For example, consideration should be given to sequencing the development of the KRA 65A2 to accommodate expansion of the marine precinct in Steiglitz. The expansion of the marine industry at Steiglitz into the area containing quality sand resources will provide an opportunity for the two development activities to coincide. The sand extraction will add to the material resource derived from the area without the detriment impact of a residual and isolated lake.

In summary, based on the demand and supply data, development of sand extraction precincts within the timeframe of this study should be limited to KRA 65 A1 and KRA 65 B. Extraction of the KRA 65A2 should be sequenced to accommodate expansion of the marine precinct, should the demand for such expansion be identified.

Figure 3-5 provides a suggested sequencing of sand extraction sites based on the above considerations.
Key Resource Areas 65A1 and 65B have the capacity to provide enough sand resources for the region until 2031.

KRA 65A2 resources are to undergo staged extraction to allow the development of marine facilities.

Combined Environmental Constraints includes:
- Areas of regional & state biodiversity significance
- RAMSAR sites
- Koala Conservation Area
- Wetlands
- Nature Conservation Act protected areas
- Endangered regional ecosystems (including Eucalypts)
- Fish habitat areas

Legend:
- Study area
- Local Government Boundary
- Urban Footprint, Oct 2006
- Cadaster, January 2008
- Key resource area buffer
- Key resource area
- Waterbodies & waterways
- Railway station
- Railway line
- Good Quality Agricultural Land
  - Class A
  - Class B
- Combined environmental constraints
- IRTC possible corridor
- Freeway or Highway
- Major road
- Haul routes
- Existing land use
  - Low Density Residential
  - Urban & Residential
  - Business & Industry
  - Extractive Industry Rock
  - Extractive Industry Sand
  - Past extraction sites

Source: Department of Infrastructure & Planning
Gold Coast City Council
SEQ Catchments - Satellite Imagery 2.5m SPOT (2005)
3.3 Sport and recreation activities

3.3.1 Motor sport facilities

Site selection options

This study identified a broad area for further investigation for location of motor sport facilities and motorised outdoor recreation. Selection of individual sites for location of motor sport facilities would require detailed examination of a significant number of issues, including landowner support, security of tenure, as well as a comprehensive environmental impact assessment, that are outside of scope of this study.

The selected area for potential motorsport facility is located in the vicinity of Stapylton Landfill and Stapylton quarry site. The area was identified based on the following considerations, based on the site selection criteria provided in s.2.3.2:

- Direct access to a primary road network – the selected area is serviced by a direct connection to the Pacific Motorway via Stapylton Jacobs Well Road. Location of a motorsport facility elsewhere within the study area, would involve greater impact on rural and residential areas associated with the through traffic.

- Proximity to residential land uses/ Noise impact management – The selected area is in proximity to the Pacific Motorway and existing industrial activities that are known generators of high decibel noise levels (> 90dB). Location of a motor sport facility within this area is likely to have minimal effect on the existing situation in terms of noise generation. In addition, the selected area is adjacent to areas dedicated to existing and future industrial land uses that are not identified as sensitive noise receivers. In addition, the landscape characteristics of post mining sites have potential to address buffering requirements for noise mitigation of a motor sport facility.

- Potential to minimise impact on GQAL – more than 50% of the selected area is represented by existing or past extraction sites, with already disturbed land cover.

- Potential for expansion – the selected area presents an opportunity for potential expansion of a motor sport precinct to the west up to 50 hectares. The selected area is in proximity to proposed IMETT development. Should this development be approved, there is potential for the motor sport precinct to be co-located with the facilities offered as part of the IMETT development.
Combined Environmental Constraints includes:
- Areas of regional & state biodiversity significance
- RAMSAR sites
- Koala Conservation Area
- Wetlands
- Nature Conservation Act protected areas
- Endangered regional ecosystems (including Eucalypts)
- Fish habitat areas

Site options: Motor sport facilities
3.3.2 Outdoor recreation

Site selection options

Location of low-impact, non-motorised outdoor recreation activities (e.g. bushwalking or kayaking) primarily relies on presence of unique landscape features and characteristics that would satisfy requirements of a particular outdoor recreation type (e.g. availability of bushland for bushwalking or a water body for kayaking).

Location of motorised outdoor recreation (i.e. trail bike riding) is largely dependent on a site’s accessibility via primary road network, compatibility with surrounding land uses, and suitability of the terrain for identified recreational activities.

Given the largely non-urban nature of the study area, and as a consequence, a significant number of individual sites that would potentially satisfy selection criteria as identified in s.2.4.2, location of outdoor recreation activities (both motorised and non-motorised) within the study area was considered to be largely opportunistic, subject to, among other considerations, availability of land based on its tenure and ownership. Accordingly, once sites become available these should be evaluated against the selection criteria provided in s.2.4.2 of this Study.

Given that the study area contains a number of current and past extraction sites, particular consideration was given to rehabilitation and re-use of such sites for recreational purposes. Accordingly, this study considered a past extraction sites and an approved extraction site with potential for outdoor recreation (refer Figure 3-7):

Site A — past extraction site at Jacobs Well. The site contains a series of dams that could be rehabilitated for a range of water-based recreation activities including motorised water sports provided noise impacts and water quality can be appropriately managed.

Site B — current extraction at the mouth of Logan River (KRA 65 A1). The site has long-term potential for water-based outdoor recreation once the extractive industry operations have ceased.
North East Gold Coast Study

Figure 3-7

Site options: Outdoor recreation

Source: Department of Infrastructure & Planning
Gold Coast City Council
SEQ Catchments - Satellite Imagery 2.5m SPOT (2005)

Legend
- Study area
- Local Government Boundary
- Urban Footprint, Oct 2006
- Cadastre, January 2008
- Waterbodies & waterways
- Railway line
- Past extraction site
- Extraction permit
- Combined environmental constraints
- Alternative wildlife corridor
- Freeway or Highway
- Major road
- Existing land use
- Low Density Residential
- Urban & Residential
- Business & Industry
- Extractive Industry Rock
- Extractive Industry Sand
- VDR 100m buffer

Site A
Site B
4. Preferred location strategy

Figure 4-1 illustrates the preferred location strategy for identified land uses.

With respect to marine industry, the study identified two potential site options: expansion of the Steiglitz marina and development of a new marine precinct at an approved extraction site at the mouth of Logan River. Expansion of the Steiglitz marina was considered to be the preferred option, given the significant flood management, limited land likely to be available for marine industry development post-extraction and environmental constraints associated with the Logan River site. In addition, expansion of Steiglitz marina is associated with land use and infrastructure efficiencies, given the proximity to an existing marine precinct.

With respect to sand extraction, KRA 65 A1, KRA 65 A2 and KRA 65 B were considered priority sites for sand extraction. In total, these sites contain sufficient unmined resources to accommodate regional demand to year 2031. Extraction of KRA 65 A1 and KRA 65 B would allow consolidation of the extraction industry around existing permits, thus ensuring that overall land take associated with the sand extraction is minimised. Development of the KRA 65 A2 would occur to accommodate the proposed expansion of Steiglitz marina. Lakes created as a result of the extractive operation would be re-used by the marine industry, thus minimising the overall land take associated with industrial operations within the study area.

With respect to motor sport activities, a broad area for detailed investigation was selected. The selected investigation area is located in vicinity of Stapylton landfill and quarry sites. The area is characterised by existing high level noise generators (i.e. traffic associated with the Pacific Motorway, industrial activities), and a limited number of noise sensitive receivers (i.e. rural residential uses), and as such has potential to absorb a motorsport facility without a significant impact on existing amenity. The area is also characterised by a direct access to Pacific Motorway via Stapylton Jacobs Well Road that would avoid increase in traffic associated with the proposed motor sport facility via local roads.

With respect to outdoor recreation, given largely non-urban nature of the study area, and as a consequence, a significant number of sites that would potentially satisfy selection criteria as identified in s.2.4.2, location of outdoor recreation activities (both motorised and non-motorised) within the study area was considered to be largely opportunistic, subject to, among other considerations, availability of land based on its tenure and ownership. Accordingly, once sites become available these should be evaluated against the selection criteria provided in s.2.4.2 of this Study.

The study area contains a number of post extraction sites that contain land features potentially suitable for outdoor recreation (e.g. lakes). Accordingly, the study identified two post-extraction sites with potential for water-based recreation. An important consideration in selection of these sites was the potential for reclamation of disturbed post mining areas that would otherwise remain underutilised or are prohibitively expensive to develop for other purposes.

The following section (Section 5) discusses infrastructure requirements and infrastructure delivery strategy to support establishment of the above industries in the preferred locations.
Figure 4-1

Preferred location strategy for identified land uses

Source: Department of Infrastructure & Planning
Gold Coast City Council
SEQ Catchments - Satellite Imagery 2.5m SPOT (2005)

Combined Environmental Constraints includes:
- Areas of regional & state biodiversity significance
- RAMSAR sites
- Koala Conservation Area
- Wetlands
- Nature Conservation Act protected areas
- Endangered regional ecosystems (including Eucalypts)
5. **Supporting infrastructure strategy**

5.1 **Current infrastructure provision**

5.1.1 **Transport**

The study area is served by existing and planned transport infrastructure principally located on the western fringe and associated with the Pacific Motorway, the Yatala Enterprise area industrial land and the Ormeau and Pimpama residential growth areas. Within the study area, the Intra Regional Transport Corridor (IRTC) is a planned inter-urban connection road. The South East Queensland Infrastructure Plan and Program identifies corridor preservation for the IRTC to the year 2026 (Figure 5-1).

The Department of Main Roads is undertaking planning for the upgrade of the Stapylton Jacobs Well Road between the motorway and the future IRTC intersection. These works may be brought forward to accommodate development of the Precinct Four Industrial land in the Yatala Local Area Plan.

Gold Coast City Council provided (August 2008) schematic information on road widening planning for the remaining alignment of the Stapylton Jacobs Well Road, from the IRTC to Jacobs Well (Figure 5-1). The identified upgrade is for an ultimate four lane rural standard road. The schematic plan identifies road widening, re-alignment to improve intersection and curve geometry and a new road alignment south of the existing alignment that will eliminate several right angle bends and intersections from the Stapylton Jacobs Well road, in the vicinity of New Norwell Road. However, neither GCCC nor DMR have completed detailed route investigation or design work for this section of the road to-date.

The Gold Coast City Priority Infrastructure Plan (PIP) includes the upgrade of both Burnside Road and Eggersdorf Road between the Pacific Motorway service road and the IRTC alignment. It is noted that haul roads are maintained under a regime funded by a differential rate (as opposed to a charge/tonne) and are not included in the PIP.

There are no planned upgrades for the rural class roads that serve the majority of the study area. These roads have evolved from a farming community and are aligned to suit that land use configuration. Consequently the roads typically have poor geometry and alignment when considered as trunk transport carriers.

5.1.2 **Public transport**

The study area is served by the Brisbane Gold Coast rail line with stations at Ormeau and Beenleigh and proposals for an additional station north of Eggersdorf Road and at Pimpama. Queensland Transport have advised that while the two stations are contemplated within forward plans, there is no commitment to timing or funding to establish these stations. There must be significant local supporting land uses in close proximity to generate a demand that will bring forward the rail stations.

In the case of Pimpama the development of the surrounding land to the planned residential use and density may provide the critical mass that will support the station. Ormeau is close to fully developed and may require an additional land use driver to trigger the demand for a new station.
Bus services are provided to serve Eagleby and Ormeau to Beenleigh. There are no bus services within the bulk of the study area.

5.1.3 Water supply

Reticulated potable water is available, or planned to be available within the urban footprint, defined by the current South East Queensland Regional Plan, with the exception of the Steiglitz and Cabbage Tree Point development area. Planning is underway for reticulation to serve Jacobs Well with no clear date for delivery. This service will extend from Yawalpah Road and augment the current supply to the Calypso Bay development located adjacent to Jacobs Well.

Class B recycled water is delivered by main from the Beenleigh Waste Water Treatment Plant (WWTP) to the Rocky Point sugar mill and co-generation power plant at Woongoolba. This main also serves to provide irrigation to several cane farms along the way.

The Northern Wastewater Strategy for Gold Coast Water (GCW) assumed that approx 1,150 ha of cane land would be available to take Class B treated wastewater from the Beenleigh and Stapylton WWTP to balance its effluent production into the future. Any reduction in the irrigation water consumption must be balanced by another use.

5.1.4 Wastewater

Wastewater treatment and disposal is planned for the current urban footprint, with the exception of the Steiglitz and Cabbage Tree Point development area with catchments directing flow to either the Beenleigh, Stapylton or Pimpama Waste Water Treatment Plants.

Stapylton WWTP has a planned upgrade to an eventual capacity to treat 22 Ml/day. The plant will easily accommodate future development within the current urban footprint. GCW will undertake sensitivity analysis to determine capacity to serve further expansion but the Stapylton WWTP site is constrained for growth by transport corridors (i.e. the IRTC). The plant will produce both Class A+ and Class B recycled water for a variety of markets.

The Pimpama WWTP/ Recycled Water Treatment Plant (RWTP) is due for completion and commissioning in 2008 and will serve the Coomera and Pimpama region by treating its wastewater and returning Class A+ recycled water.

5.1.5 Aquifer storage

An initiative of the Coomera Pimpama Water Futures Strategy (GCCC, 2004) was the investigation into the location and use of an ancient riverbed aquifer beneath the current agricultural land. The aquifer is currently under assessment by GCW and has passed Phase 3 modelling based on bore logs to establish that the gravel bed is a suitable storage. Phase 4 will require test injection of water into the aquifer. Phase 5 will bring the aquifer into full operation.

It is important to note that the aquifer is a store for class A+ treated wastewater and is required for the water balance for the Coomera/Pimpama water management scheme. The aquifer is not a source of irrigation water for occasional use in agriculture. GCW are yet to establish a tenure and licensing arrangement for access to the aquifer and are unsure if it will be a GCCC or State managed asset.
5.1.6 Electricity

The current urban footprint is served by the SEQ electricity distribution network and is expanding to include the development growth in Yawalpah Road, with the Pimpama WWTP, and the Yatala Enterprise Area.

“Green” power is provided within the study area from the Rocky Point sugar mill/distillery/power plant. The Stapylton “Green Power” electricity generation plant, located adjacent to the WWPT consumes 5 ML of Class B water per day.

5.2 Marine industry infrastructure requirements

5.2.1 Development proposal

The proposed extension to the marine precinct has potential to increase the development footprint between Steiglitz and Cabbage Tree Point up to some 144 ha (gross) and occupy land on both sides of Cabbage Tree Point Road. While this land will require geotechnical modification (i.e. fill) to provide flood free building areas, the site must also preserve conveyance for the regional flood event through areas designated as moorings (i.e. wet berths and waterways). Ideally, the waterway/conveyance area can be located between the proposed expansion of the marine precinct and the existing township of Cabbage Tree Point, thus providing some separation and buffering to the marine industry.

5.2.2 Transport

The extension to the marine industry by 144 ha (gross) will add approximately 72 ha x 163 trip end/ha = 11,736 trip ends per day to the road network\(^{13}\). Traffic volumes in this order will require the construction of the Stapylton Jacobs Well Road from the planned works by the Department of Main Roads (DMR) at the intersection of the IRTC to Cabbage Tree Point Road, and the upgrade of Cabbage Tree Point Road and intersection. This assumes that the DMR will provide for the construction of the Stapylton Jacobs Well Road between the Pacific Motorway service road and the IRTC.

Figure 5-1 indicates the identified road widening and potential realignment for the Stapylton Jacobs Creek Road that provides for the ultimate four lanes and improves the horizontal geometry of the road. The proposed development of the marine precinct will add approximately 12,000 vehicles per day (vpd) to the road network and exceed a two lane rural road capacity of 14,000 vpd (GCCC Land Development Guidelines).

The estimated cost of construction of the four lane road beyond the IRTC, to connect to the Cabbage Tree Point Road, excluding land acquisition, is $33m. The estimated cost of constructing Cabbage Tree Point Road to the future alignment of the Stapylton Jacobs Well Road, excluding land acquisition, is $5.25m\(^{14}\).

Figure 5-1 also indicates currently planned (DMR and GCCO) road widening for the Stapylton Jacobs Well Road, south of Cabbage Tree Point Road, through to Jacobs Well. It is noted that this section of the road is planned to support development at Jacobs Well and there is no nexus between this section of road and the proposed expansion of the marine industry.

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\(^{13}\) The preliminary work by Gold Coast City Council on the additional land required for the Marine Industry provided for 50% of the gross land requirement to be constrained.

\(^{14}\) The estimate of unit rates for road construction was provided by Gold Coast City Council, (August 2008)
precinct at Steiglitz. The intent of the transport strategy for the marine precinct is to direct traffic to the IRTC rather than local roads.

5.2.3 Water supply

The proposed 144 ha (gross) of marine precinct industrial land will deliver 1,152 Equivalent Tenements (ET) at GCCC planning scheme population rates (72 ha nett developable area at 16 ET/ha).

There is a committed proposal to bring water to Jacobs Well from Yawalpah Road. It is proposed, to satisfy the planned growth, to extend this line with a 200 mm main to Cabbage Tree point and service the town, Stieglitz and the future marine industry. The estimated cost of this extension is $2.7 m (6 km of 200 mm diameter water main at $450/m).

There may be opportunities to augment the supply with treated wastewater derived from an extension of the planned supply to Jacobs Well rated at Class A+ then it could be used for fire fighting, wash down and other ancillary uses. This strategy will require 6 km of 150 mm potable water main ($2.1m) and 6 km of 100 mm recycled water main ($1.5m). The estimated cost of this option is $3.6m. This option will deliver long term savings in potable water consumption but is subject to a proven adequate supply of recycled water from the Pimpama WWTP.

5.2.4 Wastewater

There is a commitment to serve Calypso Bay and Jacobs Well with sewer reticulation draining back to the Pimpama WWTP. It is proposed to extend a rising main to pump from Cabbage Tree Point and the proposed new marine precinct at Steiglitz to connect into the Jacobs Well system.

The proposed marine precinct development of 1,152 ET would require a pump station and 6 km of 150 mm rising main at $350/m = $2.1m plus $0.5m for the pump station being a total cost of $2.6m.
Figure 5-1

Legend
- Study area
- Local Government Boundary
- Urban Footprint, Oct 2006
- Waterbodies & waterways
- Railway line
- Railway station
- IRTC possible corridor
- Freeway or Highway
- Major road
- Minor road
- Pacific Motorway to IRTC (committed upgrade, DMR)
- GCCC planning road upgrade included in priority infrastructure plan
- IRTC to Cabbage Tree Point Rd (identified upgrade and potential re-alignment (GCCC information), no detailed route investigation completed, DMR)
- Cabbage Tree Point Rd to Jacobs Well (planned upgrade, DMR)

Planned Transport Infrastructure

Source: Department of Infrastructure & Planning
Gold Coast City Council, 2008
5.3 Extractive industry infrastructure requirements

5.3.1 Development proposal

Expansion of the sand extraction industry within the study area will seek to consolidate mining around the existing mining sites to provide an opportunity for the area re-use for a post mining activity.

Extraction typically occurs in the wet as a dredging process. Sand is sieved and stockpiled on site before being transferred by truck to on-sell or use.

5.3.2 Transport

The current extractive industry utilises the existing rural road network in the study area on designated haul routes. New sites may require some road upgrades on local roads that link to existing haul routes subject to their condition. Haul roads are maintained under a regime funded by a differential rate and are not included in the PIP. Current haul routes are shown on Figure 5-2.

Any upgrades required will be achieved as a condition of development approval and do not need to be considered as part of this study.

5.3.3 Water supply

Sand extraction industries in the study area use dredges operations operating on lakes derived from ground water and accumulated rainwater. There is minimal requirement for potable water to supply staff amenities and this could be derived from rainwater tanks on site fed from roof water or filled by tanker.

5.3.4 Wastewater

Sources of wastewater would be limited to small domestic wastewater systems from staff amenities and could be easily managed with onsite treatment and disposal.
5.4 Motor sport activities

5.4.1 Development proposal

The development proposal for motorised sport and recreational activities fall into two distinct categories: land-based and water-based activities.

This study considered land-based motorised activities. Land-based motorised activities provide opportunities for vehicle recreation uses that are becoming incompatible with the growth in urban development on the Gold Coast. There are up to 9 motosport facilities on the Gold Coast that are being displaced and require re-location.

The preferred outcome identified by GCCC is the establishment of a community motorsport precinct that can accommodate a number of clubs and activities within a single, large site.

The GCCC has identified land requirements of approximately 60ha to 150ha to locate a community motorsport precinct, depending on the specific site characteristics and nature of surrounding land uses.

In addition to track spaces, a community motorsport precinct will require space for:

- pit areas and vehicle parking for the unloading/ loading of bikes/ karts/ cars. Most participants transport their vehicles in vans, utes or on trailers
- emergency vehicle access
- marshalling of vehicles prior to races
- car parking for participants and spectators of regular weekly activities plus overflow space for larger events and competitions
- separation of vehicle and pedestrian movement zones
- club facilities and amenities
- safe spectator viewing areas
- water storage such as detention basins to meet watering requirements for dust suppression.
- stormwater quality management and pollution control areas
- buffering to ensure the ongoing acoustic amenity of surrounding land uses (especially residential dwellings).

5.4.2 Transport

The establishment of motor sport recreational sites will depend upon the availability of land on an existing major road. It is not expected that motorised recreational uses are expected to generate traffic volumes necessary to trigger major road upgrades beyond those already anticipated by the PIP. Localised works may be required at intersections to improve road safety but these will be site specific and can be resolved with detailed design.
5.4.3 Water supply

Water supply is not considered to be a constraint on site selection for either type of motor sport uses. Neither land nor water based recreation is anticipated to be a major water user and may be supplied from rainwater to service amenities in the short term. Water will be required to provide for dust suppression for the land based motorsport activates. These sites are ideally 150ha in area and it is recommended that surface water should be concentrated through drainage channels and collected in dams that provide for dust suppression. Class B water can augment runoff-dam water in providing for dust suppression. The site selection in proximity to Stapylton WWTP/RWTP may take advantage from Class B recycled water supplied either from Beenleigh WWTP (currently reticulated to the Rocky Point co-generation plant and sugar mill) or Stapylton WWTP/RWTP.

5.4.4 Wastewater

It is not anticipated that either of the proposed recreational uses will generate significant volumes of wastewater. Given the scale of use in providing for basic amenities and considering the land available, onsite treatment and disposal of wastewater is a viable and preferred option for this site and for the land based use.

5.5 Infrastructure delivery strategy

5.5.1 Transport

The implementation of the marine industry, extractive industry, and motor sport recreation activities will impact on the existing road network within the study area and the supporting road and transport network that supports this area and the greater region.

The development of the marine industry to an expanded area of 144 ha in the Cabbage Tree Point vicinity will require the upgrading of the Stapylton Jacobs Well Road, onto an improved alignment to a four lane rural road standard, between the IRTC and Cabbage Tree Point Road, and the upgrading of Cabbage Tree Point Road to similar standard. The road connection upgrade will carry on from work, currently under investigation, by DMR to upgrade the Stapylton Jacobs Well Road between the Pacific Motorway Service Road and the IRTC to a four lane urban standard. The Staplyton Jacobs Well Road is a state controlled road and the required road upgrading is the responsibility of the DMR. The estimated cost of the 4 lane construction, excluding land acquisitions, is $33M to be recovered from developer contributions. Cabbage Tree Point Road is a local road controlled by the Gold Coast City Council. The estimated cost of construction to 4 lanes is $5.25M excluding acquisition to be recovered from developer contributions (PIP). Both roads can be constructed in stages commencing with two lanes on an alignment to facilitate an ultimate 4 lanes as demand develops.

The development of the study area as described above not only creates a need to upgrade the local road infrastructure but also delivers additional traffic onto the major arterial road systems. The IRTC is the major north-south interurban connection road that will release some of the growing pressure in the Pacific Motorway. While the IRTC corridor preservation has been identified in the SEQ Infrastructure Plan and Program (2008-2026), no timeframe has been identified for its construction. The Department of Main Roads has advised that no definitive planning has been undertaken on the future alignment for the IRTC north of the Stapylton Jacobs Well Road in order to identify how this significant traffic stream will be
ultimately integrated with the greater Brisbane region. It is noted that while the resolution of traffic planning for the IRTC is outside the scope of this study it is considered critical. It is recommended that regional traffic and transport modelling be commissioned to resolve the ultimate form and function of the IRTC and a likely route for its extension north of the Staleyton Jacobs Well Road.

5.5.2 Water supply

The expansion of the marine industry precinct at Steiglitz will be a catalyst to bring forward the ultimate planning to serve this industrial and residential community with a potable supply. Gold Coast Water is currently reviewing their planning for the supply of Jacobs Well. The increase in development to the north can leverage of the work planned to supply Jacobs Well with an extension of a 150 mm main to Cabbage Tree Point. This supply may be augmented with the extension of the 100 mm recycled supply also planned to serve Jacobs Well. Recycled water can be used to provide cooling water for industrial use and for fire fighting and wash down. The cost of this extension is estimated to be $3.6M and is directly related to the development of the marine industry. The construction of this infrastructure will coincide with the early expansion of the marine industry and its cost will be recovered from charges derived from development approvals.

5.5.3 Wastewater

In the case of expansion to the marine industry, the situation with wastewater is similar to that of water supply. The provision of reticulated drainage for wastewater will extend from the service currently planned for Jacobs Well and will direct wastewater to the Pimpama WWTP. The estimated cost of the extension of the sewer reticulation to Cabbage Tree Point is $2.6M and is primarily related to the development of the marine industry. The construction of this infrastructure will coincide with the early expansion of the marine industry and it cost will be recovered from charges derived from development approvals.

The alternative to conventional reticulation is for a decentralised small WWTP at Steiglitz that will treat the wastewater and deliver treated recycled water for industrial use. This alternative may be explored though the detailed assessment of development proposals for this precinct.

5.5.4 Summary

Figure 5-3 and Table 5-1 provide a summary of major infrastructure required to support the selected land uses.

Table 5-1 Summary of infrastructure requirements to support selected land uses

<table>
<thead>
<tr>
<th>Infrastructure Item</th>
<th>Cost</th>
<th>Delivery agent</th>
<th>Timing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Road upgrade of Staleyton Jacobs Well Road between the IRTC and Cabbage Tree Point Road to ultimate 4 lanes (rural)</td>
<td>$33M funded from developer contributions (excludes acquisition)</td>
<td>Queensland Department of Main Roads</td>
<td>Initially 2 lanes on ultimate alignment to coincide with expansion of marine precinct</td>
</tr>
<tr>
<td>Road upgrade of Cabbage Tree Point Road between Staleyton Jacobs Well Road to marine</td>
<td>$5.25M funded from developer</td>
<td>Gold Coast City Council</td>
<td>Initially 2 lanes on ultimate alignment to coincide with</td>
</tr>
<tr>
<td>Infrastructure Item</td>
<td>Cost</td>
<td>Delivery agent</td>
<td>Timing</td>
</tr>
<tr>
<td>------------------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------</td>
<td>-------------------------------------</td>
<td>------------------------------------------------------------------------</td>
</tr>
<tr>
<td>precinct to ultimate 4 lanes.</td>
<td>contributions (excludes acquisition)</td>
<td></td>
<td>expansion of marine precinct</td>
</tr>
<tr>
<td>Extension of a 200mm potable and a 150mm recycled water supply between Jacobs Well and Cabbage Tree Point, proposed marine precinct and Stieglitz</td>
<td>$3.6M funded from developer contributions.</td>
<td>Gold Coast City Council</td>
<td>Constructed to coincide with expansion of the marine industry</td>
</tr>
<tr>
<td>Extension of a 150mm rising main and pump station to drain Cabbage Tree Point, proposed marine precinct and Stieglitz to the Pimpama WWTP</td>
<td>$2.6M funded from developer contributions</td>
<td>Gold Coast City Council</td>
<td>Constructed to coincide with expansion of the marine industry</td>
</tr>
</tbody>
</table>
Preferred infrastructure delivery strategy

(native & extractive industries)

Source: Department of Infrastructure & Planning
Gold Coast City Council

Combined Environmental Constraints includes:
Areas of regional & state biodiversity significance
RAMSAR sites
Koala Conservation Area
Wetlands
Nature Conservation Act protected areas
Endangered regional ecosystems (including Eucalypts)