



TOONDAH HARBOUR

CHAPTER 23 SUMMARY OF DIRECT AND INDIRECT IMPACT ASSESSMENT

23. Summary of Direct and Indirect Impact Assessment

23.1. MNES Significant Impact Assessment Process

Under the EPBC Act an action will require approval from the minister if the action has, will have, or is likely to have, a significant impact on a matter of national environmental significance (MNES). There are nine defined MNES, these are:

- World heritage properties;
- National heritage places;
- Wetlands of international importance (called Ramsar sites after the international treaty);
- Nationally threatened species and ecological communities;
- Migratory species;
- Australian Government marine areas;
- Great Barrier Reef Marine Park;
- Nuclear actions (including uranium mining); and
- A water resource, in relation to coal seam gas development and large coal mining development.

The Toondah Harbour Project was made a controlled action under the EPBC Act as it has the potential for significant impacts on the following MNES:

- Wetlands of international importance;
- Listed threatened species and communities; and
- Listed migratory species.

The MNES Significant Impact Guidelines 1.1 (DoE 2013) (Significant Impact Guidelines) define a 'significant impact' as an impact which is important, notable, or of consequence, having regard to its context or intensity, with whether or not an action is likely to have a significant impact depending upon the sensitivity, value, and quality of the environment which is impacted, and upon the intensity, duration, magnitude and geographic extent of the impacts.

The Significant Impact Guidelines provide a set of criteria to assist in determining whether the impacts of a proposed action are likely to result in a significant residual impact on a MNES. When considering whether or not an action is likely to have a significant impact on a MNES it is relevant to consider all adverse impacts which result from the action, including indirect and offsite impacts.

In order to assess the potential for the Project to impact on MNES all matters with the potential to be present within or adjacent to the Project footprint have been identified and assessed against the relevant significant impact criteria. The potential for impacts to MNES from consequential and cumulative actions resulting from the Project have also been assessed against the relevant significant impact criteria.

The MNES significant impact assessment has been carried out through the following steps:

- A detailed assessment was carried out addressing all potential environmental, social and economic impacts including analysis of existing values, potential impacts and management measures. This assessment is included in Volume 2 of the draft EIS and its appendices. The detailed assessment identified environmental values, including MNES, with the potential to be affected by the Project and risk of impact to these values pre and post management. A brief summary of key environmental impacts is outlined in this chapter (sections 23.2 and 23.3).

- Assessment against the relevant MNES significant impact criteria. This includes all marine and terrestrial threatened species (Chapter 24), marine and terrestrial migratory species (Chapter 25) and the potential for cumulative and consequential actions to impact on each of the MNES (Chapter 26).
- Assessment has also been carried out on the potential for the Project to impact on the Moreton Bay Ramsar Site (MBRS) including assessment against the wetland of international importance MNES significant impact criteria and a broader assessment to identify whether the Project would result in a change in the ecological character of the MBRS (Chapter 27).
- A Draft Environmental Management (EM) Framework has been outlined for avoiding and minimising the potential for impacts on MNES (and the surrounding environment in general) in Chapter 28. The framework will include management plans for the MNES listed as controlling provisions, with the specific management measures identified in Volume 2 incorporated into the relevant plans.
- Where residual significant impacts exist, environmental offsets have been proposed to provide an overall conservation outcome for that MNES. This includes showing an overall benefit to the ecological character of the MBRS. The proposed offsets strategy has been outlined in Chapter 29.

Importantly, under the EPBC Act, a significant impact is a threshold for further assessment to identify whether those impacts are considered acceptable. It is not a threshold for refusal of a Project.

23.2. Summary of Key Impacts to Environmental Values

A brief overview of potential impacts from the Project to terrestrial and marine environmental values is provided below. Existing environmental values and impacts to those values from the Project are shown conceptually on Figure 23-1 a-c.

23.2.1 Overview of Potential Impacts on the Marine Environment

Potential direct and indirect impacts from the Project on the marine environment include:

- loss of habitat directly under the reclamation and dredge areas;
- marine fauna becoming trapped or injured within the reclamation area;
- physical interactions with marine fauna (boat strike) during dredging operations;
- changes to sedimentation rates and turbidity (water clarity) during dredging and, to a lesser extent, construction of the reclamation bunds;
- release of contaminants from dredged material;
- disturbance of potential acid sulfate soils (PASS);
- spills of hydrocarbons and other contaminants;
- noise associated with dredging and reclamation activities as well as other marine works such as piling associated with the jetty structure at the ferry terminal;
- artificial light at night (ALAN);
- introduction of pest species;
- changes stormwater runoff quality and quantity;
- spills of hydrocarbons and other contaminants including litter; and
- increased human activity including boat usage.

The Project will result in the direct loss of marine and wetland habitat within the reclamation and dredging footprint including:

- 3.4 ha of mangroves;
- 37 ha of seagrass, including 11.8 ha in the Fison Channel extension; and
- 8.8 ha of unvegetated sand/mud.

It should be noted the above impacts relate to the entire Project footprint, not just the Moreton Bay Ramsar Site.

Some seagrass is likely to regrow in the proposed channel, as it did after the previous maintenance dredging of the existing channel undertaken by Redland City Council (RCC) in 2019.

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, with population densities far higher on the Eastern Banks of Moreton Bay (the landward side of the bay islands). Australian humpback dolphin is found throughout the bay; however, the Project footprint is not part of their core habitat.

Changes to stormwater runoff due to the Project are unlikely to negatively impact water quality, aquatic habitats or fauna and flora outside of the Project footprint. Inside the Project footprint there may be some slight increases in suspended solids and nutrients within the marina and internal waterways, however modelling indicates these areas will be well flushed by tidal forces therefore eutrophication (high nutrient levels resulting in algal blooms) is unlikely.

While there may be some short-term localised changes to turbidity during dredging, and some localised minor changes to erosion and sedimentation rates, this is unlikely to significantly impact aquatic marine species, or the habitats that support them.

Existing turbidity in the vicinity of the proposed works is already high, chronically exceeding water quality objectives. Predicted increases in turbidity in the dredge campaigns are short lived, and usually less than the current ambient maximums. Consequently, 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. It is also noted that silt curtains will be used where possible to reduce the extent of turbidity plumes, which would result in much smaller impacts than those shown by dredge plume modelling.

Fish, turtles, dugong and dolphin may be trapped within the reclamation areas as they are bunded off. However, this risk will be mitigated through a range of standard management practices including installing barriers at low tide, using trained marine megafauna spotters during works to ensure no megafauna are trapped within the bunded areas and using mechanical noise and boat activity to deter marine mammals from entering bunded areas.

Underwater noise and vibration will be generated from activities such as dredging and pile driving. Assessment of underwater noise sources found levels will not exceed thresholds for changes in fauna behaviour outside the areas immediately surrounding Toondah Harbour. This area does not provide significant habitat for any listed marine megafauna species, therefore potential for impacts are minimal.

Increased boating activity in the area has the potential to result in more collisions with marine megafauna. During dredging operations this will be mitigated by a comprehensive management plan that includes fauna spotters, restrictions on vessel movement when marine megafauna are sighted, vessel exclusion zones around megafauna, and adherence to speed limits.

The Project will not result in a significant increase in marine vessel usage in Moreton Bay but may result in some changes to usage patterns via decommissioning the existing boat ramp, providing wet berths, providing funds for the upgrading the William Street boat ramp, and providing access for non-motorised vessels. It will also facilitate an increase in ferry trips and allow larger vessels to use the channel. As the predicted increase in vessel traffic directly attributable to the proposed development is small in comparison to broader recreational boating usage in the region, the increased risk resulting from the proposed development to marine fauna is expected to be minor.

Other potential risks, such as disturbance of acid sulfate soils (ASS), spills of hydrocarbon and other contaminants, introduction and spread of pest species, and increased litter, are low, and can be reduced through appropriate site management.

Water quality and the condition of key habitats will be monitored throughout the dredging and reclamation works and initial use of the site post development. Where detrimental impacts to either water quality or habitat are detected, management responses will be implemented.

23.2.2 Overview of Potential Impacts on the Terrestrial Environment

Potential direct and indirect impacts from the Project on the terrestrial environment include:

- Temporary noise, dust and vibration associated with construction of containment bunds, excavation, treatment and compaction of marine sediments potentially impacting wildlife within and outside the Project footprint;
- Temporary generation of road traffic for the delivery of machinery and materials, as well as for workers attending the site daily, impacting on koala safety when crossing roads within and outside of the Project footprint, noting that most of the infill material would result from the channel dredging, which would minimise truck movements;
- Direct impact of removal of a small number of koala habitat trees within the Project footprint;
- Temporary noise, dust and human presence associated with civil works potentially impacting wildlife in the terrestrial and marine environments within and outside of the Project footprint;
- Temporary generation of traffic for the delivery of machinery and materials, as well as for workers attending the site, impacting on koala safety when crossing roads within and outside of the Project footprint;
- Erection of temporary fencing or other potential barriers to koala movement for terrestrial works, including temporary road traffic barriers, potentially affecting the movements of resident and transitory koalas;
- Traffic generated by the various residential, commercial and retail elements of the Project impacting on the safety of koalas crossing roads within and outside of the Project footprint;
- Recreational use of the Project footprint by new residents, a proportion of whom would be dog owners, as well as an increase in visitors from outside the Project footprint attracted by ferry terminal upgrades and improved amenity, causing disturbance to native species within the Project footprint.

With the implementation of the proposed mitigation and management measures, no significant residual impacts are expected on the terrestrial environment.

Of the 215 koala food trees recorded within GJ Walter Park and other areas within the PDA, only one primary food tree and 18 secondary food trees are within the Project footprint and will be removed as a result of construction works. Fifteen of these trees are within existing carpark plantings and are not considered to represent critical habitat for koalas due to the existing threats present in these locations. To mitigate this impact and enhance the value of the Project footprint as koala habitat, it is proposed to plant approximately 1,000 koala food trees with occasional shelter trees over an area of 1 ha within GJ Walter Park. The planting will be comprised primarily of the primary food tree *Eucalyptus tereticornis*.

The same habitat areas within GJ Walter Park and the trade school grounds also support feeding resources for grey-headed flying-fox, primarily the winter-spring flowering *Eucalyptus tereticornis* that provides food for the species at a time when available resources are scarce. The proposed supplemental planting for koala will likewise benefit grey-headed flying-fox.

The Project will increase the potential for indirect impacts to koala through increased traffic generation internal and external to the Project footprint. The koala underpass beneath Middle Street will ensure the increased traffic at this location is not a barrier to koala movement. Further the Proponent proposes that measures will be identified and enacted by contributing to the establishment of a 'Koala Safe Neighbourhood' in Cleveland that incorporates the Project footprint

and surrounds. The program will provide community education and participation, landscape scale monitoring and management opportunities beyond those that could be achieved by the Proponent alone and will allow a broader and coordinated approach to the identification and management of threats to koalas in the local area.

23.2.3 Overview of Potential Impacts on Threatened and Migratory Shorebirds

Dredging and reclamation to accommodate the Project footprint will result in a permanent direct impact on 28.9 ha of tidal flat habitat that provides feeding habitat for migratory shorebird species. This area coincides with the seagrass and unvegetated mud/sand habitats identified in Section 23.2.1. Tidal flat feeding habitat within the Project footprint is characterised as important habitat for migratory shorebirds under the EPBC Act since it occurs within the MBRS.

Due to density dependent factors, the loss of a relatively small area of feeding habitat in south-western Moreton Bay as a result of the Project is unlikely to result in a proportionate reduction in the population sizes in Moreton Bay of species such as eastern curlew, great knot, lesser sand plover and bar-tailed godwit that have undergone substantial population declines due to factors operating outside of Australia. Whether the loss of a relatively small area of feeding habitat in south-western Moreton Bay will result in a proportionate reduction in the population sizes of migratory shorebird species such as grey-tailed tattler, whimbrel, terek sandpiper, red-necked stint and common greenshank, whose populations have not declined, remains uncertain.

The implementation of a range of management measures to reduce indirect disturbance, such as fauna friendly lighting strategies and avoiding high noise generating activities during periods when shorebirds are most active, minimises potential impacts on areas outside of the immediate footprint. The Project is not expected to have significant residual impacts on migratory shorebirds using roost sites adjacent to the Project footprint.

23.2.4 Summary of Direct and Indirect Impacts from the Toondah Harbour Project

Key direct impacts resulting from the Toondah Harbour Project include:

- Removal of marine habitats including 3.4 ha of mangroves, 37 ha of seagrass (some of which will likely return) and 8.8 ha of unvegetated sand/mud;
- Removal of 28.9 ha of tidal flat habitat that provides feeding habitat for migratory shorebird species (this area coincides with the seagrass and unvegetated mud/sand habitats; and
- Removal of a small number of trees including one primary koala food tree and 18 secondary koala food trees.

Key potential indirect impacts resulting from the Toondah Harbour Project include:

- Turbidity plumes from dredging have the potential to reduce light penetration, which would in turn impact on benthic habitats outside of the Project footprint including seagrass and hard corals. Existing turbidity in and around Toondah Harbour is naturally high indicating habitats can withstand increased levels. Dredging events will be relatively short lived and result in turbidity spikes lower than those already occurring at the site. Management measures such as silt curtains around dredge areas will reduce the extent and severity of turbidity plumes, further minimising any potential for impact.
- Increased traffic during construction and ongoing uses increasing risk of fauna strike, including koalas. A fauna underpass will be installed as part of the Middle Street upgrade and, subject to willingness of RCC, the Proponent will contribute funding/sponsorship to establish a 'Koala Safe Neighbourhood' program in Cleveland.
- Temporary impacts from increased underwater and ambient noise during construction periods. These impacts will be mitigated through a range of management measures and ongoing monitoring and are not expected to affect sensitive areas adjacent to the Project footprint such as roost sites for migratory shorebirds.

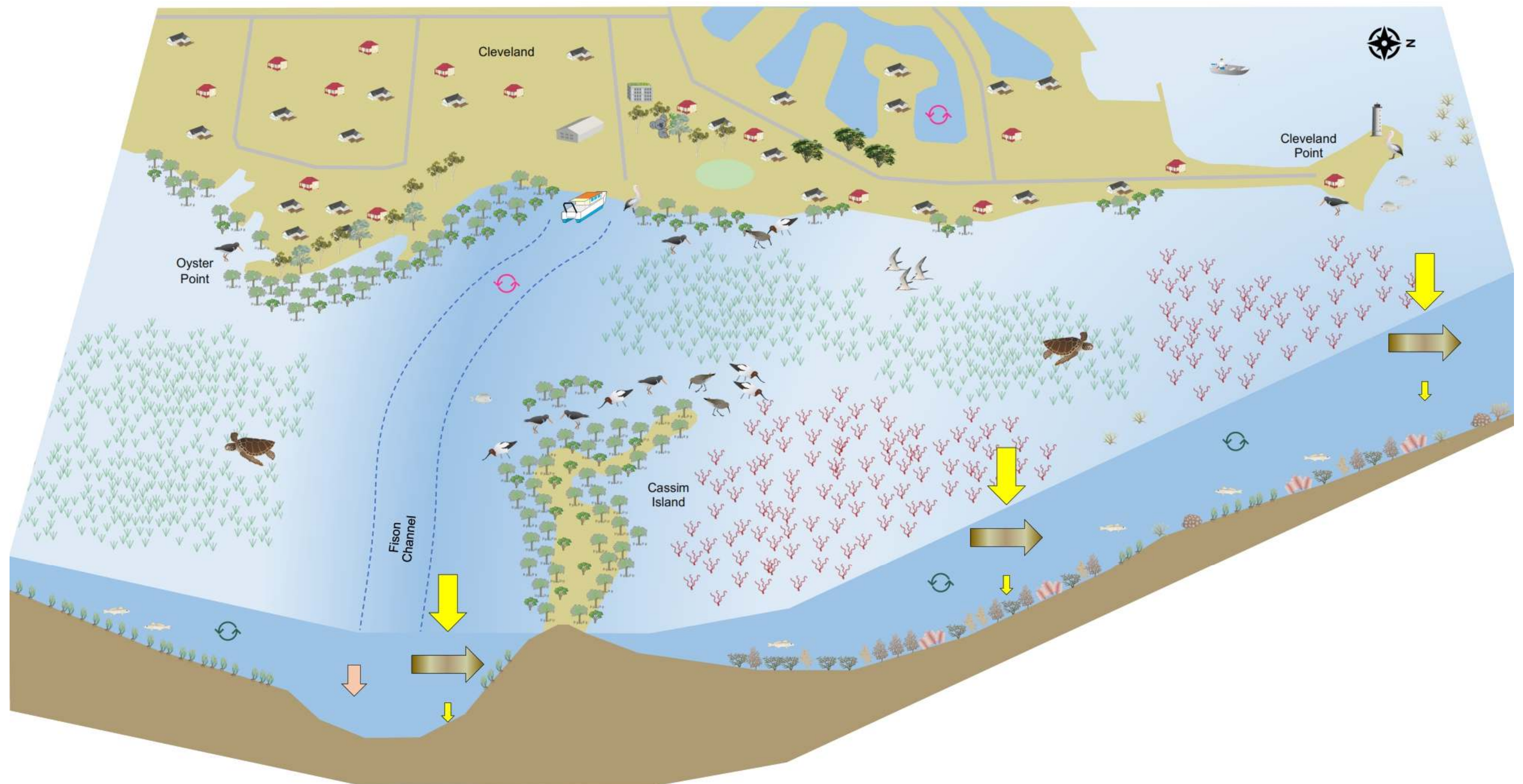


Figure 23-1a: Conceptual Model of Environmental Values at Toondah Harbour (Existing)

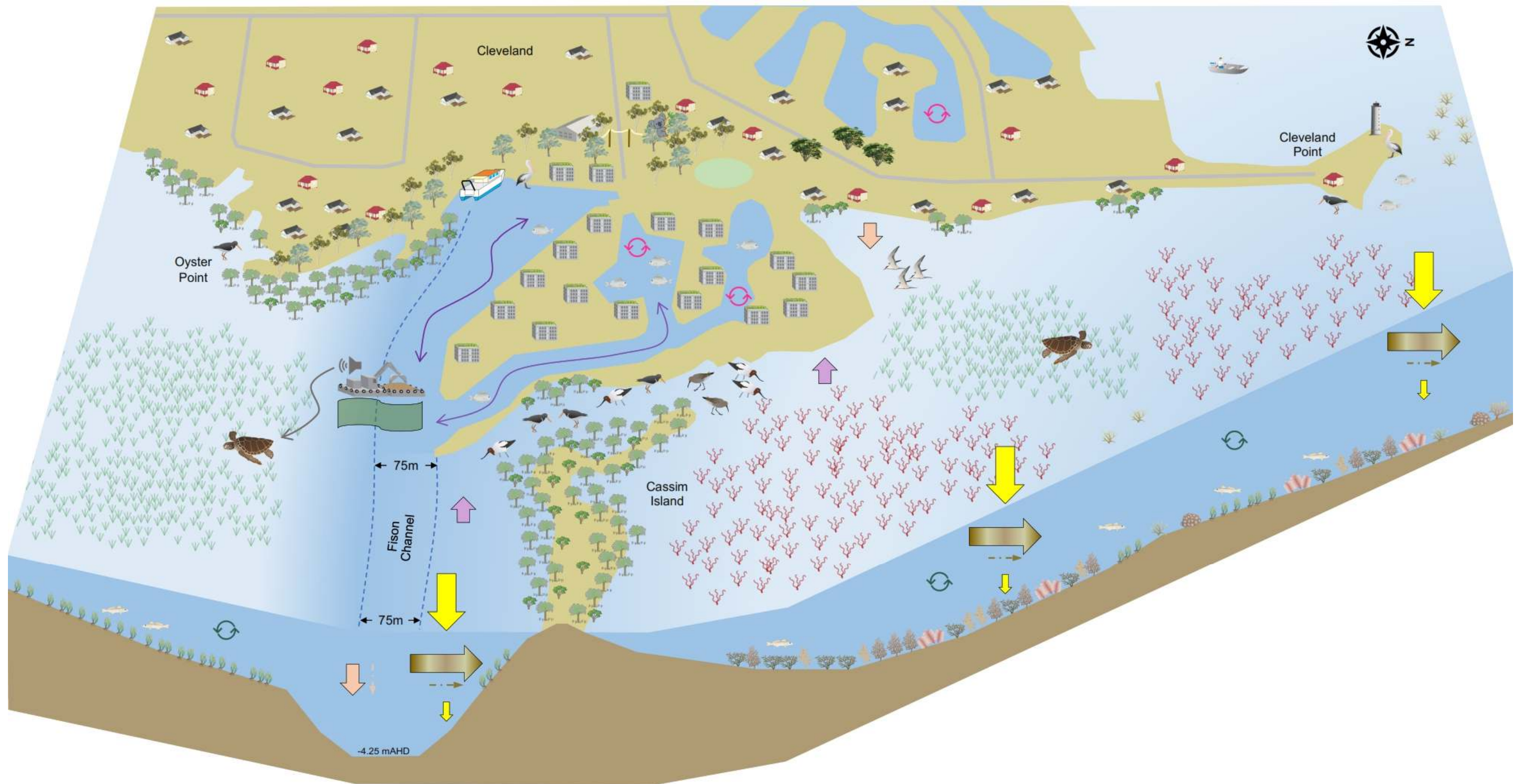
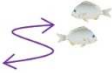
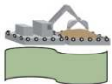


Figure 23-1b: Conceptual Model of Environmental Values at Toondah Harbour (Impacts)

Legend

	Mangrove community.		Turbidity in the area is high and highly variable. Peaks in turbidity are associated with tides, current and wind.
	Seagrass communities.		The increase in turbidity due to dredging is small compared to existing turbidity, with peaks generally at the same time as existing turbidity, and for the same, or smaller period.
	Macroalgae community. Species dominated by <i>Sargassum</i> , <i>Dictyota</i> , <i>Padina</i> , <i>Lobophora</i> and <i>Asparagopsis</i> .	 	Photosynthetically Active Radiation from the sun, varies with season, time of day and weather. Benthic Photosynthetically Active Radiation (BPAR) – amount of light available at the sediment surface for seagrass, macroalgae and coral, after passing through turbid water.
	Hard coral reefs. Species include isolated <i>Turbinaria</i> sp. with sponges, sea fans and dense macroalgae on rubble substrate.		Sediment accretion.
	The new habitat around the marina is likely to be used by fish species such as bream.		Modelling indicates that sediment accretion due to the proposed development is small compared to existing sedimentation. However, there may be some sedimentation in the Fison Channel and on the beach face to the north of the proposed development.
	Proposed dredge with silt curtain to reduce impacts to surrounding water. Silt curtains around dredging activities will significantly reduce the movement of turbid water away from the dredge activities.		During dredging there will be an increase in noise, that will typically be low intensity with peak frequencies below 1000 Hz. Close to the channel this may be above the behavioural change thresholds, decreasing to below these thresholds relatively close to the dredging activities. Noise from underwater pile driving will be limited to when sheet piling occurs in water (i.e. a maximum 3.25 hours either side of high tide). 38 m from the source this sound will be below behavioural change thresholds. Fauna may move away from this noise.
	Water column mixing and flushing (e-folding time) was modelled for the proposed development and Raby Bay. The north-eastern channel flushed in less than a day, the central marina up to 6 days to flush, and Raby Bay can take up to 8 days.		Modelling indicates that due to the configuration of the proposed development there may be some slight increase in erosion and sedimentation over some areas of seagrass, however this is dependent on substrate type and seagrass cover (e.g. areas of rubble will not erode, but softer sediments may). Any erosion will reduce over time as a new equilibrium depth is reached. Seagrass species in the area are colonising species that can quickly re-establish.
	Nutrient cycling within and between zones is not impacted by the proposed development.		Koalas are known to occur in the area. Terrestrial fauna movement solutions.

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Figure 23-1c: Conceptual Model of Environmental Values at Toondah Harbour (Legend)