierarchy to avoid and minimise impacts where possible, as recommended in supporting policies to the EPBC Act and the Ramsar Convention.

The proposed capital dredging is based on internationally accepted channel design guidelines to accommodate the future demand for ferries for a two-way channel, noting that the Toondah Harbour PDA Development Scheme requires consideration of two ferry operators. The concept design has been undertaken in accordance with Harbour Approach Channels – Design Guidelines (PIANC, 2014). The use of these guidelines as the basis for design was supported by the Regional Harbour Master for Toondah Harbour. A detailed description of the design process in included as **Appendix J**, including correspondence from the Harbour Master.

Alternatives to reclamation are addressed in section 1.5.3 of the Draft EIS. Options explored included disposal on land, within existing designated areas within Moreton Bay and in deep ocean offshore of the islands fringing Moreton Bay. None were considered feasible due to significant technical or financial constraints, and/or environmental impacts. That is one of the reasons the PDA was declared. The most feasible option for disposal without reclamation would be to dispose of the material at the Mud Island Ocean Disposal site. As outlined in the Draft EIS neither Port of Brisbane or Maritime Safety Queensland, who manage the site, would support this outcome. Even if approval could be obtained for disposal, the cost of dredging, disposal and upgrades to marine infrastructure and facilities at the harbour would cost ~$100 million. It is unclear how this would be funded without a partnership with private industry.

As previously noted, the PDA Development Scheme supports reclamation and urban development within its boundaries. There are no other PDAs located over tidal land in Moreton Bay. Therefore, it is more relevant to review impacts in relation to the surrounding area rather than the only location in Moreton Bay where reclamation is supported by a State planning instrument.

Table 7-1 and Figure 7-1 have been modified from Table 16-1 and Figure 16-4 of the Draft EIS. They show marine habitat impacts resulting from the Project in comparison to coverage of those marine habitats Moreton Bay, the Marine Investigation Area (MIA – assessment area for the Project based on a conservative estimate of the potential impact) and Zone of Influence (ZoI – assessment area potentially impacted by cumulative and consequential impacts from the Project). The MIA covers an area of coast stretching from Cleveland Point to Victoria Point which represent approximately one third of the Redland coastline. The ZoI covers an area of central and southwest Moreton Bay stretching from the Brisbane River to the Logan River.

Marine habitats impacted by the Project are 0.2% or less of their representation in Moreton Bay. In the MIA, which only covers an approximately 10 km stretch of coastline including the PDA, Impacts represent 1.8%, 1.5%, 4.9% and 0.75% of bare mud/sand, mangrove, seagrass and rubble habitats respectively.

In addition to the reduction in the Project footprint, the Project has been designed to avoid indirect impacts on marine habitats with coastal modelling showing there will be minimal change to waves and currents outside of the immediate Project area. Turbidity plumes from dredging have the potential to reduce light penetration. However, dredging events will be relatively short lived and result in turbidity spikes lower than those already occurring at the site minimising the

effects of the plumes. Management measures such as silt curtains around dredge areas will reduce the extent and severity of turbidity plumes, further minimising any potential for impact.

The Project has been designed to avoid and minimise impacts to the marine environment as much as possible while still achieving the outcomes required by the PDA Development Scheme.

Table 7-1: Marine Habitat Impacts

Marine Habitat	Development footprint Impacts (ha)	Moreton Bay (ha)[1]	ZoI (ha)	MIA (ha)	MB Impacted	ZoI Impacted	MIA Impacted
Bare Sand / Mud	**25**	20,500	unknown	1,357	0.12%	NA	1.8%
Mangroves	**3.4**	15,231	1,336	228	0.02%	0.25%	1.5%
Saltmarsh	**0**	3,171	unknown	71	0%	0%	0%
Seagrass	**37**	17,900	2,225	758	0.2%	1.7%	4.9%
Rubble	**1**	unknown	unknown	135	-	-	0.75%

1 Roelfsema *et al*. 2013, Gibbes *et al*. 2014 and Lockington *et al*. 2017

7.2.2. Marine Ecology and Water Quality

1. ***Further justification of the marine survey effort is required. The Draft EIS does not provide enough detail on survey dates methods.***

Benthic habitat surveys for the MIA were completed in 2020. It is acknowledged the timing of surveys could have been more clearly identified in the Draft EIS.

The surveys were designed to supplement existing data collected from 2014 for the proposed development, and also include extensive available data, as detailed in section 16.3 and Appendix 2-M of the Draft EIS. Benthic invertebrates were assessed in March and September 2020. Eight megafauna surveys were conducted over a period spanning from February to September 2020.

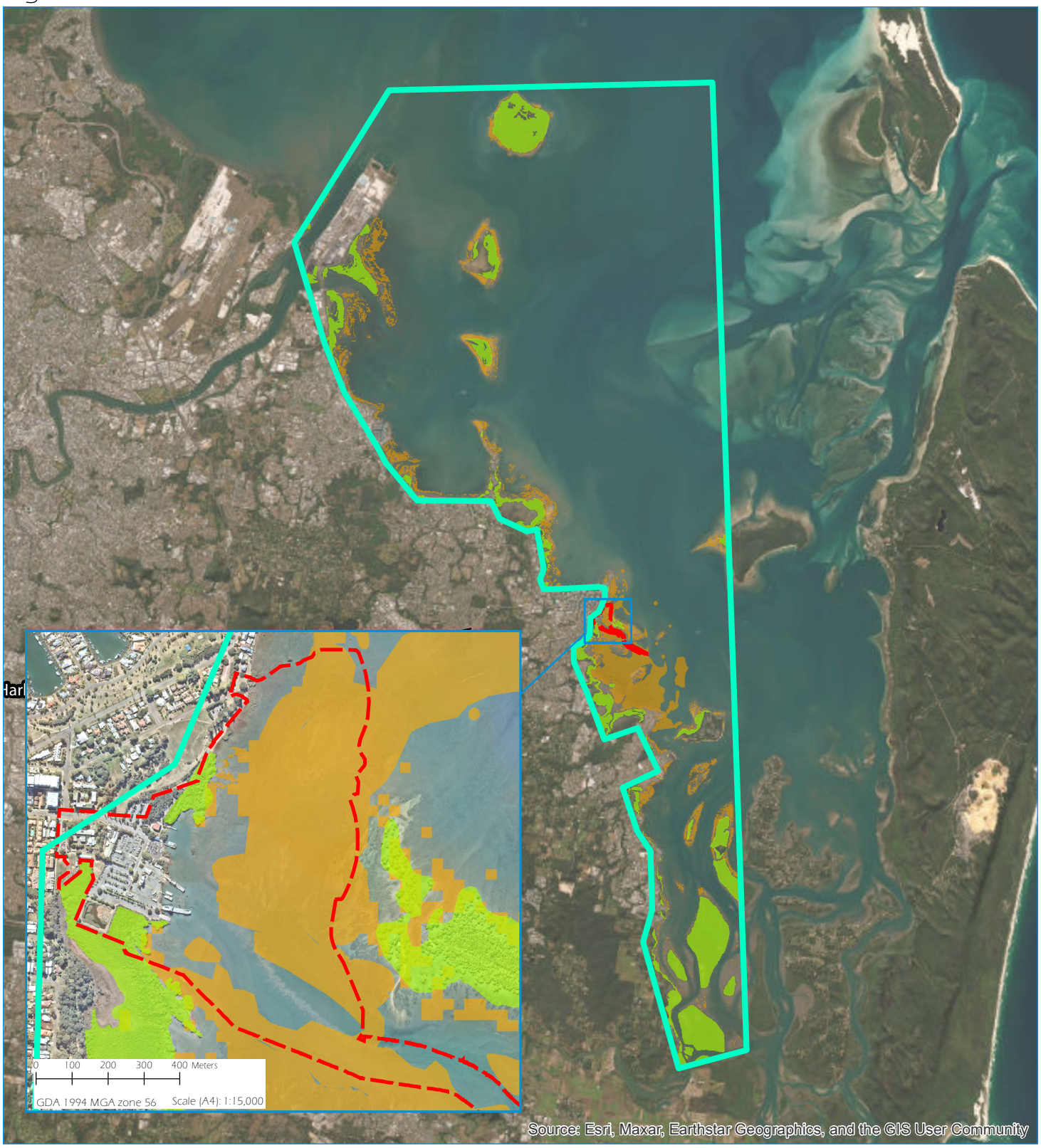
Sampling methods for marine megafauna were based on methods used by Ansmann 2013 and Hawkins et al. 2020, adapted as described in section 16.2.2 of the Draft EIS. Surveys were seasonal to comply with the EPBC Act EIS Guidelines. Boat speed (10-16 km per hour), sea state (Beufort sea state scale $\leqslant 3$), and daylight hours constraints were based on the methods in the citations. Two experienced observers were positioned in the boat, such that the circumference of the boat could be visually scanned.

2. ***The Draft EIS does not adequately assess impacts on White's Seahorse***

White's seahorse was listed as endangered by the Commonwealth in December 2020. The EPBC Act requires proponents to address matters listed at the time the decision was made on the approval process, i.e., at the time of the referral decision (s158A of the EPBC Act). The Project was made a controlled action on 23 July 2018. As a result the Draft EIS is not required to address significant impacts on White's Seahorse, however an assessment was still completed as part of the Draft EIS for completeness (refer to section 24.4.3 of the Draft EIS).

Further assessment of the potential for the Project to impact on White's Seahorse is included in the response to public comment MEW18 (section 6.7) and **Appendix R** of this Supplementary Report.

Figure 7-1: Marine Habitat Areas



Toondah Harbour EIS

Legend

- Project Footprint
- MBRS Zone of Influence
- Mangroves within ZOI
- Seagrass within ZOI

N

0 5 10 Kilometers

GDA 1994 MGA zone 56 Scale (A4):1:230,000

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Layer Source: © State of Queensland Datasets (Department of Resources 2022), Aerial (Nearmap 2020)

DATE 1/08/2023

FILE REF: 9858 E Figure 5_12 Marine Area A

3. ***Potential impacts of increased boat activity (including boat strikes) on marine fauna may have been underestimated in the EIS. It appears that there will be an increase in the numbers of vessels and maximum vessel size arising from the proposed harbour and channel upgrades within the entire Moreton Bay due to the proposed project, especially the traffic to and from the proposed project area and Dunwich. The potential impact of this on marine megafauna, including humpback whales, along the route of the ferry crossings (e.g., from collisions, noise, boat strikes), has not been addressed in the EIS.***

The risk of boat strike to marine megafauna was assessed in detail by the Draft EIS (Sections 16.5.1.4, 16.5.3.2, 16.6.1 and Table 16.6, with further detail in Appendix 2-M (Sections 5.10, 5.11, 8.1.4, 8.3.2, 9.3.2, 10.1 and 10.2). In addition to the assessment carried out for the Draft EIS, further detail has been provided on the potential for boat traffic collisions with marine fauna in **Appendix R** to this document.

In summary, the increase in vessel traffic as a result of the Project is likely to be limited to an increase in ferry traffic of 10%, and an increase in the size of the ferries. This has the potential to impact individuals of some threatened and migratory species. A range of management measures will be put in place to minimise this potential impact. With the implementation of these mitigations measures, it is unlikely that the Project will result in a significant residual impact to these species.

4. ***The EIS should provide the State assessment criteria for threatened species to provide clarity on the regulatory requirements that will need to be met for these species. It should also directly address matters of state environmental significance, including species listed as threatened under State legislation.***

State matters were not included in the Draft EIS to avoid confusion on the matters being assessed and approved through the EPBC Act EIS process. The matters being assessed are the MNES listed as the EPBC Act controlling provisions for the Project, being:

- Wetlands of international importance.
- Listed threatened species and communities under the EPBC Act.
- Listed migratory species under the EPBC Act.

While State matters are not specifically addressed in the EPBC Act EIS process, assessment methodologies incorporated Queensland Government guidelines and survey methods where possible to ensure the outcomes would address future State level applications.

5. ***The EIS should include a visual representation in accordance with the Technical Guidance, Environmental Impact Assessment of Marine Dredging Proposals (Western Australian EPA 2016) of how sediment contaminant plumes will interact with sensitive receptors including spatial zoning of the dredge plume impacts considering extent, severity and duration.***

Impact assessment and dredge plume modelling addressed the requirements of the EIS Guidelines. The technical guidance identified are from Western Australia therefore have no application to the current project. However, the technical guidance has been reviewed to identify whether they could assist in clarifying impact analysis. The document suggests describing impacts using a spatially based zonation scheme. The scheme consists of three zones:

- **Zone of High Impact** (ZoHI) is the area where impacts on benthic communities or habitats are predicted to be irreversible.
- **Zone of Moderate Impact** (ZoMI) is the area within which predicted impacts on benthic organisms are recoverable within a period of five years following completion of the dredging activities.

- **Zone of Influence** (ZoI) is the area within which changes in environmental quality associated with dredge plumes are predicted and anticipated during the dredging operations, but where these changes would not result in a detectible impact on benthic biota.

Detailed modelling of dredge plumes was undertaken for the Project with outcomes detailed in section 8.4.6.3 of the Draft EIS. It should be noted that modelling did not incorporate the use of silt curtains, which are expected to reduce turbidity plumes to almost nothing outside of the Project footprint. Coastal processes and dredge plume modelling were peer reviewed by two independent experts who concluded that the approach was thorough and robust and allowed for detailed assessment of potential marine and coastal environmental impacts (refer to Appendix 2-F of the Draft EIS).

The modelling indicates that:

- The turbidity associated with the proposed works will not be significantly higher than turbidity already experienced in the area. Nearshore areas at Toondah Harbour experience turbidity levels in excess of 100 NTU regularly with dredging expected to generate plumes of less than 10 NTU outside of the Project footprint.
- Peaks in turbidity due to the project coincide with natural peaks (i.e. turbidity plumes during dredging will occur during peak tidal movement when natural turbidity is already high).
- The period of high turbidity is not significantly altered compared to natural conditions.

If the spatially based zonation scheme from Environmental Impact Assessment of Marine Dredging Proposals (Western Australian EPA 2016) was applied to the Project the dredge footprint would be considered the ZoHI with areas outside of the footprint considered to be within the ZoI.

6. ***Provide further details on the proposed dredge monitoring program including consideration of real time monitoring methodologies given the capital dredging campaign will run for years.***

As outlined in section 2.4.1 of the Draft EIS dredging will be carried out over 2 campaigns using a backhoe dredge. Campaign 1 will last 4 months and campaign 2 will last 2 months. Dredging will not last a 'few years'.

A framework for the water quality monitoring program is outlined in section 9.5 of the Draft EIS. This includes the approach to 'early warning' and sensitive receptor monitoring and trigger criteria for some parameters. Given Stage 1 dredging is unlikely to commence for two to three years post approval, additional baseline monitoring will be carried out before setting specific trigger criteria for the water quality management plan. Dredge plume modelling (section 8.4.6 of the Draft EIS) shows that even worst case plumes are minor in comparison to current background turbidity levels, and this does not take into account use of a silt curtain which can reduce plumes by over 80% where selected and implemented appropriately (Francingues and Palermo 2005).

The water quality monitoring program is composed of three components:

- Monitoring plumes associated with dredging.
- Monitoring water quality within the marina.
- Monitoring water quality at key habitats, and at potentially impacted and reference sites.

The monitoring of the dredge plume is based on the monitoring required for maintenance dredging of Toondah Harbour and Fison Channel as stipulated in Environmental Authority (EA) EPPR0618513 issued under the EP Act. The proposed dredge plume monitoring includes the monitoring of pH and turbidity as per the EA, with the addition of measuring the percent saturation of dissolved oxygen. This monitoring is for the 'relevant activity' of dredging between 100,000 and 1,000,000 tonnes per year. The monitoring required in this EA is similar to that required at a number of other sites, including the Burnett River and Rosslyn Bay, neither of which require the use of silt curtains.

As per the current EA, and monitoring of dredging in the Fison Channel to date, up and down current locations are dependent on tidal flows and the position of the dredge on the day of monitoring. This is easily determined in the field. Comparison of up and down current sites enables the size of the dredge plume to be assessed. This cannot be achieved as effectively using fixed monitoring sites. Fixed monitoring sites in key habitats are useful to assess longer term impacts, noting that BPAR (benthic light) at the fixed monitoring sites will be used to supplement the plume monitoring.

As per section 9.1.5.3 of the EIS, water quality, including Secchi depth, BPAR, turbidity, temperature, electrical conductivity, and percent saturation of dissolved oxygen will be monitored for a 12 month period prior to the commencement of dredging at the key habitats. This data will be used to derive trigger values.

Metals and other contaminant monitoring is not proposed as none were identified in the sediments to be dredged at levels that would result in environmental harm (refer to Draft EIS section 7.3.1).

Continuous monitoring is not proposed due to the small, predicted plumes and short timeframes for the dredging. Each stage of dredging will be completed in two to four months and will not be carried out during summer months therefore seasonal criteria were not considered appropriate.

Further parameters and methods can be incorporated into the monitoring program through the State approval process as required.

7.2.3. Sediment Quality and Acid Sulfate Soils

1. ***Acid Sulfate Soils (ASS) sample numbers and intervals are inadequate to provide a characterisation of the ASS material within the project area. Sampling has been completed in accordance with the National Assessment Guidelines for Dredging (NAGD) but should also take into account the National Acid Sulfate Soils Guidance-- Guidelines for the dredging of acid sulfate soil sediments and associated dredge spoil management and relevant Queensland Guidelines.***

ASS sampling and analysis effort has been summarised in response to comment SQ3 (section 6.1 of this Supplementary Report). The EIS Guidelines for the Project outline the following requirements for analysis of sediment to be dredged:

- assessment of sediment according to the National Assessment Guidelines for Dredging (NAGD) 2009 this must include an assessment of the suitability of this material for reclamation.
- assessment of the risk and potential impacts of acid sulfate soils (ASS) and potential acid sulfate soils (PASS).
- consideration of potential impacts of mobilised sediments (e.g. metal or contaminant release).

Sampling was carried out in accordance with the National Acid Sulfate Soils Guidance: Guidelines for the dredging of acid sulfate soil sediments and associated dredge spoil management 2018 (NASSG) when historical sampling from maintenance dredging campaigns was taken into account. Several historical sediment investigations have been conducted at Toondah Harbour as part of the approval process or maintenance dredging campaigns. The most recent analysis, undertaken in 2018, was used to reduce the amount of sample sites required for the capital dredging. Including the 2018 sampling a total of 25 sample locations (14 in 2019 and 11 in 2018) were used to characterise sediments within or adjacent the proposed dredge channel. This meets the requirements of the NASSG. Sample locations are shown on Figure 5-1.

A Draft ASSMP for the dredging and reclamation activities has been developed as part of the Supplementary Report and is included as **Appendix L** to this Supplementary Report. The Draft ASSMP includes a range of measures for managing ASS through the dredging and reclamation process, including additional sampling prior to works commencing to better

define the extent and concentration of ASS, liming rates for different management areas and procedures for ongoing testing and management.

2. ***The EIS should address dioxin levels and contamination including characterising dioxin and furan levels in in proposed dredge sediments. Assess sediments for bioaccumulation as part of the sediment characterisation process.***

Dioxins and furans were not included in the analysis as they are industrial point source contaminants highly unlikely to be present in the sediments around Toondah Harbour. Similarly, testing for radionuclides was not proposed as these are highly unlikely to be found in the sediments around Toondah Harbour. Radionuclides are generally used for medical and industrial purposes or as a source of radiation and there are limited discharge sources for these substances in Moreton Bay.

The National Dioxins study was completed in 2004 carried out sediment sampling at 11 locations throughout Queensland (Mueller et al 2004). No sample sites were located in Moreton Bay however sampling was carried out in the Brisbane River. The key outcomes of this analysis were:

The highest levels of dioxin-like chemicals in sediment samples in Queensland were found in the city reaches of Brisbane with about 4.9 pg TEQ g-1 dm. It is interesting to note that dioxin-like PCB contributed significantly to the total TEQ value for the sample from the Brisbane River indicating a local source of dioxin-like chemicals exists in the lower Brisbane River.

PCB testing was undertaken as part of the sediment analysis at Toondah Harbour and were found to be below the limits of reporting (i.e. if present it is at concentrations too low to detect). This indicates dioxins are not present in sediments at Toondah Harbour.

If dioxons have been spread through Moreton Bay by recent flooding it would be present at low levels in the top layer of sediments. Maintenance dredging at Toondah Harbour will be due in 2023/2024 providing opportunity for further analysis. If dioxins are present, it is likely they would be at very low levels. No matter whether it is present or not, any potential contaminated sediments could be managed within the reclamation area which will be surrounded by impermeable bunding.

It is noted that the outcome of sediment analysis in both 2018 and 2019 was that the 95% UCL of all parameters in the proposed dredge area were below the NAGD Screening Levels (where available) and in many instances were below the laboratory's detection limits.

7.2.4. The Moreton Bay Ramsar Site and Migratory Shorebirds

1. **Consideration should be made for the implications of the development and associated processes on Ramsar management at the site.**

While the Moreton Bay Ramsar Information Sheet (RIS) identifies there is a management plan the information provided in the management planning section of the RIS states that no management plan exists for the site: 'Management plans exist for the island protected areas on Bribie Island, Moreton Island and South Stradbroke Island. The Moreton Bay Marine Park Zoning Plan is not a management plan but provides guidance on use'. Consultation with DES indicates their preferred management process for Ramsar sites in Queensland is to use multiple management plans covering different aspects of the wetland site. The only plan listed with any relevance to the Project is the Marine Park Zoning Plan, which provides guidance on uses but no other management actions.

The proponent will continue to engage with DES on how to best incorporate the Project into ongoing management of the MBRS. The management framework for the Project will include a Ramsar Impact Management Plan which will include measures to avoid and minimise impacts on the MBRS during construction. This will continue through to the ongoing use of the harbour, marina and other components of the development. A management plan for these ongoing uses could be integrated into management of the Ramsar site similar to the plans for protected areas on the Islands.

2. **The Impact Assessment does not address the listing criteria for the Moreton Bay Ramsar site.**

The listing criteria for the MBRS was addressed as part of the impact assessment carried out in Chapter 27 of the Draft EIS. See response to comment RA21 in section 6.8 of this Supplementary Report.

3. **Provide robust scientific evidence to support the assumption of carrying capacity of Moreton Bay for migratory shorebirds in relation to any comment on impact to shorebird populations.**

Background to the assessment of carrying capacity was outlined Section 17.4.3.4 of the Draft EIS with further detail provided in Section 4.2, 4.4 and 5.4 of Appendix 2-N. It was not a central part of the logic of the developer or impact assessment for the Project. It applies a known ecological theory to suggest a potential outcome to the loss of habitat at Toondah Harbour. The Draft EIS has acknowledged the loss of foraging habitat as a significant residual impact (SRI) on several threatened shorebird species.

See response to comment MS1 in section 6.6 of this Supplementary Report.

4. **The EIS should provide a robust assessment of indirect impacts to shorebirds including potential increased access to Cassim Island roost site for people and dogs at low tide, the capacity of Nandeebie roost site and reference to maximum numbers of a shorebird species.**

Indirect impacts from light, noise and human presence were addressed in section 17.4.3 of the Draft EIS and section 5.3 of Appendix 2-N. The assessment found that implementation of a range of management measures to reduce indirect disturbance, such as fauna friendly lighting strategies and avoiding high noise generating construction activities during periods when shorebirds are most active (Nov – March), will minimise potential impacts on areas outside of the Project footprint.

See response to comment MS21 to MS30 in section 6.6 of this Supplementary Report.

The results of all surveys pertaining to Nandeebie Claypan are summarised in section 17.3.3.2 of the Draft EIS and detailed in Section 4.3.1.2 of Appendix 2-N. Surveys were completed as far back as 2014 when migratory birds were still observed utilising the site. No migratory shorebirds have been observed utilising the site since December 2019 with surveys completed as recently as 2022.

In accordance with EPBC Act policy statement 3.21, the maximum and average numbers within the most recent five years of surveys were presented in section 17.3 and Appendix 2-N of the Draft EIS.

5. **The EIS should provide additional information and justification on the likely success of offset measures for impacts to shorebirds foraging and roosting areas.**

An updated Offset Strategy has been provided as **Appendix U** to this Supplementary Report. Table 3 of the updated Offset Strategy outlines a series of criteria any offset project must meet in order to be selected. Offsets projects must be able to demonstrate a conservation outcome for the matter being impacted. A review of key threats and conservation

priorities for the matter impacted must be carried out including national guidelines, conservation advice, recovery plans and recent peer reviewed literature.

Offsets will be provided through an Environmental Trust Fund (ETF) which will be funded by the proponent. The delivery approach and basis for the calculation of the financial contribution are outlined in section 1.3 of **Appendix U**. A total financial payment of $9,041,401 is required to offset SRIs on MNES.

A detailed examination of potential projects will be carried out to determine which are the highest priority and will provide the most value for habitats in Moreton Bay. The outcome of this process will be an ETF Project Delivery Strategy that will outline at least 5 years' worth of projects including budget requirements. This process will be run by the Independent Advisory Group (refer to section 1.5.4 of the updated Offset Strategy) which is proposed to include representatives from the relevant Federal, State and Local government departments.

6. **Quantify the loss of habitat and its impacts on shorebird populations and other MNES due to the development of Raby Bay directly to the west of Toondah Harbour.**

The review of threats and trends in shorebird habitat condition in Moreton Bay included in section 17.3.1.1 of the Draft EIS and section 4.4 of Appendix 2-N included the history of roost site loss in the Cleveland area, including Raby Bay.

The Cumulative Impact Assessment addresses predicted future impacts to shorebird habitat from projects currently approved or are considered reasonable likely to approve. Raby Bay was constructed nearly 30 years ago therefore is not considered in this assessment as it is now part of the existing environment. As described throughout the Draft and Supplementary Report the number of migratory shorebirds that utilise Toondah Harbour is considerably less than the 5,000 at Raby Bay as identified by the commenter.

8. Conclusion

In September 2014, Walker Group Holdings Pty Ltd (the Proponent) was announced by RCC and the Queensland Government as the preferred development partner to redevelop the government owned land in the PDA. The Toondah Harbour Project (the Project) includes the following key components:

- Capital dredging of up to 530,000m^3 of marine sediment to expand Fison Channel so that it meets minimum requirements for safe navigation set out in the Permanent International Association of Navigational Congresses (PIANC 2014) Harbour Approach Channels Design Guidelines. Currently, the channel is approximately 45 m wide (excluding batters) with a target depth of -2.5 m below Lowest Astronomical Tide (LAT). The Project proposes to widen the channel to 75 m (excluding batters), with a target depth of -3 m LAT. Dredging will be undertaken in two separate campaigns with Stage 1 encompassing the turning basin and inner Fison channel and Stage 2 the outer Fison Channel.
- All dredged and excavated sediments generated by capital dredging will be beneficially reused to reclaim a portion of the sub-tidal area north of the harbour to create new landforms for proposed public open space, including community facilities, and urban uses.
- Up to 200 wet berths within a marina basin and internal waterways providing access to Fison Channel.
- The reclamation will be formed in two discrete stages – north and south. For each stage, a perimeter bund will be established to contain the dredged material, which will limit indirect impacts outside of the project footprint. The reclamation has been designed to balance dredge material volumes with fill requirements, minimising the need to import fill or dispose of dredge material offsite.
- New harbour and public transport infrastructure, facilities and amenities for ferry customers and visitors will be constructed south of the existing vehicle ferry loading area. These works will be undertaken concurrently with the first reclamation stage.
- Proposed uses on the reclamation areas and the new harbour include a hotel, residential apartments, retail and commercial development centred around a new marina plaza. A further residential precinct will be located in the western part of the PDA.
- A network of open space and recreation areas including a 3.5 ha foreshore park, education centre, boardwalks, plazas, walking paths, neighbourhood parks and a ramp for non-motorised vessels such as kayaks and dinghies.
- Installation of civil infrastructure and services – such as electrical, gas, telecommunications, water supply, sewerage infrastructure and roads will keep pace with development projects.

The Project was referred under the EPBC Act to the Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEEW) on **5 June 2018** (EPBC Reference number 2018/8225) and was made a controlled action on **23 July 2018**, to be assessed by environmental impact statement (EIS).

The Proponent prepared a Draft EIS in accordance with the final guidelines which was published for a period of 40 business days for public review and comment. The public comment period commenced on **12 October 2022** and concluded on **6 December 2022**.

Following the public comment period, all submissions received were reviewed and collated to provide a list of all issues raised. In order to finalise the EPBC Act process for the Project the proponent must address all issues raised, provide that information to DCCEEW for assessment and publish the response report and Draft EIS so that it is accessible to the public.

A total of 26,225 submissions were received during the Draft EIS public notification period. Of these 26,225 submissions, 1,939 were from people who made multiple submissions, resulting in a total of 24,286 unique submitters. Some individuals made more than 50 submissions on the Project. Statistics on public sentiment refer only to the number of

submitters (i.e. that person is either for or against the Project no matter the number of individual submission they lodged) while statistics on issues raised included all **submissions**, no matter who sent them).

Overall sentiment toward the Project showed the majority of submitters outside of the Redlands oppose the Project. The majority of these submissions were in response to a national mail out campaign that was linked to a 'portal' platform and online forms that either pre-filled or provided pre-composed content to be included in the submission. The campaign mail outs and portals did not provide important site and contextual information, project imagery or plans. No links to the EIS documentation were provided. Many of these forms and other collateral included factually incorrect information about the Project (refer to Table ES-1).

The outcome is significantly different when only local Redland City and Cleveland submitters are included. When only the Redland City LGA submitters are included – a total of 3,211 submitters – results show 52% of submitters are in support of the Project and 48% against. When only submitters from the suburb of Cleveland are included - a total of 936 submitters – results show 58% of submitters are supportive and 42% oppose

The analysis of submissions showed that issues most commonly raised were around Ramsar and migratory birds, with approximately 31% of submissions raising each of these topics. The next most frequently raised issues were marine habitats and masterplan (16%). These issues were followed by coastal processes (9%), social (7%), koala (7%), offsets (5%) and the EIS process (5%). This analysis considered all submissions received, including those from repeat submitters.

The number of times a matter has been raised does not necessarily reflect the number of comments requiring response. For example, Ramsar was one of the issues consistently raised by submissions, however most comments on the Ramsar site related to the Project not meeting the definition of "wise use" or being inconsistent with Australia's obligations under the Ramsar site. This meant that several thousand submissions could be addressed by a small number of responses. Analysis of submissions identified 353 comments with responses provide for each one.

This Supplementary Report report summarises and responds to all comments received on the Draft EIS for the Toondah Harbour Project. The report should be read in conjunction with Draft EIS with the combined reports considered the final assessment of the Toondah Harbour Project under the EPBC Act. No updates will be made directly to the Draft EIS.

Several additional studies have been carried out as a result of the public submissions received and consultation with Federal and State government agencies. The studies included clarification of design and construction requirements and, additional technical environmental assessment. Specific studies completed for the Supplementary Report were:

- Review of Project masterplan optimisation.
- Review of the Project masterplan against the Toondah Harbour PDA Development Scheme.
- Breakdown of community infrastructure investment.
- Redland housing demand study.
- Dredging design basis report for the turning basin and entrance channel.
- Reclamation early works construction method.
- A review of the history of development proposals at Toondah Harbour.
- A Draft Acid Sulfate Soils Management Plan for the dredging and reclamation components of the Project.
- Contaminated land Detailed Site Investigation.
- Development of a simple geometric spreading model for underwater noise and vibration.
- Detailed assessment of Project Wise Use of the Ramsar site.
- Updated Environmental Offsets Strategy.

The Project masterplan was updated to reflect the above studies and other feedback received through the public consultation process.

Toondah Harbour is positioned uniquely, in that much of its proposed infrastructure is of regionally significant scale. Opportunities are scarce at other locations within the Redland LGA to facilitate comparable development. This is particularly true with respect to the port upgrade, alterations to the channel, and the significant public foreshore parklands.

Given that Toondah Harbour's current functionality has deteriorated to the extent that the ferry terminal is classified as dilapidated, the port upgrade will offer high social value, underpinned by the harbour's role as the main ferry access point to popular tourist destination Minjerribah (North Stradbroke Island).

Reclamation areas within the tidal zone have reduced by approximately **35% (57.72 ha to 37.43 ha)** since the initial design in 2015. This has occurred through a reduction in the size of the marina and optimisation of the dredge channel and basin, minimising the volume of dredge material used to form the reclamation areas. The iterative re-design of the Project masterplan and footprint since the initial proposal in 2015 demonstrates how the Project has responded to site constraints and ongoing consultation with relevant experts and DCCEEW. This has resulted in a significant reduction of the footprint on tidal lands while still achieving the required outcomes of the Toondah Harbour PDA Development Scheme. The redesign efforts are consistent with the environmental mitigation hierarchy to avoid and minimise impacts where possible, as recommended in supporting policies to the EPBC Act and the Ramsar Convention.

The Project will include significant investment in public infrastructure, most of which will be delivered within the first five years of works commencing. Approximately $100 million will be invested in infrastructure including major upgrades of sub-tidal and land-based infrastructure at the boat harbour, foreshore parks and promenades, and community buildings. The Project will contribute significantly to nature-based tourism within the MBRS with over 70% (approximately 25.8 ha of 36.5 ha) of the reclamation areas within the Ramsar site being taken up with uses that contribute to the ecological character of the Moreton Bay Ramsar Site.

Based on the outcomes of updated detailed assessments the Project is considered likely to have a significant residual impact on the following MNES:

- The loss of 28.9 ha of foraging habitat for a range of threatened and migratory shorebird species which will reduce the potential area of occupancy for these species within Moreton Bay by 0.29%.
- The area of the MBRS within the Project footprint (reclamation and dredge areas) will be substantially modified impacting on a range of wetland habitats including seagrass, mangrove, rocky rubble and unvegetated sand and mud substrate. The Project will result in the permanent modification of 58.7 ha of the over 120,000 ha MBRS (approximately 0.02%) including::
    - 2.5 ha of mangroves (approximately 0.03% of all mangroves in the MBRS);
    - 35 ha of seagrass (approximately 0.2% of all seagrass in the MBRS);
    - 1.1 ha of rocky rubble; and
    - 19.4 ha of unvegetated sand and mud substrate (approximately 0.2% of mudflats within the MBRS).

Significant impacts to MNES will be offset by the Project. The overall objective of the offsets strategy is to provide a conservation gain for the MNES impacted by the Project, which will in turn provide a benefit to the ecological character of the MBRS. It is proposed to deliver a suite of direct and indirect offsets through a fund managed by a third party with the ability to access public land and obtain approvals not available to a commercial entity such as the Proponent. The fund will be established so that offset projects undertaken meet the principles outlined in the EPBC Act Environmental Offsets Policy, including the need to provide conservation benefit for the matters impacted.

There are no tools under the EPBC Act to calculate funds for offsets delivery, therefore the Queensland environmental offset financial calculator (QEOFC) has been used to identify an appropriate financial contribution to offset impacts from

the Project. A total financial payment of $9,041,401 will be provided through a fund to offset SRIs on MNES. In some instances offset payments will be as high as $270,000 per hectare of impacted land.

Toondah Harbour is an ecologically sustainable use of the Redlands primary marine facility that has been considered the 'gateway to Straddie' for more than half a century. There is a need for these facilities to allow residents and tourists to safely travel to and from Minjerribah as well as future proofing the regional gateway. Previous studies carried out by RCC have not identified a viable alternative location for similar facilities. The harbour has been operational since the 1970s and is subject to regular maintenance dredging events to maintain navigational depths to and from the ferry terminal therefore is already subject to disturbance from the existing uses.

8.1. Summary of Impact to MNES

The Toondah Harbour Project Environmental Impact Statement (EIS) has addressed Matters of National Environmental Significance (MNES). The specific MNES the Project was required to assess were wetlands of international importance; listed threatened species and communities; and listed migratory species. To complete this assessment a range of detailed studies have been completed over a period spanning several years. Key studies have included:

- Sampling and analysis of potential contaminants and acid sulfate soils in over 100 locations covering the land and tidal components of the Project area.
- The installation of 14 groundwater bores to collect water quality samples and other data to carry out modelling of potential changes to the existing groundwater regime.
- Detailed modelling of coastal processes and dredge plumes including collection of several months of site specific current data and modelling of a range of potential extreme events and sea level rise.
- Collection of more than three years of background water quality data including the deployment of multiple turbidity logging instruments to collect reading in real time every 15 minutes.
- Detailed modelling of stormwater treatment and receiving water quality to demonstrate the Project will not result in adverse water quality impacts.
- Collection of background air quality data and modelling of potential impacts to sensitive receptors.
- Collection of background data and modelling of ambient and underwater noise and vibration to identify risk of impact to marine and terrestrial fauna.
- Modelling of light sources from the completed Project to identify impacts to adjacent mudflats and other external receptors.
- Assessment of impacts to terrestrial flora and fauna including GPS plotting of all habitat trees within the Project area and use of a UAV to monitor koala movement within and adjacent the Project area.
- On ground surveys of all marine habitats within the Project area and surrounding areas where there was potential for indirect impacts, surveys for marine megafauna and detailed analysis of the potential for impacts from boat traffic.
- Migratory shorebird surveys spanning a period of more than 7 years from October 2014 to December 2021. This included 52 surveys of the mudflats within the Project footprint as well as multi year surveys at nearby roost sites including Cassim Island, Oyster Point and Nandeebie Claypan. Additional surveys were completed at the mudflats, Oyster Point and Cassim Island in October 2023. Surveys were also completed over a 567 ha area of mudflats spanning approximately 34 km of coastline north and south of Toondah Harbour.
- Development of a method for assessing impacts to the Ecological Character of a Ramsar site and implementing the method to assess the potential to impact on the Moreton Bay Ramsar Site (MBRS).

Outcomes of the MNES assessment include:

Threatened Species

Threatened species considered likely to be significantly impacted by the Project are Eastern curlew, Great knot, Lesser sand plover and Bar-tailed godwit. All four are migratory shorebird species that use the mudflats where reclamation and dredging will occur as foraging habitat. Two of the species, great knot and lesser sand plover, have only been observed once on the mudflats across seven years of surveys. Eastern curlew is observed at the site in low numbers (average of 3) and do not utilise the adjacent roost sites. The Bar-tailed godwit is observed on the mudflat and at Cassim Island in small numbers. Importantly, significant impacts are considered likely for all four species due to a loss of critical habitat or 'area of occupancy' for that species. Tidal flats in Toondah Harbour are only considered critical habitat for these species as they are located within the MBRS and not because of the number of individuals using the area.

Five threatened marine species have the potential to utilise habitats within or adjacent to the Project footprint: loggerhead turtle, green turtle, hawksbill turtle, dugong and Australian humpback dolphin. While dugong and marine turtles feed on seagrass, the Project footprint does not provide significant habitat for them. Australian humpback dolphin is found throughout the bay; however, the Project footprint is not part of their core habitat. None of these species were observed within the PDA during EIS surveys.

The Project is not expected to have a significant impact on any terrestrial fauna species including koala. The proposed koala underpass beneath Middle Street, habitat tree planting and establishment of a 'Koala Safe Neighbourhood' in Cleveland will ensure the increased traffic at this location is not a barrier to koala movement.

Migratory Species

The dominant migratory species observed at Toondah Harbour were the Grey-tailed Tattler and Whimbrel, both of which utilise the mudflat and Cassim Island roost site. The Project is expected to result in short-term disruption of roosting behaviour from construction noise however this will be minimised by avoiding high noise generating activities during winter months when fewer migratory shorebirds are present.

Moreton Bay Ramsar Site

While the Project will not result in a change to the ecological character of the MBRS a small area of the wetland (less than 0.02%) will be substantially modified. Habitat loss is well under 1% of all comparative habitats in the MBRS. Approximately 70% of the Project will be uses that beneficially contribute to the ecological character of the MBRS including parks, open space, education centre, harbour upgrades and recreational boating facilities. The remaining 30% will be used for infrastructure that will facilitate wise uses. The includes roads, parking, residential areas, a hotel and retail and commercial space. Without these uses the significant contribution to community infrastructure that will allow for increased interaction with Moreton Bay would not be possible.

While direct impacts from the Project are unavoidable, it will also provide a number of benefits to MNES including:

- Creation of approximately 1.5 km of rockwall that will be designed to provide fish habitat and roosting habitat for a number of migratory bird species, including grey-tailed tattler, ruddy turnstone and terek sandpiper.
- Marine structures such as dolphins and jetties will provide structure and habitat for fish species.
- Creation of oyster reefs within the Project footprint will provide further habitat for fisheries species.
- Stormwater treatment will reduce nutrient loads released into Moreton Bay during storm events given that the existing harbour currently has no treatment measures.
- The upgrade of the ferry terminal, turning basin and Fison Channel, and the provision of an education centre as well as a visitor information centre, will add significantly to the recreational, tourism and educational values of Moreton Bay, both of which are considered critical services of the MBRS.

- Creation of an additional 12.4 ha of open space and parklands along the Cleveland foreshore to allow greater interaction and public enjoyment of the Ramsar site.
- The interpretation and awareness raising of Aboriginal cultural heritage values through signage, public art and opportunities for land and sea country management and cultural and nature-based tourism activities will promote the Indigenous cultural heritage of Moreton Bay, which is considered a critical service of the MBRS.

In addition to the above the Proponent has committed to a comprehensive adaptive management regime including:

- Further sampling prior to the commencement of works.
- Detailed baseline monitoring.
- Real time construction monitoring.
- Active management techniques such as the use of silt curtains during dredging.

The proponent has also voluntarily committed to establishing a technical advisory panel to regularly review and provide recommendations to ensure best practice management throughout the life of the Project.

Further the Project will deliver approximately $100 million of infrastructure, providing direct benefits to the public and environment, most of which will be delivered within the first five years of development. In addition, more than $9 million will be provided through a trust fund to deliver projects benefiting the matters impacted, including migratory shorebirds and marine habitats.

As a result, the Project will provide a significant long term net benefit to Moreton Bay environment as well as delivering a substantial contribution to the local community, economy, infrastructure and liveability of the growing Redland City.

Plate 8-1: 3D Model of the Toondah Harbour Project

9. References

General

PIANC. 2014. *Harbour Approach Channels Design Guidelines*, PIANC Report No 121, Maritime Navigation Commission

Saunders Havill Group. 2022. Toondah Harbour – EPBC Act Draft Environmental Impact Statement, prepared for Walker Corporation, October 2022.

Department of State Development, Infrastructure and Planning (2014) *Toondah Harbour Priority Development Area Development Scheme*

Migratory Shorebirds

Brown, A.L. 1990. Measuring the effect of aircraft noise on sea birds. *Environment International* 16: 587–592.

Bush RA, Coleman JT, Coleman LA, Driscoll PV, and Woodworth BK. 2022. Growing capacity to support migratory shorebird resilience at three of Queensland's coastal Ramsar sites: A two year volunteer-led field project. Final report for Queensland Community Sustainability Grant Project CSAT20034. The Queensland Wader Study Group, Brisbane, Australia.

Fuller RA, Clemens RS, Woodworth BK, Moffitt D & Simmons BA. 2021. Managing Threats to Migratory Shorebirds in Moreton Bay. A report to Healthy Land and Water. University of Queensland, Brisbane.

Gaston, K. J., Bennie, J., Davies, T. W., & Hopkins, J. 2013. The ecological impacts of nighttime light pollution: a mechanistic appraisal. *Biological Reviews* 88: 912-927.

Lilleyman, A., Bradley K. Woodworth, Richard A. Fuller, and Garnett, S. T. 2020. Strategic planning for the Far Eastern Curlew. NESP Threatened Species Recovery Hub Project 5.1.1 final report, Brisbane, December 2020

Lloyd, P., Finn, P.G. and L. Popple. 2021. Twelve years of monitoring shorebird use of a tidal flat at Brisbane Airport in Moreton Bay, Queensland. *The Stilt* 76: 64-73.

Murray, M.J., Clemens, R.S., Phinn, S.R., Possingham, H.P. and Fuller, R.A. 2014. Tracking the rapid loss of tidal wetlands in the Yellow Sea. *Frontiers in Ecology and the Environment* 12: 267–272.

Studds, C. E., Kendall, B. E., Murray, N. J., Wilson, H. B., Rogers, D. I., Clemens, R. S., ... and Milton, D. A. 2017. Rapid population decline in migratory shorebirds relying on Yellow Sea tidal mudflats as stopover sites. Nature Communications 8:14895), DOI: 10.1038/ncomms14895

Threatened Species Scientific Committee (TSSC). 2015. Approved Conservation Advice for Numenius madagascariensis (Eastern Curlew). Canberra: Department of the Environment. Available from: http://www.environment.gov.au/biodiversity/threatened/species/pubs/847-conservation-advice.pdf. In effect under the EPBC Act from 26-May-2015.

O'Mara, K., Fry, B. & Burford, M. 2021. Changes in Benthic Microalgae Biomass and Brown Tiger Prawn Penaeus esculentus Body Condition Following a Large Cyclone-Driven Flood in Moreton Bay. Estuaries and Coasts 44, 1050–1061.

Smit, CJ and Visser, GJ. 1993. Effects of disturbance on shorebirds: a summary of existing knowledge from the Dutch Wadden Sea and Delta area. Wader Study Group Bulletin 68: 6-19.

Jeremy Thompson. 1990. The Sex and Age-related Distribution of Bar-tailed Godwits in Moreton Bay, Queensland, During the Northward Migration, Emu - Austral Ornithology, 90:3, 169-174.

Wilson, J. P., Amano, T., & Fuller, R. A. (2023). Drone-induced flight initiation distances for shorebirds in mixed-species flocks. Journal of Applied Ecology, 60, 1816–1827

Wright, M. D., Goodman, P., & Cameron, T. C. 2013. Exploring behavioural responses of shorebirds to impulsive noise. *Wildfowl* 60: 150-167.

Zharikov, Y & Skilleter, GA. 2004a. Potential interactions between humans and non-breeding shorebirds on a subtropical intertidal flat. Austral Ecology 29: 647-660)

Zharikov, Y. & Skilleter, G.A. 2004b. A relationship between prey density and territory size in non-breeding Eastern Curlews *Numenius madagascariensis*. Ibis 146: 518-521

Environmental Offsets

Bayraktarov, E., Saunders, M.I., Abdullah, S., Mills, M., Beher, J., Possingham, H.P., Mumby, P.J. and Lovelock, C.E. 2016. The cost and feasibility of marine coastal restoration. Ecol Appl, 26: 1055-1074.

Lilleyman, A., Alley, A., Jackson, D., O'Brien, G., & Garnett, S. (2018). Distribution and abundance of migratory shorebirds in Darwin Harbour, Northern Territory, Australia. Northern Territory Naturalist, 28, 30-42.

Saunders MI, Atkinson S, Klein CJ, Weber T, Possingham HP. 2017. Increased sediment loads cause non-linear decreases in seagrass suitable habitat extent. PLoS ONE 12(11): e0187284

Wear, R. J., J. E. Tanner, and S. L. Hoare. 2010. Facilitating recruitment of Amphibolis as a novel approach to seagrass rehabilitation in hydrodynamically active waters. Marine and Freshwater Research 61: 1123–1133

Coastal Processes and Maritime Engineering

BMT WBM. 2014. Monitoring of Maintenance Dredging Plumes – Gladstone Harbour, November 2014

Department of Transport and Main Roads. 2019. Anchorage Area Design and Management Guideline. Maritime Safety Queensland.

GHD and AECOM. 2017. Port of Hastings Development Project: Concept Channel Design and Channel Development Strategy

Jianghao, C. and Degong. D. 2018. Analysis of PIANC Guideline and ROM Standard in Design of Approach Channel and Harbor Design. PIANC-World Congress Panama City, Panama 2018

NSW Government. 2012. The principles of Environmentally Friendly Seawalls

PIANC. 2014. Harbour Approach Channels Design Guidelines, PIANC Report No 121, Maritime Navigation Commission.

Ports Australia. 2014. Dredging and Australian Ports: Subtropical and Tropical Ports.

Sunarko, H. and Saunders, B. 2019. Australasian Coasts & Ports 2019 Conference – Hobart, 10-13 September 2019 Variable Channel Design for Ports and Harbours in Macro Tidal Environments

Terrestrial Ecology

Queensland Department of Environment and Science. 2022. Koala Sensitive Design Guideline: Department of Environment and Science Government.

Air Quality

Australian Government, 2003. National Environment Protection (Ambient Air Quality) Measure, Canberra : Office of Legislative Drafting, Attorney-General's Department, Canberra.

Australian Government, 2011. National Environment Protection (Air Toxics) Measure, Canberra: National Environment Protection Council Service Corporation.

DEC, 2002. Internal working paper no. 3 Ambient Concentrations of Polycyclic Aromatic Hydrocarbons in NSW, Sydney: Department of Environment and Conservation.

DEHP, 2013. Guideline: Odour Impact Assessment from Developments, Brisbane: Department of Environment and Heritage Protection.

DES, 2021. Application requirements for activities with impacts to air Ver 4.04, Brisbane: Department of Environment and Science.

Exponent , 2019. CALPUFF Version 7 Users Guide Addendum, Maynard, MA: Exponent, Inc.

NSW EPA, 2016. Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales, Sydney: Environment Protection Authority.

NZMFE, 2016. Good Practice Guide for Assessing and Managing Dust, Wellington, New Zealand: Ministry for the Environment.

USEPA, 2011. Haul Road Workgroup Final Recommendations, Chicago: United States Environmental Protection Agency.

USEPA, 2015. Speciation Profiles and Toxic Emission Factors for Non-road Emissions EPA-420-R-15-019, Washington DC: USEPA.

VIC EPA, 2013. Francis Street Monitoring Program - Report Two Publication 1520, Melbourne: EPA Victoria.

Noise and Vibration

Duncan, AJ and Parsons, MJG. 2011. How Wrong Can You Be? Can a Simple Spreading Formula Be Used to Predict Worst-Case Underwater Sound Levels? Proceedings of Acoustics 2011

ICF International, Illingworth & Rodkin, Inc. 2020. Technical Guidance for Assessment of the Hydroacoustic Effects of Pile Driving on Fish. Prepared for California Department of Transportation (CALTRANS), Sacramento.

Illingworth & Rodkin, Inc. 2017. Pile-Driving Noise Measurements at Atlantic Fleet Naval Installations: 28 May 2013-28 April 2016. Prepared for HDR Environmental for Naval Facilities Engineering Command (NAVFAC).

Queensland Government, Environmental Protection (Noise) Policy 2019 (EPP (Noise))

Sediment Quality and ASS

Biala, J. 2011. Short report: The benefits of using compost for mitigating climate change, report prepared for Department of Environment, Climate Change and Water NSW.

BMT WBM. 2013. Toondah Harbour Sediment Quality Report, report prepared for prepared for Department of Transport and Main Roads.

Department of the Environment, Water, Heritage and the Arts. 2009. National Assessment Guidelines for Dredging

Macreadie, PI, Anton, A, Raven, JA, Beaumont, N, Connolly, RM, Friess, DA, Kelleway, JJ, Kennedy, H, Kuwae, T, Lavery, PS, Lovelock, CE, Smale, DA, Apostolaki, ET, Atwood, TB, Baldock, J, Bianchi, TS, Chmura, GL, Eyre, BD, Fourqurean, JW, Hall-Spencer, JM, Huxham, M, Hendriks, IE, Krause-Jensen, D, Laffoley, D, Luisetti, T, Marbà, N, Masque, P, McGlathery, KJ,

Megonigal, JP, Murdiyarso, D, Russell, BD, Santos, R, Serrano, O, Silliman, BR, Watanabe, K & Duarte, CM. 2019. 'The future of Blue Carbon science', Nature Communications, vol. 10, no. 3998.

Müeller J, Muller R, Goudkamp K, Shaw M, Mortimer M, Haynes D, Paxman C, Hyne R, McTaggart A, Burniston D, Symons R & Moore M 2004, Dioxins in Aquatic Environments in Australia, National Dioxins Program Technical Report No. 6, Australian Government Department of the Environment and Heritage, Canberra.

Simpson, SL, Mosley, L, Batley, GE and Shand, P. 2018. National Acid sulfate soils guidance: Guidelines for the dredging of acid sulfate soil sediments and associated dredge spoil management, Department of Agriculture and Water Resources, Canberra, ACT. CC BY 4.0.

Stenton CA, Bolger EL, Michenot M, Dodd JA, Wale MA, Briers RA, Hartl MGJ, Diele K. Effects of pile driving sound playbacks and cadmium co-exposure on the early life stage development of the Norway lobster, Nephrops norvegicus. Mar Pollut Bull. 2022 Jun;179:113667

The Blue Carbon Initiative. 2019. Mitigating Climate Change Through Costal Ecosystem Management, https://www.thebluecarboninitiative.org/.

WBM. 2005. Toondah Harbour Sediment Sampling and Analysis November 2004.

WBM. 2006. Toondah Harbour sediment and ecotoxicology assessments.

Marine ecology

Ansmann, I.C., Lanyon, J.M., Seddon, J.M. & Parra, G.J. 2013. 'Monitoring Dolphins in an Urban Marine System: Total and Effective Population Size Estimates of Indo-Pacific Bottlenose Dolphins in Moreton Bay, Australia', PLoS ONE, vol. 8, no. 6.
Biala, J. 2011. Short report: The benefits of using compost for mitigating climate change, report prepared for Department of Environment, Climate Change and Water NSW.

BMT WBM. 2013. Toondah Harbour Sediment Quality Report, report prepared for prepared for Department of Transport and Main Roads.

Commonwealth of Australia. 2017. National strategy for reducing vessel strike on cetaceans and other marine megafauna.

Commonwealth of Australia. 2017b. National Guidelines for whale and dolphin watching.

Davison, GWH, Ng, PKL & Ho Hua Chew. 2008. The Singapore Red Data Book: Threatened plants and animals of Singapore, Nature Society, Singapore.

DCCEEW. 2022. National Light Pollution Guidelines for Wildlife Including Marine Turtles, Seabirds and Migratory Shorebirds, Department of Climate Change, Energy, the Environment and Water, https://www.dcceew.gov.au/environment/biodiversity/publications/national-light-pollution-guidelines-wildlife.

Department of the Environment, Water, Heritage and the Arts. 2009. National Assessment Guidelines for Dredging

Fuentes, MMPB, Bell, I, Hagihara, R, Hamann, M, Hazel, J, Huth, A, Seminoff, JA, Sobtzick, S & Marsh, H. 2015. 'Improving in-water estimates of marine turtle abundance by adjusting aerial survey counts for perception and availability biases', Journal of Experimental Marine Biology and Ecology, vol. 471, pp. 77-83.

Harasti, D. 2014. The biology, ecology and conservation of White's seahorse Hippocampus whitei, University of Technology, Sydney.

Hawkins, ER. 2023. Threat identification and spatial risk assessment for a vulnerable Australian humpback dolphin population in Moreton Bay, Queensland, report prepared for Dolphin Research Australia, Byron Bay, Australia.

HLW. 2022. South East Queensland flooding brings a new wave of marine pollution to Moreton Bay Ramsar Wetlands, Healthy Land & Water, https://www.hlw.org.au/news/news-hub/south-east-queensland-flooding-brings-a-new-wave-of-marine-pollution-to-moreton-bay-ramsar-wetlands.

Lourie, SA, Stanley, HF, Vincent, ACJ, Hall, HJ, Pritchard, JC & Casey, SP. 1999. Seahorses: An Identification Guide to the World's Species and Their Conservation, Project Seahorse, London.

Macreadie, PI, Anton, A, Raven, JA, Beaumont, N, Connolly, RM, Friess, DA, Kelleway, JJ, Kennedy, H, Kuwae, T, Lavery, PS, Lovelock, CE, Smale, DA, Apostolaki, ET, Atwood, TB, Baldock, J, Bianchi, TS, Chmura, GL, Eyre, BD, Fourqurean, JW, Hall-Spencer, JM, Huxham, M, Hendriks, IE, Krause-Jensen, D, Laffoley, D, Luisetti, T, Marbà, N, Masque, P, McGlathery, KJ, Megonigal, JP, Murdiyarso, D, Russell, BD, Santos, R, Serrano, O, Silliman, BR, Watanabe, K & Duarte, CM. 2019. 'The future of Blue Carbon science', Nature Communications, vol. 10, no. 3998.

Manning, CG, Foster, SJ, Harasti, D & Vincent, ACJ. 2018. 'A holistic investigation of the ecological correlates of abundance and body size for the endangered White's seahorse Hippocampus whitei', Journal of Fish Biology, vol. 93, no. 4, pp. 649-663.

Maxwell, PS, Pitt, KA, Burfeind, DD, Olds, AD, Babcock, RC & Connolly, RM. 2014. 'Phenotypic plasticity promotes persistence following severe events: Physiological and morphological responses of seagrass to flooding', Journal of Ecology, vol. 102, no. 1, pp. 54-64.

Mazarrasa, I, Lavery, P, Duarte, CM, Lafratta, A, Lovelock, CE, Macreadie, PI, Samper-Villarreal, J, Salinas, C, Sanders, C, Trevathan-Tackett, S, Young, M, Steven, A & Serrano, O. 2021. 'Factors determining seagrass Blue Carbon across bioregions and geomorphologies', Global Biogeochemical Cycles, vol. 35.

McPherson, C, Yurk, H, McPherson, G, Racca, R & Wulf, P (2017) Great Barrier Reef Underwater Noise Guidelines: Discussion and Options Paper, Townsville.

McQueen, AD, Suedel, BC & Wilkens, JE (2019) Review of the Adverse Biological Effects of Dredging-induced Underwater Sounds', Journal of Dredging, vol. 17, no. 1.

Meager, JJ, Hawkins, ER, Ansmann, I & Parra, GJ. 2018. 'Long-term trends in habitat use and site fidelity by Australian humpback dolphins Sousa sahulensis in a near-urban embayment', Marine Ecology Progress Series, vol. 603, pp. 227-242.

National Strategy for Reducing Vessel Strike on Cetaceans and other Marine Megafauna (Commonwealth of Australia 2017)

National Marine Fisheries Service. 2018. 2018 Revisions to: Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing (Version 2.0): Underwater Thresholds for Onset of Permanent and Temporary Threshold Shifts. U.S. Dept. of Commer.

Pirotta, E, Laesser, BE, Hardaker, A, Riddoch, N, Marcoux, M & Lusseau, D 2013, 'Dredging displaces bottlenose dolphins from an urbanised foraging patch', Marine Pollution Bulletin, vol. 74, no. 1, pp. 396-402.

Poutiers, JM. 1998. 'FAO Species Identification Guide For Fishery Purposes. The Living Marine Resources of The Western Central Pacific. Volume 2. Seaweeds, Corals, Bivalves and Gastropods', KE Carpenter & VH Niem (Eds.), Rome, pp. 494-495.

Roberts, L & Elliott, M. 2017. 'Good or bad vibrations? Impacts of anthropogenic vibration on the marine epibenthos', Science of The Total Environment, vol. 595, pp. 255-268.

Sobtzick, S, Cleguer, C, Hagihara, R & Marsh, H. 2017. Distribution and abundance of dugong and large marine turtles in Moreton Bay, Hervey Bay and the southern Great Barrier Reef. A report to the Great Barrier Reef Marine Park Authority. TropWater Report 17/21. Townsville: James Cook University.

Southall B L, Finneran J J, Reichmuth C, Nachtigall P E, Ketten D R, Bowles A E, Ellison W T, Nowacek D P, Tyack P L. 2019. Marine Mammal Noise Exposure Criteria: Updated Scientific Recommendations for Residual Hearing Effects. Aquatic Mammals 2019, 45(2), 125-232.

Stenton CA, Bolger EL, Michenot M, Dodd JA, Wale MA, Briers RA, Hartl MGJ, Diele K. Effects of pile driving sound playbacks and cadmium co-exposure on the early life stage development of the Norway lobster, Nephrops norvegicus. Mar Pollut Bull. 2022 Jun;179:113667

The Blue Carbon Initiative. 2019. Mitigating Climate Change Through Costal Ecosystem Management, https://www.thebluecarboninitiative.org/.

WBM. 2005. Toondah Harbour Sediment Sampling and Analysis November 2004.

WBM. 2006. Toondah Harbour sediment and ecotoxicology assessments.