11 MAROOCHYDORE TO SUNSHINE COAST AIRPORT

11.1 Introduction

This Chapter considers the environmental and social effects of the proposed scheme between the Maroochydore Central station at Plaza Parade and the Sunshine Motorway west of the Sunshine Coast Airport where the alignment terminates at a station on the motorway. This section of the route is approximately 10.6km in length and would travels within the Sunshine Motorway corridor for the majority of its length. A new crossing of the Maroochy River would be required located adjacent to the existing motorway bridge crossing. Two stations are proposed in this section, one at Bradman Avenue and the other located east of the motorway and west of the Sunshine Coast Airport. The Airport station is proposed to cater for commuters and would incorporate adequate parking facilities.

Significance criteria have been applied to subject areas within this Chapter and used to describe the assessment of effects. For details relating to the derivation of these criteria the reader is referred to Part A, section 4.6.

11.2 Land Use Planning

This section of the proposed route is contained within the existing Sunshine Motorway reserve. West of Maroochydore centre, the route traverses through a largely undeveloped area which, subject to resolution of drainage problems, is planned for the development of a masterplanned residential community and mixed housing. Planning for this development should be cognisant of the location of this route and also bushland values identified in forward planning for this area.

Between Maroochydore Road and the Maroochy River, the corridor is adjoined by existing residential development, including a retirement village and caravan park. There is also a local commercial centre adjoining the south-eastern corner of the Bradman Avenue/Sunshine Motorway area, whilst to the west of the motorway in this location existing low intensity areas are planned for multi-storey residential and mixed housing development in the draft Maroochy Planning Scheme.

This local centre and future development areas provide the opportunity for transit supportive development for a station in this vicinity.

North of the Maroochy River, the corridor remains within the Sunshine Motorway reserve and traverses predominantly rural areas (which are protected in forward planning for their agricultural land values), together with the residential area of Pacific Paradise.

The termination of the route would occur within a Rural zoned area adjoining a significant area intended for the expansion of the Sunshine Coast Airport.

The existing portion 878 is recognised in the Draft Maroochy Scheme as “Airport Periphery” which, although originally intended for industrial development, is likely to be significantly constrained by the habitat of regionally endangered eco-system types which exist on the site. The draft Plan indicates Council will investigate other opportunities for industrial development in the locality, so as to preserve the values of these areas if possible.

This station location, in planning terms, should provide commuter opportunities from significant existing and future development areas to the north (the Coolum area and Noosa Shire); as well as opportunities to serve the airport itself.

11.3 Local Transport Issues

The proposed Bradman Avenue station adjoins the Sunshine Motorway just to the south of the Maroochy River bridge. Preliminary planning for this station suggests that it can only realistically be developed if the motorway ramps to and from Bradman Avenue are removed. It is understood that the removal of these ramps has been promoted by Maroochy Shire Council as a means of improving the amenity along the David Low Way / Bradman Avenue as a result of reducing the ‘non local’ or through traffic using this link. It is also understood that the DMR has some reservations about such a proposal as it would increase the traffic loadings on Maroochydore Road and other links. It is therefore beyond the scope of this study to resolve these issues but simply to examine the likely implications of such a station. This study does not advocate the removal of these ramps, but does evaluate the possible impact of a station if the ramps were to be removed. If the Motorway ramps are not removed, there is insufficient land available (without significant resumptions) to construct a station in this location.

Upon review of Council’s draft planning scheme documents for this area, it is evident that a station in this location could be well suited to the planned increase in residential densities along this strip. On the basis that the motorway ramps could be satisfactorily removed, each road could then provide local access opportunity to the station site. It would also be possible to consider a lower level pedestrian / cyclist link under the motorway in this location. Such a link would improve east west connectivity in the area, which is currently severed by the motorway.

The proposed location of the Sunshine Coast Airport station has been altered following the ecological
fieldwork and discussions with the EPA, DNR and others. The draft IAS nominated a station a little further to the north and adjoining the Motorway in the vicinity of Finland Road (see Figure 11.3a). However, following a submission and discussions with Maroochy Shire Council, DMR Gympie and others, it is possible that another location closer to Pacific Paradise may be more suitable. It is not necessary nor possible at this stage to resolve these issues until at least after the DMR completes its investigations into possible new interchange options for the David Low Way and Sunshine Motorway interchange.

It is however worth noting that a station in this location (see Figure 11.3b) would be expected to serve the residents of Pacific Paradise, the Sunshine Coast Airport and commuters to and from the rapidly growing residential areas to the north. The modelling work that has been undertaken to date shows that there is likely to be a substantial increase in demand across the river from 2011 onwards. This demand would comprise mainly of commuters to/from Maroochydore and areas further south, plus some visitor travel into Maroochydore.

11.4 Community Facilities and Severance

11.4.1 Future Without Scheme

The Sunshine Motorway is likely to be upgraded to three lanes in each direction and 1 HOV lane in each direction in the future. This would also entail upgrading of the Mooloolah River, Maroochydore Road, Bradman Avenue and Pacific Paradise Interchanges.

The Wise’s property in the centre of Maroochydore is currently under investigation for major urban development, possibly including a cultural centre, sporting facilities, residential and commercial land uses.

The Airport may expand through lengthening of the runway and associated infrastructure extensions.

11.4.2 Effects of the Scheme

This section focuses on the direct and indirect impacts on property, community facilities, access etc. The effects on residential amenity (including noise and visual impacts) has been assessed elsewhere in this chapter and have not been repeated here.

This section should be read in conjunction with Table 11.4.2, which provides details of all affected properties and the proportion of those properties likely to be affected by the scheme. Figure 5.5.1e&f provide the reader with the location of those affected properties.

<table>
<thead>
<tr>
<th>No.</th>
<th>Type</th>
<th>Category</th>
<th>Description</th>
<th>Total Area (ha)</th>
<th>% Affected</th>
<th>Affected by</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>P</td>
<td>Rural without buildings, land take only</td>
<td>Private owner</td>
<td>4.4</td>
<td>10.9%</td>
<td>Corridor</td>
</tr>
<tr>
<td>2</td>
<td>P</td>
<td>Rural without buildings, land take only</td>
<td>Private owner</td>
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<td>1.9%</td>
<td>Corridor</td>
</tr>
<tr>
<td>3</td>
<td>P</td>
<td>Rural without buildings, land take only</td>
<td>Private owner</td>
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<td>7.2%</td>
<td>Corridor</td>
</tr>
<tr>
<td>4</td>
<td>C</td>
<td>No existing buildings or structures, land take only</td>
<td>Allora Gardens</td>
<td>14.5</td>
<td>1.8%</td>
<td>Corridor</td>
</tr>
<tr>
<td>5</td>
<td>C</td>
<td>No existing buildings or structures, land take only</td>
<td>Allora Gardens</td>
<td>4.7</td>
<td>0.5%</td>
<td>Corridor</td>
</tr>
<tr>
<td>6</td>
<td>G</td>
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<td>Council Reserve</td>
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<td>21.5%</td>
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</tr>
<tr>
<td>7</td>
<td>G</td>
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<td>QT Reserve</td>
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<td>0.9%</td>
<td>Corridor</td>
</tr>
<tr>
<td>8</td>
<td>G</td>
<td>Reserve (uncommitted, drainage or buffer)</td>
<td>Council Reserve</td>
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<td>1.2%</td>
<td>Corridor</td>
</tr>
<tr>
<td>9</td>
<td>C</td>
<td>Existing business, building affected</td>
<td>Existing Business</td>
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<td>22.9%</td>
<td>Corridor</td>
</tr>
<tr>
<td>10</td>
<td>G</td>
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<td>Reserve</td>
<td>5.3</td>
<td>1.8%</td>
<td>Corridor</td>
</tr>
<tr>
<td>11</td>
<td>G</td>
<td>Reserve (uncommitted, drainage or buffer)</td>
<td>Council Reserve</td>
<td>4.5</td>
<td>52.6%</td>
<td>Corridor and station</td>
</tr>
</tbody>
</table>

Total number of properties affected = 11
Total number of individual land owners affected = 6

Key: G = Government  P = Private  C = Commercial

11.4.2.1 Community and Recreational Facilities and Severance

There are no community facilities directly affected by the corridor in this section, apart from minor landtake from two strips of motorway buffer planting areas located on the eastern side of the motorway and north of Maroochydore Road. On the northern bank of the Maroochy River a small area of open space would be affected by the alignment.
As the route would be travelling along the eastern side of the Sunshine Motorway, the issue of additional severance is not considered a significant issue. Existing overpasses and underpasses would be affected during the construction phase only.

11.4.2.2 Privately Owned Residential and Commercial Properties

As the route alignment travels south from the Maroochy Central Station it would again impact one of the properties owned by PF Wise and part of the same block owned by Christadale Pty Ltd. Two additional properties owned by PF Wise would also be affected as the alignment continues on the eastern side of the Sunshine Motorway.

A 10m wide strip of land would be required from Allora Gardens (a retirement village) along the southern boundary of this property where it adjoins the motorway.

A commercial property on Bradman Avenue adjoining the motorway reserve may be affected by landtake that could impact on the building on this site. The scale of this impact would be dependent upon the future needs of the Sunshine Motorway and the alignment of any new bridges across the Maroochy river.

There are two properties currently used for agricultural purposes (cane growing) at the northern most end of this section where the proposed Maroochy Airport station could be located.

11.4.3 Government Owned or Leased Properties

As previously stated, two portions of buffer land are affected by minor land take. There is also a portion of open space affected on the northern bank of the Maroochy River.

11.4.3 Response

11.4.3.1 Introduction

Many of the impacts associated with acquiring land for the corridor would be deemed to have been satisfactorily mitigated through the provision of compensation.

Requests to acquire designated land under hardship can be made under the Integrated Planning Act 1997 once the Minister for Transport designates the corridor.

During construction to avoid delays and traffic congestion in this section access would be maintained through the use of traffic management measures and sidetracking where required. Staging of construction will also help to manage the impacts of construction upon access.

Landowners directly affected by the route alignment would receive appropriate levels of compensation.

11.4.4 Assessment

The land take requirements from PF Wise, Christadales property (both currently undeveloped) and Allora Gardens is considered to be a minor adverse effect assuming that appropriate levels of compensation are provided. The commercial property on Bradman Avenue may need to be relocated resulting in moderate adverse effects.

11.5 Terrestrial Ecology

11.5.1 Future Without the Scheme

The following activities may occur in this section in the next 10-15 years and may or may not have an effect on the ecology of the area:

- The Wise's property is likely to be developed for a variety of community, commercial and residential property uses.
- The Sunshine Motorway is likely to be widened to 3 lanes in each direction and one HOV lane in each direction within the next ten years.
- The Airport may expand through lengthening of the runway and associated infrastructure extensions.

11.5.2 Effects of the Scheme

11.5.2.1 National Parks

The original alignment proposed for the railway in this section ran into the centre of Lot 878 (a proposed National Park) east of the motorway, with the original station location notionally located in the centre of this property. This would have required the direct disturbance and clearing of some 0.5ha of melaleuca forest and more than 0.3ha of heathland (0.3ha for the alignment itself, plus area for the station and associated carparks). In addition to whatever areas would have been required to allow access between the station and the Airport terminal buildings, some 800m away. It would also have exposed large portions of the central (relatively undisturbed to date) area of Lot 878 to edge effects, which they do not currently suffer.

The preferred alignment now follows the Sunshine Motorway adjacent to the eastern portion of proposed National Park Lot 878. It is proposed to run within the Motorway Easement in this section to minimise the impacts to the proposed NP site. As such, the preferred alignment does not intrude directly into Lot 878 at all.

Parts of the Motorway easement still contain vegetation in a relatively natural state (with only minor edge effects apparent), and construction along the preferred
alignment through this area would require the clearing of a band of native vegetation, totalling some 2.2ha in total. This clearing would take place adjacent to the boundary of the main eastern portion of the proposed NP, and would expose the edge of the NP area to the edge effects from which it is currently buffered. It should be noted, however, that future upgrades of the Motorway at this point would have the same impact even if CAMCOS did not proceed.

11.5.2.2 Rare and Threatened Species

Flora

Three species of rare, threatened or otherwise significant flora (namely Allocasuarina emuina, Acacia baueri and Schoenus scabripes) are known or likely to occur within habitat affected by this section of the alignment, with all specimens having been recorded from the proposed National Park area (Lot 878).

Specimens of some of these species are also likely to occur in the heathland vegetation currently remaining within the motorway easement (particularly A. emuina – W. Drake pers. comm. 1990). Any such specimens would be likely to be cleared by the preferred rail alignment. It should be noted, however, that clearing in that area of the motorway easement would in any case be required for future widening of the Motorway through this section.

Fauna

Ten rare, threatened or otherwise significant fauna species are known or likely to occur within habitats affected by this section of the rail alignment. These include False Water-rat (Xeromys myoides), Eastern Chestnut Mouse (Pseudomys gracilicaudatus), Wallum Rocketfrog (Limnodynastes freycineti), Wallum Sedgefrog (Litoria olongburensis), Wallum Froglet (G眮ina tinnula), the skink (Lampropholis guichenoti), Grey Goshawk (Accipiter novaehollandiae), Eastern Curlew (Numenius madagascariensis), Ground Parrot (Pezoporus wallacicus) and Swamp Crayfish (Tenuibranchiurus glypticus).

The Wallum Froglet and the Grey Goshawk are the only species to occur in habitats to the north and south of the Maroochy River within this section of the rail alignment. The Wallum Froglet is not considered to be threatened by development of the rail alignment between the Maroochydore Centre and Maroochy River. The development of the rail alignment through the central part of the largest bushland remnant on the “Wise’s farm land” has the potential to impact on Grey Goshawk. If the individual observed is part of a pair, resident within the area (nesting occurred at the Buderim Transfer site in 1997, though current status is uncertain), clearing and additional on-going disturbance to the bushland remnant on the “Wise’s farm land” may represent a serious loss of habitat and impact, sufficient to force the pair to relocate. If the individual ranges further west, dispersing to the lowlands to over-winter, the loss of this forest may not be as significant.

The population of wallum froglets was small (fewer than 8 males calling) and located too far east to be directly affected by the route. The rare elf skink may also occur at this site but the habitat is probably less than ideal and none were located despite a search beneath logs and debris. They would not be expected to occur in the swamps section of the site (the paperbark forest with rainforest understorey) nor in the drier eucalypt forest to the east, but may occur along the transition zone in between, where the forest is damp, but the soil not saturated. If so, the railway development would probably destroy the population as this habitat will be cleared for the development.

North of the Maroochy River, all species listed above are associated with either the River’s riparian habitat or the native habitats adjacent to airport lands. Three species, the False Water-rat, Grey Goshawk and Eastern Curlew are likely to utilise riparian habitat on the northern side of the Maroochy River. For the False Water-rat, intertidal habitat within and immediately adjacent either side of the existing motorway is thought to support feeding grounds of marginal value (suitable nesting habitat is unlikely to occur here). The only habitat that would be directly affected for railway construction would be the regenerating mangrove fringe adjacent to the eastern side of the motorway bridge. As the rail bridge would be built on pylons, thus allowing access for the False Water-rat to the mangrove fringe further west, very little potential feeding habitat would be lost in the long term. The mangrove fringe extends east from the motorway for more than a kilometre, and these areas are presumably the main feeding grounds for the False Water-rat in this region. As the railway would be built adjacent to the motorway, any habitat impact for Eastern Curlew and Grey Goshawk would be highly restricted.

State-owned land to the west of the Sunshine Coast Airport (including Lot 878) supports habitat for Eastern Chestnut Mouse, Wallum Rocketfrog, Wallum Sedgefrog, Wallum Froglet, the skink (Lampropholis guichenoti), Grey Goshawk, Ground Parrot and Swamp Crayfish. It is a very noteworthy feature of this site that it is now the southernmost habitat in Queensland for the vulnerable Ground Parrot and supports all three rare and threatened “acid” frog species.

The rail alignment, as originally proposed, would have traversed to the centre of this significant habitat area. This would have caused a severe adverse impact for species such as the Ground Parrot. Development of a rail station and associated infrastructure would also have destroyed a significant component of suitable habitat and it is highly likely that noise and general activity arising from the operation of the rail and station would have resulted in the displacement of the species.
from a larger area. Rail and station development would also have impacted on surface water hydrology and quality and would have been likely to generate a severe adverse impact on the acid frogs, particularly the Wallum Sedgefrog and Wallum Rocketfrog.

Development on this site would also have resulted in habitat removal and modification, for the rare Grey Goshawk and regionally significant Eastern Chestnut Mouse, *Lampropholis guichenoti* and Swamp Crayfish. As a result of these findings, a range of options were recommended and an alignment revision resulted in shifting the preferred route, north of Menzies Road, to lie entirely within the eastern side of existing motorway easement with the station site located within land currently used for the growing of sugarcane. A detailed field inspection of that area was not possible in the available timeframe for this study. Comments regarding potential impacts to terrestrial fauna resulting from the revised alignment are therefore based on limited field assessment and inferences drawn from knowledge of species known to occur within similar habitats occurring on the adjoining Lot 878 and their habitat preferences.

The development of the preferred (revised) rail alignment would remove habitat that is probably used by Wallum Froglet (particularly melaleuca forest to the south), Grey Goshawk (throughout the length of the route) and most significantly, Ground Parrot (within heath habitat of the northern section) and possibly Eastern Chestnut Mouse, Wallum Rocketfrog, Wallum Sedgefrog, the skink (*Lampropholis guichenoti*), and Swamp Crayfish.

The area of habitat loss would, however, be confined to a linear strip adjoining the existing motorway and the only species likely to be affected in a significant way by this loss is the Ground Parrot, due to its very specialised habitat needs, large home range, sensitivity to human impacts and history of decline in the region. The preferred alignment would avoid creating a significant intrusion into, and creation of a permanent and on-going source of disturbance within, the core of this regionally significant habitat remnant.

### 11.5.2.3 Marine Plants

The rail alignment passes through a fringe of mangroves some 80m wide on the north bank of the Maroochy River, to the immediate east of the existing Motorway crossing, and would require the disturbance of less than 0.2ha of them.

As previously discussed, the alignment would be constructed on viaduct in this section, and it is therefore expected that some mangrove specimens could be retained within these areas during construction, and that others would be able to grow under the railway lines during the operation phase.

Again, a permit would be required from the DPI for the removal/disturbance of this mangrove area.

### 11.5.2.4 Critical Nature Conservation Areas

The preferred alignment passes through 1.4km of the Marcoola Wallum Critical Nature Conservation Area (CNCA) within the motorway easement. Approximately 500m of this is through melaleuca forest, and 600m through heathland, requiring the clearing of approximately 1ha and 1.2ha respectively. At the north-western corner of the CNCA, the alignment passes through approximately 300m of lands which are more disturbed (containing a number of roads and drains) than other areas of the CNCA, but which contain patches of heathland vegetation of value both as habitat for rare and threatened species and as a significant vegetation type (see relevant sections below).

### 11.5.2.5 Significant Wetland Areas

Two identified significant wetland areas would be affected in this section, namely:

- Maroochy River Wetland (129); and
- Marcoola Wetland (194).

The Maroochy River Wetland (129) includes the mangrove fringe on the north bank of the Maroochy River. The impacts to these mangroves are discussed above under the “Marine Plants” section.

The alignment would pass along the westernmost fringe of the Marcoola Wetland (129) area, within the motorway easement, requiring disturbance to a strip of land covering approximately 3.2ha of the Wetland area (including 2.0ha of melaleuca forest and 1.2ha of heathland).

### 11.5.2.6 Riparian Vegetation

The principal riparian vegetation to be affected by this section of the route alignment is the mangroves associated with the north bank of the Maroochy River. The impacts to these mangroves are discussed above under the “Marine Plants” section.

### 11.5.2.7 Significant Vegetation Types

The key areas of Priority 1 vegetation types in this section are associated with:

- Wise’s farm land;
- Maroochy River;
- Land west of Pacific Paradise Primary School; and
- Lot 878.

In all, the approximate areas of each Priority 1 vegetation type directly affected in this section are:
Most of the melaleuca forest areas to the south of the lands associated with the Airport are degraded remnants which lie within the motorway easement.

In the vicinity of the Airport, the vegetation which would be disturbed in the preferred option lies within the motorway easement. While the alignment for the preferred option is longer than that originally proposed, it allows the station (and its attendant carparks and access ways) to be constructed in areas of existing disturbance (ie motorway reserve and cane fields) and beyond the areas of priority vegetation, thereby minimising the overall priority vegetation clearance requirement.

#### 11.5.2.8 Areas of Regional and/or local fauna habitat value

South of the Maroochy River, only small isolated remnants now remain as a result of urban development and are located on privately owned land which is subject to potential development. Whilst these are small and subject to relatively high levels of edge impacts and disturbance, they continue to provide habitat refuges for a range of native species and may contribute to the local persistence of mobile species with large home ranges (eg. Grey Goshawk). Two sites adjacent to the northern side of the motorway (“Wise’s farm land”) would be traversed by the rail alignment. The southernmost and the largest remnant would be traversed close to its centre resulting in loss of habitat, significant increases in edge environment and fragmentation of this already small isolated area. This is likely to significantly reduce its capacity to sustain habitat suitability for a diverse range of fauna. The narrow remnant strip further to the north, east and adjacent to the motorway, does not support high fauna habitat values and the impact of the rail alignment on this feature is not considered to be significant.

#### 11.5.2.9 Bushland/Wildlife Corridors

South of the Maroochy River, native vegetation cover is highly fragmented and reduced to relatively small remnants. The Sunshine Motorway currently presents a significant barrier to fauna movement, particularly for ground-dwelling fauna. The addition of a rail service adjoining the Sunshine Motorway and within the highly disturbed easement is unlikely to add significantly to the existing impediments to fauna movements.

The northern bank of the Maroochy River supports areas of riparian vegetation which are likely aid movement of fauna, principally birds, up and downstream and to nodes of remnant bushland which adjoin this vegetated fringe. In the longer term, construction of a rail bridge is unlikely to significantly affect these values.

#### 11.5.2.10 Broad Nature Conservation Areas

Within this area, the railway traverses lands designated as part of a Broad Nature Conservation Area (BNCA) between the Maroochy River and land adjacent to the Sunshine Coast Airport. The majority of these lands are either subject to agriculture, primarily sugar cane, or urban development. A relatively narrow strip of riparian vegetation on the northern side of the Maroochy River would be crossed though this is not expected to create a significant impact to this feature in the longer term.

#### 11.5.2.11 Local Council Protected Areas

No Environmental Parks or Open Space areas would be directly affected by the preferred rail alignment. The alignment passes alongside the bushland park between Pindari St and the Sunshine Motorway, but no clearing should be required within the park area itself. Some encroachment of edge effects would be expected into the vegetation contained within that bushland park, but it contains a relatively narrow, degraded patch of remnant vegetation.

#### 11.5.3 Response

See section 8.6.3 for discussion regarding compensatory habitat measures and policy.

Minimising clearing within the required “safety clearing zone” along the railway lines is recommended. This zone is the area either side of the railway lines which would be required to be maintained free of trees and/or other objects likely to be able to fall on or otherwise damage the power lines associated with the train lines, or the train lines themselves. This is recommended to minimise the disturbance to the existing native vegetation in this section and the subsequent degradation to habitat and other ecological values of the area.
It is envisaged that measures which would be undertaken to minimise clearing in these areas would include:

- Lopping of trees within the clearing zone, in preference to completely removing them;
- Retaining the low-growing vegetation layers (shrub-layer and ground-layers) except for areas where further clearing is absolutely essential; and
- Where clearing must occur during the construction phase, avoiding bulldozing (or otherwise clearing completely to ground level) - at most, slashing of existing vegetation layers should be undertaken, so that the diversity of native plant species retained is maximised, and that maintenance slashings be as infrequent as possible, to maximise the habitat value of those areas.

In areas where the alignment passes through relatively intact areas of disturbance-sensitive vegetation types, such as melaleuca forest areas, buffer plantings along the exposed forest edges is recommended, to minimise edge-effect impacts to the remaining forest areas. Such plantings should include appropriate native understorey species such as those present within the remaining forest area itself. They should be planted at the forest edges at a level of density which would provide adequate protection to the forest environment in terms of shading, weed inhibition and microclimate control in general.

At the Maroochy River crossing, clearing in the riparian zone would be restricted where possible to lopping of taller trees, with complete-to-ground clearing avoided. Separate crossings for access tracks would not be constructed, as access would be able to be gained to the crossing area from both sides of the River.

In mitigation, habitat compensation areas would be sought, clearing within the “safety clearing zone” should be minimised, buffer planting should be undertaken where clearing occurs through sensitive, relatively undisturbed vegetation, and vegetation clearing be strictly contained within the existing motorway easement. In crossing the north bank of the Maroochy River placement of pylons within the mangrove fringe would be avoided. The intensity and extent of disturbance to mangroves and intertidal flats would be restricted to only those activities critical to construction; and would result in no net loss of the current extent of intertidal flat and dry land component within the construction footprint and adjacent environment. The timing of vegetation clearance should be selected in order to minimise impacts (direct and indirect disturbances) during optimum breeding periods for both rare and threatened species (eg. September-January). Habitat removal to be strictly limited to within the existing motorway easement.

Mitigation of indirect impacts to the Maroochy River Wetland in this section of the route are expected to be minimised by construction of the railway on a viaduct structure approximately 80m in length. Few mitigation measures would be practical for the Priority Vegetation areas to the south of the Maroochy River, as most of the remnants would be removed during construction and they would be of little value to protect.

11.5.4 Assessment of Effects

The following table describes the assessment of effects of the scheme (with proposed mitigation) on terrestrial ecology on this section of the route.

<table>
<thead>
<tr>
<th>Area</th>
<th>Level of Impact</th>
<th>Area</th>
<th>Level of Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wise’s farm land</td>
<td>Major</td>
<td>Roadside remnants</td>
<td>Minor</td>
</tr>
<tr>
<td>Maroochy R (Nth bank)</td>
<td>Major</td>
<td>Melaleuca Remnants</td>
<td>Major</td>
</tr>
<tr>
<td>Canelands</td>
<td>Minor</td>
<td>Motorway Easement adjacent to Lot 878</td>
<td>Major</td>
</tr>
<tr>
<td>Lot 878</td>
<td>Minor</td>
<td>Preferred Airport Station Site</td>
<td>Not Significant</td>
</tr>
</tbody>
</table>

This section crosses the Maroochy River adjacent the existing Sunshine Motorway. As discussed previously, this section of the route crosses the Maroochy River Fish Habitat Area and a portion of mangroves on the northern bank.

11.6 Aquatic Ecology

11.6.1 Effects of the Scheme
The potential impacts associated with the construction of this section of the railway are similar to that described within the Mooloolah River section. The water quality impact assessment indicates that the overall unmitigated construction of the railway would have significant adverse effects, which would in turn have adverse consequences for aquatic ecology.

The construction and positioning of the pylons within the Maroochy River has the potential to disturb/remove aquatic fauna in the immediate vicinity of the pylon locations. Sessile fauna, such as benthic epif- and infauna at these locations is likely to be removed. However, the communities are expected to be comprised of species common to the region and would rapidly recolonise the area following completion of construction works. Additionally, the pylons are likely to be colonised by a range of encrusting fauna following placement. More mobile aquatic fauna, such as estuarine fish species, are likely to avoid the area during the construction phase should conditions be unsuitable. Opportunistic species, such as Bream (*Acanthopagrus australis*) are likely to prey upon benthic fauna disturbed by the construction process.

The construction and placement of the pylons has the potential to remobilise sediments in the area immediately adjacent to the pylon locations. This has the potential to generate plumes of turbid waters with associated down-current ecological impacts (eg. smothering of benthic fauna). However the construction/placement technique likely to be utilised in the Maroochy River crossing (driving) is unlikely to generate large plumes of turbid waters as minimal sediment will be disturbed. Turbidity impacts may be experienced in the areas immediately adjacent the pylon locations, but these are likely to be recolonised rapidly, as stated above. No seagrasses are known to occur in the immediate vicinity of the bridge crossing.

Some disturbance/clearing of mangroves associated with the route on the northern bank of the Maroochy River may be required.

Discussions with the Queensland Department of Primary Industries, Fisheries (pers. comm. Dr R.Quinn) has indicated that the placement of permanent structures (pylons) within the Maroochy River Fish Habitat Area (FHA) will require revocation of a portion of the FHA under the *Fisheries Act 1994*. Additionally, associated works within the FHA will require a permit from the QDPI under Section 51 of the Act. Liaison with the relevant sections of the QDPI will be required to determine the requirements of the revocation process and Section 51 application for the final bridge construction.

Recreational angling (both shore and boat based) within the Maroochy River is a popular activity. Access to the immediate vicinity of the crossing location to recreational and/or traditional fishermen may be somewhat restricted during the construction, but is likely to be a short term impact and limited in extent. This area represents a very small area of that available for recreational and/or traditional fishing within the River. Boat access past the construction site in the form of a navigation channel would be maintained at all times in accordance with Transport Regulations.

Commercial fishing operations are not permitted downstream of the “Cod Hole”, approximately 250m upstream of the proposed crossing location. As such commercial operations would not be directly impacted by railway construction activities.

The operational phase of the railway is unlikely to provide any significant impact to the hydrodynamic environment of the River, but unmitigated water quality impacts may have an adverse impact on the Maroochy River's water quality. As such, the operational phase of the proposed railway without mitigation measures could have an adverse impact upon the aquatic ecology of the River, due to water quality degradation.

### 11.6.2 Response

Whilst the crossings would involve the removal of a corridor of riparian vegetation, these impacts would be minimised. Additionally construction impacts would be minimised by adherence to the Environmental Management Plans (EMP's) presented in Chapter 12.

### 11.6.3 Assessment

Overall the potential impact of the construction of the mitigated CAMCOS development upon the Maroochy River, with reference to aquatic ecology, would be considered *moderate adverse* (due primarily to the presence of the Maroochy River Fish Habitat Area). The impact of the operational phase of the development would be considered to be *minor adverse*.

### 11.7 Hydraulics

#### 11.7.1 Introduction

From Maroochydore to the Airport the proposed rail line is adjacent to the Sunshine Motorway and crosses the Maroochy River and its floodplains. On the southern approach to the Maroochy River there is a large culvert in the Sunshine Motorway designed it is assumed to convey flow which breaks out of Eudlo Creek. North of the River the route passes through cane fields on the flood plain of the Maroochy River. The locations at which drainage structures are required are shown in Figure 4.7.6f and 100 year ARI flood levels and discharges, and structure sizes are given in Table 11.7.1.
WBM has an ESTRY model (WBM 1994) covering this region from which the flood levels have been adopted for this report. For the 100 year event the model has a tidal boundary peak of 2.06 m which is a synthesis of the mean spring tide and a storm surge as described by the BPA(1985) and is considered to be a conservative upper limit. It includes an allowance for wave set up which is only partially valid at a river mouth. A sensitivity test was undertaken to determine the influence of the boundary condition on the flood levels and discharges in the vicinity of the route. The 100 year event was also run with a 20 year boundary with a peak level of 1.22 m. The flood levels dropped by 10 mm and the variation in the discharge was typically less than 1%. On the basis of this analysis it was concluded the results at the route were not sensitive to the boundary conditions up to a peak of 2.06 m.

The WBM ESTRY model indicates that the Sunshine Motorway is graded above the 100 year flood level along this section. Therefore the structures in the rail line only need to be duplications of those in the Sunshine Motorway and there would not be a significant increase in levels in events up to the 100 year, assuming that the culverts are continuous through both embankments or control works are implemented between the embankments to minimise expansion of the flow. The only exceptions are MA5 and MA9. MA5 is positioned at the current David Low Way overpass. Ground levels through the overpass indicate that part of the southern overpass bridge would convey flow in a 100 year event. MA5 was sized on this estimated waterway area. MA9 is adjacent to Sunshine Motorway culvert 11A (Plan No. 258178) which is a 9/2440x600 RCBC. The ESTRY model indicates that this culvert is inadequate to pass a 100 year event without overtopping the Sunshine Motorway. If this culvert was simply duplicated in the rail embankment there would potentially be a large afflux in the 100 year event. In the physical model used by the Department of Main Roads to size these culverts some of this flow may have been conveyed by the drainage structures located approximately 550 m to the north of Finland Road or further to the south where the WBM model indicates that the culverts are oversized. Because of the uncertainty at this stage the recommended culvert structure at MA9 is larger than the one in the motorway. Further detailed modelling would be required to establish the distribution of flows.

As with the other sections of the route, the recommended waterway areas would not significantly increase upstream flood levels in events up to the 100 year. However, if the rail is graded above the 100 year flood level and above the motorway, it would increase upstream flood levels in events between that which causes overtopping of the motorway and that which overtops the rail line flood levels.

The CAMCOS route would not significantly alter the hydrology or hydraulics of the Maroochy River in flood events up to the 100 year.

<table>
<thead>
<tr>
<th>Waterway Identification</th>
<th>100 Year ARI Discharge (m³/s)</th>
<th>100 Year ARI Upstream Flood Level (mAHG)</th>
<th>Structure Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>MA1</td>
<td>230</td>
<td>2.50</td>
<td>35/3000 x 1800 RCBC</td>
</tr>
<tr>
<td>MA2</td>
<td>3020</td>
<td>2.30</td>
<td>405 m</td>
</tr>
<tr>
<td>MA3</td>
<td>50</td>
<td>2.45</td>
<td>21/3000 x 1200 RCBC</td>
</tr>
<tr>
<td>MA4</td>
<td>65</td>
<td>2.55</td>
<td>45/3000*1200 RCBC</td>
</tr>
<tr>
<td>MA5</td>
<td>-</td>
<td>-</td>
<td>4/2400*600 RCBC</td>
</tr>
<tr>
<td>MA6</td>
<td>-</td>
<td>-</td>
<td>3350 x 1520 RCBC</td>
</tr>
<tr>
<td>MA7</td>
<td>130</td>
<td>2.80</td>
<td>21/3660 x 1200 RCBC</td>
</tr>
<tr>
<td>MA8</td>
<td>180</td>
<td>2.95</td>
<td>140 m²</td>
</tr>
<tr>
<td>MA9</td>
<td>-</td>
<td>-</td>
<td>1830 x 1200 RCBC</td>
</tr>
</tbody>
</table>
11.8 Water Quality

11.8.1 Effects of the Scheme

In this section of the route, the only waterway potentially affected is the Maroochy River. The Maroochy River contains a Fish Habitat Area, and therefore the protection of water quality in the River is important. Based on available water quality information and the water quality undertaken for this study, the Maroochy River maintains good water quality.

The potential impacts to water quality from the route would be higher in the construction phase. Areas exposed from the earthworks phase could contribute a high sediment load to receiving waters, unless mitigated. Increased sediment loads to the Maroochy River would be undesirable due to the numerous adverse ecological impacts that could occur. These impacts could include: decreasing light penetration (which has implications for photosynthetic and respiration processes), reducing the suitable habitat for some aquatic species which cannot tolerate such turbid conditions and reducing the aesthetic appeal of waterways. Siltation of the waterways may also occur, which can smoother aquatic submerged macrophytes (which stabilise creek banks) and benthic fauna. Such water quality impacts to a Fish Habitat Area (as contained within the Maroochy River) would be highly undesirable.

A smaller potential impact to water quality arises from accidental spillages of materials associated with rail construction (eg. fuel, lubricants etc.) during the construction phase. These materials could cause water quality degradation in downstream waterways, if not prevented from entering waterways.

During the operational phases, potential water quality impacts from the railway line are smaller than during the construction phase, with railways having only a minor potential for water quality impacts. Some increase in pollutant loads from the railway track may result, including some oils and greases and possibly herbicides (used to keep the tracks weed free). The potential for large hydrocarbon or pollutant spillages during the operational phase would be negligible, as the railway would be electric.

During the operation phase of the railway, pollutants may accumulate on the carparking areas at stations during dry periods and be washed into downstream waterways during subsequent runoff events. Depending on the pollutants accumulated, water quality degradation and adverse impacts to aquatic flora and fauna may result. The potential for car parking impacts to water quality is limited in this section of the route. The Bradman Avenue carpark is small in extent and the larger carpark at the Sunshine Coast Airport is distant from the Maroochy River (>5km). Therefore, these carparks have only a limited potential to impact on water quality of the Maroochy River.

These impacts have the potential to affect the water quality of the Maroochy River, which currently maintains good water quality. The Mooloolah River is not only considered a feature of regional significance, but also contains a Fish Habitat Area and therefore any increase in the pollutant load to the River would be highly undesirable.

11.8.2 Response

The potential water quality impacts from the railway construction and operation would be mitigated using the following measures.

11.8.3 Best Practice Sediment and Erosion Control Measures

Providing best practice sediment and erosion control measures are implemented and maintained during the entire construction phase, the potential impacts to water quality would be minimised. Such best practice sediment and erosion control measures would include the provision of sedimentation basins, flocculation of basin discharges, minimising exposed soil areas and diverting upstream runoff from exposed areas. More detail on the sediment and erosion control measures recommended for the construction phase of the railway would be determined at the design stage of the project. It has been recommended that sediment and erosion control measures be designed to effectively treat events up to a one in one year average recurrence interval, which is the largest event which can be practically treated with best management measures.

11.8.4 Treatment of Track Runoff by Vegetated Swales

It has been recommended that runoff from the railway and access tracks be directed into vegetated swales to filter runoff prior to it flowing into vegetated areas and/or waterways. Natural topography and drainage features would be utilised to direct runoff into the vegetated swales, and native vegetation would be retained for this purpose, where possible.

11.8.5 Minimise and Manage Herbicide Application

It is recommended that the application practices of any herbicides are carefully controlled, with no excess herbicide applied. Herbicides which have been designed to minimise potential water quality and faunal impacts, by degrading rapidly to harmless by-products are recommended.
11.8.6 Treatment of Carpark Runoff

Mitigation measures recommended to reduce the load of pollutants from carparking areas prior to entering receiving waters include:

- Inclusion of sediment removal structures, such as Continuous Deflective System or CDS units, at major stormwater outlet points. Sediment removal units (such as CDS’s) are capable of removing 95% of all gross pollutants (ie litter and coarse sediment) from stormwater (Cargill R., July 1997). These units are also effective for removing hydrocarbons from stormwater runoff;
- Inclusion of vegetated swales, where possible, to filter minor runoff flows prior to discharge from carparking areas; and
- Regular sweeping and maintenance of carparking areas to minimise the accumulation of pollutants in carparking areas.

11.8.7 Assessment

The potential for erosion and high sediment loads arising from the construction phase would be largely mitigated by the use of best practice sediment and erosion control measures given above. More detail on the sediment and erosion control measures recommended for the construction phase would be determined at the design stage of the project.

Some increased potential for high sediment export would still exist, as large storm events cannot be effectively treated, even with the adoption of best management practice measures. This increased potential for sediment export during the construction phase would result in a moderate adverse water quality impact, as the potential impacts to the highly significant waterway are able to be successfully mitigated.

During the operational phase potential water quality impacts are all minor. Runoff from carparking areas at stations would be only a minor impact due to the size and/or distance from the River of the carparking areas and the railway route itself also has only a minor potential for adverse water quality impacts. Mitigation measures for the carparking areas, would ensure pollutant loads from carparking areas are minimised and only minor increases, if any, in pollutant concentrations would result in receiving waters.

Therefore, during the operational phase the impacts from the proposed railway would be minor adverse, based on only a slight potential for increased pollutant loads to nationally significant waterways.

11.9 Cultural Heritage

11.9.1 Future Situation Without the Scheme

No sites have been identified through this section. The possibility of locating artefactual material through this area is considered to be low.

11.9.2 Effects of the Scheme

No sites were defined in this section that would be affected by the proposed scheme.

11.9.3 Response

Although no sites were located, it is recommended that monitoring by Aboriginal representatives occur along the banks of the Maroochy River.

11.10 Noise and Vibration

11.10.1 Effects of the Scheme

11.10.1.1 Construction Noise and Vibration

The main construction activities on this section of the route would be:

- Construction of a railway bridge over Maroochy River at Maroochydore;
- Construction of a bridge parallel to the existing Sunshine Motorway bridge over the roundabout on Maroochydore Road;
- Construction of a bridge parallel to the existing Sunshine Motorway bridge over the roundabout at Pacific Paradise;
- Construction of a major commuter railway station and a carpark by the Sunshine Coast Airport;
- Construction of a railway embankment through mainly flat terrain not subject to flooding or controlled by culverts.

The main sources of noise during the construction in this section of the route would be the noise from the earth moving activities (large trucks and embankment compaction equipment).

The construction of the viaducts and bridges would produce noise from the use of earth moving equipment, concrete trucks, cranes, compressors, generators, and pilling equipment.

The main residential areas along the Maroochydore Centre to Sunshine Coast Airport section of the proposed route are located around the Maroochydore Centre. The background noise levels in this section is relatively high ranging from 46 dB(A) by night to 60 dB(A) by day (see Table 5.13b section 5.13). Most of the noise is generated by the traffic on the Sunshine Motorway and it is likely that a lot of the construction
noise would be only slightly higher than the existing background noise levels. In spite of this there would be some temporary loss of amenity for noise sensitive places during the construction, depending on the type of activities being undertaken and their proximity.

Available plans for future development along this section of the route indicate that there may be extensive noise sensitive development in the Maroochy Centre area of the proposed route and in the area along the existing Pacific Paradise development. As a result, by the time of the construction of the railway significantly larger number of noise sensitive places may be affected, if the future development is not undertaken with regard for the proposed railway route.

Provided proper noise mitigation measures are implemented (as specified in the EMP, Chapter 12) the noise impacts from the construction activities can be controlled to a level of moderate, temporary impact at noise sensitive places.

Vibration levels due to construction activities are expected to be generally very low and would typically not be perceptible at the nearest residential locations. The activities which would tend to create the highest levels of vibration would be piling, rock breaking (if required), and vibrating compaction equipment. If this work is expected to occur within 25m of residences then vibration may become perceptible and monitoring would be undertaken in accordance with the EMP to address any concerns residents may have regarding the activities.

11.10.2 Operational Noise and Vibration

In the Maroochydore Centre to Maroochy Airport section of proposed railway line the predicted levels indicate that the noise criteria would be meet at a distance of 22 metres from the centre-line of the track on embankments and at a distance of 27 metres from the centre-line of the track on concrete bridges or viaducts (see Figure 11.10.2). The only area along the route where the EPP (Noise) planing criteria would be exceeded at noise sensitive places is to the south of Maroochy River, near Henley Park in Maroochydore. There are 16 properties along Maroochy Waters Drive, and a larger retirement village off Main Road, that are very close to the railway line (approximately 14 metres). Noise attenuation measures, such as noise barriers, will need to be constructed in this area.

To the south of this area the Sunshine Motorway is elevated through the Maroochydore Road Interchange. The nearest residential properties are 70 metres from the centre-line of the railway line track in this area. The noise level in this area would therefore exceed the noise indicator levels. The noise sensitive receptors at Pacific Paradise Development (nearest properties are 100 metres from the railway centre-line) would also experience noise levels above the indicator levels.

The future development plans for the area involve major residential development in the areas where the proposed railway line passes. If the noise level from future trains is not reduced, the increased residential development would result in larger number of noise sensitive places being affected by the operation of the railway.

Vibration levels due to electric trains passing residential areas are not expected to be perceptible to building occupants. In addition to the electric passenger trains, maintenance work forms part of the operation noise associated with the rail lines. Most maintenance vehicles are powered by diesel motors and are fitted with exhaust silencers and in some cases acoustic enclosures are installed around the engines to minimise noise. Whilst this will reduce the noise, the primary operations of tamping, grinding, ballast screening and placement are often noisier and are more difficult to treat. These operations are performed only occasionally and hence are not considered to represent significant noise impact.

A railway station is proposed near Maroochy Airport for the section of the route. The two potential sources of noise from the station are public address (PA) systems used for announcing train information to passengers and vehicle noise associated with passenger set-down and pick-up carparks.

11.10.2.1 Response

Noise attenuation measures, such as noise barriers, will need to be constructed in this area. The design of the barriers will need to consider the complication that some of the residences are two story dwellings. The height of any noise barriers in this area will have to be significant to reduce the noise level at the upper floor of the affected two storey houses.

The PA systems will be designed to minimise noise to neighbours while maintaining speech intelligibility for passengers on the station platform. Design considerations include the use of directional loudspeakers aimed along the platform and spaced close together (eg. 15m) to allow the source level to be reduced. Modern systems also include the use of an automatic gain control circuit to control the level of automatic train announcements.

The station car park near the Sunshine Coast Airport is intended to have 150 – 300 spaces in the medium term and potentially some 500 spaces in the longer term. This may be less if the Pacific Paradise station is developed, therefore providing car parking capacity. Noise impacts will be minimised by arranging the carpark to be accessed as directly as possible via busier roads (eg. the Sunshine Motorway). The impact...
from this station is expected to be minimal due to the distance from residential areas. If the carpark was directly adjacent to noise sensitive areas, noise barrier fences may be erected to reduced intrusion from noise and car headlights.

11.10.2.2 Assessment

With the installation of suitable noise barriers the noise impact at the most exposed noise sensitive places would result in moderate adverse effects.

11.11 Landscape

11.11.1 Introduction

The landscape analysis has focused on those areas that have been identified by the Consultants and through the public consultation process as being of concern to local residents. Within this section of the route the following locations are assessed.

- Sunshine Motorway just north of Commercial Road where the rail alignment would be located within the Sunshine Motorway corridor; and
- Maroochy River crossing where the bridge structure carrying the rail line is adjacent to the Motorway crossing.

11.11.2 Effects of the Scheme

11.11.2.1 Sunshine Motorway at Commercial Road

The rail alignment is proposed to run along the eastern side of the Sunshine Motorway reserve. In the future, the Sunshine Motorway will have to be upgraded to accommodate future demand. Figure 11.11.2a shows this context with the widened motorway and the rail alignment within the Motorway reserve.

The impacts within this precinct are significant due to the constrained amount of land within the reserve to accommodate road widening and the rail alignment and hence the lack of room for significant landscape buffers. Residents at Regents Landing Retirement Village to the east of the Motorway are not currently exposed to views from the Motorway due to the presence of a noise mound. There would be a requirement for acoustic barriers to be located adjacent to the Regents Landing Retirement Village and to the north. It is anticipated that these barriers would buffer residents from any views from the rail alignment.

11.11.2.2 Maroochy River Crossing

A new bridge structure would be required to take the rail across the Maroochy River. This structure would be constructed at the same height as the existing Sunshine Motorway bridge and would parallel it for its length. Figure 11.11.2b shows the bridge in relation to the Sunshine Motorway bridge. The new bridge would be visible from residential properties located on Bradman Avenue. However, as it does not break the skyline above or below the existing road bridge that lies behind, it is considered that it would be absorbed into the existing environment and not be visually intrusive.

11.11.3 Mitigation

11.11.3.1 Sunshine Motorway at Commercial Road

Existing vegetation would be retained where possible and the acoustic barriers would also be buffered with planting which would assist in minimising the visual impact upon the surrounds. The planting and barrier design would need to be coordinated to achieve an aesthetically acceptable screen.

11.11.4 Assessment of Effects

The visual effect of the rail alignment for residents along the Sunshine Motorway is considered to be moderate adverse given the limited scope for mitigation in this corridor.

The effect of the rail bridge across the Maroochy River on the local landscape is considered to be minor adverse.

11.12 Overall Effects

The majority of the route in this section follows the eastern edge of the Sunshine Motorway all the way to Sunshine Coast Airport. A new crossing of the Maroochy River is required. West of the Maroochy centre, the route traverses through largely undeveloped land which is expected to be development as a master-planned community. Land take from these properties is considered to result in a minor adverse effect given that appropriate levels of compensation are provided. The remainder of the route would not cause any significant detrimental effects on land use and planning for the area as it is mostly contained within the Sunshine Motorway reserve.

A significant issue that arose during the IAS process was the importance in ecological terms of lot 878 adjacent to Sunshine Coast Airport. At the end of Stage 2 of the project the rail alignment terminated in the centre of this property. Consultation and ecological field work during the development of the IAS has recognised the importance of this area and consequently the alignment has been moved so that it continues within the motorway reserve to a point north west of the existing airport buildings. The station is now proposed on land use for cane farming and is located outside of ecologically sensitive areas.
Major adverse effects would result with construction of the alignment across the north bank of the Maroochy River, through remnants of melaleuca and within the motorway easement adjacent to Lot 878. In addition, loss of melaleuca woodland on land owned by DMR adjacent to the Sunshine Motorway would also result in major adverse effects. Minor adverse effects would result from impacts on roadside remnants and lot 878. During construction of the new rail bridge across the Maroochy River, moderate adverse effects on aquatic ecology would be anticipated due to impacts on the Fish Habitat Area. Operational effects on aquatic ecology within this section would be minor adverse.

A range of mitigation and offset measures have been incorporated with the scheme to ameliorate these impacts such as:

- Inclusion of a compensatory habitat policy to offset losses of areas of ecological significance that cannot be mitigated. The intent is that areas of at least equal conservation value would be sought which could be acquired and/or rehabilitated to compensate for the loss and/or degradation (including edge effects) of native flora and fauna habitat within the public transport corridor.
- Specific design features to mitigate direct and indirect effects on ecological features including:
  - placement of pylon structures in riverine environments to avoid marine plants such as mangroves;
  - Buffer planting along exposed forest edges; and
  - Measures to minimise additional clearing outside of that required for safety reasons.

During the operational phase of the rail alignment impacts of the rail alignment would be minor adverse based on only a minimal potential for increased pollutant loads to nationally significant waterways ie Maroochy River FHA.

No cultural heritage sites were identified in this section.

With the installation of suitable noise barriers the noise impact at the most exposed noise sensitive places would result in moderate adverse effects.

With respect to landscape and visual effects for residents along the Sunshine Motorway, the proposed noise attenuation measures and associated landscape planting would act as a visual screen from the Motorway corridor. In visual terms the effect is considered moderate adverse given the limited scope for mitigation in this corridor. The effect of the rail bridge on the local landscape across the Maroochy River is considered to be minor adverse.

Continuation of the CAMCOS corridor north from Maroochydore has implications for the grading of the SAL over the Sunshine Motorway and into Maroochydore. Construction activities in this area and along the Sunshine Motorway will need to be carefully staged so as not to cause major disruption to the future gateway entry of Maroochydore. Local traffic management plans will need to be developed in conjunction with Maroochy Shire and Main Roads.