

4 SUBMISSION RESPONSES – VOLUME B

4.1 B1 - Dredge Pump-out Operations – Fisheries Issues

(1 of 196 submissions)

Draft EIS/MDP reference: Chapter B1, Section 1.4, Chapter B5, Section 5.8.6.4, Chapter B8, Section 8.7.1

The non-government organisation representing commercial fishing interests in Moreton Bay (the Moreton Bay Seafood Industry Association) raised several specific comments about the proposed dredge pump-out operation at Luggage Point.

While the Association acknowledges in their submission that the Luggage Point mooring location is the preferred location of the four options identified in the Draft EIS/MDP, the proposal to moor the dredge vessel at the Luggage Point site is seen by the organisation 'to have significant economic impacts on beam trawl operators'.

Issues raised in the submission regarding broader impacts on fisheries from the removal of mangroves and saltmarsh are dealt with in **section 4.7, Wetland Mitigation**. Comments relevant to fisheries issues associated with the proposed dredging at Middle Banks are addressed in **section 5.5, Fisheries Issues**.

Submitter Issues:

Specific issues raised in the submission were as follows –

- That the area has economic importance for operators who will not be able to fish in the area taken up by the vessel, in addition to the exclusion zone that will apply while it is moored.
- That BAC should 'buy out' five beam trawl endorsements (licences) to mitigate this impact and reduce pressure on remaining areas of the river and also reduce the cumulative economic impact on operators.
- Concern about silt plumes created by the mooring and unmooring of the dredge in the surrounding area that will have a significant impact on beam trawling operations.

Raised by:

	Community	Govt Agency	NGO	Elected Reps
Submitter ID	Nil	Nil	223	Nil
Total	0	0	1	0

BAC response:

The Draft EIS/MDP acknowledges the temporary impact the proposed operation could have in relation to this fishery and BAC has had several discussions directly with representatives of the Association about the matter. In relation to the substantive issues raised in the submission the following responses are put forward.

4.1.1 Reduction of Access and Buy-out of Licenses

As part of meetings with the submitter, BAC has given an undertaking to develop measures cooperatively with the Association for the implementation phase of the project.

Measures discussed include further engagement with the Port of Brisbane concerning fishing access arrangements for the area when the dredge vessel is not present (cognisant of security regulations concerning wharves and vessels while in Port) and the publication of daily vessel timetables to and from Middle Banks to assist fishers in planning to access the Luggage Point mooring area when the dredge vessel is not present. As outlined in **section 4.7** of this Report, BAC is also exploring with the Association, a possible funding contribution to support the development of their Environmental Management System.

BAC does not support contributing funding to the buying-out of beam trawl licences on the basis that:

- 1) The impact on the beam trawl fishery at the Luggage Point location is temporary and current fishing efforts could resume once the 12 – 18 month dredging operation is complete;
- 2) There would continue to be access to areas within and adjacent to the mooring location when the vessel is absent (up to 17 hours in a 24 hour period);
- 3) The cumulative impact on current access rights and catch productivity that have been occurring over time for the beam trawl fishery in the Brisbane River are a result of many planning, development and natural resource management decisions and not solely the result of or impact from the New Parallel Runway project.

4.1.2 Turbidity from Operation of the Dredge

As mentioned in the Draft EIS/MDP under Chapter B8, Section 8.7.1, localised effects from the dredge vessel propellers disturbing bottom sediments will be similar to other large vessels using the Port such as the oil tanker that moors at the adjacent oil berth and other large cargo vessels that load and unload at the Fisherman Islands wharves.

Project consultants, WBM Pty Ltd has advised that localised turbidity at the mooring location could lead to a temporary shift in the movement path of the prawns. Whether this is into deeper or shallower water is a matter of debate. However, in such instances, the prawns would still be able to be accessed downstream in the river.

Visual observations of pump-out operations by a medium-class dredge vessel at the Port of Brisbane in 2006 were indicative that even when fully-laden and unmoored (the vessel was being held in place by bow thrusters during the pump-out operation) the prop wash plume from the vessel was limited in spatial extent (highly localised around the vessel) and duration (the discolouration of water around the vessel dispersed rapidly).

Addition/Omission to Draft EIS/MDP:

No changes are proposed in the Draft EIS/MDP in relation to this issue.

4.2 B2 - Land Use Planning - State and Regional Coastal Management Plans (4 of 196 submissions)

Draft EIS/MDP reference: Chapter B2, Section 2.6

The Queensland Government's submission (as part of comments from the Environmental Protection Agency) recommended that the Draft EIS/MDP provide further assessment detail on particular policies of the *State Coastal Management Plan 2001* and the *SEQ Regional Coastal Plan 2006* under the *Queensland Coastal Protection and Management Act 1995*.

Specifically, the submission sought further assessment of the proposed seawall reconstruction, approach lighting structure and Kedron Brook Floodway Drain against relevant policies of the State and regional coastal plans. A preliminary assessment of these matters has been included in the Supplementary Report below, acknowledging that a more detailed assessment will need to occur in the future when relevant State approvals are sought from EPA for these development components.

Several NGO submitters also made comments that the Draft EIS/MDP failed to recognise or consider State and regional coastal plan policies (specifically related to wetlands) in the context of Chapter B5 – Terrestrial and Marine Ecology. This is not correct – each of the relevant policies of the coastal plan including those recognising that the mangroves on the Airport are declared as significant coastal wetlands was discussed in Chapter B2, **Table 2.6** of the Draft EIS/MDP and cross-referenced in Chapter B5, Section 5.7.2. Notwithstanding, as the issue raised principally relates to acceptable offsets in relation to the project, it has been dealt with in **section 4.7, Wetland Mitigation** in the Supplementary Report.

Raised by:

	Community	Govt Agency	NGO	Elected Reps
Submitter ID	Nil	242	72, 143, 193	Nil
Total	0	1	3	0

BAC response:

- That new text be inserted into **Table 2.6** as part of the EIS/MDP as indicated in the 'Addition/Omission section' below.
- That a new **Table 2.6a:** Seawall; **Table 2.6b** Approach Lighting Structure; and **Table 2.6c** Kedron Brook Floodway Drain be included in the EIS/MDP in this section of Chapter B2 as set out in the 'Addition/Omission section' below.

Addition/Omission to Draft EIS/MDP:

The following additions to the Draft EIS/MDP are proposed:

That **Table 2.6** be amended as follows –

Under the coastal management outcome, Coastal Use and Development, insert reference to Policy 2.1.3 – Coastal Dependent Land uses. This State Plan policy deals with planning for appropriate land uses in areas adjoining the foreshore and ensuring adequate provision for coastal-dependant land uses. There is no additional regional plan policy for the State Plan policy. Development associated with the New Parallel Runway is consistent with the Master Plan for the Airport and intended use of Airport land under other planning instruments such as the Brisbane City Council planning scheme. Being largely contained on the Airport site and consistent with the intended use of that land, it is concluded that the New Parallel Runway project does not exclude or otherwise disadvantage other coastal dependent uses.

Under the coastal management outcome, *Physical Coastal Processes*, insert reference to

Policy 2.2.1 – *Adaptation to Climate Change*. This State Plan policy deals with improving the knowledge and understanding of greenhouse issues and climate change impacts and to ensure that planning on the coast addresses potential impacts from climate change. There is no additional regional plan policy for the State Plan policy. The New Parallel Runway Draft EIS/MDP takes into account climate change issues through:

- Consideration of potential rises in sea level from climate change in the context of the runway design and re-construction of the seawall as outlined in Chapter A4; and
- Consideration of the impact of air emissions from construction activities and from aircraft operation in Chapters B12 and D6.

Under the coastal management outcome, *Physical Coastal Processes*, insert reference to

Policy 2.2.5 – *Beach protection structures*. This State Plan policy is already addressed in **Table 2.6** in the Draft EIS/MDP. There is no additional regional plan policy for the State Plan policy. There is a demonstrated need in the public interest to protect the existing and proposed extension of the airfield associated with the New Parallel Runway from coastal erosion, particularly in storm events where storm surge could cause flooding of the runway and taxiway systems and shut down airport operations. Further information on this issue is provided below in **Table 2.6a: Policies of Coastal Plans relevant to the Proposed Seawall.**

Insert coastal management outcome, *Public Access to the coast*

Insert reference to Policy 2.3.2 – *Design of access*. This State plan policy deals with the provision of public access to the coast and/or foreshore. There is no additional regional plan policy for the State Plan policy. Areas above high water mark along the foreshore of the Airport are private land owned by the Commonwealth Government and are not intended for public access. None of the works proposed as part of the New Parallel Runway project are designed with the intention of providing public access to the site or to adjacent sites owned or controlled by Brisbane City Council.

Insert coastal management outcome, *Co-ordinated management* and insert references to the following policies:

Policy 2.9.1 – *Regional Coastal Management Plans*. This State Plan policy deals with the preparation of regional coastal management plans. It has no relevance to the New Parallel Runway project.

Policy 2.9.2 – *Co-ordinated Management of Jurisdictions*. This State Plan policy deals with various Government entities taking a coordinated approach to coastal management decision-making. The Draft EIS/MDP has been developed in accordance with EIS Guidelines endorsed by the Australian Government under the *Environment Protection and Biodiversity Act 1999*. State Government requirements were included in the EIS Guidelines. BAC has engaged officers from the Australian Government, State Government and Brisbane City Council in its working group process during the development of the Draft EIS/MDP as outlined in Chapter A1, Section 1.7.

Policy 2.9.3 – *State land on the coast*. This State Plan policy relates to State Government decision-making in relation to State land on the coast. While the bulk of the works associated with the New Parallel Runway are on Airport land, BAC must consult with the Department of Natural Resources and Water in the context of tenure arrangements for temporary construction aspects of the project such as the dredge pipeline. These matters will be resolved through the State approval process.

The regional coastal management plan (supporting document) identifies State land on the coast that is important for coastal management. There is no State land on the coast listed in the regional plan that is relevant to the New Parallel Runway project or Brisbane Airport.

Policy 2.9.5 – Coastal management districts. This regional plan policy relates to identification of the coastal management district and contains provisions related to land surrender for development applications involving the reconfiguring of a lot. The Draft EIS/MDP has identified the need for referral of development applications for the dredge pipeline to the chief executive administering the Coastal Protection and Management Act as it would involve the removal of quarry material on State coastal land in a coastal management district. The coastal management district is not otherwise relevant to the proposal in terms of development applications.

Insert new **Tables 2.6a, 2.6b** and **2.6c** as shown below -

Table 2.6a: Policies of Coastal Plans Relevant to the Proposed Seawall

Policy #	Policy Name	Assessment
2.1.1	Areas of State Significance (social and economic)	The proposed seawall does not affect or influence any nearby area of State significance (social and economic). Its purpose is to protect the airfield - as infrastructure of State significance - from coastal erosion and associated coastal hazards.
2.1.8	Dredging	The construction of the seawall will not involve dredging other than minor excavation associated with the removal and reconstruction of the existing seawall alignment. This will be addressed as part of the tidal works approval.
2.1.9	Reclamation	The construction of the seawall will not involve reclamation other than minor filling works (to be addressed as part of the tidal works approval).
2.2.1	Adaptation to climate change	The final design of the seawall will need to be prepared prior to lodging approvals. The preliminary design of the seawall takes into account the level of risk from cyclones and major coastal storms as well as estimates of greenhouse attributed sea level rise.
2.2.2	Erosion prone area	As explained in Chapter B4, the seawall involves re-construction of an existing dumped rubble seawall which is not an engineered structure. The proposed seawall reconstruction will improve the structural safety and visual amenity of the shoreline and provide protection of the airfield from major storm events. Reconstruction of the wall is not a new structure in the erosion prone area and does not change the intensity of use in the erosion prone area at that location. Retreat is not seen as a viable option given the proximity of the New Parallel Runway to the foreshore and that the infrastructure is not expendable. The displaced threshold from the existing runway (which locates the new runway as close as possible to Moreton Bay) has been done for aviation safety and aircraft noise reduction purposes.
2.2.4	Coastal hazards	The preliminary design of the seawall takes into account the level of risk from cyclones and major coastal storms as well as estimates of greenhouse attributed sea level rise.

¹ From Executive Summary (2007) – Source: http://www.aph.gov.au/senate/committee/rrat_ctte/oil_supply/report/a02.htm

Policy #	Policy Name	Assessment
2.2.5	Beach Protection Structures	<p>As outlined in Chapter B4, the low energy nature of the shoreline and modeling undertaken as part of the current study demonstrates that the proposed reconstruction of the seawall will have negligible effect on longshore drift and other natural coastal processes occurring in the area. The seawall will not contribute to an increase or decrease in the rate of siltation occurring in Kedron Brook Floodway Mouth.</p> <p>Shoreline erosion on the Airport land to the west of the proposed seawall is occurring largely in relation to the previous reclamation works on the airport and effects from the old Cribb Island Jetty Structure which is acting as a de-facto groyne structure. This erosion process is not proposed to be actively stopped and coastal processes can continue to occur unhindered until the shoreline reaches a new equilibrium. This part of the shoreline is contained in the undeveloped Biodiversity Zone on the Airport so no infrastructure will be built (and need to be protected) in the area in the long term.</p>
2.3.1	Future need for access	The Airport is Commonwealth Land held in freehold. The Airport boundary along the northern foreshore is coincident with mean high water springs. Public access is not permitted above the foreshore area. Reconstruction of the seawall does not change the existing access regime over the land.
2.4.1	Water quality management	Other than temporary, minor increases in turbidity associated with the removal of the current wall and placement of material during construction, there will be no on-going water quality degradation from the reconstructed seawall. This matter is addressed further in Chapter B5, Section 5.8.4.
2.5.2	Involvement of Indigenous Traditional Owners	A Cultural Heritage Management Plan under the <i>Aboriginal Cultural Heritage Act 2003</i> is in place between BAC and the Jagera people.
2.6.2	Cultural heritage	There are no items or places of cultural heritage significance under the Queensland Heritage Register or other registers near to the location of the proposed work. Care will be taken to ensure the Cribb Island Jetty/Bathing Shed Structure is not disturbed by construction.
2.7	Coastal landscapes	The proposed seawall reconstruction works are considered to be an improvement to the scenic amenity of the foreshore compared to the existing dumped rock seawall. Other rubbish along the foreshore such as tyres and concrete will also be removed as part of the construction process.
2.8.1/ 2.8.2	Areas of State Significance (Natural Resources) Coastal wetlands	<p>The alignment of the proposed seawall reconstruction will be partly below high water mark and adjacent to the Moreton Bay Ramsar site. However, there are no mangroves or seagrass assemblages within or adjacent to the foreshore at this location.</p> <p>As stated in the Draft EIS/MDP, the seawall does not impact on the ecological character of the Ramsar site and associated coastal wetlands recognised as 'significant' under the Regional Coastal Plan.</p> <p>Other than a temporary impact to birds using the foreshore as feeding habitat (see 2.8.3 below) no other ecology impacts from the seawall construction are expected to occur.</p>

Policy #	Policy Name	Assessment
2.8.3	Biodiversity	<p>The flat inter-tidal foreshore area of the Airport along Bramble Bay is used as a feeding habitat for migratory shorebirds some of which are of conservation significance.</p> <p>As outlined in Chapter B14, construction schedules for the reconstruction of the seawall will be implemented wherever possible to minimise potential disturbance to migratory wader birds during periods when they are more susceptible to disturbance (March/April and September/October). An observation programme will be implemented to measure the effectiveness of mitigation measures.</p> <p>Following the construction period, the re-built sea wall will continue to provide respite/roosting areas for shorebirds during high tide.</p>

Table 2.6b: Policies of Coastal Plans Relevant to the Proposed Approach Lighting Structure

Policy #	Policy Name	Assessment
2.1.1	Areas of State Significance (social and economic)	The proposed approach lighting structure does not affect or influence any nearby area of State significance (social and economic). Its purpose is to increase aviation safety for pilots when landing aircraft on the new runway in inclement weather.
2.1.8	Dredging	The construction of the approach lighting structure will not involve dredging other than marine piling (addressed as part of the tidal works approval).
2.1.9	Reclamation	The construction of the seawall will not involve reclamation. It is a piled structure.
2.2.1	Adaptation to climate change	The final design of the approach lighting structure will need to be prepared prior to lodging approvals. The preliminary design takes into account implications of climate change and sea level rise attributed to greenhouse.
2.2.2	Erosion prone area	The piling design (shape and spacing) of the approach lighting structure will be such that it will have essentially no effect on the prevailing currents and waves that pass through the structure footprint. As such, the structure will be 'transparent' in terms of the wave/current factors affecting the regional and local hydrodynamic processes of Moreton Bay and the coastal processes in the area adjacent to the airport.
2.2.4	Coastal hazards	The preliminary design of the approach lighting structure takes into account the level of risk from cyclones and major coastal storms as well as estimates of greenhouse attributed sea level rise.

Policy #	Policy Name	Assessment
2.3.1	Future need for access	<p>The piled structure is proposed to extend 680m from the foreshore into Moreton Bay. The length is in accordance with aviation safety requirements.</p> <p>There would be a minor loss of public access to marine waters from the establishment of the structure. Regular users of the area such as recreational boaters and commercial line net fisherman would likely need to adapt/modify current practices and boating routes to avoid interaction with the structure in the area. There are no practicable alternatives with regard to the location and length of the proposed structure as these are in accordance with aviation safety requirements.</p> <p>The design of the structure will include measures to deter members of the public from climbing or mooring to the superstructure. It is recognised that the approach lighting structure may attract fish and become beneficial to recreational anglers in the local area at high tide.</p>
2.4.1	Water quality management	Other than temporary, minor increases in turbidity associated with marine piling, no on-going water quality issues will occur from the approach lighting structure. This matter is addressed further in Chapter B5, Section 5.8.5.
2.5.2	Involvement of Indigenous Traditional Owners	A Cultural Heritage Management Plan under the <i>Aboriginal Cultural Heritage Act 2003</i> is in place between BAC and the Jagera people.
2.6.2	Cultural heritage	There are no items or places of cultural heritage significance under the Queensland Heritage Register or other registers near to the location of the proposed work.
2.7	Coastal landscapes	Implications of landscape and scenic values from the approach lighting structure are documented in Chapter B13 of the Draft EIS/MDP. There are no practicable alternatives with regard to the location and length of the proposed structure as these are in accordance with aviation safety requirements.
2.8.1/ 2.8.2	Areas of State Significance (Natural Resources) Coastal wetlands	<p>The approach lighting structure extends several hundred metres into the Moreton Bay Ramsar site. However, there are no mangroves or seagrass assemblages within or adjacent to the foreshore at this location.</p> <p>As stated in the Draft EIS/MDP, the approach lighting structure does not impact on the ecological character of the Ramsar site and associated coastal wetlands recognised as 'significant' under the Regional Coastal Plan.</p> <p>Impacts on other biodiversity values are shown below under policy 2.8.3.</p>

Policy #	Policy Name	Assessment
2.8.3	Biodiversity	<p>The flat inter-tidal foreshore area of the Airport along Bramble Bay is used as a feeding habitat for migratory shorebirds some of which are of conservation significance.</p> <p>As outlined in Chapter B14, construction schedules for the nearshore components of the approach lighting structure will be implemented wherever possible to minimise potential disturbance to migratory wader birds during periods when they are more susceptible to disturbance (March/April and September/October). An observation programme will be implemented to measure the effectiveness of mitigation measures.</p> <p>Following the construction period, the approach lighting structure may provide additional respite/roosting areas for shorebirds during high tide.</p> <p>Marine piling will be undertaken cognisant of the use of the area from time to time by dolphin species (particularly in winter months). However, the construction does not pose any significant risk to these species which will avoid the area during the pile driving activity. It is extremely unlikely that dugong or turtles would be present in the area at all given the lack of available seagrass food sources.</p> <p>Potential impacts from shading of the benthic environment underneath the lighting structure is addressed in Chapter B5, section 5.8.5.</p>

Table 2.6c: Policies of Coastal Plans Relevant to the Proposed Kedron Brook Drain

Policy #	Policy Name	Assessment
2.1.1	Areas of State Significance (social and economic)	The proposed drain does not affect or influence any nearby area of State significance (social and economic). Its purpose is to provide drainage for the southern portion of the new airfield including the domestic terminal precinct. It would function both during the reclamation phase (for dredge tailwater and stormwater) and for the operational phase (stormwater only).
2.1.8	Dredging	The construction of the drain will involve the removal of an estimated 1750 m ³ of material from areas below high water mark in order to connect the drain to the Kedron Brook Floodway. Consistent with best practice for excavation of artificial channels in areas with potential and actual acid sulfate soils present, an earthen plug will be retained as various stages of the drain are constructed on the Airport site to allow neutralisation of any acidic groundwater drawn down into the drain by the excavation. Only when the drain is fully excavated and pH balanced will the plug be removed. This construction methodology is detailed in Chapter A5 and the Acid Sulfate Soil Management Plan which is an appendix to Chapter B14.

Policy #	Policy Name	Assessment
2.3.1	Future need for access	<p>The drain is almost entirely on Airport land which does not allow public access. The mouth of the drain occurs along a narrow drainage easement associated with the Kedron Brook Floodway which is freehold land in trust held by the Brisbane City Council. Land access to the area where the drain connects is through airport land which is security controlled.</p> <p>The drain will be sub-tidal and navigable to small vessels. As a result it is likely that it will be used following the construction period by anglers and recreational boaters similar to other natural and artificial channels in the local area. Tidal flap gates, grates and perimeter fencing will secure airside security restricted areas similar to other large tidal drains on the Airport.</p>
2.4.1	Water quality management	<p>As discussed above, the construction methodology for the drain retains an earth plug until the final connection of the drain to tidal water. Using this methodology, the final excavation of the earthen plug is likely to generate some localised turbidity for short periods until such time as the drain is flooded with tidal water and fully mixed with receiving waters. The necessity and effectiveness of mitigation measures such as the use of silt curtains to further reduce these impacts can be discussed with relevant agencies as part of the detailed approval process.</p> <p>Management of acid sulfate soils and management of acidic groundwater during this construction process is discussed in Chapter A5 and the Acid Sulfate Soil Management Plan under Chapter B14.</p> <p>Chapter B8 of the Draft EIS/MDP models the construction impacts (associated with the dredge tailwater) and the operational impacts (associated with stormwater) on water quality from the drain. This Chapter should be consulted in full rather than reproduce the findings here.</p>
2.5.2	Involvement of Indigenous Traditional Owners	<p>A Cultural Heritage Management Plan under the <i>Aboriginal Cultural Heritage Act 2003</i> is in place between BAC and the Jagera people. In the context of the proposed drain, this includes having persons representing the Aboriginal Party present during excavation works.</p>
2.6.2	Cultural heritage	<p>There are no items or places of cultural heritage significance under the Queensland Heritage Register or other registers near to the location of the proposed work.</p>
2.7	Coastal landscapes	<p>There are no landscape or visual impacts predicted from the construction of the drain. Benching within the drain design will provide for the establishment of mangroves along the banks of the artificial waterway, similar to other creeks and major drains in the local area.</p> <p>Visual turbidity in the Kedron Brook Floodway from the operation of the sediment ponds on the Airport site during the reclamation phase is possible, but should disperse quickly based on predicted results of water quality modeling.</p>

Policy #	Policy Name	Assessment
2.8.1/ 2.8.2	Areas of State Significance (Natural Resources) Coastal wetlands	The construction of the drain will involve the disturbance of a small number of grey mangroves (<i>Avicennia sp.</i>) that fringe the foreshores of Kedron Brook Floodway. No further impacts on wetlands or important habitats are predicted.
2.8.3	Biodiversity	<p>Wading birds such as egrets and ibis are occasionally observed along the banks for Kedron Brook Floodway in the vicinity of the proposed drain in small numbers but the area is not recognised as important feeding or roosting habitat for shorebirds or wading birds.</p> <p>The overall risk to local marine fauna assemblages present in benthic habitat within the Kedron Brook Floodway are considered to be low. This is discussed in detail in Chapter B5, Section 5.8.7.1 taking into account the findings of the water quality modeling presented in Chapter B8.</p>

4.3 B3 - Acid Sulfate Soils

(1 of 196 submissions)

Draft EIS/MDP reference: Chapter B3 and Chapter B14, Appendix A

The Queensland Government (through the Department of Natural Resources and Water) made several technical comments about acid sulfate soil management in its submission. Acid sulfate soil issues are addressed in the Draft EIS/MDP in Chapter B3 and the Acid Sulfate Soil Management Plan as contained in Appendix A to Chapter B14 Environmental Management Framework.

Related issues about groundwater management are addressed in this Supplementary Report under **section 4.4**.

Submitter Issues:

Specific recommendations raised by the Department of Natural Resources and Water can be grouped as follows –

Further SPOCAS Testing – KBF Drain

That further samples be submitted to laboratory testing to provide a better indication of ASS risk and accurate liming rates.

Base Further Sampling on pH/pHFOX Difference of 3 or More

Field testing results that exhibited a change in approximately 3 pH units or more should be submitted for laboratory testing. Further lab testing that verifies the field testing results and confirms the absence or low levels of ASS is also highly recommended.

Construction Method for KBF Drain

The construction method of the KBF drain should be clarified with specific mention of how the construction method will mitigate groundwater fluctuations unless each section is bunded on completion and allowed refill from Kedron Brook.

Strategic Re-burial

That laboratory results for both retained acidity and actual acidity should be consulted before spoil is proposed for reburial.

Liming Rates

That a bulk density conversion factor needs to be applied to the liming rates and a specific comment that the proposed liming rate for KBF drain CH675-CH750 should be increased based on the results from BH118 which appears to be on the boundary of this section.

FAFA

That a layer of lime be incorporated into the surface of the soil in the FAFA area to treat any existing acidity and provide a neutralising agent to treat groundwater.

Lime Trench

That an invert level should be used rather than arbitrary 1.2m – 1.5m depth stated for the line interceptor trench depth.

Verification/Spatial Tracking

Clarification if the SPOCAS testing in the ASS Management Plan is referring to pre-treatment testing to refine liming rates or post-treatment verification testing.

Water Quality Monitoring and Corrective Actions

- That additional water quality discharge criteria be provided in the document including dissolved oxygen; and
- That corrective actions should be provided for soil neutralisation, surface/discharge water and groundwater.

Raised by:

	Community	Govt Agency	NGO	Elected Reps
Submitter ID	Nil	242	Nil	Nil
Total	0	1	0	0

BAC response:

4.3.1 Further SPOCAS Testing – KBF Drain

A further 22 samples have been submitted for SPOCAS or Chromium Suite analysis based on DNRW's initial comments on the Draft EIS/MDP. Of those, 19 are from samples retained from the original investigation or from monitoring wells installed on the northern side of the KBF drain alignment (within 75-125 m of the proposed drain alignment). Results of the laboratory analysis is summarised in **Tables 1 and 2**.

Table 1: Results of Analysis - Retained Samples.

Previous Sample Location	Action Criteria (mole H+/t)	TAA (mole H+/t)	ANC (%)	Texture Description	SPOS (%)	'Net Acidity' (mole H+/t)	pH _{ox}
BH59 0.25-0.75m	18	<2	0.31	Loamy Sand	0.04	<10	7.7
BH63 0.0-0.5m	18	<2	2.79	Sand, shells	<0.02	<10	8.7
BH108 0.5-0.75m	18	<2	--	Loamy Sand	<0.02	<10	5.2
BH120 0.0-0.25m	36	<2	--	Loam, trace shells	<0.02	<10	5.9
BH127 0.25-0.5m	36	<2	--	Sandy Clay, organic	'--	20	-
BH134 0.25-0.5m	36	<2	0.74	Clay Loam, shell	<0.02	<10	8.2
BH135 0.0-0.75m	36	<2	0.50	Loam, some shell	0.03	<10	7.8
BH128 0.0-0.5m	36	<2	0.37	Sandy Loam, some shell	<0.02	<10	7.1

Table 2: Results of Analysis - Extra Samples from MW in KBF Drain Area.

Location	Action Criteria (mole H+/t)	TAA (mole H+/t)	TPA (mole H+/t)	Texture Description	SPOS (%)	'Net Acidity' (mole H+/t)	pH _{ox}
MW13 0.75-1.0m	36	204	-	Loam, dk brown, organic	*	323	-
MW13 2.0-2.25m	36	26	-	MC grey, organic	*	58	-
MW13 2.75-3.0m	36	50	898	MC grey, organic	1.54	1010	2.0

Location	Action Criteria (mole H+/t)	TAA (mole H+/t)	TPA (mole H+/t)	Texture Description	SPOS (%)	'Net Acidity' (mole H+/t)	pH _{ox}
MW14 0.0-0.25m	36	26	61	MC, grey	<0.02	36	3.8
MW14 0.5-0.75m	36	43	85	MC, lt brown	0.03	152	3.2
MW14 1.25-1.5m	36	28	43	clayey Sand, grey	<0.02	30	4.1
MW14 2.5-2.75m	36	6	420	clayey Sand, grey	0.9	565	2.2
MW15 0.0-0.25m	36	14	<2	MC, brown, fill, gravel	<0.02	20	4.6
MW15 0.5-0.75m	36	<2	<2	MC, brown, gravel, shell	0.02	<10	6
MW15 2.0-2.25m	36	14	198	clayey Sand, grey	0.43	280	2.6
MW15 2.75-3.0m	36	4	63	clayey Sand, grey	0.18	116	3.4

Three samples were also taken from the area of the Serpentine Inlet Drain which are summarised in **Table 3**.

Table 3: Results of Analysis - Samples from MW9A.

Location	Action Criteria (mole H+/t)	TAA (mole H+/t)	TPA (mole H+/t)	Texture Description	SPOS (%)	'Net Acidity' (mole H+/t)	pH _{ox}
MW9A 0.25-0.5m	36	<2	-	LC, grey, organic	*	42	-
MW9A 0.5-0.75m	36	33	1240	Sand, grey	2.36	1500	2.0
MW9A 1.75-2.0m	36	14	644	sandy Loam, grey	1.29	818	2.0

Test results reflect the range and are consistent with the 'net acidity' and S_{POS} values previously determined for the samples analysed from the KBF drain. As such, there should be no need to increase liming rates. As an additional safeguard, should verification tests indicate failure for any of the 100m sections of the drain, liming rates for that section will be increased accordingly.

4.3.2 Base Further Sampling on pH/pHFOX Difference of 3 or More

There have been other more recent investigations conducted for BAC projects in areas close to the KBF Drain. These include the Banksia West development situated approximately 200-300m south of the KBF Drain and the proposed Northern Access Road.

The results of a further five samples analysed from these projects from within about 75-100m of the KBF drain alignment are summarised in **Table 4**. Adding these results to the previous investigations for the New Parallel Runway project provides that a total of 84 samples have now been analysed from on or near the KBF Drain.

Table 4 - Additional ASS Soil Analysis from Nearby BAC Projects

Location	'AC' (mole H+/t)	TAA (mole H+/t)	TPA (mole H+/t)	Texture Description	SPOS (%)	'Net Acidity' (mole H+/t)	pH _{ox}
Banksia West Development Site							
BWASS11 0.75-1.0m	36	82	241	SCL, grey, organics	0.17	186	4.6
BWASS11 1.75-2.0m	62	34	40	HC, grey-brown	0.07	76	4.7
Northern Access Road Project							
BH43 0.5-0.75m	62	16	54	HC, grey & orange	0.03	35	3.7
BH43 1.5-1.75m	18	8	196	CS, grey	0.40	254	3.8
BH44 0.0-0.25m	18	48	169	CS, dark brown	0.07	93	3.8
BH44 0.5-0.75m	18	8	39	S, orange grey	0.02	23	4.3
BH44 1.75-2.0m	18	<2	36	S, grey	0.09	54	4.1

Several of these additional samples analysed showed a drop in pH of the order of 3 or more. In addition, a significant drop in pH after oxidation was the basis for selection of the original samples. In most cases this also equated to the lowest pH_{FOX} values.

Construction Method for KBF Drain

The construction sequence for the KBF Drain is given in detail in Chapter A5, section 5.3.9 (refer also figure 5.3c) and as such, is not reproduced in the Acid Sulfate Soil Management Plan within the EMF.

It should be noted that each 100m section, once excavated and with surface treatments completed (2-3 weeks), will then be connected to the previous section and the water table allowed to return to status quo. It should be noted that during all of this, the 50m "plug/bund" will remain in place between Kedron Brook and the constructed drain, until the entire drain is completed and water quality meets discharge criteria.

Additional wording within the EMF Acid Sulfate Soil Management Plan to clarify the construction process for the drain are highlighted in the section below.

Strategic Re-burial

The perimeter bund is to be constructed from the lime treated and verified spoil from the KBF Drain, with a short fall of some 30,000 m³. There will be no need to "bury" any spoil other than the mound of dredge spoil from the former Kedron Brook Floodway maintenance dredging in the 1980's described in Chapter B3 and situated in the central New Parallel Runway area.

The former dredge spoil material to be removed from the central New Parallel Runway area has an average Total Actual Acidity (TAA) of 43 moles of acid/ tonne (which is relatively low). There is to be a lime "guard layer", geotextile blanket and sand capping layer placed over the spoil when it is placed in the dammed off creek. The area will eventually be covered with more than 2m of sand fill. It is expected that on average <1m (depth) of spoil will be

placed in the creek (eg. about 65 moles for each m² of surface). Capping, below the water table in what is an alkaline environment will not result in “activation” of any retained acidity (ie. that would require the pH to drop significantly before any retained acidity was released). However, to adequately neutralise the 43 moles of acid/ tonne present in the spoil, a liming “guard layer” at 5kg of lime/m² will be adopted.

ASS investigations indicate an abundance of alkaline buffering capacity in the in-situ sediments in this area, which will act as a ‘third line of defence’ to prevent any short term acid generation resulting from disturbance and placement of the spoil.

Liming Rates

20 random test results have been checked in relation to the query. All liming rates checked include a bulk density conversion rate of 1.5 or 1.7 (for sands).

The liming rate for BH118 has been checked and it is recommended that the Lime Treatment Column in **Table 1a** of the EMF be changed to read CH475-CH700 lime at 120kg/m³, rather than CH475-CH675 (ie. do not overlap with BH118 which is to be treated at the highest rate).

This change is highlighted in the section below.

FAFA

The recommendation to apply a lime layer immediately following clearing in the Future Aviation Facilitate Area (FAFA) is not seen as being practical given that the vegetation will not be cleared completely, just cut off to leave root/stubble, thus preventing the tyning in of lime. Also, placement of saturated, dredged material will wash away the lime on placement. Sufficient lime will be placed in the cut off trench to allow for neutralisation of the actual acidity present. Surface water run-off from this area (like other areas within the New Parallel Runway footprint) will be collected in the sediment ponds and can be tested prior to discharge off the site.

Lime Trench

Results of on-going groundwater level monitoring along the western side of the New Parallel Runway (the approximate location of the lime trench) indicate the groundwater height has varied between 0.7m and 2.2m AD (or -0.4 to 1.1m AHD).

Groundwater modelling has indicated the potential for the water table to rise due to surcharging. Allowance is to be made to extend the trench down to RL 0.5 m AD (ie. to below the lowest groundwater level measured to date in the area), and under the influence of increased groundwater levels the groundwater will flow through the trench. For this level, the trench will have a variable depth of between about 1.9m and 1.2m (average 1.5m), depending on the exact location.

Verification/Spatial Tracking

The Acid Sulfate Soil Management Plan reflects that SPOCAS tests are required [only] as Verification Tests on the lime treated spoil, undertaken at the rates indicated (in the EMF). No pre-liming testing is required.

Water Quality Monitoring and Corrective Actions

It is proposed that monitoring parameters and provisional limits for surface water quality be added to the Acid Sulfate Soil Management Plan for dissolved iron, dissolved aluminium, total suspended solids and dissolved oxygen. It is proposed that a range of corrective actions also be added to the plan.

These changes are highlighted in the section following.

Addition/Omission to Draft EIS/MDP:

In light of the above discussion, no changes are proposed to the Draft EIS/MDP for Chapter B3 with respect to those sections of the Chapter that deal with acid sulfate soils.

As outlined above, the following changes to the Acid Sulfate Soil Management Plan (refer Chapter B14, Appendix A) are proposed to the Draft EIS/MDP to address the comments by the submitter (changes shown in red text) –

Construction Method for KBF Drain

Implementation Strategy (Contd.)	<p>Under the heading Construction of Drainage works -</p> <p>5. Stage 1 of the drain construction comprises CH00 to CH675. Undertake the following construction steps: Add new dot point -</p> <ul style="list-style-type: none"> • Temporary bunds will be progressively left in place until each of the Stages is completed and then they will be removed and the sections connected, before the whole drain is eventually brought 'on line'. <p>Under the heading Water Treatment -</p> <p>4. Subsequent to construction of the first 100m section, the pH of surface waters in the discharge/overflow structure, shall be monitored and recorded before discharging to the main drain (which will remain disconnected from Kedron Brook Floodway until the drain is complete).</p>
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Strategic Reburial

Implementation Strategy (Contd.)	14. Up to 40,000m ³ of medium level PASS fill will need to be excavated from the former 1980s dredge spoil handling area in the centre of the new parallel runway area. This material will be reburied in the dead end area of the Serpentine Creek (under a lime 'guard layer and geotextile blanket').
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Liming Rates

Amend **Table 1a**, row 8, as follows:

KBF Drain Stg 1 CH00-CH750	46,500	< 2.0	-0.55	72,000	nil	72,000	CH00-175 : 12 CH175-475 : 50 CH475-700 : 120 CH700-750 : 8
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Invert Level for Lime Trench

Implementation Strategy (Contd.)	16. The western lime trench will be filled with agricultural lime and crushed limestone, will be excavated, keyed into the edge of the proposed runway fill platform prior to placement of any fill or surcharge. The trench will be triangular in cross section, to 1.2 to 1.9m depth (invert level of 0.5m AD), with the base inclined at a shallow angle back to the surface for a width of 12m (refer to detail SK1 - Type A trench).
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Water Quality Monitoring

Amend the section on 'Performance Criteria' by inserting the following under item 8:

Performance Criteria (Contd.)	<p>8. Monitoring parameters and provisional limits for surface water quality are:</p> <ul style="list-style-type: none"> • pH range 6.5 to 8.5; • dissolved iron < 500 µg/L; • dissolved aluminium < 30 µg/L; • TSS 80 mg/L based on the 80th Percentile (as stated in the Surface Water Quality Section of the EMF); • Dissolved Oxygen ≥ 6mg/L or 90-105% saturation.
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Corrective Actions

Insert a new section between sections on 'Monitoring' and 'Auditing and Reporting' as follows:

Corrective Actions	<ol style="list-style-type: none"> 1. Should results of verification testing indicate residual acidity outside allowable limits, the offending material shall remain in the treatment area, be re-treated with an increased quantity of lime and the verification process repeated until 'Performance Criteria' are met and the material released for disposal. 2. If the pH of surface water in any of the new drains falls outside the stated limits, check again within 12 hours and if still not complying: <ul style="list-style-type: none"> • inspect any automatic pH control equipment and repair it if necessary; • undertake manufacturers calibration checks of manual pH metres; • contact BAC's Environmental Officer/Consultant as soon as is practicable. 3. If low pH values persist: <ul style="list-style-type: none"> • carry out an inspection of all nearby bunds and possible sources of untreated ASS and repair and/or lime any exposed untreated soils; • dose locally with hydrated lime at a concentration that will adequately reduce the pH level; (refer to 'Soil Management Guidelines - Version 3.8' and monitor pH during dosing to limit the risk of over dosing). 4. If pH of groundwater falls outside the established baseline range of values, check again within 48 hours and if still not complying: <ul style="list-style-type: none"> • contact BAC's Environmental Officer/Consultant as soon as practicable; • undertake sampling and analysis of water from Kedron Brook for parameters listed in 'Performance Criteria'; • cease current construction earthworks involving ASS, in the area(s) closest to the affected monitoring well and review management strategies; • immediately inspect all bunds and guard layers for breaches and repair them if necessary; • undertake a verification test on any spoil currently in the effected area of the site and increase the liming rate if results indicate that acidity remains present. 5. Should groundwater pH remain depressed (ie. more than 0.3 units below 'baseline' lower bound), or a red iron precipitate become evident in nearby Kedron Brook, further physical mitigation will be required (in that specific area). Remediation will include: <ul style="list-style-type: none"> • The lime interception trench in the area closest to the affected monitoring well is to be opened up along a length of 50m and the lime charge inspected. If an abundance of 'iron floc' is evident on the lime remaining in the trench it is to be replaced; if most of the lime appears to have been used up by the neutralisation process, then the lime is to be replenished. The trench is to then be re-covered.; • Monitoring of water quality in the affected area(s) shall continue on a twice weekly basis until groundwater pH is adjusted back above the baseline 'lower bound'
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4.4 B3 - Groundwater

(2 of 196 submissions)

Draft EIS/MDP reference: Chapter B3, Sections 3.3 (baseline), 3.6 (impact)

The Queensland Government (through the Department of Natural Resources and Water) raised issues about baseline condition and assessment of groundwater impacts.

An NGO submitter also raised concern about acidic groundwater leachate being released as a result of the surcharge process.

The groundwater issues raised in these submissions are addressed in this section of the Supplementary Report. Related issues about the management of acid sulfate soils are addressed in this Supplementary Report under **section 4.3**.

Submitter Issues:

Specific recommendations raised by the Department of Natural Resources and Water about groundwater can be grouped as follows –

Geology and Soils

- The Draft EIS/MDP should provide a comment stating that the sediments are mostly estuarine.
- The Draft EIS/MDP should provide a comment on:
 - the existence of “ribbon” or “shoe string” sand lens (aquifers?) based on the results of drilling; and
 - the relationships between the published soil mapping and the geology mapping, and the results of the shallow drilling.
- That **Figure 3.2b** should show the presence of basalt.

Existing Environment – Groundwater

- The Draft EIS/MDP should include a map showing the location of the DNRW monitoring bores.
- The Draft EIS/MDP should clarify whether the bores have been surveyed or have been extrapolated.
- The Draft EIS/MDP should include a comment on the accuracy of the natural surface at the bore site.
- **Figure 3.3a** should include contour lines showing the minimum drainage potential, i.e. mean sea level along the banks of the tidal creeks, and around the mine void etc.
- The Draft EIS/MDP should include a comment about the groundwater level decline.

Conceptual Hydrogeological Model

- The Draft EIS/MDP should include a brief description of the elements of the overall water balance (rainfall, surface runoff, recharge, evapotranspiration and shallow groundwater discharge).
- **Figure 3.3f** should include the boundary between the Upper and Lower Holocene and show the inferred ‘Holocene alluvial channel’ to depth of RL -25 m AD, as shown on figure 3.2b.
- **Figure 3.3f** should include the highest and lowest recorded water levels.

Impacts on Groundwater

- The Draft EIS/MDP should undertake an assessment of the post-runway construction.
- The Draft EIS/MDP should include:

- an assessment of the likely watertable elevation and potential gradient along the axis of the proposed drains; and
- comment on the initial inflow to the proposed drain compared with the long term average inflow (subject to seasonal variation in water level).
- The Draft EIS/MDP should include a quantitative analysis of the likely change to the water balance as a direct consequence of the proposed construction. For example, potential change in:
 - Immediate surface runoff as a result of change in pavement cover
 - Evapotranspiration due to a change in forest – grasslands area
 - Net groundwater storage
 - Groundwater drainage
 - Other.
- The Draft EIS/MDP should include a quantitative analysis of the change in the groundwater flow component of the overall water balance.

Further testing and fieldwork

- Recommendation that additional drilling and installation of nested monitoring bores to different depths adjacent the existing monitoring bores should be undertaken to confirm the characterisation of the groundwater within the entire Holocene sediments.

Raised by:

	Community	Govt Agency	NGO	Elected Reps
Submitters	Nil	242	193	Nil
Total	0	1	1	0

BAC response:

The Draft EIS/MDP thoroughly considered potential impacts from the displacement or movement of groundwater as a result of the surcharge process and excavation of the major drains. A range of mitigation measures are proposed as part of the Draft EIS/MDP to ensure groundwater mobilised by the construction of New Parallel Runway is treated and neutralised.

Seventeen groundwater wells have been installed within and adjacent to the New Parallel Runway footprint and groundwater modeling has been carried out to assess the potential magnitude of the impact due to site filling.

Following discussion with DNRW, additional monitoring bores have been installed adjacent to the existing monitoring bores at MW1 and MW6. At each of these locations, two deeper monitoring bores have been installed to two different depths, to assess the potential for vertical hydraulic gradients, and to carry out further permeability testing.

In relation to the more specific recommendations in the Queensland Government submission made by the Department of Natural Resources and Water, responses under the main headings listed above are contained in **Appendix 12** to this Supplementary Report. This is due to the highly technical nature of both the requested information and the proposed response.

The additional data that has been collected through ongoing monitoring on the site and the additional information that has been provided in response to the issues raised by DNRW (refer the Appendix) continues to improve the baseline understanding of groundwater on the site. However, it should be noted that the findings and data have not altered the mitigation measures proposed for the project (i.e. the lime-filled groundwater treatment trench and the lime treatment on the batters of proposed drains) which continue to be seen as the most effective measures for managing potential groundwater impacts from the surcharge process.

Addition/Omission to Draft EIS/MDP:

For the EIS/MDP, information presented in the Appendix should be read together with existing text in Chapter B3 of the Draft EIS/MDP.

Specific changes to figures contained in the Draft EIS/MDP and new figures that are to be inserted into Chapter B3 of the Draft EIS/MDP (as contained in the Appendix) are shown in the table below -

Fig No.	Title	Relationship to figures in the Draft EIS/MDP
1	Test locations and contours of base of Holocene alluvium	Updates and replaces Figure 3.2b
2	Groundwater Level Hydrograph (Jul 06 – Dec 06)	New Figure to be inserted following Figure 3.3d
3	Groundwater Levels December 2006	New Figure to be inserted following Figures 3.3a, 3.3b and 3.3c
4	Groundwater Monitoring Bore Positions	New Figure to be inserted into section 3.3
5	Groundwater Levels – Bores in DNR database	New Figure to be inserted into section 3.3
6	Ground Water Flow Zones	New Figure to be inserted into section 3.3
7	Conceptual Hydrogeologic Model	Updates and replaces Figure 3.3f

4.5 B4 - Erosion Issues

(3 of 196 submissions)

Draft EIS/MDP reference: Chapter B4

In relation to this Chapter of the Draft EIS/MDP, submitters raised issues about potential impacts the New Parallel Runway and associated development such as the seawall and approach lighting structure may have on nearshore coastal processes along the foreshores of Bramble Bay and the Kedron Brook Floodway.

Issues related to hydrology and silting of the Kedron Brook Floodway are addressed in this Supplementary Report under **section 4.9, Flooding and Hydrology**.

Submitter Issues:

Specific comments raised by submitters about erosion issues were as follows –

Erosion at the Kedron Brook Mouth

- Concern about the existing and potential future effects of erosion on the mangroves and littoral zone at the Kedron Brook Floodway Mouth including potential impacts to Nudgee Road.

Seawall

- That the Draft EIS/MDP does not address the impacts of the reconstructed seawall and that the effects of erosion and scour due to wave action on seawalls are documented worldwide.
- That the Draft EIS/MDP should provide information on the proposed mitigation measures to minimise any negative effects on coastal processes during construction.

Approach Lighting Structure

- That the Draft EIS/MDP should include a full assessment supporting the statement that the approach lighting structure will not impact on coastal processes including local effects.

Raised by:

	Community	Govt Agency	NGO	Elected Reps
Submitter ID	Nil	242	166, 143	Nil
Total	0	1	2	0

BAC response:

4.5.1 Erosion at Kedron Brook Mouth

As stated in the Draft EIS/MDP, the shoreline around the Airport is continuing to evolve in response to natural conditions and the effects of the reclamation works to establish the current airport. These processes will continue until a level of equilibrium with coastal processes is reached.

The project will not involve any direct works or interference at or near the mouth of the Kedron Brook Floodway. Thus, any potential impacts at the mouth could only relate to indirect effects on the waterway flows through the mouth. Section 7.8.1.3 of the Draft EIS/MDP (**Figure 7.8b**) confirms that the project will not impact on flood flow velocities at the mouth. As such, there is no mechanism by which the project would have any effect on coastal processes at or near the mouth.

4.5.2 Seawall

The implications of upgrading the seawall on coastal processes are discussed in Chapter B4, section 4.8.2.3 of the

Draft EIS/MDP. The seawall upgrade is not new work, but rather a beneficial improvement in the appearance and function of the existing dumped rock structure that has been in place for many decades. In particular, the seawall upgrade is proposed to ensure a sound last line of defence in storm events.

Based on the long term stability of the shoreline at that location, there will be no change in the stability of the beach itself, or any impacts to adjacent shoreline areas. With all seawall and hard coastal protection structures, some scour will occur from time to time after significant storm events but is likely to be minimal at the location given the low energy environment where the upgraded seawall is proposed.

Erosion and other impacts on coastal processes during construction of the seawall are expected to be minimal.

4.5.3 Approach Lighting Structure

Text on the implications of the lighting structure on coastal processes is included in Chapter B4, Section 4.8.2.2. To address the submitters comment the existing text is proposed to be replaced with a fuller description as outlined below.

Addition/Omission to Draft EIS/MDP:

Changes to the Draft EIS/MDP in relation to the issues raised in the submissions are proposed as follows -

- Chapter B4, Section 4.8.2.2, 1st paragraph – omit.
- Replace with the following text under the heading ‘Lighting System’-

*The proposed lighting structure will be founded on piles and otherwise elevated above the water level. It will extend about 700m across inter-tidal flats that become inundated at higher tide levels and are affected by wave and current action. As shown in **Figures 4.5f** and **4.5h** of the Draft EIS/MDP, the area across which it will be constructed has a mobile seabed as evidenced by moving sand waves of dimensions typically about 0.3m high and 45m long.*

The piling design (shape and spacing) will be such that it will have essentially no effect on the prevailing currents and waves that pass through the structure footprint. As such, the structure will be ‘transparent’ in terms of the wave/current factors affecting the regional and local hydrodynamic processes of Moreton Bay and the coastal processes in the area adjacent to the airport.

There will be some effects on the seabed at an immediately local (several metres) spatial scale in the form of minor disturbance to sand movements and potentially some minor scour immediately next to the piles from time to time. This will not interfere with the general natural transport of the bed sediments or migration of the sand waves.

The piled design of the lighting structure is proposed to prevent any interference to coastal processes that would be associated with (for example) a causeway structure and represents an effective mitigating measure against adverse impacts to the coastal processes.

4.6 B5 - Ecology – Birds and Ramsar Values

(10 of 196 submissions)

Draft EIS/MDP reference: Chapter B5, Section 5.5.7 (baseline), Section 5.8.3 (impact), Section 5.8.8 (ecosystem functioning and conservation values)

This section of the Supplementary Report deals with submitter comments on Chapter B5, Terrestrial and Marine Ecology as it relates to birds (specifically in relation to comments about shorebirds and Lewin’s Rail) as well as comments made about potential impacts to the Moreton Bay Ramsar Site.

Impacts related to potential increases in the incidence of bird strike and its effect on aircraft safety are addressed in Chapter D8 and **section 6.9** of this Supplementary Report. Concerns about bird mortality and adverse impacts on bird habitat as a result of interaction with aircraft are addressed in this section.

Submitter Issues:

The submitter issues raised in relation to these issues can be grouped as follows –

- General concern about impacts of the project to the nearby Moreton Bay Ramsar wetland and local shorebird populations (10/10).
- Concern about impacts on bird strike on shorebirds given the proximity of the runway to foreshore areas and migratory bird roosts and flight paths (3/10).
- Impacts to Lewin’s Rail and its habitat including recommendations for better protection of this species on the Airport site (4/10).
- Recommendations about the need for long-term shorebird monitoring at the airport site (1/10).

Raised by:

	Community	Govt Agency	NGO	Elected Reps
Submitter ID	106, 138, 190, 197, 220, 219	Nil	72, 166, 235, 237	Nil
Total	6	0	4	0

BAC response:

4.6.1 Ramsar Wetland

With the exception of the lighting structure, the proposed works associated with the New Parallel Runway occur outside the Moreton Bay Ramsar wetland, and will therefore not directly affect wetland values.

The ecology study within Chapter B5 has concluded that there would not be any direct or indirect impacts on the ecological character of the adjacent Moreton Bay Ramsar site from any aspect of the New Parallel Runway project.

This conclusion was reached through an analysis of:

- the baseline ecological condition and values of the project area and study site based on extensive flora and fauna surveys;
- the construction methodology and likely impacts of the proposed reclamation and other development elements associated with the New Parallel Runway, and
- hydrology, water quality and other natural coastal processes occurring in the local area that, if altered, could affect ecological resources beyond the immediate project area.

Conclusions in Chapter B5 related to terrestrial and marine ecology took into account findings of other relevant chapters of the Draft EIS/MDP such as potential impacts from water quality modelled as part of Chapter B8 for the construction and operational phase of the project and potential changes to coastal processes and hydrology from the proposed reclamation (Chapter B4).

Specific analysis was also carried out in relation to the potential for the proposed development to impact on one or more of the specific Ramsar criteria for which the Moreton Bay Ramsar site has been declared under the Convention. The analysis of impacts compared to the Ramsar criteria for the Moreton Bay Ramsar Site is summarised in Chapter B5, **Table 5.8k** of the Draft EIS/MDP.

4.6.2 Shorebirds

Based on observation of aircraft operations on shorebirds that roost and feed in close proximity to both the existing 14-32 cross and 01-19 main runways, it is considered unlikely that the operation of the New Parallel Runway at its proposed location is incompatible with continued use of inter-tidal foreshore areas by shorebirds over time. As discussed in Chapter D8 of the Draft EIS/MDP, no increase in bird strike rate is expected by locating the New Parallel Runway closer to Moreton Bay, given that the current cross-runway does not experience significantly higher bird strike rate than the main runway.

Studies undertaken by WBM as part of the Draft EIS/MDP (also discussed in Chapter D8) found that despite observations under a variety of tidal and weather conditions, there was no observable evidence that birds halted or reduced feeding activities or dispersed from feeding grounds whilst air traffic approached or was overhead. Furthermore, no observations were made of shorebirds leaving roost sites (including along centreline and in close proximity to the 19 end of the existing runway) whilst air traffic approached or was overhead.

No studies were identified as part of the Draft EIS/MDP preparation process linking air emissions from aircraft to bird mortality or bird habitat degradation. The risk of aircraft fuel dumping over inter-tidal areas used by shorebirds and over the Lewin's Rail habitat situated at the 01 end of the New Parallel Runway are considered to be extremely remote. As stated in Chapter D6, since the current airport opened in 1988, approval to dump fuel has never been sought or granted and an aircraft operating in such an emergency scenario is normally directed to release any excess fuel at height and over water where it will vaporise.

4.6.3 Lewin's Rail

The *Phragmites*-dominated habitat located on Airport land opposite the Nudgee Golf Course, is important for a range of native bird and reptile fauna, including Lewin's Rail (*Rallus pectoralis*) (Lambert and Rehbein 2004).

The Lambert and Rehbein (2004) fauna survey commissioned by BAC identified that this *Phragmites*-dominated habitat had high ecological values for fauna and on this basis, the 40 ha *Phragmites* wetland area has been included within the Airport Biodiversity Zone. As mentioned in the Draft EIS/MDP and this Supplementary Report, there is a commitment that this area be managed for conservation purposes in the long term as part of the Airport Biodiversity Management Strategy

Consistent with observations of the species at other sites, Lewin's Rail on the Airport occupy a low, dense, enclosed habitat within the *Phragmites* wetland areas. The habitat characteristics, small size of the birds, and ground-dwelling behaviour of the species, suggest that Lewin's Rail do not represent any risk to aircraft in terms of bird strike, and likewise the passage of aircraft over the habitat does not place the birds at any risk from collision.

In the context of possible impacts to the Lewin's Rail habitat during construction phases of the project, BAC has recently engaged Queensland University of Technology researchers to conduct further field work within the Lewin's Rail habitat area and advise BAC about best practice measures that could be implemented to further minimise construction impacts including effectiveness/design of buffer areas. This study will also provide recommendations about management of the habitat in the long term.

As part of this process, BAC is also investigating the feasibility of converting Casuarina habitat in the biodiversity zone to the *Phragmites* habitat favoured by Lewin's Rail as a means of expanding the habitat area suitable and preferred by that species.

4.6.4 Shorebird Monitoring

As outlined in the Draft EIS/MDP, BAC commissioned several shorebird wader counts during 2004 and 2005 on the Study Site which were carried out by the consultant Lambert and Rehbein. The Queensland Wader Study Group also has been conducting monthly shorebird counts on Airport land with the consent of BAC. Data obtained as part of shorebird observation programmes proposed as part of construction of the dredge pipeline, approach lighting structure and reconstruction of the seawall would be added to these existing databases once completed. In the longer term, BAC will continue to work with the Queensland Wader Study Group and other conservation groups to facilitate observation of shorebirds on the site as part of implementation of the Airport Biodiversity Management Strategy.

Addition/Omission to Draft EIS/MDP:

In light of the responses above, no changes to the Draft EIS/MDP are proposed in relation to these issues.

4.7 B5 - Ecology – Wetland Mitigation

(23 of 196 submissions)

Draft EIS/MDP reference: Chapter B5: Section 5.5 (baseline), Section 5.8 (impact), Section 5.11 (approach to mitigation)

A number of submitters raised concerns regarding the removal of mangroves, salt marsh and other vegetation communities on Airport land that would result from construction of the New Parallel Runway. The values of wetlands in this context primarily related to concerns regarding a loss of fishery resources, loss of open space and general concern about associated loss of biodiversity.

In the context of mangrove loss, submitters also raised questions and made recommendations about provision of compensatory habitat and other mitigation measures to offset the environmental impact from the loss of wetlands. These issues are also canvassed in this section.

Submitters who raised the issue of wetland loss in the context of broader arguments about runway layout and runway separation have been dealt with as part of Chapter A3 (refer **sections 3.8 and 3.9** of this Report) and these submitter issues are not duplicated here.

Specific comments made in relation to impacts to birds and potential impacts on the nearby Moreton Bay Ramsar site from the New Parallel Runway project are also documented under the separate section, **Birds and Ramsar values**.

Submitter Issues:

The comments from the submitters related to wetlands and mitigation can be grouped as follows -

Mangroves and Saltmarsh (23 submissions)

- General concern about the loss of estuarine wetlands on the site associated with the reclamation particular with regard to the fisheries habitat and biodiversity values these wetlands provide (23/23).
- Specific concern about the significance of the yellow mangroves on the site (*Ceriops tagal var. australis*) on the site (2/23).
- Impacts to fishery habitat provided by the mangroves and saltmarsh specifically in relation to impacts on commercial fisheries production (3/23).

Mitigation and Offsets (10 submissions)

- General queries about what BAC as the proponent was going to do to replace or improve wetlands/fish breeding grounds intended to be removed (3/10).
- Recommendations that BAC should implement a no-net loss or net environmental improvement approach to acquiring/restoring wetlands of similar habitat value in the Moreton Bay region (7/10).
- “Other Land” as identified in figure 5.11a (this figure shows the proposed Airport Biodiversity Zone) must be incorporated into the Biodiversity Zone (1/10).
- Remnant areas of mangroves on Airport lands outside the New Parallel Runway footprint - some 73 hectares in total - have already been afforded protection in the 2003 Master Plan and 2004 Airport Environment Strategy. To now incorporate these areas as part of the offsetting package is not justified and akin to ‘double accounting’ and alternate offsetting would be appropriate (1/10).
- That affected fishers and the community should be compensated at realistic values for the ongoing loss of natural resources and fish product (3/10).
- Specific recommendations from commercial fishing interests in relation to habitat loss (1/10).

Raised by:

	Community	Govt Agency	NGO	Elected Reps
Submitter ID	6, 67, 104, 110, 150, 158, 179, 190, 213, 219, 227, 229	153, 242	72, 143, 154, 166, 193, 223, 231, 235	114
Total	12	2	8	1

BAC response:

4.7.1 Mangroves and Saltmarsh

Layout

As discussed in Chapter A3 of the Draft EIS/MDP, the removal of mangroves and saltmarsh on the Airport site is unavoidable if the proposed New Parallel Runway project is to go ahead.

Yellow Mangroves

Yellow mangroves (*Ceriops tagal var. australis*) are found in small pockets in the New Parallel Runway project area with larger areas present nearby in the vicinity of Serpentine Inlet and Jubilee Creek within and neighbouring Airport land.

The total area of *Ceriops tagal var. australis* in Moreton Bay and in the project area was calculated based on mapping conducted by Dowling and Stephens (1998). Areas where this species was known to occur as a mono-specific community or where this species dominated (i.e. communities 1D(i) and 1D(ii) according to Dowling and Stephens (1998) classification) were selected.

The total area of *Ceriops tagal var. australis* as a mono-specific community within Moreton Bay and the project area is 8.394 sq km and 0.115 sq km respectively. The project area therefore contains approximately 1.36% of the total area of *Ceriops tagal var. australis* dominated communities mapped by Dowling and Stephens (1998) in Moreton Bay.

Based on this, the removal of yellow mangroves associated with the New Parallel Runway project is considered to represent a site specific to local scale impact (similar to other mangroves that will be cleared on the site) but is considered a negligible impact at a sub-regional to regional scale.

Impacts to Commercial Fishers

The principal impact from infilling of waterways and estuarine wetlands within the Project Area will be the loss of nursery habitat for fish and shellfish species, some of which are targeted by commercial and recreational fishers. As explained in the Draft EIS/MDP, it is difficult to quantify relationships between habitat area and fisheries productivity, because there is little empirical evidence to suggest that estuarine fish/shellfish populations are habitat limited. Consequently, no attempt has been made to quantify potential loss of fishery productivity due to loss of habitat.

4.7.2 Mitigation Strategy

Chapter B5, section 5.13 of the Draft EIS/MDP outlines the proposals for an Airport Biodiversity Zone and the prospective contribution of funding to a range of off-site projects relevant to the mitigation of impacts to mangrove and saltmarsh communities that will be removed as a result of the runway construction. Further information to address submissions in relation to this section of the Draft EIS/MDP is provided below.

Airport Biodiversity Zone

The Airport Biodiversity Zone as shown in **Figure 5.11** includes land that is within the Airport lease area. Neighbouring land on the figure not on the BAC lease area but managed with a similar conservation focus is shown

as “Other Land”. This includes freehold land in trust held by the Brisbane City Council along the Kedron Brook Floodway and tidal lands and waters contained in the ‘Airport to Port Habitat Zone’ of the Moreton Bay Marine Park.

While outside the direct management control of BAC, Brisbane City Council has indicated that it supports managing the terrestrial areas around Kedron Brook Floodway for conservation purposes in the long term. On this basis, acquisition of this land is not seen as warranted. However, it should be recognised that BAC is not reliant nor dependant on Council’s controlled land to deliver the actions of the Biodiversity Management Strategy or in the management of the Airport Biodiversity Zone in a way that maintains and enhances these habitats in the long term.

BAC holds the view that the Airport Biodiversity Management Strategy and key actions within it such as the setting aside of the Airport Biodiversity Zone represents a significant long term commitment to conservation. Covering an area of 285 ha of land and waters, management of the Biodiversity Zone will be supported through significant private investment by BAC (as lessee of the land). With direct management control over the land, BAC can ensure the values of the zone are maintained and enhanced in perpetuity.

In the context of the submitter’s comment about the mangrove areas on Airport already being afforded protection, it should be noted that these areas were set aside as environmentally significant areas under the 2004 Airport Environment Strategy proactively by BAC in anticipation of the future infrastructure development of the Airport such as the New Parallel Runway and Northern Access Road Project. The decision to set aside these areas for conservation purposes is seen as directly relevant to the mitigation package for the New Runway Project now that the project has progressed to an environmental impact assessment stage.

Off-site Projects

BAC engaged with representatives from conservation groups, the regional Natural Resource Management Body (SEQ Catchments) and State and local government agencies about possible mangrove restoration/rehabilitation projects prior to and during the public submission period of the Draft EIS/MDP. This was done with a view to BAC considering contributing financial support to one or more of these projects either in a planning context or to assist the completion of an existing project as part of the mangrove mitigation package.

Several potential project areas/concepts were identified in the Moreton Bay region by State agencies, but BAC was not made aware of any major restoration projects that were being actively planned or implemented at the current time in the local area.

As an alternative to a large scale restoration project, non-government groups in consultation with BAC advocated the use of funding for more established projects and programmes that are currently being implemented. On this basis, BAC has sought to advance discussions about funding of the three off-site mitigation projects directly with non-Government groups.

These projects include:

- 1) contribution of funding to support the establishment of new or expanded facilities at the Nudgee Beach Environmental Education Centre.
- 2) contribution of funding to support the Wildlife Preservation Society of Queensland proposed mangrove and saltmarsh monitoring programmes.
- 3) contribution of funding to support the Moreton Bay Seafood Industry Association Environmental Management System.

A short description of these projects is included below.

These three projects were selected on the basis of:

- 1) their salience to mangrove and saltmarsh habitats being removed by the New Parallel Runway;

- 2) their local relevance in the context of the location of the Airport in western Moreton Bay; and
- 3) their contribution to understanding, maintenance or enhancement of the Moreton Bay Ramsar site.

Nudgee Beach Environmental Education Centre – New Classroom

Nudgee Beach Environmental Education Centre (NBEEC) is a facility of the Department of Education, Training and the Arts. The Centre currently works with in excess of 3500 students per year from predominately Greater Brisbane. In addition annually a small number of students from country areas and international students access the site.

Students from Prep to Year 12 access a range of learning experiences which focus on the Wetlands and Marine Environments of the north eastern part of Moreton Bay.

These environments allow students to learn about a range of habitats, the biodiversity of wetlands and the fragility of mangroves, seagrass and tidal foreshores and sustainable development issues associated with being on the edge of the second fastest growing metropolitan region in the world.

Brisbane Airport Corporation has been a supporter of the Centre over an extended period of time. For many years the Corporation has supported the Centre by providing resources for events such as *Clean-Up Australia* as well as provision of items such as a powerful microscope to extend the capacity of the Centre for students and researches working in the mangroves.

BAC has been advised that the current facilities at the Centre could benefit by enhancing the internal learning space. A new purpose-built classroom has been proposed as the best means of improving the educational focus supporting maths, science and technology in a marine context.

The proposed support by BAC to build this facility would allow this site to provide better service to the students who learn about this marine environment focusing on mangroves along the edge of the bay. Students would be able to use leading edge technology to investigate the wetlands, using computers to download and manipulate images, tanks and microscopes to look at creatures in more detail and an internal area able to allow lessons to be delivered to class groups during times of inclement weather etc. Currently some students are located upstairs while others wait under the building during these conditions.

As an Environmental Education Centre and a Queensland Sustainable Schools Hub, the Centre wishes to adopt sustainable development principles for the project concept through design construction and operational phases. The facility planned will then become an example of sustainable practice and used as a teaching resource.

Discussions between BAC and NBEEC about the classroom are continuing including developing cost estimates for construction.

WPSQ - Mangrove and Saltmarsh Monitoring Programme

The Wildlife Preservation Society of Queensland (WPSQ) is a non-profit community based conservation organisation comprising head office and a number of branches statewide. Bayside Branch (WPSQBB) and Boondall to Tinchi Tamba Wetlands Branch (BTTWB) are non-profit community groups that aim to raise public awareness of environmental issues. One method of achieving this goal has been the implementation of a Coastal Wetland Monitoring Program, built upon the highly successful Seagrass-Watch program in Moreton Bay, Queensland.

WPSQ has advised BAC that this scientifically rigorous and award winning program, originally developed by the Queensland Department of Primary Industries, is used by communities who, through groups of trained volunteers, monitor the status of seagrass meadows along the Queensland coast. The project is designed to extend monitoring to coastal wetland from intertidal to terrestrial zone, such as beach (meiofauna), mangroves and saltmarsh habitats.

WPSQ have approached BAC about the contribution of funding in relation to Mangrove Watch including saltmarsh monitoring. Key elements of the proposed program (appended from the WPSQ proposal) are included below:

Mangrove Watch will involve the monitoring of mangrove health, gathering data on leaf litter fall, biodiversity (examining gastropods & crustacean numbers) and looking for signs of anthropogenic impacts.

*One of the impacts the project aims to monitor is genetic damage to *Avicennia marina* and *Rhizophora* sp caused by hydrocarbons found within the sediment derived from stormwater. The damage manifests itself in the form of mutation seen as 'albino' propagules attached to parent trees (Duke et al, 2001). The affected propagules lack chlorophyll and normal green coloration, leaving them yellow or red. If they do establish and grow leaves they soon die once the seedlings reserves are depleted (Duke et al, 2001). Lota Creek, Bulwer Island, Cleveland and Erapah Creek, Victoria Point are some of the areas where this genetic damage has been observed. This community monitoring project is needed to validate remote assessments of mangrove health being undertaken by researchers at UQ using satellite and aerial imagery.*

Community volunteers will work alongside specialists from UQ and QDPI&F to assess mangrove transects across mangrove areas. The idea is to map out differences in canopy health, as measured by Leaf Area Index, chlorophyll in leaf samples and other soil and forest characteristics. Data collected at particular GPS coordinates will be compared with the colour images at positions marked on aerial imagery. This information will be used to produce maps of mangrove health across the bay area.

A component of this project could be introduced to produce and publish an informative guide for approximately 30 mangrove boardwalks across the region. A number of people and local institutions would gather the data, information and photos required. It would provide standard information about each boardwalk, maps, plants and animals to be seen and any other significant feature. The guide will be prepared by the same professional graphic designer who did the "Australia's Mangroves" book.

Similar to the mangrove component, saltmarsh monitoring will involve the monitoring of saltmarsh community health, gathering data species, their density, height and overall biodiversity assessment and looking for signs of anthropogenic impacts.

BAC has discussed with WPSQ representatives a financial contribution of base funding for an environmental coordinator position to manage the mangrove and saltmarsh component of the programme with some operational funding to support the position.

BAC has also indicated that it would be prepared to make mangrove and saltmarsh sites available on Airport land (within the Biodiversity Zone) for the programme and would provide in-kind resources to carry out the fieldwork and reporting as required.

These proposals will be further discussed with WPSQ following lodgement of the EIS/MDP.

MBSIA - Environmental Management System for Moreton Bay Fisheries

Through discussions with representatives of the Moreton Bay Seafood Industry Association on the Draft EIS/MDP, BAC was made aware of the array of collaborative research and development projects being undertaken by the Association under its Environmental Management System for Moreton Bay.

These include projects that will ensure the health of Moreton Bay fish stocks now and for future generations. The Moreton Bay EMS and many of the projects associated with it are supported by a range of groups, including the Queensland Conservation Council, the Wildlife Preservation Society of Queensland, Queensland Government agencies, recreational fishing and boating clubs and associations, the University of Queensland and importantly, seafood consumers who represent the broader public (through Seafood Lovers Queensland).

Examples of projects currently underway include:

- Trial and development of by-catch reduction devices in the otter trawl and net fisheries;
- Trial and development of hoppers for otter trawlers to improve survival rates of by-catch (non-target species);
- Development of a waste removal system to collect urban debris while trawling and dispose of it for auditing by Healthy Waterways Partnership, thus improving water quality; and

- Development and trial of devices that minimise impact of trawling on benthic communities (e.g. batwing otter boards and soft brush ground gear).

MBSIA has identified that there are many more projects underway and planned for the future.

BAC has discussed with MBSIA representatives a financial contribution of base funding for future projects that will support/improve practices related to the fisheries operating in close proximity to Airport site, namely the beam trawl fishery and inshore net fishery. These proposals will be further discussed with the Association.

Implementation of Mitigation Projects

The boundaries and management intent for the Airport Biodiversity Zone are already being implemented by BAC in the context of planning and design of other projects on the Airport (such as the Northern Access Road Project and Remote Car Parking Area). Buffer areas and similar measures are being implemented to protect these habitat areas from construction and predicted operational impacts.

As identified in **section 4.6** of this Report, QUT researchers have been engaged as part of a two year study of the Lewin's Rail habitat area, providing BAC with construction and operational management plans for its long term protection. Work is also progressing in the context of locating an alternative roost site for the White Bellied Sea Eagle pair that nest in the New Parallel Runway area and will be displaced.

BAC is continuing to engage with relevant parties associated with the Gateway Upgrade Project (GUP) to assess how the design and construction of that project affects the Old Kedron Brook Mangroves in the southern part of the Airport site. If tidal flow can be maintained in this area, BAC has indicated its willingness to investigate how the area which is currently degraded and prone to mangrove dieback can be rehabilitated and restored.

For the off-site projects discussed in the previous section, funding commitments will be dependant on approval of the New Parallel Runway project and intended timing for the commencement of work but have been progressed in good faith with the external parties. The level of funding support will be negotiated directly with the external parties.

Additional Projects

Following the public submission period, Brisbane City Council provided BAC with several potential mitigation projects related to estuarine habitats. These included a range of acquisition, rehabilitation and research projects in the local area between the Brisbane River and Pine River. Further information (including scope and cost of projects) are being provided to BAC by Council officers.

BAC's preference is to continue to proceed with the offsite mitigation projects developed in good faith with the interest groups as discussed previously, but will closely evaluate the projects proposed by the Council when such information is provided.

Addition/Omission to Draft EIS/MDP:

The discussion about prospective off-site mitigation projects in the previous section supplements and updates the text in Chapter B5, Section 5.11, Page B5-284.

No other changes to the Draft EIS/MDP are proposed for the issues raised by submitters.

4.8 B5 - Ecology – Approach Lighting Structure

(4 of 196 submissions)

Draft EIS/MDP reference: Chapter B5, Section 5.8.5.

This section of the Supplementary Report addresses issues raised by submitters regarding impacts to ecology and on commercial fishing practices from the construction and operation of the proposed approach lighting structure. These issues are addressed in Chapter B5 of the Draft EIS/MDP.

Submitter Issues:

Specific issues raised include –

- That the Draft EIS/MDP should include details of mitigation measures to minimise the effects of construction and operation of the lighting structure on plants and animals in the inter-tidal zone (1 of 196).
- That the structure will have an impact on the Moreton Bay Ramsar Site (3 of 196).
- That the structure would negatively impact inshore commercial net fisherman that utilise the area (1 of 196).

Raised by:

	Community	Govt Agency	NGO	Elected Reps
Submitter ID	190	242	193, 223	Nil
Total	1	1	2	0

BAC response:

While an approval is being sought as part of the Draft EIS/MDP process for the offshore approach lighting structure, BAC's holds the view that there is a distinct possibility that the structure will not need to be established due to improvement to aircraft navigation over the next 5 -10 years prior to runway opening.

Notwithstanding, responses to the substantive issues raised by the submitter are included below.

4.8.1 Mitigation Measures

Potential impacts on ecological values from the approach lighting structure are addressed in the Draft EIS/MDP in section 5.8.5. The Draft EIS/MDP concluded that the approach lighting structure will have negligible impacts on marine and terrestrial ecology of the area.

A very small area of benthic habitat would be removed within the footprint of the piles associated with the structure. During the piling process, highly localised turbidity impacts on water quality will occur. The Draft EIS/MDP concluded that both of these processes would have negligible impacts on benthic habitats given the limited duration and extent of any plumes and the small area of habitat under and adjacent to the piles.

The Draft EIS/MDP also concluded that shading under the lighting structure would have limited impacts to biota and their habitats given the open nature of the overhead structure (essentially a gantry). No mitigation was therefore recommended for these issues.

As indicated in the baseline study, the flat inter-tidal foreshore area adjacent to the Airport along Bramble Bay is used as a feeding habitat for migratory shorebirds some of which are of conservation significance and mitigation actions are proposed to address temporary impacts to this habitat during the construction period.

As outlined in Chapter B14, construction schedules for the nearshore components of the approach lighting structure will be implemented wherever possible to minimise potential disturbance to migratory wader birds during periods

when they are most susceptible to disturbance (March/April and September/October). An observation programme will be implemented to measure the effectiveness of mitigation measures. Following the construction period, the approach lighting structure may provide some marginal benefit to shorebirds using the area by providing additional respite/roosting areas during high tide.

In terms of larger marine animals, marine piling will be undertaken cognisant of the use of the area from time to time by dolphin species at high tide (particularly in winter months). However, the construction does not pose any significant risk to these species as it is likely that they will avoid the area during the pile driving activity. It is extremely unlikely that dugong or turtles would be present in the area at all given the lack of available seagrass food resources.

4.8.2 Ramsar Impacts

The ecology study within Chapter B5 has concluded that there would not be an impact on the ecological character of the Moreton Bay Ramsar site. This conclusion was reached through an analysis of the design and construction methodology for the structure, the physical processes and ecological values of the inter-tidal area where the approach lighting is proposed and potential for the proposed development to impact on one or more of the Ramsar criteria for which the Moreton Bay Ramsar site has been declared under the Convention. This is summarised in Chapter B5, **Table 5.8k** of the Draft EIS/MDP. Further information on potential impacts to birds and Ramsar values are addressed in **section 4.6** of this Supplementary Report.

4.8.3 Commercial Net Fisheries

There are no practicable alternatives with regard to the location, length and height of the proposed approach lighting structure as these must be designed in accordance with aviation safety requirements.

Given the extension of the structure several hundred metres from the foreshore, if the approach lighting structure was to be constructed, it is likely that regular users of the area where the approach lighting structure is proposed such as recreational boaters and commercial net fisherman would need to adapt/modify current practices and boating routes to avoid interaction with the structure and/or damage to fishing gear. However, large foreshore inter-tidal areas along this local area - about 1 km west from the proposed structure to the Kedron Brook Mouth and over 2 km to the east from the proposed structure to the mouth of Jubilee Creek – remain unaffected and would continue to be able to be used.

The approach lighting structure itself may lead to enhanced recreational and commercial fishing opportunities by creating hard structure in an area otherwise devoid of it, functioning as an artificial reef. BAC is advised that mesh net fishermen have adapted their fishing practices to fishing around the Port of Brisbane seawall extension and the same is feasible in the area of the lighting structure.

Addition/Omission to Draft EIS/MDP:

In light of the responses above, no changes to the Draft EIS/MDP are proposed in relation to these issues.

4.9 B7 - Flooding and Hydrology Issues

(10 of 196 submissions)

Draft EIS/MDP reference: Chapters B4 and B7

A range of submitters raised concerns regarding impacts the New Parallel Runway reclamation and drainage layout could have on flooding in upstream areas of the Kedron Brook Floodway catchment. Related issues about the potential for further siltation of the Kedron Brook Floodway mouth (dealt with in Chapter B4 of the Draft EIS/MDP) are also dealt with here.

Submitter Issues:

The main issues raised by submitters for this topic can be grouped as follows –

Flooding

- Reclaiming of the floodplain for the New Parallel Runway is a major change to the floodplain that will result in increased flood levels upstream that will affect residential properties. (3/10)
- BAC should guarantee no further encroachment of floodwaters onto the waterway corridors and flood plains. (1/10)
- That stormwater should not be channelled directly into Kedron Brook on the basis that a heavy downpour combined with storm surge, increasing sea levels from global warming and/or high tide will exacerbate upstream residential flooding in Cannery Creek and Pound Drain. (1/10)
- Concern whether the cumulative impacts of many development projects along and adjacent to the Floodway, climate change and tidal surges have been properly considered. (1/10)
- That more frequent flooding of the golf course is not an acceptable solution and that BAC should, 'find a way to ensure it is status quo or improved'. (1/10)
- That BAC should compensate affected residents as a result of upstream flooding from the New Parallel Runway and associated development and should be responsible for funding future drainage work required to combat the flooding. (1/10)

Siltation of Kedron Brook Floodway

- That BAC must demonstrate that the design of the Floodway and new drainage channel does not rely on regular and costly dredging by Brisbane City Council. (1/10)
- General concern about silting of the Kedron Brook Floodway from stormwater from the Airport site. (1/10)

Raised by:

	Community	Govt Agency	NGO	Elected Reps
Submitter ID	6, 109, 110, 196, 213, 227, 229	153	166	114
Total	7	1	1	1

BAC response:

4.9.1 Flooding

The New Parallel Runway development is situated outside of the Flood Regulation Lines established by the Brisbane City Council around the Kedron Brook Floodway. The maximum flood levels predicted for the New Parallel Runway are lower than the maximum flood level documented in the Brisbane City Council's *Kedron Brook Flood Study 1995* for ultimate development conditions.

The methodology and data inputs used for the hydrologic and hydraulic assessments were based on *Kedron Brook Flood Study 1995* and were presented and discussed with officers of the Brisbane City Council prior to the release of the Draft EIS/MDP.

As demonstrated in the hydraulic and hydrologic modelling in Chapter B7 of the Draft EIS/MDP, flooding of upstream residential areas will not occur from the construction of the New Parallel Runway and associated development.

The baseline and impact assessment of potential changes to hydrology from the construction of the New Parallel Runway took into account all relevant factors that could contribute to increased flooding upstream of the proposed interception drain, including use of a mean high water springs (MHWS) tailwater condition, estimated rainfall temporal patterns based on Australian Rainfall and Runoff data, and storm surge potential. It should be pointed out that the flooding assessment is also conservative on the basis that it assumes ultimate development in the catchment area and thus estimates maximum runoff.

The use of the Kedron Brook Floodway for surface water drainage of the Brisbane Airport site (including the New Parallel Runway) is consistent with the intended use of the waterway, in accordance with the registered deed of transfer from the Commonwealth Government to the Brisbane City Council signed by both parties in 1998. This document reserves the right of the Commonwealth and the Federal Airports Corporation (and its lawful successors) to drain adjoining lands into the Floodway Channel at such locations and subject to conditions as the Council shall reasonably require. Based on the findings of the flooding assessment and on the stability of the mouth of Kedron Brook discussed below, BAC would argue that the Draft EIS/MDP has demonstrated that the proposed drain is appropriate and that impacts are negligible.

As reported in Chapter B7 of the Draft EIS/MDP, the Nudgee Golf Course currently experiences flooding during a 1:100 year rainfall event. The small increases in flood levels and flow velocities over the golf course as a result of the New Parallel Runway development will have negligible impact on course use given that course playability is already affected during flood events.

Apart from the effects on Nudgee Golf Course discussed above, increased flood levels (**Table 7.8a** in Chapter B7 of the Draft EIS/MDP) and increased flood velocities (**Table 7.8b**) as a result of the New Parallel Runway development occur only within BAC land in the Landers Pocket Area or within the confines of the Floodway itself. As such, there would be no requirement for compensation to be paid to residents as a result of flooding events.

4.9.2 Siltation of Kedron Brook Floodway

The Kedron Brook Floodway is an artificial waterway designed to accommodate flood discharges. As described in detail in the Draft EIS/MDP Section 4.5.5.3, the waterway channel cross-section required for flooding is considerably larger than would be in equilibrium with the tidal flow (**Figure 4.5p**) and thus tends to accumulate coastal sediment and requires dredging to maintain the required design flood conveyance. The pattern of channel infill at the mouth is illustrated in **Figure 4.5o** of the Draft EIS/MDP, confirming that the sediment transport into the channel is caused by wave and current action across the adjacent inter-tidal flats and, while the channel is so far out of equilibrium with tidal flow, is not affected by the tidal flow.

The project will not involve any direct works or interference at or near the mouth of the Kedron Brook Floodway. Thus, any potential impacts at the mouth could only relate to indirect effects on the waterway flows through the mouth.

The Draft EIS/MDP describes in considerable detail the potential impacts on Jackson's Creek as a result of reduction in tidal flow there, leading to slow siltation of that channel. In contrast, while the Draft EIS/MDP (Section 4.8.2.5) has analysed a reduction of about 13% in the tidal flow through the Kedron Brook mouth (**Figure 4.8q**), this will have no effect on channel siltation or the requirements for maintenance dredging at the Kedron Brook mouth area. This is because the processes involved in transporting sediment into the channel at the mouth are dominated by wave/current action and will not be affected by a reduction in tidal flow, as outlined above.

Upstream of the junction with Jackson's Creek along Kedron Brook, there will be essentially no change in the tidal flows and thus no effect on potential siltation.

Further, Section 7.8.1.3 of the Draft EIS/MDP (**Figure 7.8b**) confirms that the project will not impact on flood flow velocities at the mouth. As such, there is no mechanism by which the project would have any effect on coastal processes at or near the mouth.

Addition/Omission to Draft EIS/MDP:

In light of the discussion above, no changes are proposed to Chapters B7 or B4 of the Draft EIS/MDP in relation to the flooding and hydrology issues raised by submitters.

4.10 B8 - Surface Water Quality

(2 of 196 submissions)

Draft EIS/MDP reference: Chapter B8, Section 8.7, Chapter B5, Section 5.8.7, Chapter B14, Appendix A (Acid Sulfate Soil Management Plan)

The Queensland Government's submission raised issues regarding the quality of the dredge tailwater proposed to be released during the reclamation phase of the project, particularly as it relates to total suspended solids. The submission also made comment about the water quality monitoring.

An NGO submitter representing commercial fishing interests also made recommendations about water quality monitoring in relation to nutrients and toxins from the proposed drains.

This section of the Supplementary Report deals with surface water quality issues. **Sediment quality and impacts on benthic fauna** are addressed in **section 4.11** while **Groundwater** issues are addressed in **section 4.4**.

Submitter Issues:

Specific comments and recommendations from the submissions can be grouped as follows –

Best Practice management – Total Suspended Solids

- The Draft EIS/MDP should demonstrate the use of best management practices for the operation of the sedimentation ponds rather than aiming for a 50 mg/L TSS median discharge concentration.
- BAC should propose additional management measures, considering best practice alternatives, to reduce the suspended solids concentrations and turbidity in the sediment pond discharge water.
- Re-modeling should be undertaken using anticipated discharge quality resulting from best practices as this could provide evidence that the proposal is in accordance with the management intent for the receiving waters to show an improvement in water quality for the receiving environment of Kedron Brook and Serpentine Inlet discharges.

Water Quality monitoring

- The Draft EIS/MDP should:
 - Propose more frequent and suitable monitoring of turbidity at the outlet of the sediment ponds such as continuous monitoring via an on-line turbidity meter.
 - Propose monitoring of the effects of the proposal on sediment characteristics and benthic ecology.
 - Provide performance criteria, monitoring frequencies and corrective actions in the Water Quality Monitoring Plan.
 - Improve the monitoring programme for Kedron Brook and Serpentine Inlet with monitoring locations close to the potential discharges.
- A monitoring program should be implemented to assess the dissolved nutrient levels and toxin levels in the dredge water and that appropriate action be taken to prevent unacceptably contaminated water from entering into Moreton Bay.

Raised by:

	Community	Govt Agency	NGO	Elected Reps
Submitter ID	Nil	242	223	Nil
Total	0	1	1	0

BAC response:

4.10.1 Best Practice Management – Total Suspended Solids

Estimation of Tailwater Sediment Discharge Concentration

As discussed in the Draft EIS/MDP, the quality of the supernatant dredge tailwater generated during reclamation will be affected by three primary factors:

- 1) Contact with particulates within the reclamation area, including exposed in-situ soils and material from previous fill on the Airport site;
- 2) Entrainment of fine particulates from sand extracted at Middle Banks; and
- 3) Dissolved nutrients present in the fluidisation water at Luggage Point collected by the dredge and pumped onto the site with the extracted sand.

As established through the Draft EIS/MDP, dissolved nutrients obtained by the dredge as fluidisation water at the mouth of the Brisbane River cannot be practicably treated or otherwise mitigated while the tailwater is on the reclamation site other than through strategies to reduce total suspended solids (which nutrients could bind to). As a result, this section of the Supplementary Report focuses on items 1 and 2 above

In accounting for the potential impacts of fine sediments on water quality, BAC's design consultants Maunsell developed a design and construction methodology for the proposed reclamation focussed on reasonable and practicable measures to manage these sediment impacts.

A key element in this design is the establishment of sediment settlement ponds on the site during the reclamation phase. These measures in connection with individual reclamation cells on the site and initiation of best practice erosion and sediment control techniques by the construction/dredge contractor will be used to reduce levels of fine sediment in dredge tailwater prior to its discharge off the site.

The intended design and layout of the sedimentation ponds are shown in Chapter B8, **Figure 8.7a**. The dimensions of the ponds have been devised by Maunsell to maximise fine sediment reduction (through settlement) while accommodating the large volume of supernatant dredge tailwater that will need to be accommodated on the site during each dredge cycle prior to discharge. Large flow baffles have also been included in the design of the ponds to reduce re-suspension of settling fines from wind effects.

The derivation of 47 mg/L used in the Draft EIS/MDP as a median concentration for modelling water quality impacts from the tailwater phase of the project was not arbitrarily chosen or sourced from un-related stormwater quality guidelines, but was developed following an analysis of the likely sediment loads in the supernatant dredge tailwater based on consideration of the following:

- 1) the sediment characteristics of sediments on the reclamation site and in the dredged material that may be entrained in the tailwater;
- 2) the residence time of tailwater on the site and velocity of discharge from the sediment ponds during each dredge cycle;
- 3) the anticipated performance of best practice erosion and sediment control measures that would be implemented by the construction/dredge contractor;
- 4) total suspended solids and turbidity concentrations that were being achieved by other large reclamation or land filling projects.

The methodology used to predict the concentration of sediment in the supernatant upon release from the sedimentation ponds was based on application of a first order kinetic decay and dispersion model to silt particulates

as this size of particles would be dominant at the outflow from sediment ponds in comparison to sand material, which tends to settle rapidly, with low concentration transported from within the reclamation cells to the sediment ponds.

As part of the design of the reclamation, an assessment of the concentration of TSS generation rates was made for each of the reclamation phases. In addition, a sensitivity assessment of the generation rates was undertaken to test the sensitivity of the pond discharge to generation rates.

Table 1 below shows the mean suspended solids concentration of pond outflow for the estimated TSS generation rates.

Table 1 – Estimated Reclamation Supernatant Pond Outflow Concentration

Mean TSS Concentration	Estimated Generation Rate
Start-up filling to bare reclamation cell (with best-practice erosion control)	10,000mg/L
Filling on established sand platform with runoff over insitu soils (without ponded water in the reclamation cell)	600mg/L
Filling on established sand platform with runoff over insitu soils (with ponded water in the cell)	400mg/L
Filling on established sand platform with runoff directly to supernatant ponds	50mg/L
Average concentration of pond outflow (released to receiving waters)	46.5mg/L

Description of Best Practice Measures to be Implemented by the Contractor

Reclamation for the New Parallel Runway Project will be undertaken in a number of stages to accommodate requirements for construction staging, consolidation of insitu soils and dredge capacity constraints. Reclamation cells (confined sub-areas within the reclamation footprint) will be constructed for each stage of the reclamation and filling within each cell will be subject to a number of phases. This methodology and typical arrangements that would be implemented by a dredge contractor for the reclamation have been described in Chapter A5 of the Draft EIS/MDP, specifically shown in figures 5.4a and 5.4b

As outlined in section 5.4.7 of the Draft EIS/MDP, the processes influencing entrainment of particulates in the reclamation dredge tailwater will vary between different phases of reclamation.

The four main reclamation phases occurring within the overall reclamation and corresponding to four of the five phases listed in **Table 1** above include:

- a) Initial hydraulic placement of sand fill on insitu soils with best-practice erosion controls (start-up condition);
- b) Hydraulic placement on established sand platforms with some exposure of insitu soils to supernatant within the reclamation cell (and no standing, ponded water within the cell);
- c) Hydraulic placement on established sand platforms within reclamation cells that have ponded water to control scour;
- d) Hydraulic placement within reclamation cells nearing completion, where there is insignificant storage and sedimentation occurring within the active cell.

The fifth reclamation phase (e) occurs following completion of the dredging programme when loaders/earthmoving equipment is used to fill the sedimentation ponds.

During initial hydraulic placement of sand fill into reclamation cells (phase (a) start-up condition) there is potential for erosion of insitu soils that are not protected by overlying sand layers. There are a number of best-practice construction methods that will assist in reducing the erosion of insitu soils and will be required to be adopted by the reclamation Contractor during this initial reclamation phase (as outlined below), however the start-up condition will constitute the greatest potential for erosion of insitu soils. The duration of the start-up condition is expected to be less than 1 day.

During the reclamation process, the Contractor will be responsible for the selection and implementation of best-practice erosion control techniques to minimise erosion potential and the subsequent entrainment of fine particulates from the site and from the dredge material. The contractor will use these techniques throughout the reclamation to achieve the nominated discharge standard and in relation to addressing legislative requirements that reasonable and practical measures to protect water quality must be implemented.

The types of measures that will be considered by the contractor include but are not limited to the following –

- Use of silt curtains within reclamation cells and within the sediment ponds;
- Use of discharge spreading devices for pipe ends to disperse the flow over a greater area;
- Mechanical placement (using earthmoving equipment) over highly erodible substrate.

Not all of these measures will need to be implemented at all times during the reclamation process. As identified above, most care will need to be undertaken by the contractor during initial phases of the reclamation (when dredge tailwater has most potential to entrain fine particles on the reclamation surface) and during the latter stages of the reclamation when the number of reclamation cells available for additional containment and settlement is limited and dredge tailwater run-off is directly into the constructed sediment ponds.

Ensuring best practice measures are implemented and benchmarking

Implementation of reasonable and practicable measures in accordance with best practice environmental management to protect water quality is a legislative requirement under the *Airports (Environment Protection) Regulations 1997*.

To facilitate compliance with the Regulations, BAC has engaged a dredge tailwater management specialist from the Danish Hydraulic Institute (DHI) to both peer review the work by Maunsell in the Draft EIS/MDP and to provide further advice to BAC about best practice methods and discharge standards for reclamation projects of this nature using large dredge plant and equipment.

As there is little experience and case examples of this scale and type of reclamation in Australia, the review will focus on international best practice measures and methods particularly in the Asia region.

Initial advice from DHI in the context of their review is that:

- The reclamation strategy outlined in the Draft EIS/MDP - based on the use of multiple reclamation cells connected by weirs - is considered best practice for control of sediment concentrations entering the settlement pond area;
- The use of dedicated settlement ponds is not standard practice and represents a further measure for reducing total suspended solids and turbidity from the reclamation site on receiving waters;
- The proposed discharge limit in the Draft EIS/MDP (80 mg/L based on the 80th percentile) is workable and is consistent with or better than normal practice elsewhere in the world for this type of reclamation project;
- That a more stringent maximum discharge standard for ambient water quality (such as a 50mg/L standard) will be very difficult to achieve by the industry and deviates from present best practice approach in other jurisdictions.

An area where DHI advised that the Draft EIS/MDP had deviated from 'best practice' was in the context of setting a limiting spill budget for the reclamation to complement the concentration limit outlined above.

DHI advised that best practice approaches used elsewhere for setting reclamation discharge limits is to specify:

1. a concentration limit to eliminate repeat occurrences of concentration spikes that is preferably defined as a % exceedance above a target value rather than an absolute maximum (similar to that proposed in the Draft EIS/MDP); and

2. a limiting spill budget in terms of maximum allowable sediment discharge (measured in Tonnes/day) and measured at defined different time scales (daily, weekly, and monthly).

DHI is of the opinion that a spill budget limit is more effective than a concentration limit for daily and weekly control of the works by the contractor including improving response and deployment of mitigation measures. Further, from an environmental perspective, DHI indicated that setting a spill budget limit would better ensure overall compliance with management objectives.

While water quality objectives set under the Environmental Protection (Water) Policy provide a long-term goal for ambient water quality (measured as an annual median), regulatory standards for maximum allowable sediment discharge (eg. load-based targets or objectives) do not presently exist for Kedron Brook Floodway or Serpentine Inlet/Bramble Bay. Further, there are no established sediment or turbidity tolerances for benthic habitats characteristic of those found in the two receiving environments.

Based on this it is difficult, without further consultation with regulatory agencies, to determine how an appropriate limiting spill budget would be set. However, as a means of demonstrating a commitment to best practice, BAC will engage in further discussion about development of a maximum allowable sediment discharge standard for the New Parallel Runway project with regulatory agencies to complement the existing ambient water quality discharge standard presented in the Draft EIS/MDP. This will occur prior to the commencement of any works.

Amendments to the Draft EIS/MDP are proposed in the sections below to highlight this commitment.

4.10.2 Water Quality Monitoring

Monitoring Approach On-site

The approach to monitoring within the Draft EIS/MDP (refer Chapter B8 and Chapter B14, Appendix A) acknowledges and emphasizes carrying out monitoring that can feed directly back into on-site water quality management practices.

Table 8.7j in Chapter B8 specifies daily monitoring at the weir box for each sediment pond while in operation. As specified in the table, this daily monitoring is to be for pH, turbidity and dissolved oxygen.

Performance criteria for turbidity in relation to discharge of tailwater at the weir box of sediment pond will also be required to be developed by the contractor to complement the TSS criteria proposed in the Draft EIS/MDP, once the relationship between TSS and turbidity on the site is established.

The submitter also raised queries about response time in the context of corrective actions where water quality discharge standards are not met. A related comment recommended that an automated turbidity meter be installed at the weir box to provide real time monitoring rather than relying on the daily monitoring proposed.

DHI have advised that the two day initiation of physical responses recommended in the context of the corrective actions for water quality is considered to be consistent with best practice.

To further improve response time for the initiation of corrective actions, BAC will undertake to implement the submitter's recommendation to install an automated, continuous turbidity meter at the weir box.

BAC will also look at real time monitoring for other parameters being analysed in the sediment pond such as dissolved oxygen and pH. Use of such equipment would replace the need for daily measurements for these parameters proposed in the Draft EIS/MDP.

Corresponding changes to the Draft EIS/MDP are proposed in the section below.

Monitoring in Off-site Areas – Surface Water Quality

The submitter sought an expansion of the scope and frequency of the monitoring programme for waterway sites off-airport at the mouth of Kedron Brook Floodway and in Serpentine Inlet/Bramble Bay.

BAC will further examine off-site water quality monitoring requirements prior to the commencement of the reclamation in consultation with the appointed dredge contractor.

At this stage - as outlined in the Draft EIS/MDP - the following monitoring commitments are proposed:

- 1) Monitoring at the mouth of Kedron Brook Floodway and in offshore areas from Serpentine Inlet (refer **Table 8.7j**) to validate water quality modelling in the Draft EIS/MDP. This is proposed to occur weekly for a period of two months following the commencement of reclamation tailwater discharge.
- 2) Weekly monitoring of Dissolved Oxygen, Dissolved Iron, Dissolved Aluminium, Total Suspended Solids (TSS) and pH at the drain outlets at Kedron Brook Floodway and Serpentine Inlet during the whole of the tailwater discharge phase (as outlined in the Acid Sulfate Soil Management Plan – Appendix A to Chapter B14).
- 3) Throughout the entire construction and reclamation process, reference will be made to EHMP monthly monitoring data from sites E00905, E00906 and E00902 in Bramble Bay.

Given the focus of response measures and corrective actions are triggered at the point of discharge from the sediment ponds (which as discussed above will be bolstered by a commitment to real time monitoring devices), this proposed water quality monitoring programme for off-site areas is seen as adequate.

Monitoring in Off-site Areas – Benthic Environments

The expansion of the off-site water quality monitoring programme to include benthic sediment monitoring as recommended in the Submission is not supported on the basis that:

- the impact predicted by the increase in total suspended solids and turbidity and dissolved nutrients is not seen as a significant threatening process on the continued health of these benthic systems;
- the impact during the reclamation phase on the benthic environment is temporary (between six and nine months) for each of the proposed drains and may not be detectable except at the most localised of scales given that benthic assemblages observed as part of previous sampling and the current study show significant variation of these assemblages across habitats and over time (refer **section 4.11** of this Report).

Other Monitoring – Nutrients and Toxins

In relation to the comment made by the NGO submitter about measuring dissolved nutrient levels and toxin levels in the dredge waters, it should be noted that the dredge material being used from Middle Banks is clean marine sand devoid of heavy metals and other toxicants commonly present in material dredged from harbours and rivers.

Monitoring at the weir box connecting the sediment pond to the two external drains will include weekly analysis of Total Iron, Total Nitrogen and Total Phosphorous such that the flow of dredge tailwater off the site can be regulated if unacceptable concentrations of nutrients or iron are present. Mitigation measures can also be implemented within the ponds such as adding agricultural lime to ensure waters are pH adjusted and any dissolved iron or aluminium is precipitated out of solution.

It should also be recognised that BAC already conducts a monthly water quality sampling programme that looks at nutrients, sediment and toxicants in surface waters within and around the Airport. This programme includes monitoring sites in close proximity to the proposed drainage channels at Kedron Brook Floodway and Serpentine Inlet.

The programme will continue to be implemented in the period leading up to the construction period for the New Parallel Runway, and would continue throughout the construction and post-construction period. All water quality data collected by BAC is made available to the Department of Transport and Regional Services on a monthly basis and is documented in Annual Environment Reports.

Addition/Omission to Draft EIS/MDP:

In accordance with the responses provided above, the following additions to the Draft EIS/MDP are proposed:

For Chapter B8, **Table 8.7j** and Chapter B14, **Table 14.3e**:

Under the heading, '**Performance Criteria**' in the table, insert the following text:

'Development of a limiting spill target with relevant regulatory agencies prior to the commencement of works to complement the total suspended solid concentration target identified above.'

Under the heading, '**Implementation Strategy**' in the table, insert the following text:

'The Dredge Contractor will be required to develop water quality management targets as part of the Construction Environmental Management Plan including a corresponding performance criterion for turbidity to complement the performance target set for Total Suspended Solids'

Under the heading, '**Monitoring**' in the table, omit first dot point (and the corresponding information in the table beneath it) and replace with the following text:

- *'Monitoring of supernatant discharge from the sediment ponds (at the weir outlet) is to be conducted as follows:*
 - *Turbidity, Dissolved Oxygen and pH – **Continuous** using an appropriate on-line water quality monitoring instrument;*
 - *Total Fe, Total N, Total P, Total Suspended Solids - **Weekly** sampling submitted for laboratory testing'*

4.11 B8 - Sediment Quality and Impacts on Benthic Fauna

(1 of 196 submissions)

Draft EIS/MDP reference: Chapter B8, Sections 8.4 (baseline) and 8.7 (impact) Chapter B5, Sections 5.5.4 (baseline) and 5.8.7 (impact)

The Queensland Government's submission recommended that the Supplementary Report should fully address potential impacts on sediments within the discharge waters at Kedron Brook Floodway and Serpentine Inlet including potential impacts of increased pollutant loads and sediment loads of the environmental values of the estuarine and marine benthos from the reclamation tailwater.

This issue relates to both Chapter B8 (water quality) and Chapter B5 (ecology) of the Draft EIS/MDP as it concerns the baseline condition of sediments and benthic communities in Kedron Brook Floodway and Serpentine Inlet and the impact the release of reclamation tailwater may have on these environments during the construction phase of the New Parallel Runway.

Raised by:

	Community	Govt Agency	NGO	Elected Reps
Submitter ID	Nil	242	Nil	Nil
Total	0	1	0	0

BAC response:

In response to the recommendation raised in the submission, BAC commissioned WBM Pty Ltd in February 2007 to undertake further sediment sampling within the proposed discharge environment in Kedron Brook Floodway. Samples of sediment chemistry at Serpentine Inlet have previously been obtained as part of flora and fauna investigations for the Draft EIS/MDP.

Chapter B5, section 5.5.4 describes the benthic fauna within and adjacent to Kedron Brook Floodway and Serpentine Inlet. The Draft EIS/MDP reported that communities were numerically dominated by small-bodied species that are typical of estuarine environments, and showed complex patterns in space and time. Sediment-benthos interactions were discussed and explored.

New sections are to be inserted into Chapter B8 (water quality) and Chapter B5 (terrestrial and marine ecology) of the Draft EIS/MDP that expand on the findings of the Draft EIS/MDP in the context of additional sampling information collected.

These new sections are shown in full below.

Addition/Omission to Draft EIS/MDP:

The following additions are proposed in the Draft EIS/MDP to Chapters B8 and B5 to address the recommendation in the submission:

(1) That the following text be inserted into a new section 8.4.6 within Chapter B8:

8.4.6 Existing conditions – sediment quality

8.4.6.1 Kedron Brook Floodway

Existing sediment quality within Kedron Brook was sampled on 12 February 2007 at four locations corresponding to water quality assessment points for both bed and bank substrates. The resultant samples were analysed by Queensland Health Scientific Services Laboratories and the results presented in **Table 8.4I** below. From this, it is apparent that the bed areas around the discharge point (500m upstream, Discharge Point and 500m Downstream) are dominated by extremely fine, nutrient

rich sediments with reasonable (approximately 10%) amounts of organic matter, as indicated by the TOC (total organic carbon) and LOI (Organic Matter by Loss on Ignition). As expected, the bank substrate samples show lower amounts of organic matter and nutrients and this is likely due to less very fine (<75 µm) material, however it is expected that all samples around the proposed discharge are heavily influenced by catchment sourced suspended sediments settling in the lower flow areas resultant of the increased volume of the Floodway compared to Kedron Brook proper.

The Kedron Brook Floodway Mouth samples are both much lower in both nutrients and organic matter and this is evidenced by the fact they are dominated by particle sizes in the 212µm range (fine sands) and this suggests that tidal flows through this area are relatively high as little fine sediment is being deposited and the concentrations present are likely to be influenced as much by material sourced from Bramble Bay in addition to that coming from Kedron Brook.

Several of the samples around the discharge point showed evidence of heavy metal contamination and this is to be expected given both the large contributing catchment area and close proximity of a major motorway (Gateway Arterial) to the sampling locations. The ANZECC Ocean Disposal Guidelines for Dredge Sediment (2000) were used to assess the potential magnitude of contamination and this suggests that the Nickel concentrations are slightly above screening values for effects (low-range) at the three sampling locations near the proposed discharge points.

8.4.6.2 Serpentine Inlet

Sediment sampling for Serpentine Inlet was conducted in January 2006 at 12 sample points in and around Serpentine Inlet and analysed in a NATA accredited laboratory. Results of the analysis are shown in **Table 8.4m**. As for the Kedron Brook Floodway results, the sediments are nutrient rich, however the particle sizes are dominated by sand fractions and while organic matter was not specifically analysed, it would be expected that organic matter concentrations would be lower associated with this particle size range.

The nutrient concentrations are approximately half those of the Kedron Brook Floodway samples near the proposed discharge point, but much higher than those at Kedron Brook Floodway Mouth, suggesting that catchment inputs are still a dominant source of the resultant material at the sampling locations in a similar fashion to those around the Kedron Brook proposed discharge point. In all samples, no heavy metal concentrations are greater than the screening levels given in the ANZECC Ocean Disposal guidelines and this is likely due to the majority of contributing runoff being directly from Airport lands.

8.4.6.3 Conclusions

Based on the existing ambient water quality, it is apparent that both Kedron Brook and Serpentine Inlet experience elevated suspended sediments and nutrient concentrations, particularly during and after flow events and this is evidenced by the quality of sediment at those locations. The results presented above also show that sediment nutrient concentrations were higher in Kedron Brook than in Serpentine Inlet most likely in response to the larger proportion of fine, organically enriched sediments within Kedron Brook and the larger contributing catchment area.

Table 8.4i: Kedron Brook Floodway Sediment Quality

Analyte	Description	ANZECC Ocean Disposal Guidelines (screening level)*	ANZECC Ocean Disposal Guidelines (maximum level)	Kedron Brook Floodway Mouth Bed 12/2/07	Kedron Brook Floodway Mouth Bank 12/2/07	500m Upstream Bed 12/2/07	500m Upstream Bank 12/2/07	Discharge Point Bed 12/2/07	Discharge Point Bank 12/2/07	500m Downstream Bed 12/2/07	500m Downstream Bank 12/2/07
Total Kjehl. Nitrogen	mg/kg		110	110	110	1300	530	1800	690	1600	370
Total Phosphorus	mg/kg		290	270	270	640	470	860	480	780	413
Aluminium	mg/kg		5620	6900	6900	29500	14300	33700	18800	37900	12400
Arsenic	mg/kg	20	8	7	7	10	6	12	6	12	6
Cadmium	mg/kg	1.5	<1	<1	<1	<1	<1	<1	<1	<1	<1
Chromium	mg/kg	80	11	14	14	48	32	57	36	60	27
Copper	mg/kg	65	2	3	3	24	10	29	13	29	13
Iron	mg/kg		13100	13800	13800	35800	25200	42200	26000	43200	23600
Manganese	mg/kg		500	280	280	240	170	370	190	360	160
Nickel	mg/kg	21	11	12	12	27	19	31	19	31	23
Lead	mg/kg	50	<10	<10	<10	28	<10	31	11	32	<10
Zinc	mg/kg	200	27	45	45	140	67	160	74	150	52
LOI (550°C/2hrs)	%		1.8	1.8	1.8	7.7	3.3	12.7	8.9	10.8	2.3
TOC	%C		0.06	0.05	0.05	1.1	0.34	1.2	0.59	1.1	0.22
+2.36mm Fraction	%		0.3	0.6	0.6	0.6	<0.1	<0.1	0.4	0.1	0.5
+600µm Fraction	%		2.5	0.3	0.3	1.1	0.4	0.9	0.8	0.9	2
+212µm Fraction	%		90.6	57.3	57.3	13.8	13.2	1.4	9.1	1.2	14.6
+75µm Fraction	%		5.5	39.9	39.9	16.7	51.6	3.7	48.1	4.4	58.4
-75µm Fraction	%		1.1	1.9	1.9	67.8	34.8	94	41.6	93.4	24.5

*Values greater than the screening level highlighted in this colour

*Figure 8.7d shows the indicative location of the sampling sites in Kedron Brook Floodway

Table 8.4m: Serpentine Inlet Sediment Quality

Analyte	ANZECC Ocean Disposal Guidelines (screening level)*	ANZECC Ocean Disposal Guidelines (maximum level)	Offshore			Creek			Inlet Basin						
			Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 7	Site 8	Site 9	Site 10	Site 11	Site 12	
Total Phosphorus			260	240	320	260	370	190	220	240	230	230	310	310	310
Total Nitrogen			510	120	430	140	680	410	180	230	590	820	300	910	910
Arsenic	20	70	5.8	5	5.1	5.5	8.2	3.8	6.1	5.4	5.1	5	6	4	4
Aluminium			7900	5200	8300	6100	10000	5100	4500	5900	6900	5200	7200	8300	8300
Cadmium	1.5	10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Chromium	80	370	17	14	21	15	23	13	10	15	18	13	18	25	25
Copper	65	270	5.5	2.2	6.2	2.4	9.9	4.6	2.5	3.1	9.5	6.8	4.5	11	11
Iron			15000	13000	18000	14000	20000	11000	10000	13000	14000	12000	15000	19000	19000
Mercury			0.03	0.01	0.06	0.01	0.05	0.03	0.01	0.03	0.03	0.03	0.03	0.05	0.05
Manganese			210	310	190	260	120	78	130	120	120	220	140	180	180
Nickel	21	52	11	9.2	11	9.8	12	6.9	6.8	8.9	10	8.5	10	12	12
Lead	50	220	6.3	4.2	7.5	4.5	8.5	4.2	3	3.8	13	9.1	5.4	9.9	9.9
Zinc	200	410	44	34	51	40	60	33	26	35	64	54	45	60	60
% fines			12.5	2	37.5	2	46.5	14	13.5	6.5	18	14	18.5	54.5	54.5
% sands			87.5	96	62	98	52	86	82	92	82	83.5	81	45.5	45.5
% gravel			0	2	0.5	0	1.5	0	4.5	1.5	0	2.5	0.5	0	0

*Values greater than the screening level highlighted in this colour

*Chapter B5, Appendix C shows the location of the sampling sites within Serpentine Inlet

(2) That the following be inserted at the end of section 5.8.7 within Chapter B5:

After Paragraph 1, insert new heading -

‘Construction related impacts to Estuarine Fauna’

At the end section 5.8.7, insert new sentence –

‘Further analysis of ecological responses of benthic communities to the changes in water and sediment quality are contained in Appendix E.’

Insert Appendix E within Chapter B5 -

Appendix E: Sediment-Benthos Interaction

Impacts to communities and ecosystem functioning may occur when water and/or sediment properties are altered and fall outside the tolerance limits of resident biota. There are no empirical data describing the sensitivity of resident taxa to changes in the physio-chemical properties of waters and sediments. It is known from case studies elsewhere that benthic community structure can be altered by:

1. a change in physical properties of sediments.
2. an increase in suspended sediment concentrations.
3. an increase in nutrient concentrations.

Each of these processes are considered below and summarised in **Table E-1**.

Sediment Properties

A change in physical properties of sediments may occur when there is a change in the types of sediments entering a system, or where the drivers that control bed sediment size (i.e. waves and currents) are altered. No detectable changes in current and wave patterns are expected as a result of the proposed development; hence major changes in the physical characteristics of bed sediments are not expected (except perhaps at highly localised spatial scales at the point of discharge).

It should also be noted that the quantity of sediment being discharged through the proposed outflows in Kedron Brook and Serpentine Inlet is likely to result in a maximum potential deposition depth of only 3.8mm (assuming all suspended material settles and is entirely deposited over an area of approximately 20 ha, both of which are extremely conservative assumptions). This figure was derived by calculating the total load of sediment to be discharged over the entire discharge period of either discharge point and assuming that this load would entirely be deposited within 1 km of the discharge point in an area approximately 200m wide (i.e. 20 ha). This area was derived by examining the channel width at Kedron Brook and assuming tidal influence would result in deposition between 500m downstream and 500m upstream, as these two locations were indicated to have significant concentrations of TSS as indicated in the receiving water quality modelling. The same assumptions were also applied to the Serpentine Inlet discharge. In both cases, it must be reiterated that this is an extremely conservative approach in order to demonstrate the maximum potential deposition and it is highly unlikely that this will be observed during actual construction due to wind action, greater tidal movement and lower settling rates.

On this basis, it is not expected that the discharged sediment will have little, if any detectable impact on the existing sediment chemistry of both the Kedron Brook and Serpentine Inlet discharge areas. Detectable flow-on effects to ecological communities are therefore not expected.

High Suspended Sediment Concentrations

High suspended sediment concentrations may affect light climate and cause smothering if it were to exist. This is particularly the case in areas that have low background turbidity levels, which may contain organisms that either do not have adaptations that allow them to cope with elevated suspended sediments (e.g. many filter-feeders, some fish), or are sensitive to light deprivation (i.e. plants).

Benthic fauna analyses¹ suggests that benthic fauna communities within Serpentine Inlet and Kedron Brook were numerically dominated by deposit-feeders, predators and scavengers, with the few filter-feeder taxa present recorded in low numbers. This is a typical pattern observed in turbid water soft-sediment estuarine environments world-wide.

It should be noted that nearshore benthic communities are in a state of constant flux, and show dramatic changes in structure in response to environmental conditions (e.g. flows, water temperature etc.). Species that normally would not occur in turbid water, nearshore environments may recruit into western Moreton Bay during 'drier' than normal periods, and could therefore be susceptible to increases in suspended sediment loads resulting from the discharges. However, these vagrant species would normally be lost after even under relatively small catchment inflows.

Given the high background rates of sedimentation and suspended solid concentrations in the receiving waters, it is unlikely that the predicted increases above background resulting from the proposed works would result in major, detectable changes in benthic communities in receiving waters. Any changes in benthic communities that may occur would be expected to be of a temporary nature, and are highly unlikely to result in major flow-on effects to higher order predators such as fish and birds. Furthermore, any impacts that may occur will be short-term, measurable over the life of the construction phase.

Nutrients

Several species of gastropod snail, which feed on microalgae, were a conspicuous component of the mangrove fauna. Benthic microalgae (live and dead) would also form part of the diet of many deposit-feeders on mud and sand flats within the receiving waters of the two discharge channels. It is possible that the higher turbidity resulting from the discharges may lead to highly localised reductions in microalgae densities in deeper waters, reducing food availability for these fauna. In the event that this occurred, rapid recovery would be expected after the completion of construction works, and the spatial scale of impacts would be expected to be measured in 10s of metres. The extra nutrient loads in discharge waters are unlikely to affect microalgae productivity, as it is apparent that there is already large quantities of nitrogen already available in the benthic zone, and light is probably the main control on benthic microalgae densities.

In qualitative terms, it is also known that several of the dominant taxa are often found in enriched environments, and may reach enormous densities under enriched conditions. In particular, the polychaetes *Prionospio* spp. (e.g. Ansari, et al. 1986, Pearson and Rosenberg 1978, Thompson and Shin 1983), *Owenia fusiformis* (e.g. Elias et al. 2001) and members of the family Capitellidae (ANZECC/ ARMCANZ 2000) are often found in high abundances in enriched estuarine environments.

ANZECC/ARMCANZ (2000) suggests that average capitellid densities >1000 individuals per m² may be indicative of nutrient enrichment. As shown in **Figure E-1**, site 2 in January 2006 (offshore tidal flats), and site 12 in both months (Creek habitat), had average capitellid densities ≥ 1000 individuals/m². Average densities of spionid worms were >800 individuals/m² at site 4 (January), site 12 (January and March) and site 2 (March). These results may suggest that Serpentine Inlet represent a nutrient enriched environment, although in the absence of a true baseline, it is not possible to determine whether this represents a natural or anthropogenic impact.

¹ the feeding ecology of most marine invertebrates is poorly known, and that modes of feeding may vary depending on food resource availability etc.

Pearson Product-Moment correlation analysis was undertaken to explore potential linkages between local in-situ sediment quality attributes and densities of capitellid and spionid species (refer **Table E-2**). Note that other environmental attributes that are controlled by processes operating at broad spatial scales (e.g. water column nutrients, seasonal changes in biological processes etc.) may also have a profound effect on benthic communities, but can not be accounted for in these analyses.

Weak, but nonetheless statistically significant, correlations were detected between sediment total nitrogen and total densities of capitellid ($r = 0.408$, $p = 0.047$) and spionid worms ($r = 0.493$, $p = 0.013$). Furthermore, significant correlations were detected between percentage of fines and total spionid densities ($r = 0.493$, $p = 0.0133$), although no significant correlations were detected between phosphorus and polychaetes.

There were also inter-correlations between several sediment variables (e.g. % fines and nutrients) that were correlated with polychaete densities, and it is further likely that measured sediment properties were correlated to other factors that may also exert an influence on polychaete densities (e.g. % of fines and degree of flushing, wave disturbance etc.).

Overall, these results indicate that unexplained factors, possibly together with local sediment conditions, appear to control the abundance of these species.

Given that existing communities at both discharge points experience high ambient nutrient and suspended sediment concentrations and would therefore be adapted to cope with such conditions, major changes in communities are not expected as a result of the discharges.

Further, while highly localised changes in the abundance of some organisms at the point of discharge can not be entirely dismissed, any such changes that may occur are expected to be of a short-term nature as benthic communities in this area are primarily comprised of species that are able to rapidly recolonise and recover from perturbation.

Conclusions

Based on the above, and as summarised in **Table E-1**, it is apparent that:

- Long-term, detectable effects to the physical and chemical properties of sediments are not expected;
- Any changes to benthic communities are expected to be of limited spatial extent;
- Because no major changes in habitats are expected, benthic communities should rapidly recover from any impacts.

Table E1: Summary of key impacting processes and ecological responses associated with discharges from Serpentine Inlet Drain and Kedron Brook Drain

Impact	Serpentine Inlet	Kedron Brook
Change in suspended sediment and nutrient concentrations in the water column	<ul style="list-style-type: none"> • Short-term increase in suspended solids and nutrients above background as a result of works (see Chapter B8) • Limited spatial extent of impact • Major long-term flow-on effects to benthic communities and ecosystem functioning are not expected, as changes are not greatly above background levels, and communities should quickly recover following any impact. 	<ul style="list-style-type: none"> • Short-term increase in suspended solids and nutrients above background as a result of works (see Chapter B8) • Limited spatial extent of impact • Major long-term flow-on effects to benthic communities and ecosystem functioning are not expected, as changes are not greatly above background levels, and communities should quickly recover following any impact.
Change in physical properties of sediments in receiving waters	<ul style="list-style-type: none"> • Waves and currents represent key controls on sediment properties. Quiescent areas contain finer sediments, whereas more active areas contain a higher proportion of sand. • Outlet designed such these processes will not be altered >10 m from outlet. • Little to no change in physical sediment properties, and therefore benthic communities, is expected. 	<ul style="list-style-type: none"> • Waves and currents represent key controls on sediment properties. Kedron Brook represents a relatively quiescent environment most of the time, allowing the settlement of finer particles on the seabed. • No change in currents and wave processes are expected as a result of the works. • Consequently, while there will be an increase in loads of fine sediments, the actual physical properties are not expected to be greatly altered as a result of the works.
Change in chemical properties of sediments and pore waters in receiving waters	<ul style="list-style-type: none"> • Physical properties of sediments have a strong influence on pore water chemistry. Little change in physical sediment properties expected. • Increase in pore water nutrient concentrations due to higher nutrients in overlying waters are expected in the vicinity of the outlet (i.e. within mixing zone). • Within this mixing zone, there may be an increase in the abundance of species that prefer nutrient enriched conditions (i.e. some capitellids, spionids etc.) during the construction phase. There may also be flow-on effects to other species (due to competition, tolerances to chemicals changes), possibly leading to alterations in community structure. • Any effects to sediment nutrient concentrations and benthic communities would be expected to reverse shortly after the cessation of construction phase discharges. 	<ul style="list-style-type: none"> • Little change in physical sediment properties expected. • Increase in pore water nutrient concentrations due to higher nutrients in overlying waters are expected in the vicinity of the outlet (i.e. within mixing zone). • Within this mixing zone, there may be an increase in the abundance of species that prefer nutrient enriched conditions (i.e. some capitellids, spionids etc.) during the construction phase. There may also be flow-on effects to other species (due to competition, tolerances to chemicals changes), possibly leading to alterations in community structure. • Any effects to sediment nutrient concentrations and benthic communities would be expected to reverse shortly after the cessation of construction phase discharges.

Impact	Serpentine Inlet	Kedron Brook
Change in rates of sedimentation	<ul style="list-style-type: none"> • Assuming all discharged sediments were to settle onto the seabed of the Inlet, it has been calculated that the maximum sediment accumulation would be 3.8 mm for the six months of discharge. • However, sedimentation rates are determined not only by sediment concentrations in the overlying water column, but also by current velocities and waves energy. All sediments are unlikely to settle out of suspension, hence the figure above grossly over estimates impact. • Due to increase in availability of fine sediments, the more quiescent areas (mud flats) in Serpentine Inlet could experience higher rates of fine sediment accumulation compared to present. • These fine particles are likely to represent an additional source of nutrients, which could promote secondary productivity due an increase in abundance of capitellid and spionid worms. • Any changes in benthic habitats and communities are expected to be short-term, with rapid 'recovery' expected shortly after the completion of works. 	<ul style="list-style-type: none"> • Assuming all discharged sediments were to settle onto the bed of the Floodway, it has been calculated that the maximum sediment accumulation would be 3.8 mm for the six months of discharge. • However, sedimentation rates are determined not only by sediment concentrations in the overlying water column, but also by current velocities and waves energy. All sediments are unlikely to settle out of suspension, hence the figure above grossly over estimates impact. • Any changes in benthic habitats and communities are expected to be short-term, with rapid 'recovery' expected shortly after the completion of works.

Table E-2: Pairwise correlation coefficients (Pearson r) for sediment quality attributes and abundances of selected polychaete worms

Fisher's r to z	Correlation	P-Value
Total capitellid, Total spionid	.230	.2836
Total capitellid, Prionospio spp	.246	.2507
Total capitellid, % fines (January)	-.026	.9038
Total capitellid, Total Nitrogen	.408	.0468
Total capitellid, Phosphorus	-.239	.2648
Total capitellid, Owenia	-.067	.7601
Total spionid, Prionospio spp	.998	<.0001
Total spionid, % fines (January)	.406	.0482
Total spionid, Total Nitrogen	.493	.0133
Total spionid, Phosphorus	.010	.9622
Total spionid, Owenia	.107	.6222
Prionospio spp, % fines (January)	.399	.0529
Prionospio spp, Total Nitrogen	.509	.0102
Prionospio spp, Phosphorus	.011	.9585
Prionospio spp, Owenia	.099	.6497
% fines (January), Total Nitrogen	.661	.0003
% fines (January), Phosphorus	.686	.0001
% fines (January), Owenia	.216	.3141
Total Nitrogen, Phosphorus	.326	.1209
Total Nitrogen, Owenia	.008	.9712
Phosphorus, Owenia	.286	.1779

24 observations were used in this computation.

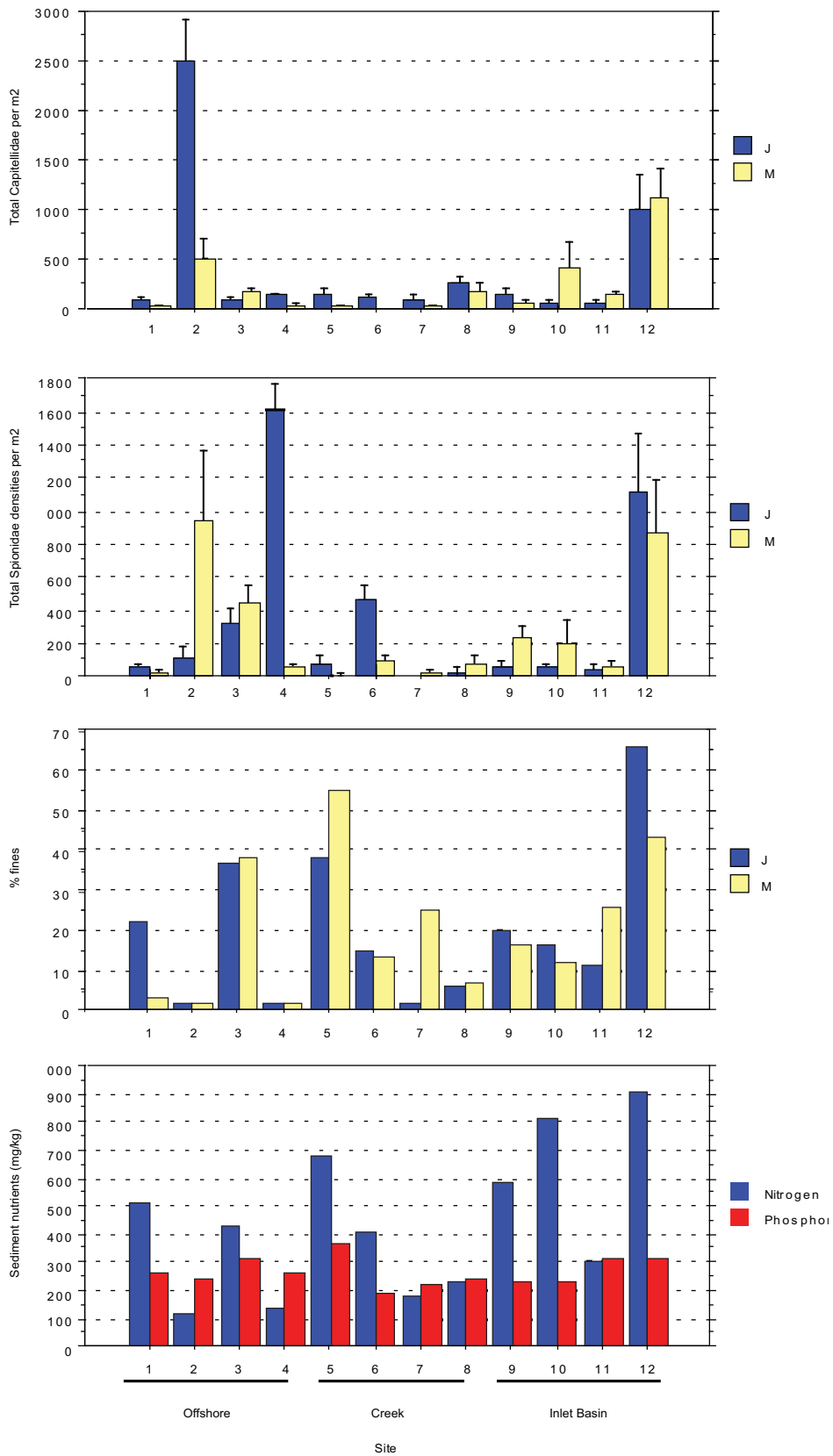


Figure E-1: Average densities (per m²) of spionid and capitellid worms (error bars represent ±S.E., n = 5/site/time), along with the percentage of fine sediment (<0.075 mm) and concentrations of total phosphorus and nitrogen in bed sediments (mg/kg)

4.12 B9 - Amenity Issues at Nudgee Beach and Other Neighbouring Communities (8 of 196 submissions)

Draft EIS/MDP reference: Chapter B9 Social Impact Assessment and specific issues addressed in B11 (Noise) and B13 (Landscape and Visual)

This section of the Supplementary Report deals with submitters that have raised concern about the amenity of local areas that would be affected by the New Parallel Runway, particularly in communities west of the Airport at Nudgee, Banyo and Nudgee Beach. Submission ID 207, from the Nudgee Banyo Northgate Citizen Action Group, had 112 signatures from Nudgee Beach Residents.

Submitter issues

Many of the issues raised in the submissions listed below relate to **Runway Separation** which is addressed in **section 3.8** of this Supplementary Report.

More specific amenity and social impact issues raised by submitters included:

- Amenity at Nudgee Beach being under threat from development of the Airport City and the closeness of the current Airport boundary and New Parallel Runway to residential areas (4/8).
- Noise impacts from bird strike guns servicing two runways instead of one (2/8).
- Noise impacts from aircraft taxiing and ground running activities (engine testing of aircraft) and whether mitigation such as highway barriers could be constructed to reduce noise (3/8).
- Intrusion of open landscape and viewing the night sky by the approach lighting structure (2/8).
- Loss of recreational use and activities in local waterways and in particular Jackson's Creek (4/8).

Raised by:

	Community	Govt Agency	NGO	Elected Reps
Submitter ID	62, 79, 104 109, 110, 142, 207	Nil	231	Nil
Total	7	0	1	0

BAC response:

4.12.1 Amenity at Nudgee Beach

The comparative analysis of locating the New Parallel Runway at a 2000m separation versus 1525m separation are comprehensively covered in Chapter A3 of the Draft EIS/MDP and discussed in **section 3.8** of this Report.

Future use of Airport land is shown in the 2003 Brisbane Airport Master Plan. *The Airports Act 1996* provides that the Master Plan must be reviewed every five years and must include community consultation. The Master Plan is approved by the Australian Government Minister for Transport and Regional Services and all Major Development Plans (MDPs) submitted for approval must be consistent with the approved Master Plan. As stated in Chapter A1 of the Draft EIS/MDP, the proposal for a New Parallel Runway at Brisbane Airport is consistent with the current (as well as previous) Master Plans. Concerns in the submissions about the 'Airport City' concept and the long term development of the Airport site is best addressed through this planning process.

The proximity of the current Airport boundary to the nearest house at Nudgee Beach will not change as a result of the proposal and is not seen as relevant given the future use of this area as Airport land is for conservation purposes as recognised under the Master Plan. This is further reinforced by the setting aside of *casuarina* plantation and grassland areas as part of the proposed Biodiversity Zone.

The proximity of the New Parallel Runway to the Nudgee Beach Community and implications from aircraft noise has been studied as part of BAC's lateral noise study and discussed on several occasions with residents in meetings with BAC staff prior to and during the public notification period for the Draft EIS/MDP. Aircraft noise impacts in relation to lateral noise are discussed in **section 3.8** of the Supplementary Report.

4.12.2 Bird Strike

Managing bird activity is part and parcel of everyday management for all airports. Bird activity has been successfully and safely managed at Brisbane Airport's current site for more than 17 years.

Bird deterrent strategies move birds away from critical areas within the airport to ensure they do not interfere with the operation of aircraft. The use of vehicle lights, sirens and horns are the preferred deterrents to move birds away from critical areas like the runways. However, 'Bird Frite' shots are also used at Brisbane Airport to move birds from around runways. These are pyrotechnic shots used to scare birds from their roosts using sound, smoke and a flash. These are used sparingly by Airport Operations Officers when vehicle lights, sirens and horns do not move birds from specific areas.

'Bird Frite' shots are currently used at the 14 (north-western) end of the cross-runway. Given that this will become the 19 (north) end of the New Parallel Runway when completed and taking into account the location of Nudgee Beach, this means that bird shot used in relation to the New Parallel Runway will not be instigated any closer to the community than is currently the situation.

It should be noted that the buffer to neighbouring communities across the Kedron Brook Floodway expands as one moves south along the New Parallel Runway centreline by virtue of the Kedron Brook Drainage Reserve controlled by Brisbane City Council. Communities at Banyo are further buffered by the location of the Nudgee Golf Course and industrial areas close to the 01 end of the Runway. Noise impacts from 'Bird Frite' shots will also be lessened in southern areas of the New Parallel Runway by ambient noise from the Gateway Motorway.

Retaining the vegetated biodiversity zone will further contribute to reducing noise of bird shot and other ground-level noise along the New Parallel Runway.

4.12.3 Aircraft Ground Noise

Aircraft ground noise from engine testing and activities of aircraft and other equipment at the terminals was discussed in Chapter B11, Section 11.8. (Aircraft taxiing, take-off and landing was assessed in Chapter D5.)

Engine testing activities are conducted in accordance with the Ground Running Procedures. The Ground Running Procedures have been developed as part of the Airport Environment Strategy, which is reviewed every 5 years. No changes are proposed to the location or type of ground running activity as result of the New Parallel Runway and there will be no engine testing on the New Parallel Runway.

There are no changes proposed to the current terminal layout at the Airport as a result of the New Parallel Runway, so there will be no changes to noise for aircraft stationed at the terminals.

4.12.4 Visual Impacts of Approach Lighting System

While an approval is being sought as part of the EIS/MDP process for the offshore approach lighting structure, BAC's holds the view that there is a distinct possibility that the structure will not need to be established due to improvement to aircraft navigation over the next 5 -10 years prior to runway opening.

If the approach lighting structure is required to be constructed in the future, there are limited mitigation measures BAC could implement to address concerns about impacts to visual amenity in terms of gantry height, alignment, type and direction of lighting and overall length of the structure given that these matters are subject to International Civil Aviation Organisation (ICAO) standards for such structures.

The Draft EIS/MDP acknowledges the local impacts this structure may cause at Nudgee Beach during daylight hours. These are reported as a local sensitivity level. In the context of night time impacts, any light impacts from the structure need to be considered in the context of far more intense light emanating from the nearby Port of Brisbane the highly directional nature of the lighting, as well as existing light from airport operations (such as the existing control tower) which would already affect Nudgee Beach Residents.

4.12.5 Access and Use of Waterways

It is the perception of several submitters that the entire Jackson's Creek system would be destroyed by the New Parallel Runway. This is incorrect as large areas of waterways and associated mangrove areas will be retained as part of the proposed Airport Biodiversity Zone. Large areas downstream of the former Cribb Island Road bridge over Jackson's Channel will be retained and managed for conservation purposes in accordance with the Airport Biodiversity Management Strategy. The waterways to be retained include the remnant Jackson's Creek (as it existed prior to the original Airport development in the early 1980s) and part of the artificial waterway called Jackson's Channel (refer Volume B of the Draft EIS/MDP, **Figure 5.11b**) which was constructed as part of the original Airport development to connect Jackson's Creek to the remnant Serpentine Creek. As shown in **Figure 5.11b**, this amounts to a linear length of over 4800m (taking into account both sides of the creek) of mangrove-lined waterway that will be retained for conservation purposes.

Unless Federal Government security restrictions in relation to these areas change, marine access for boating and recreational fishing in these retained waterways can continue, similar to the current situation. However, it should be noted that areas fenced or otherwise access restricted during the construction period and protection of the airside perimeter once the new Runway is operational, will be strictly enforced.

Addition/Omission to Draft EIS/MDP:

In light of the responses above, no changes to the Draft EIS/MDP are proposed in relation to these issues.

4.13 B10 - Surface Transport

(9 of 196 Submissions)

Draft EIS/MDP reference: Chapter B10 and Chapter A3

A number of Submissions have raised issues concerning vehicle traffic impacts from increased air travel through Brisbane Airport. Impacts of construction traffic were also raised.

Specific comments made in relation to **haulage routes** are addressed in **section 3.7** of this Report as this issue was principally dealt with in Chapter A3 of the Draft EIS/MDP.

Submitter Issues:

Submitter issues related to surface transport issues and the traffic modelling contained in the Draft EIS/MDP can be grouped as follows –

- Existing road traffic congestion levels and the relationship between this and likely future congestion (3/9).
- Ability of future road network capacity to cater for forecast demand (2/9).
- Method for airport patrons forecasting (1/9).
- Increased traffic, both background and a result of New Parallel Runway, of traffic along Toombul Road (1/9).
- Cost of providing future infrastructure not borne by BAC (1/9).
- Intrusion of Construction Vehicles in residential areas and impact during peak periods (1/9).

The Queensland Government's submission mostly focuses on the relationship of the Draft EIS/MDP with the Department of Main Roads "Guidelines for Assessment of Road Impacts of Development 2006." It also raises a number of issues concerning the impact of construction vehicles and the uncertainty of the quarry locations and haulage routes, as well as wanting to identify mitigation measures to address major road impacts.

Brisbane City Council also provided a formal submission on the Draft EIS/MDP. A meeting and presentation to discuss Council's traffic issues was held on 13th March, 2007. From this presentation it was agreed further consultation would occur between Council officers and BAC's consultants.

Raised by:

	Community	Govt Agency	NGO	Elected Reps
Submitters	109, 110, 116, 128, 150	153, 242	Nil	188, 201
Total	5	2	0	2

BAC response:

4.13.1 Traffic and Modelling Issues

1. The operation of the existing road network is stated within the Draft EIS/MDP as generally operating at or above capacity at key intersections within the study area. These existing road network deficiencies are a result of existing development.

1. Note: the feeding ecology of most marine invertebrates is poorly known, and that modes of feeding may vary depending on food resource availability etc.

2. Significant growth in travel demand is forecast as result of development in the Australia TradeCoast precinct, Hamilton Northshore as well as greater Brisbane. This forecast growth will occur irrespective of the provision of New Parallel Runway. Road and transport infrastructure such as the Gateway Upgrade Project, Airport Northern Access Road Airport Link, and North South Bypass Tunnel are all in various stages of design, planning or construction and all are expected to be operational prior to 2015. These projects are intended to provide some congestion relief to the road network. Traffic modelling undertaken for the New Parallel Runway Draft EIS/MDP indicates key elements of the road network still to be operating generally at or above capacity irrespective of the New Parallel Runway.
3. Two key components were used in forecasting future traffic demand from the Brisbane Airport terminals. Firstly, aircraft movements and secondly their travel characteristics on the Brisbane road network. The aircraft movement forecasts were undertaken as a separate exercise by specialist consultants, Tourism Futures International. Detailed surveys were undertaken of passengers at both the Domestic and International terminals in May 2005 to determine airport patrons travel characteristics upon arriving and departing the terminals. This data represents the most detailed available information on the travel characteristics of passengers travelling through the Brisbane Airport terminals. This data was applied in the New Parallel Runway Draft EIS/MDP traffic forecasting model.
4. Toombul Road, whilst busy, is one of the lesser congested routes within the study area road network. Some road network upgrades are committed for Toombul Road. The Brisbane City Council Transport Plan for Brisbane 2002 - 2016 (which is currently being updated) states that works for Toombul Road would include to "Undertake minor corridor improvements (including intersection upgrades and other local improvements) to ensure consistent capacity along corridors" to be undertaken for Toombul Road between 2013 and 2016. As a result, traffic growth on Toombul Road is likely to be higher compared with other elements of the study area network in future cases.
5. BAC has invested and is continuing to invest in new and upgraded road infrastructure on airport. BAC also contributed substantial funding to the Gateway Motorway/Airport Drive Round-about slip lane project which is located off airport. This infrastructure not only provides better access to Brisbane Airport but also provides some relief to the wider network. For example, the Gateway Deviation (a key component of the Gateway Upgrade Project) which is due for completion around 2010 crosses BAC lands. Further, the Airport Northern Access Road, a wholly BAC funded new motorway standard road between the Gateway Deviation and the Airport Terminals, will also be completed in 2009.

4.13.2 Haulage, Road Impacts and Construction Traffic Issues

GARID

The New Parallel Runway Draft EIS/MDP is in broad agreement with the "The Guidelines for the Assessment of Road Impacts of Development 2006 (GARID)". Whilst not explicitly acknowledged in the New Parallel Runway Draft EIS/MDP, the Draft EIS/MDP assessment adopts a similar method to those in the guidelines. In particular Figure 3.1 of GARID identifies a preferred process for assessing the road impact of a development. The relationship between Chapter B10 of the New Parallel Runway Draft EIS/MDP and Figure 3.1 of GARID is demonstrated below.

Development Profile

Detailed surveys and analysis underpins the traffic forecasts contained in the Brisbane Strategic Transport Model. This includes survey data undertaken in May 2005 which represents the most comprehensive data available for airport patrons origins and destinations within South East Queensland. This data, combined with detailed forecasts of future aircraft movements, provides a robust estimate of the origin and destination of future users.

Pavement Impact Assessment

Criteria 2 of GARID states that “pavement impacts need to be considered for any section of State Controlled Road (SCR) where the construction or operational traffic equals or exceeds 5% of the existing Equivalent Standard Axles (ESAs) on the road section.

Current heavy vehicle traffic from the terminals is very low (in the order of 2%) as a proportion of traffic and this trend will not change as a result of New Parallel Runway.

Haulage routes for construction traffic is highly likely to be via the Gateway Motorway to the north and south. This is subject to the letting of construction contracts at which point the location of major supply quarries will be known with certainty.

Given that there are an estimated 140 heavy vehicle trips per day to be generated during the construction phases of the New Parallel Runway, should the haulage route be concentrated to the north or south along the Gateway, which is essentially the worst case scenario for pavement life impact assessment, it is highly likely that the ESAs will be less than 3% of existing ESAs on all sections of the Gateway Motorway.

As a result of this analysis, no pavement life impact analysis was undertaken in accordance with Criteria 2 of GARID unless the 5% does not apply.

Traffic Operations Impacts

The assessment was undertaken for a 20 year design horizon; double the recommended 10 years in GARID. This further increases the relative difference between the constrained without New Parallel Runway and with New Parallel Runway scenarios. Nonetheless, key intersections within the study area where the impact of the New Parallel Runway traffic is likely to be greater than 5% were assessed as part of the operational analysis. It should be noted that the study area is similar in size to other road network studies undertaken for the wider assessment for the development of the ATC.

In terms of link deficiencies, deficiency plots are included for the 2015, 2035 and 2035 without New Parallel Runway scenarios which clearly identify road sections which operate in specific volume to capacity bandwidths. These bandwidths generally correspond to the lower Levels of Service (LOS) stated in **Table 10.4g** of the New Parallel Runway Draft EIS/MDP. Only the lower LOS were shown as the majority of the network is congested by 2035. Links identified as increasing to LOS F as result of New Parallel Runway traffic are contained in the second paragraph after **Table 10.9b** in the New Parallel Runway Draft EIS/MDP. All other links are forecast to operate over capacity without New Parallel Runway or do not operate over capacity with New Parallel Runway.

Safety Review

A discussion on likely safety issues is discussed in Section B10.13 of the New Parallel Runway Draft EIS/MDP.

Environmental and Other Issues

These are discussed in the relevant sections of the New Parallel Runway Draft EIS/MDP.

Impact Mitigation

Where the existing operation of the transport network is above the “Limits of Acceptable Operation” as defined in GARID, then GARID recommends “the development proponent will only be required to ensure that the intersection is no worse than the predevelopment conditions”.

Section B10.10 of the New Parallel Runway Draft EIS/MDP details the BAC contribution to the wider road network through infrastructure upgrade on airport land, in particular the Airport Northern Access Road. Further material on the relief the proposed Northern Access Road provides to the wider road network was presented to Brisbane City Council and Department of Main Roads officers at a presentation on 13th March 2007 and will be used as the basis for further discussion.

Additional traffic generation from New Parallel Runway will not impact upon the surrounding road network until well after 2015. (i.e. the new runway by itself does not immediately generate new aircraft movements prove slights although in time, it will allow more flights particularly during the busy periods). This timeframe is well after the completion of the Gateway Upgrade Project. However, it is noted that further discussions are intended to take place with DMR officers on more detailed traffic issues.

Addition/Omission to Draft EIS/MDP

No additions or omissions are considered necessary for Chapter B10 in the Draft EIS/MDP. BAC will continue to work with BCC and the Queensland Government on traffic issues.

4.14 B11 - Construction, Traffic and Ground Noise

(3 of 196 submissions)

Draft EIS/MDP reference: Chapter B11 and Chapter B9

3 submissions raised concerns regarding the impacts of airport ground noise.

Submitter Issues:

The main issues raised by submitters for this topic can be grouped as follows –

- Why monitoring of ground noise is not currently undertaken.
- Query about what provision is being made for a noise buffer zone.
- For residents currently disturbed by aircraft and ground noise, fear that insulation or compensation will only be given to nearest residence.
- That engine ground running should be banned on the New Parallel Runway.

Raised by:

	Community	Govt Agency	NGO	Elected Reps
Submitter ID	62, 128	Nil	231	Nil
Total	2	0	1	0

BAC response:

Airport ground noise activities include:

- engine ground running and auxiliary power units at the terminals;
- on wing and test-bed aircraft engine testing;
- construction and development sites;
- operation of plant and machinery; and
- land and airside transport services such as road and rail.

Airport ground noise is managed through the Airport Environment Strategy, a copy of which can be obtained from Brisbane Airport's website.

Concerns regarding ground noise have also been addressed in response to Chapter B9 in the Supplementary report. Concerns and questions regarding aircraft noise are addressed separately in the response to Volume D.

4.14.1 Why Monitoring of Ground Noise is Not Currently Undertaken

It was suggested in a submission that monitoring of ground noise had been flagged as a future action in an earlier Draft Airport Environment Strategy.

Engine ground running activities at Brisbane Airport are monitored and recorded in a database and any noise complaints are also registered in the database. Any complaints are reviewed and responded to in a timely and appropriate fashion. The response may include a requirement of noise monitoring of future activities responsible for the complaint. The complaints are also considered in future reviews and improvement of the procedures.

4.14.2 Noise Buffer Zone

The buffer zone around the airport is discussed in detail in the Volume A, Chapter A1 and shown in **Figure 1.1c**. The buffer zone will be maintained so that the nearest residence to the west of the airport will be 1.4 kilometres from the New Parallel Runway.

4.14.3 Ground Noise and Insulation or Compensation

One submission indicated they were disturbed by aircraft and ground noise and fears that insulation or compensation will only be given to the nearest residences.

Insulation and/or compensation is also discussed in the response to Chapter D10 in the Supplementary Report. In summary, the Australian Government currently has a policy that insulation will be provided for residences within the 30 ANEF. No residential area in Brisbane is within the Brisbane Airport 30 ANEF (or the 25 ANEF) so there is no requirement for insulation programs or compensation for any residence in Brisbane in the neighbourhood of the airport. This will remain the case when the parallel runway is operational.

4.14.4 Engine Ground Running Should be Banned on the New Parallel Runway

Noise emissions from ground running are managed in accordance with BAC's comprehensive Ground Running Procedures. These procedures provide for a consistent approach to engine ground running and control of noise exposure to the community and tenants. The procedures outline a system for approval based on location, timing, duration, direction of jet blast and throttle settings. Local community representatives have indicated their satisfaction with the procedures to date.

There is no proposed change to these procedures with the construction and operation of the New Parallel Runway and so no engine testing is proposed on the New Parallel Runway.

Addition/Omission to Draft EIS/MDP:

In light of the discussion above, no changes are proposed to Chapters B11 of the Draft EIS/MDP

4.15 B13 - Landscape Issues

(3 of 196 submissions)

Draft EIS/MDP reference: Chapter B13

Several submitters raised general issues about the loss of open space and a reduction in visual amenity associated with the proposed clearing and reclamation of the New Parallel Runway site.

Related comments about local amenity and visual impacts are addressed in **section 4.12, Amenity issues at neighbouring communities**.

Submitter Issues:

Specific comments raised by submitters in relation to this issue are as follows –

- In the context of the *casuarina* plantation proposed to be removed, submitters recommended that a greater ratio of trees be permanently replaced/re-planted on the BAC site or in the surrounding region.
- The removal of mangroves and general disturbance to the area will result in a negative impact upon the area's visual amenity and will result in a loss of tourism revenue and community amenity.

Raised by:

	Community	Govt Agency	NGO	Elected Reps
Submitter ID	69, 213	Nil	72	Nil
Total	2	0	1	0

BAC response:

4.15.1 Casuarina Plantation

The bulk of the New Parallel Runway project area proposed to be cleared is made up of *casuarina* plantation (200+ha). As stated in Chapters B5 and B12 of the Draft EIS/MDP, the *casuarina* plantations were planted following the construction of the Airport in the 1980s to stabilise the soil on the site following construction and to deter bird life that could affect aircraft safety.

An approach to re-plant an equivalent number or area of trees is not seen as practical (given constraints of available land on the Airport and in surrounding suburban areas) or warranted given the bulk of the trees in question are a plantation species, and it was recognised that the long-term intent for the vegetation was for timber harvesting.

Notwithstanding, BAC is continuing to explore the re-use of both cleared *casuarina* and mangrove vegetation for use as biomass in a nearby biomass power station.

4.15.2 Visual Amenity from Removal of Vegetation

The visual amenity of the Airport area is described and assessed in Chapter B13 of the Draft EIS/MDP and is characterised as having a local sensitivity level. The loss of vegetation on the site will not be highly visible from ground/sea level views around the Airport and is occurring in the context of an increasing industrialisation/urbanisation of the area.

Loss of tourism revenue as a result of the reduction of amenity caused by the project is viewed as being a highly speculative comment and should be considered in the context of the very substantial tourism benefits the airport and New Parallel Runway would provide as a gateway to Brisbane and the broader region.

Addition/Omission to Draft EIS/MDP:

No change to the Draft EIS/MDP is proposed in relation to this issue.

4.16 Volume B – Miscellaneous Issues and Clarifications

(6 of 196 submissions)

Submitters have raised a number of miscellaneous issues in relation to various chapters of Volume B of the Draft EIS/MDP that are dealt with in this section of the Supplementary Report. The issue raised and proposed response is shown in tabular format below.

Draft EIS/MDP reference: As shown in table below.

Raised by:

	Community	Govt Agency	NGO	Elected Reps
Submitter ID	94, 152, 172, 213, 220	242	Nil	Nil
Total	5	1	0	0

BAC response:

Ref	Issue Raised	BAC response	Addition/Omission to the Draft EIS/MDP
B2	Table 2.8 'Planning Schemes within the Area of Interest' requires updating as the planning scheme status for the Pine Rivers planning scheme and the Redland Shire planning scheme has changed from Transitional to an Integrated Planning Act 1997 (IPA) compliant planning scheme.	Noted.	That Table 2.8 be amended in the EIS/MDP to reflect that all planning schemes within the area of interest are now, "IPA compliant".
B5	Given that implications of the impending peak and subsequent decline of world oil production make the New Parallel Runway redundant (eg. peak oil theory), the impacts to fish spawning and migratory bird habitats and deterioration of water quality cannot be justified.	This issue is addressed with other comments on 'peak oil' in the context of Chapter A2.	See section 3.5 , Justification and Need.
B5	Characterisation of wetland habitats and fauna assemblages on the Airport as not being 'unique' in Chapter B5 and the Executive Summary Document is erroneous and should be corrected.	The use of the word 'unique' in these contexts is simply to convey that there are similar habitats and species elsewhere in the Bay – not to assert that the particular habitat or assemblage does not have its own inherent uniqueness. Removal of the word from the text does not change the intent that is trying to be conveyed.	In the EIS/MDP, in Chapter B5 and corresponding text in the Executive Summary document, remove reference to the word 'unique' where it is used in the context of characterisation of flora and fauna habitats and assemblages.

Ref	Issue Raised	BAC response	Addition/Omission to the Draft EIS/MDP
B5	Mangrove communities are considered to have the 'highest conservation value of all vegetation communities'. This statement is in contrast to that on page B5-283 where protection of saltmarsh is considered significant given the decline of this habitat 'across the Moreton Bay'.	Agree that this wording could be clarified to address inconsistency.	To clarify the inconsistency, the following wording on page B5-283 is suggested – <i>'Protect saltmarsh areas on the airport. These saltmarsh areas provide habitat to juvenile fish and invertebrate species as well as providing nutrients and detritus. Across the Moreton Bay region, saltmarsh communities are an important inter-tidal habitat under threat from development and natural colonisation of salt marsh areas by mangrove communities.'</i>
B5	The Queensland Government raised the need to clarify wording in Chapter B5 with regard to the application of State environmental laws over the Airport.	Proposed changes to text are shown right. These changes remove ambiguity concerning the applicability of State environmental laws on the airport site making the text consistent with the position on this issue stated in Chapter A1.	In Chapter B5, section 5.7.2, page B5-246: <ul style="list-style-type: none"> • First paragraph, omit. • Second paragraph, omit and insert as follows- <i>Queensland Government laws and policies relating to terrestrial and marine ecology apply broadly to the New Parallel Runway project and specifically in relation to those components of the New Parallel Runway project that are proposed to be situated outside the Airport boundary such as the dredge pipeline and approach lighting structure. Key Queensland Government legislation and policies relevant to terrestrial and marine ecology include:</i>
B5	Whether or not searches were carried out in the saltmarsh areas for evidence of <i>Xeromys joides</i> (rare water mouse)	This matter is dealt with in section 6.6.7.6, page B5-243. Based on previous fauna surveys on Airport land and surveys as part of the current study, it is concluded that it is highly unlikely that the water mouse occurs within the Study Site or project area.	No change to the Draft EIS/MDP proposed.
B6	As a means of recognising the removal of the community in the late 1970s, that the name Cribb Island be commemorated in some way by the Brisbane Airport Corporation as a result of the New Parallel Runway.	BAC will consider the suggestion put forward in the Submission in future naming of places or features on the Airport.	No change to the Draft EIS/MDP proposed.

Ref	Issue Raised	BAC response	Addition/Omission to the Draft EIS/MDP
B8	<p>That the significance criteria proposed in Chapter B8, Table 8.7a related to surface water quality are not appropriate given there is no Ecosystem Health Monitoring Programme monitoring site in close proximity to the discharge.</p>	<p>As outlined in Chapter A1, Page A1-33, the Draft EIS/MDP uses an impact assessment methodology based on levels of adverse impacts with the categories of ‘major’ and ‘high’ impacts representing important considerations at the national and State level.</p> <p>A change to the Ecosystem Health Report Card Rating for Bramble Bay is introduced into the assessment criteria only in relation to the highest impact category (major adverse). In this context, reference to a change in the Report Card is seen as entirely appropriate as it would indicate a highly significant impact by the project over a large spatial scale.</p>	<p>No change to the Draft EIS/MDP proposed.</p>
B8	<p>The statement in the Draft EIS/MDP that because water quality objectives are already exceeded, “the construction phase water quality is not likely to be a major cause of compliance with WQOs” should be removed or retracted as it is not in accordance with the EPP Water.</p>	<p>The statement in the Draft EIS/MDP was made to stress that the current water quality in the discharge environments at Kedron Brook Floodway and Serpentine Inlet exceeds the declared water quality objectives and that the temporary impacts from the construction phases of the New Parallel Runway project (eg. 6-9 month operation of the tailwater sediment ponds) based on the modelling findings, would not cause long-term or irreversible impacts to the environmental values of these waterways and, subsequently, the long term achievement of the objectives over time.</p> <p>Alternative wording is proposed in this section to address the submitter’s comment.</p>	<p>The paragraph starting with “It must be stressed” on page B8-406 is to be amended in the EIS/MDP to state the following:</p> <p><i>It must be stressed in considering these impacts that existing ambient concentrations for a range of parameters at both Kedron Brook and Serpentine Inlet locations already do not meet water quality objectives. As such, the focus of the management strategy will be to implement best practice environmental management measures to minimise the impacts on the waters during the construction period. Based on the findings of the modelling, the temporary impacts during the 6 - 9 month tailwater discharge period from each location is not expected to have long term or irreversible impacts such that water quality objectives for these areas cannot be improved or met in the long term.</i></p>

Ref	Issue Raised	BAC response	Addition/Omission to the Draft EIS/MDP
B13	Draft EIS/MDP has not considered the visual impact of Sandgate and Shorncliffe residential areas from the new flight paths	The current and proposed changes to airspace architecture and information about current and proposed changes to the number and frequency of aircraft overflights is shown in the Flight Path and Noise Information Booklet released with the Draft EIS/MDP. This information provides a baseline from which the submitter can determine where aircraft are flying now within or near to the suburbs in question and what changes or intensification is predicted. Ultimately, it should be recognised that based on the current flightpaths into and out of Brisbane Airport, there are few, if any, suburbs in Greater Brisbane that do not experience some level of visible aircraft overflights.	No change to the Draft EIS/MDP proposed.

Ref	Issue Raised	BAC response	Addition/Omission to the Draft EIS/MDP
B14	<p>The Draft EIS/MDP does not reference the means of providing a shutoff barrier on the permanent tidal drains in case of a major oil spill on the runway</p>	<p>Brisbane Airport has existing environmental management procedures for dealing with oil spills and other emergency environmental incidents to avoid and minimise impacts from these incidents on water quality.</p> <p>As part of these systems, interceptors and floating boom equipment are also in place for major Airport drains. These systems and measures are implemented when spills occur to isolate the contaminants within the airport drainage system and stop the release of contaminated water to outgoing drains and external waterways such as Kedron Brook Floodway, Serpentine Inlet and Boggy Creek. Remediation measures are then undertaken, if necessary, to prevent infiltration into groundwater and to minimise site impacts.</p> <p>It is acknowledged that these systems will need to be reviewed and refined prior to the operational phases of the New Parallel Runway. This review and refinement will occur during the construction period.</p>	<p>Insert new paragraph under section 14.3.8.3 that states –</p> <p><i>There are detailed procedures in place at Brisbane Airport that are implemented by Air Services Australia, Airport Tenants and BAC should an oil spill or other environmental incident occur that could impact water quality.</i></p> <p><i>These procedures will need to be reviewed to take into account the operational phase of the New Parallel Runway taking into account the new runway layout and drainage system. This review and refinement will occur during the construction period with all relevant procedures updated prior to runway opening.</i></p>
B14	<p>In relation to the proposed program to relocate fish and other marine species, this activity may require approval under the Fisheries Act 1994 and should be developed in a way which ensures optimal survival and prevents the release of stressed or poor condition fish</p>	<p>As stated in Chapter B14, Page B14-658, there is a clear statement of intent to develop and implement the estuarine fauna re-location programme in conjunction with regulatory authorities. This includes the submitter, the Department of Primary Industries and Fisheries. Approvals required will be sought as part of this development process as will seeking advice of the Department and other relevant authorities such as the Queensland EPA concerning best practice fauna handling methods.</p>	<p>No change to the Draft EIS/MDP proposed.</p>

Ref	Issue Raised	BAC response	Addition/Omission to the Draft EIS/MDP
B14	In its submission, Queensland Government agencies raised several points of clarification regarding approvals required on the Airport and in surrounding areas.	The tables about approval requirements in the Draft EIS/MDP are proposed to be retained in their current form as they continue to reflect current legal advice. Further discussion has occurred and will continue with relevant State and local regulatory agencies as part of the detailed approval stage of the project.	No change to the Draft EIS/MDP proposed.

Addition/Omission to Draft EIS/MDP:

That the identified section/page of Volume B of the EIS/MDP be amended in accordance with the far right column of the table above.